Universitat Autònoma de Barcelona

IT'S DEFINITELY ATOMIC:
THE ACQUISITION OF ATOMICITY & COUNTABILITY BY SPEAKERS OF MANDARIN IN AN INSTRUCTED SECOND LANGUAGE ACQUISITION CONTEXT

Dakota J. Thomas-Wilhelm

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Dakota J. Thomas-Wilhelm

Doctoral Dissertation
Volume I

Supervisor: Elisabet Pladevall Ballester

Doctorat de Filologia Anglesa
Departament de Filologia Anglesa i Germanística
Universitat Autònoma de Barcelona

2020

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Departament de Filologia Anglesa i Germanística
Univeristat Autònoma de Barcelona

Supervisor: Elisabet Pladevall Ballester

2020

THIS DISSERTATION IS DEDICATED TO MY GREAT-GREAT GRANDFATHER, LESTER THOMAS,
WHO WAS THE LAST THOMAS TO GRADUATE FROM A 4-YEAR UNIVERSITY IN 1912
PRIOR TO MY PURSUIT FOR HIGHER/HIGHEST EDUCATION.

"Education is the most powerful weapon which you can use to change the world."

– NELSON MANDELA

Author’s Declaration of Originality

This dissertation has not previously been submitted for any degree other than Doctor of Philosophy in English Studies at the *Universitat Autònoma de Barcelona*. It is hereby confirmed that the dissertation comprises my original work, except where otherwise stated. All contributions from external sources have been acknowledge and explicitly referenced. Some of the information contained in this dissertation was presented at various conferences throughout the years. A comprehensive list of conference presentations can be found in Appendix M.

Publications

Thomas-Wilhelm, D. J. (2020). When research meets instruction: Teaching second-language English articles and noun-types. *AL Forum: The Newsletter of the Applied Linguistics Interest Section*. http://newsmanager.commpartners.com/tesolalis/issues/2020-03-06/5.html

A portion of this dissertation has also been written into a journal article co-authored with Dr. Elisabet Pladevall-Ballester and submitted for publication to *Language Teaching Research* in August 2020.

Signature: ______________________________ Date:___________________

Dakota J. Thomas-Wilhelm

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Abstract

Recent Generative Second Language Acquisition (GenSLA) research has tried to account for the assembly of syntactic and semantic features of L2-English articles (Cho & Slabakova, 2014) and nouns (Choi & Ionin, 2017; Choi, Ionin, & Zhu, 2018), but has done little to turn these results into practical teaching pedagogy (Whong, Gil, & Marsden, 2013a; Whong, Marsden, & Gil, 2013). Furthermore, traditional language pedagogy is not guided by theoretical principles, and GenSLA has yet to thoroughly investigate the role of instruction in acquisition. Therefore, the primary goal of this dissertation is to test previous proposals (Lopez, 2017; Sabir, 2018; Snape & Yusa, 2013) that make recommendations for innovating teaching material (Marsden & Slabakova, 2019) by investigating the acquisition of L2-English articles and noun types by L1-Mandarin speakers in different instructional contexts with the hopes of contributing to the limited number of Instructed Second Language Acquisition (ISLA) studies motivated by GenSLA theoretical findings. We attempt to do this and explore the overarching question of whether or not creating a teaching and learning environment tha tiks informed by both GenSAL research and ISLA pedagogy is beneficial. Following the previous research by Snape and Yusa (2013), Lopez (2017), and Sabir (2018), this dissertation seeks to contribute to this limited field by creating a new instructional context informed by the findings and theories within GenSLA, termed linguistically-informed instruction. Informed by the Feature Reassembly Hypothesis (Lardiere, 2008, 2009a, 2009b), the Bottleneck Hypothesis (Slabakova, 2008, 2009a, 2009b), and the Cline of Difficulty (Slabakova, 2009a), this new instructional pedagogy teaches L2-English articles and noun types through semantic universals: [±definite] for articles and [±atomic] and [±count] for nouns. We investigate the effects of instruction through four primary research questions:

(1) To what extent will L1 features be present in the participants' L2-English articles and noun types prior to intervention, as measured by the potential differences

between the L2 learners' and native speakers' performances?

(2) Does type of instruction mediate the reassembly of L1 article and noun type features for the L2?

(3) What type of instruction will lead to greater gains in the reassembly of L1 article and noun type features for the L2 at both immediate and delayed post-test?

(4) What is the effect of task type on overall improvement and its interaction with type of instruction?

To evaluate the effect of instruction, three L1-Mandarin, L2-English participant groups were established: (i) a group which received one hour of linguistically-informed instruction, (ii) a group which received one hour of instruction using their traditional textbook, and (iii) a group which received no extra instruction. The participants were tested prior to intervention, immediately following intervention, and three weeks following intervention using an elicited-sentence imitation task, an acceptability judgment task, and a forced-choice elicitation task. Our results found that L1-Mandarin, L2-English speakers displayed non-native patterns in their assembly of L2 article and noun type features prior to instruction. At immediate and delayed post-test, we found that both linguistically-informed and traditional instruction learners began to reassemble their L1 features for the L2. Our analysis also revealed that linguistically-informed learners made greater gains in linguistic knowledge than the traditional instruction learners and learners with no extra instruction. Finally, we found an interaction between instructional intervention and task type, revealing that linguistically-informed instruction may be the most beneficial in building up short-term implicit knowledge. The overall significance of our results suggests that if linguistically-informed instruction were implemented in a systematic way throughout a course, it may lead to greater gains than traditional instruction when teaching complex linguistic concepts.

Table of Contents

Volume I

AUTHOR'S DECLARATION OF ORIGINALITY VII

ACKNOWLEDGEMENTS IX

ABSTRACT XI

LIST OF TABLES XVII

LIST OF FIGURES XXI

LIST OF ABBREVIATIONS XXXIII

CHAPTER 1: GENERAL INTRODUCTION & RESEARCH AIMS 1

1.1 | Rationale 2
1.2 | Research Questions 4
1.3 | Organization of the Dissertation 6

CHAPTER 2: LINGUISTIC BACKGROUND 9

2.1 | Linguistic Properties of Articles 10
2.1.1 | Definiteness 11
2.2 | Linguistic Properties of Noun Types 17
2.2.1 | Countability 17
2.2.1.1 | A Single Domain Approach 19
2.2.1.2 | A Blind Lexicon Approach 20
2.2.1.3 | A Typological Approach 20
2.2.2 | Atomicity 22
2.2.3 | Number 23
2.3 | The Noun Phrase and Determiner Phrase 25
2.4 | Crosslingustic Variation: Articles & Noun Types in Mandarin 28
2.4.1 | Expression of Definiteness 28
2.4.2 | Expression of Countability, Atomicity, & Number 30

2.4.3 | Mandarin Nominal Phrases *34*
2.5 | SUMMARY & LINGUISTICS ITEMS TO BE ANALYZED IN THE DATA 36
2.5.1 | Appropriate Noun Phrase Construction *36*
2.5.1.1 | Countable Nouns 36
2.5.1.2 | Uncountable Nouns 37
2.5.1.3 | Flexible Nouns 37
2.5.2 | Appropriate Noun Morphology *38*
2.5.3 | Linguistic Items to be Analyzed in the Data *38*
2.5.3.1 | Definite & Indefinite Noun Phrases 39
2.5.3.2 | Plural & Singular Noun Morphology 40

CHAPTER 3: GENERATIVE SECOND LANGUAGE ACQUISITION 43

3.1 | SLA AND PRINCIPLES & PARAMETERS 43
3.1.1 | Full Transfer / Full Access *45*
3.1.2 | Partial Transfer / Full Access *46*
3.1.2.1 | The Minimal Trees Hypothesis 47
3.1.2.2 | The Valueless Features Hypothesis 48
3.1.3 | Full Transfer / Partial Access *48*
3.1.3.1 | The Fundamental Difference Hypothesis 49
3.1.3.2 | No Parameter Resetting Hypothesis 50
3.1.4 | Full Access / No Transfer *51*
3.1.5 | No Transfer / No Access *52*
3.2 | THE ACQUISITION OF FEATURES 55
3.2.1 | Feature Reassembly Hypothesis *56*
3.2.2 | Bottleneck Hypothesis *60*
3.3 | THEORETICAL ASSUMPTIONS IN THE PRESENT STUDY 64

CHAPTER 4: INSTRUCTED SECOND LANGUAGE ACQUISITION 67

4.1 | THE ACQUISITION & LEARNING DISTINCTION 68
4.2 | THE NATURE OF L2 KNOWLEDGE 70
4.2.1 | The Acquisition of L2 Knowledge *72*
4.2.2 | The Interface Hypothesis *73*
4.2.3 | The Measurement of L2 Knowledge *75*
4.3 | INSTRUCTION IN THE SECOND LANGUAGE CLASSROOM 77
4.3.1 | Arguments in Support of Instruction *79*
4.3.2 | Standard (Traditional) Instruction *82*
4.3.3 | Linguistically-Informed Instruction *84*

CHAPTER 5: SECOND LANGUAGE ACQUISITION OF ENGLISH ARTICLES & NOUN TYPES .. 87

5.1 | SECOND LANGUAGE ACQUISITION OF ARTICLES 88
5.1.1 | Previous Research on Second Language Article Acquisition & Misuse *88*

5.1.2 | Classroom Intervention & Second Language Article Acquisition *107*
5.2 | SECOND LANGUAGE ACQUISITION OF NOUN TYPES 123
5.2.1 | Previous Research on Second Language Noun Type Acquisition & Misuse *124*
5.3 | SECOND LANGUAGE ACQUISITION OF ARTICLES & NOUN TYPES 132
5.4 | SUMMARY OF PREVIOUS FINDINGS & RESEARCH GAPS TO EXPLORE 133

CHAPTER 6: METHODOLOGY 145

6.1 | GENERAL RESEARCH DESIGN 145
6.2 | PARTICIPANTS 147
6.2.1 | Experimental Group: Linguistically-Informed Instruction *147*
6.2.2 | Experimental Group: Traditional Instruction *148*
6.2.3 | Experimental Group: No Extra Instruction *148*
6.2.4 | Baseline Group: Native Speakers of English *148*
6.3 | DATA COLLECTION INSTRUMENTS 149
6.3.1 | Biodata & Language Use Questionnaire *149*
6.3.2 | English Proficiency Test *150*
6.3.3 | Experimental Tasks *150*
6.3.3.1 | Elicited Sentence Imitation Task 153
6.3.3.2 | Acceptability Judgment Task 156
6.3.3.3 | Forced-Choice Elicitation Task 159
6.4 | GENERAL PROCEDURE 163
6.4.1 | Research Ethics *163*
6.4.2 | Pilot Study Data Collection *164*
6.4.3 | Experimental Study Data Collection *165*
6.5 | THE INTERVENTIONS 167
6.5.1 | "Traditional Grammar Instruction" Intervention *167*
6.5.2 | Linguistically-Informed Instruction Intervention *168*
6.5.2.1 | Conceptualization: Inspiration & Roadblocks 168
6.5.2.2 | Designing Linguistically-Informed Materials 170
6.5.2.3 | The Final Product: LIMs for Mandarin Learners of English 173
6.6 | DATA DOWNLOAD, TRANSFORMATION, TRIMMING, & ANALYSIS 174
6.7 | REVISITING THE RESEARCH QUESTIONS, HYPOTHESES, & PREDICTIONS 176

CHAPTER 7: RESULTS 184

7.1 | ELICITED-SENTENCE IMITATION TASK 186
7.1.1 | Research Question 1: Presence of L1-Mandarin Features in L2 English *187*
7.1.2 | Research Question 2: Within Group Analysis of L2 Feature Reassembly *196*
7.1.2.1 | Linguistically-Informed Instruction 197
7.1.2.2 | Traditional Instruction 208
7.1.2.3 | No Extra Instruction 220
7.1.3 | Research Question 3: Between Group Analysis of L2 Linguistic Gains *231*

7.2 | ACCEPTABILITY JUDGMENT TASK 247
7.2.1 | Research Question 1: Presence of L1-Mandarin Features in L2 English *247*
7.2.2 | Research Question 2: Within Group Analysis of L2 Feature Reassembly *257*
7.2.2.1 | Linguistically-Informed Instruction 257
7.2.2.2 | Traditional Instruction 269
7.2.2.3 | No Extra Instruction 279
7.2.3 | Research Question 3: Between Group Analysis of L2 Linguistic Gains *290*
7.3 | FORCED-CHOICE ELICITATION TASK 304
7.3.1 | Research Question 1: Presence of L1-Mandarin Features in L2 English *304*
7.3.2 | Research Question 2: Within Group Analysis of L2 Feature Reassembly *316*
7.3.2.1 | Linguistically-Informed Instruction 317
7.3.2.2 | Traditional Instruction 328
7.3.2.3 | No Extra Instruction 339
7.3.3 | Research Question 3: Between Group Analysis of L2 Linguistic Gains *351*
7.4 | RESEARCH QUESTION 4: WITHIN & BETWEEN GROUP ANALYSIS OF TASK EFFECT 363
7.5 | SUMMARY 375

CHAPTER 8: DISCUSSION 377

8.1 | RESEARCH QUESTION 1: PRESENCE OF L1 FEATURES IN THE L2 377
8.2 | RESEARCH QUESTION 2: L2 FEATURE REASSEMBLY (WITHIN GROUPS) 382
8.2.1 | Effects of Linguistically-Informed Instruction *383*
8.2.2 | Effects of Traditional Instruction *388*
8.2.3 | Effects of No Extra Instruction *390*
8.3 | RESEARCH QUESTION 3: L2 FEATURE REASSEMBLY (BETWEEN GROUPS) 393
8.4 | RESEARCH QUESTION 4: INTERACTION OF TYPE OF INSTRUCTION AND TASK TYPE 396

CHAPTER 9: CONCLUSION 403

9.1 | MAIN FINDINGS: ANSWERING THE RESEARCH QUESTIONS 404
9.2 | CONTRIBUTIONS TO GENSLA RESEARCH AND ISLA PEDAGOGY 406
9.3 | LIMITATIONS & FUTURE RESEARCH 408
9.4 | A FINAL REMARK 410

REFERENCES 411

List of Tables

TABLE 2.1. DISTRIBUTION OF UNIVERSAL SEMANTIC FEATURES ON ENGLISH NOUN TYPES 25

TABLE 2.2. INTERPRETATION OF SEMANTICALLY-AMBIGUOUS NOUNS IN THE NOUN PHRASE CONSTRUCTION 37

TABLE 3.1. INITIAL STATE AND BEYOND: HYPOTHESES COMPARED (SOME TEXT ADAPTED FROM WHITE, 2003B, P. 94) 53

TABLE 5.1. ARTICLE GROUPING CROSS-LINGUISTICALLY: TWO-ARTICLE LANGUAGES 89

TABLE 5.2. CLOZE TEST RESULTS BY PARTICIPANT GROUP FROM IONIN ET AL. (2008) 99

TABLE 5.3. DATA COLLECTION PROCEDURE FOR SNAPE AND YUSA (2013, P. 172) 109

TABLE 5.4. DATA COLLECTION PROCEDURE FOR LOPEZ (2017, P. 8) 112

TABLE 5.5. DATA COLLECTION PROCEDURE FOR UMEDA ET AL. (2017, P. 8) AND SNAPE AND UMEDA (2018, P. 177) 114

TABLE 5.6. TYPES AND TOKENS IN THE ACCEPTABILITY JUDGMENT TASK FROM UMEDA ET AL. (2017, P. 6) 116

TABLE 5.7. PARTICIPANTS' LANGUAGE LEVEL AND LANGUAGE BACKGROUND INFORMATION FROM SABIR (2018, P. 148) 117

TABLE 5.8. DATA COLLECTION PROCEDURE FOR SABIR (2018) 118

TABLE 5.9. PARTICIPANTS' LANGUAGE LEVEL FROM ABUMELHA (2018, P. 198) 120

TABLE 5.10. DATA COLLECTION PROCEDURE FOR ABUMELHA (2018) 121

TABLE 5.11. SUMMARY OF L2-ENGLISH ARTICLE ACQUISITION STUDIES 135

TABLE 5.12. SUMMARY OF L2-ENGLISH ARTICLE INSTRUCTIONAL INTERVENTION STUDIES 138

TABLE 5.13. SUMMARY OF L2-ENGLISH NOUN TYPE ACQUISITION STUDIES 141

TABLE 5.14. SUMMARY OF L2-ENGLISH ARTICLE AND NOUN TYPE STUDIES 143

TABLE 6.1. RESEARCH DESIGN AND DATA COLLECTION TIMES FOR ALL NON-NATIVE SPEAKER (NNS) PARTICIPANT GROUPS 146

TABLE 6.2. DESCRIPTIVE STATISTICS OF THE PARTICIPANTS IN THE EXPERIMENTAL STUDY 150

TABLE 6.3. NUMBER OF GRAMMATICAL AND UNGRAMMATICAL SENTENCES IN EACH VERSION OF THE ESIT AND AJT 152

TABLE 6.4. EXAMPLE STIMULI FROM THE ESIT 156

TABLE 6.5. SAMPLE ITEMS FROM THE AJT 159

TABLE 6.6. TEST ITEMS FOR FCET 162

TABLE 7.1. MEANS AND STANDARD DEVIATIONS FOR ELICITED-SENTENCE IMITATION SCORES FOR NSS AND NNSS LEARNERS AT T0 188

TABLE 7.2. MEANS AND STANDARD DEVIATIONS FOR ELICITED-SENTENCE IMITATION SCORES FOR LING LEARNERS (N = 30) AT T0, T1, AND T2 197

TABLE 7.3. MEANS AND STANDARD DEVIATIONS FOR ELICITED-SENTENCE IMITATION SCORES FOR TRAD LEARNERS (N = 18) AT T0, T1, AND T2 209

TABLE 7.4. MEANS AND STANDARD DEVIATIONS FOR ELICITED-SENTENCE IMITATION SCORES FOR NOEX LEARNERS (N = 17) AT T0, T1, AND T2 220

TABLE 7.5. MEAN GAIN SCORES OF ELICITED-SENTENCE IMITATION SCORES FOR ALL LEARNERS 232

TABLE 7.6. MEANS AND STANDARD DEVIATIONS FOR ACCEPTABILITY RATINGS FOR NSS AND L2 LEARNERS AT T0 248

TABLE 7.7. MEANS AND STANDARD DEVIATIONS FOR ACCEPTABILITY RATINGS FOR LING LEARNERS (N = 30) AT T0, T1, AND T2 258

TABLE 7.8. MEANS AND STANDARD DEVIATIONS FOR ACCEPTABILITY RATINGS FOR TRAD LEARNERS (N = 18) AT T0, T1, AND T2 270

TABLE 7.9. MEANS AND STANDARD DEVIATIONS FOR ACCEPTABILITY RATINGS FOR NOEX LEARNERS (N = 17) AT T0, T1, AND T2 280

TABLE 7.10. MEAN GAIN SCORES OF ACCEPTABILITY RATINGS FOR ALL LEARNERS 291

TABLE 7.11. MEANS AND STANDARD DEVIATIONS FOR FORCED-CHOICE SCORES FOR NSS AND L2 LEARNERS AT T0 305

TABLE 7.12. MEANS AND STANDARD DEVIATIONS FOR FORCED-CHOICE ELICITATION SCORES FOR LING LEARNERS (N = 30) AT T0, T1, AND T2 318

TABLE 7.13. MEANS AND STANDARD DEVIATIONS FOR FORCED-CHOICE ELICITATION SCORES FOR TRAD LEARNERS (N = 18) AT T0, T1, AND T2 329

TABLE 7.14. MEANS AND STANDARD DEVIATIONS FOR FORCED-CHOICE ELICITATION SCORES FOR NOEX LEARNERS (N = 17) AT T0, T1, AND T2 340

TABLE 7.15. MEAN GAIN SCORES AND STANDARD DEVIATIONS OF FORCED-CHOICE SCORES FOR ALL LEARNERS . 351

TABLE 7.16. MEAN PERCENTAGE GAINS BY TASK AND TIME PERIOD FOR ALL LEARNERS 363

TABLE 8.1. SUMMARY OF THE RESULTS FOR NNSS, WHERE ✓ REFERS TO SIMILAR PERFORMANCE TO NSS, AND ✗ REFERS TO SIGNIFICANTLY LESS ACCURATE PERFORMANCE 378

TABLE 8.2. SUMMARY OF THE RESULTS FOR LING LEARNERS, WHERE ✓* REFERS TO SIGNIFICANT IMPROVEMENT, ✓ REFERS TO NON-SIGNIFICANT IMPROVEMENT, ✗ REFERS TO NO IMPROVEMENT OR NON-SIGNIFICANT DECREASE, AND ✗* REFERS TO SIGNIFICANT DECREASE 384

TABLE 8.3. SUMMARY OF THE RESULTS FOR TRAD LEARNERS, WHERE ✓* REFERS TO SIGNIFICANT IMPROVEMENT, ✓ REFERS TO GENERAL IMPROVEMENT, ✗ REFERS TO NO IMPROVEMENT, AND ✗* REFERS TO SIGNIFICANT DECREASE 388

TABLE 8.4. SUMMARY OF THE RESULTS FOR NOEX LEARNERS, WHERE ✓* REFERS TO SIGNIFICANT IMPROVEMENT, ✓ REFERS TO GENERAL IMPROVEMENT, ✗ REFERS TO NO IMPROVEMENT, AND ✗* REFERS TO SIGNIFICANT DECREASE 391

List of Figures

Figure 2.1. Noun type distinctions and their potential environments (adopted and adapted from Teschner and Evans (2007, p. 126, Figure 5c)) ... 27

Figure 3.1. Full Transfer / Full Access (White, 2003b, p. 61) ... 46

Figure 3.2. The Fundamental Difference Hypothesis (Bley-Vroman, 1990, 1996, 2009) ... 49

Figure 3.3. Liceras's (1996) approach to second language acquisition. ... 51

Figure 3.4. Full Access / No Transfer (White, 2003b, p. 90) ... 52

Figure 3.5. Cline of difficulty in grammatical feature acquisition (Slabakova, 2009b) ... 61

Figure 3.6. Cline of difficulty in grammatical feature acquisition in six learning situations (Cho & Slabakova, 2014, p. 166) ... 62

Figure 4.1. The Interface Hypothesis and its positions ... 73

Figure 5.1. A proposed Cline of Difficulty for L1-Najdi Arabic speakers from Abumelha (2018, p. 196) ... 119

Figure 6.1. Directions for the ESIT ... 154

Figure 6.2. Directions for the AJT ... 157

Figure 6.3. A sample item from the AJT ... 158

Figure 6.4. Directions for the FCET ... 161

FIGURE 6.5. A SAMPLE ITEM FROM THE FCET 163

FIGURE 6.6. DATA PROCESSING PROCEDURE 175

FIGURE 7.1. VIOLIN PLOTS OF MEAN ELICITED-SENTENCE IMITATION SCORES FOR ENGLISH NSS AND L2 LEARNERS AT T0 189

FIGURE 7.2. EFFECT PLOT FOR ELICITED-SENTENCE IMITATION SCORES FOR L1 BY NOUN_TYPE AT T0 IN CONTEXT 1 191

FIGURE 7.3. EFFECT PLOT FOR ELICITED-SENTENCE IMITATION SCORES FOR L1 BY NOUN_TYPE AT T0 FOR CONTEXT 2 192

FIGURE 7.4. EFFECT PLOT FOR ELICITED-SENTENCE IMITATION SCORES FOR L1 BY NOUN_TYPE AT T0 FOR CONTEXT 3 193

FIGURE 7.5. EFFECT PLOT FOR ELICITED-SENTENCE IMITATION SCORES FOR L1 BY NOUN_TYPE AT T0 FOR CONTEXT 4 194

FIGURE 7.6. EFFECT PLOT FOR ELICITED-SENTENCE IMITATION SCORES FOR L1 BY NOUN_TYPE AT T0 FOR CONTEXT 5 195

FIGURE 7.7. VIOLIN PLOTS OF MEAN ELICITED-SENTENCE IMITATION SCORES FOR LING LEARNERS IN CONTEXT1 199

FIGURE 7.8. EFFECT PLOT FOR ELICITED-SENTENCE IMITATION SCORES OF TESTING_TIME BY NOUN_TYPE FOR LING LEARNERS IN CONTEXT 1 200

FIGURE 7.9. VIOLIN PLOTS OF MEAN ELICITED-SENTENCE IMITATION SCORES FOR LING LEARNERS IN CONTEXT2 201

FIGURE 7.10. EFFECT PLOT FOR ELICITED-SENTENCE IMITATION SCORES OF TESTING_TIME BY NOUN_TYPE FOR LING LEARNERS IN CONTEXT 2 202

FIGURE 7.11. VIOLIN PLOTS OF MEAN ELICITED-SENTENCE IMITATION SCORES FOR LING LEARNERS IN CONTEXT3 203

FIGURE 7.12. EFFECT PLOT FOR ELICITED-SENTENCE IMITATION SCORES OF TESTING_TIME BY NOUN_TYPE FOR LING LEARNERS IN CONTEXT 3 204

FIGURE 7.13. VIOLIN PLOTS OF MEAN ELICITED-SENTENCE IMITATION SCORES FOR LING LEARNERS IN CONTEXT4 205

FIGURE 7.14. EFFECT PLOT FOR ELICITED-SENTENCE IMITATION SCORES OF TESTING_TIME BY NOUN_TYPE FOR LING LEARNERS IN CONTEXT 4 206

FIGURE 7.15. VIOLIN PLOTS OF MEAN ELICITED-SENTENCE IMITATION SCORES FOR LING LEARNERS IN CONTEXT5 207

FIGURE 7.16. EFFECT PLOT FOR ELICITED-SENTENCE IMITATION SCORES OF TESTING_TIME BY NOUN_TYPE FOR LING LEARNERS IN CONTEXT 5 208

FIGURE 7.17. VIOLIN PLOTS OF MEAN ELICITED-SENTENCE IMITATION SCORES FOR TRAD LEARNERS IN CONTEXT1 210

FIGURE 7.18. EFFECT PLOT FOR ELICITED-SENTENCE IMITATION SCORES OF TESTING_TIME BY NOUN_TYPE FOR TRAD LEARNERS IN CONTEXT 1 211

FIGURE 7.19. VIOLIN PLOTS OF MEAN ELICITED-SENTENCE IMITATION SCORES FOR TRAD LEARNERS IN CONTEXT2 212

FIGURE 7.20. EFFECT PLOT FOR ELICITED-SENTENCE IMITATION SCORES OF TESTING_TIME BY NOUN_TYPE FOR TRAD LEARNERS IN CONTEXT 2 213

FIGURE 7.21. VIOLIN PLOTS OF MEAN ELICITED-SENTENCE IMITATION SCORES FOR TRAD LEARNERS IN CONTEXT3 214

FIGURE 7.22. EFFECT PLOT FOR ELICITED-SENTENCE IMITATION SCORES OF TESTING_TIME BY NOUN_TYPE FOR TRAD LEARNERS IN CONTEXT 3 215

FIGURE 7.23. VIOLIN PLOTS OF MEAN ELICITED-SENTENCE IMITATION SCORES FOR TRAD LEARNERS IN CONTEXT4 216

FIGURE 7.24. EFFECT PLOT FOR ELICITED-SENTENCE IMITATION SCORES OF TESTING_TIME BY NOUN_TYPE FOR TRAD LEARNERS IN CONTEXT 4 217

FIGURE 7.25. VIOLIN PLOTS OF MEAN ELICITED-SENTENCE IMITATION SCORES FOR TRAD LEARNERS IN CONTEXT5 218

FIGURE 7.26. EFFECT PLOT FOR ELICITED-SENTENCE IMITATION SCORES OF TESTING_TIME BY NOUN_TYPE FOR TRAD LEARNERS IN CONTEXT 5 219

FIGURE 7.27. VIOLIN PLOTS OF MEAN ELICITED-SENTENCE IMITATION SCORES FOR NOEX IN CONTEXT 1 221

FIGURE 7.28. EFFECT PLOT FOR ELICITED-SENTENCE IMITATION SCORES OF TESTING_TIME BY NOUN_TYPE FOR NOEX LEARNERS IN CONTEXT 1 222

FIGURE 7.29. VIOLIN PLOTS OF MEAN ELICITED-SENTENCE IMITATION SCORES FOR NOEX IN CONTEXT 2 223

FIGURE 7.30. EFFECT PLOT FOR ELICITED-SENTENCE IMITATION SCORES OF TESTING_TIME BY NOUN_TYPE FOR NOEX LEARNERS IN CONTEXT 2 224

FIGURE 7.31. VIOLIN PLOTS OF MEAN ELICITED-SENTENCE IMITATION SCORES FOR NOEX IN CONTEXT 3 225

FIGURE 7.32. EFFECT PLOT FOR ELICITED-SENTENCE IMITATION SCORES OF TESTING_TIME BY NOUN_TYPE FOR NOEX LEARNERS IN CONTEXT 3 226

FIGURE 7.33. VIOLIN PLOTS OF MEAN ELICITED-SENTENCE IMITATION SCORES FOR NOEX IN CONTEXT 4 227

FIGURE 7.34. EFFECT PLOT FOR ELICITED-SENTENCE IMITATION SCORES OF TESTING_TIME BY NOUN_TYPE FOR NOEX LEARNERS IN CONTEXT 4 228

FIGURE 7.35. VIOLIN PLOTS OF MEAN ELICITED-SENTENCE IMITATION SCORES FOR NOEX IN CONTEXT 5 229

FIGURE 7.36. EFFECT PLOT FOR ELICITED-SENTENCE IMITATION SCORES OF TESTING_TIME BY NOUN_TYPE FOR NOEX LEARNERS IN CONTEXT 5 230

FIGURE 7.37. BAR PLOT OF MEAN ELICITED-SENTENCE IMITATION GAIN SCORES FOR ALL LEARNER GROUPS IN CONTEXT 1 233

FIGURE 7.38. EFFECT PLOT FOR ELICITED-SENTENCE IMITATION SCORES OF LEARNER_TYPE BY TESTING_TIME BY NOUN_TYPE IN CONTEXT 1 235

FIGURE 7.39. BAR PLOT OF MEAN ELICITED-SENTENCE IMITATION GAIN SCORES FOR ALL LEARNER GROUPS IN CONTEXT 2 236

FIGURE 7.40. EFFECT PLOT FOR ELICITED-SENTENCE IMITATION SCORES OF LEARNER_TYPE BY TESTING_TIME BY NOUN_TYPE IN CONTEXT 2 238

FIGURE 7.41. BAR PLOT OF MEAN ELICITED-SENTENCE IMITATION GAIN SCORES FOR ALL LEARNER GROUPS IN CONTEXT 3 239

FIGURE 7.42. EFFECT PLOT FOR ELICITED-SENTENCE IMITATION SCORES OF LEARNER_TYPE BY TESTING_TIME BY NOUN_TYPE IN CONTEXT 3 241

FIGURE 7.43. BAR PLOT OF MEAN ELICITED-SENTENCE IMITATION GAIN SCORES FOR ALL LEARNER GROUPS IN CONTEXT 4 242

FIGURE 7.44. EFFECT PLOT FOR ELICITED-SENTENCE IMITATION SCORES OF LEARNER_TYPE BY TESTING_TIME BY NOUN_TYPE IN CONTEXT 4 243

FIGURE 7.45. BAR PLOT OF MEAN ELICITED-SENTENCE IMITATION GAIN SCORES FOR ALL LEARNER GROUPS IN CONTEXT 5 244

FIGURE 7.46. EFFECT PLOT FOR ELICITED-SENTENCE IMITATION SCORES OF LEARNER_TYPE BY TESTING_TIME BY NOUN_TYPE IN CONTEXT 5 246

FIGURE 7.47. VIOLIN PLOTS OF MEAN ACCEPTABILITY RATINGS FOR ENGLISH NSS AND L2 LEARNERS AT T0 250

FIGURE 7.48. EFFECT PLOT FOR ACCEPTABILITY RATINGS FOR L1 BY NOUN_TYPE AT T0 IN CONTEXT 1 252

FIGURE 7.49. EFFECT PLOT FOR ACCEPTABILITY RATINGS FOR L1 BY NOUN_TYPE AT T0 IN CONTEXT 2 253

FIGURE 7.50. EFFECT PLOT FOR ACCEPTABILITY RATINGS FOR L1 BY NOUN_TYPE AT T0 IN CONTEXT 3 254

FIGURE 7.51. EFFECT PLOT FOR ACCEPTABILITY RATINGS FOR L1 BY NOUN_TYPE AT T0 IN CONTEXT 4 255

FIGURE 7.52. EFFECT PLOT FOR ACCEPTABILITY RATINGS FOR L1 BY NOUN_TYPE AT T0 IN CONTEXT 5 256

FIGURE 7.53. VIOLIN PLOTS OF MEAN ACCEPTABILITY RATINGS FOR LING LEARNERS IN CONTEXT1 259

FIGURE 7.54. EFFECT PLOT FOR ACCEPTABILITY RATINGS OF TESTING_TIME BY NOUN_TYPE FOR LING LEARNERS IN CONTEXT 1 261

FIGURE 7.55. VIOLIN PLOTS OF MEAN ACCEPTABILITY RATINGS FOR LING LEARNERS IN CONTEXT2 262

FIGURE 7.56. EFFECT PLOT FOR ACCEPTABILITY RATINGS OF TESTING_TIME BY NOUN_TYPE FOR LING LEARNERS IN CONTEXT 2 263

FIGURE 7.57. VIOLIN PLOTS OF MEAN ACCEPTABILITY RATINGS FOR LING LEARNERS IN CONTEXT3 264

FIGURE 7.58. EFFECT PLOT FOR ACCEPTABILITY RATINGS OF TESTING_TIME BY NOUN_TYPE FOR LING LEARNERS IN CONTEXT 3 265

FIGURE 7.59. VIOLIN PLOTS OF MEAN ACCEPTABILITY RATINGS FOR LING LEARNERS IN CONTEXT4 266

FIGURE 7.60. EFFECT PLOT FOR ACCEPTABILITY RATINGS OF TESTING_TIME BY NOUN_TYPE FOR LING LEARNERS IN CONTEXT 4 267

FIGURE 7.61. VIOLIN PLOTS OF MEAN ACCEPTABILITY RATINGS FOR LING LEARNERS IN CONTEXT5 268

FIGURE 7.62. EFFECT PLOT FOR ACCEPTABILITY RATINGS OF TESTING_TIME BY NOUN_TYPE FOR LING LEARNERS IN CONTEXT 5 269

FIGURE 7.63. VIOLIN PLOTS OF MEAN ACCEPTABILITY RATINGS FOR TRAD LEARNERS IN CONTEXT1 271

FIGURE 7.64. EFFECT PLOT FOR ACCEPTABILITY RATINGS OF TESTING_TIME BY NOUN_TYPE FOR TRAD LEARNERS IN CONTEXT 1 272

FIGURE 7.65. VIOLIN PLOTS OF MEAN ACCEPTABILITY RATINGS FOR TRAD LEARNERS IN CONTEXT2 273

FIGURE 7.66. EFFECT PLOT FOR ACCEPTABILITY RATINGS OF TESTING_TIME BY NOUN_TYPE FOR TRAD LEARNERS IN CONTEXT 2 274

FIGURE 7.67. VIOLIN PLOTS OF MEAN ACCEPTABILITY RATINGS FOR TRAD LEARNERS IN CONTEXT3 274

FIGURE 7.68. EFFECT PLOT FOR ACCEPTABILITY RATINGS OF TESTING_TIME BY NOUN_TYPE FOR TRAD LEARNERS IN CONTEXT 3 275

FIGURE 7.69. VIOLIN PLOTS OF MEAN ACCEPTABILITY RATINGS FOR TRAD LEARNERS IN CONTEXT4 276

FIGURE 7.70. EFFECT PLOT FOR ACCEPTABILITY RATINGS OF TESTING_TIME BY NOUN_TYPE FOR TRAD LEARNERS IN CONTEXT 4 277

FIGURE 7.71. VIOLIN PLOTS OF MEAN ACCEPTABILITY RATINGS FOR TRAD LEARNERS IN CONTEXT5 278

FIGURE 7.72. EFFECT PLOT FOR ACCEPTABILITY RATINGS OF TESTING_TIME BY NOUN_TYPE FOR TRAD LEARNERS IN CONTEXT 5 279

FIGURE 7.73. VIOLIN PLOTS OF MEAN ACCEPTABILITY RATINGS FOR NOEX IN CONTEXT 1 281

FIGURE 7.74. EFFECT PLOT FOR ACCEPTABILITY RATINGS OF TESTING_TIME BY NOUN_TYPE FOR NOEX LEARNERS IN CONTEXT 1 282

FIGURE 7.75. VIOLIN PLOTS OF MEAN ACCEPTABILITY RATINGS FOR NOEX IN CONTEXT 2 283

FIGURE 7.76. EFFECT PLOT FOR ACCEPTABILITY RATINGS OF TESTING_TIME BY NOUN_TYPE FOR NOEX LEARNERS IN CONTEXT 2 284

FIGURE 7.77. VIOLIN PLOTS OF MEAN ACCEPTABILITY RATINGS FOR NOEX IN CONTEXT 285

FIGURE 7.78. EFFECT PLOT FOR ACCEPTABILITY RATINGS OF TESTING_TIME BY NOUN_TYPE FOR NOEX LEARNERS IN CONTEXT 3 286

FIGURE 7.79. VIOLIN PLOTS OF MEAN ACCEPTABILITY RATINGS FOR NOEX IN CONTEXT 4 287

FIGURE 7.80. EFFECT PLOT FOR ACCEPTABILITY RATINGS OF TESTING_TIME BY NOUN_TYPE FOR NOEX LEARNERS IN CONTEXT 4 288

FIGURE 7.81. VIOLIN PLOTS OF MEAN ACCEPTABILITY RATINGS FOR NOEX IN CONTEXT 5 289

FIGURE 7.82. EFFECT PLOT FOR ACCEPTABILITY RATINGS OF TESTING_TIME BY NOUN_TYPE FOR NOEX LEARNERS IN CONTEXT 5 290

FIGURE 7.83. BAR PLOTS OF MEAN ACCEPTABILITY RATING GAIN SCORES FOR ALL LEARNER GROUPS IN CONTEXT 1 293

FIGURE 7.84. EFFECT PLOT FOR ACCEPTABILITY RATINGS OF LEARNER_TYPE BY TESTING_TIME BY NOUN_TYPE IN CONTEXT 1 295

FIGURE 7.85 BAR PLOTS OF MEAN ACCEPTABILITY RATING GAIN SCORES FOR ALL LEARNER GROUPS IN CONTEXT 2 296

FIGURE 7.86. EFFECT PLOT FOR ACCEPTABILITY RATINGS OF LEARNER_TYPE BY TESTING_TIME BY NOUN_TYPE IN CONTEXT 2 297

FIGURE 7.87. BAR PLOTS OF MEAN ACCEPTABILITY RATING GAIN SCORES FOR ALL LEARNER GROUPS IN CONTEXT 3 298

FIGURE 7.88. EFFECT PLOT FOR ACCEPTABILITY RATINGS OF LEARNER_TYPE BY TESTING_TIME BY NOUN_TYPE IN CONTEXT 3 299

FIGURE 7.89. BAR PLOTS OF MEAN ACCEPTABILITY RATING GAIN SCORES FOR ALL LEARNER GROUPS IN CONTEXT 4 300

FIGURE 7.90. EFFECT PLOT FOR ACCEPTABILITY RATINGS OF LEARNER_TYPE BY TESTING_TIME BY NOUN_TYPE IN CONTEXT 4 301

FIGURE 7.91. BAR PLOTS OF MEAN ACCEPTABILITY RATING GAIN SCORES FOR ALL LEARNER GROUPS IN CONTEXT 5 302

FIGURE 7.92. EFFECT PLOT FOR ACCEPTABILITY RATINGS OF LEARNER_TYPE BY TESTING_TIME BY NOUN_TYPE IN CONTEXT 5 303

FIGURE 7.93. VIOLIN PLOT OF MEAN FORCED-CHOICE SCORES FOR ENGLISH NSS AND L2 LEARNERS AT T0 IN CONTEXT 1 307

FIGURE 7.94. EFFECT PLOT FOR FORCED-CHOICE SCORES FOR L1 BY NOUN_TYPE AT T0 IN CONTEXT 1 308

FIGURE 7.95. VIOLIN PLOTS OF MEAN FORCED-CHOICE SCORES FOR ENGLISH NSS AND L2 LEARNERS AT T0 IN CONTEXT 2 309

FIGURE 7.96. EFFECT PLOT FOR FORCED-CHOICE SCORES FOR L1 BY NOUN_TYPE AT T0 FOR CONTEXT 2 310

FIGURE 7.97. VIOLIN PLOT OF MEAN FORCED-CHOICE SCORES FOR ENGLISH NSS AND L2 LEARNERS AT T0 IN CONTEXT 3 311

FIGURE 7.98. EFFECT PLOT FOR FORCED-CHOICE SCORES FOR L1 BY NOUN_TYPE AT T0 FOR CONTEXT 3 312

FIGURE 7.99. VIOLIN PLOT OF MEAN FORCED-CHOICE SCORES FOR ENGLISH NSS AND L2 LEARNERS AT T0 IN CONTEXT 4 313

FIGURE 7.100. EFFECT PLOT FOR FORCED-CHOICE SCORES FOR L1 BY NOUN_TYPE AT T0 FOR CONTEXT 4 314

FIGURE 7.101. VIOLIN PLOTS OF MEAN FORCED-CHOICE SCORES FOR ENGLISH NSS AND L2 LEARNERS AT T0 IN CONTEXT 5 315

FIGURE 7.102. EFFECT PLOT FOR FORCED-CHOICE SCORES FOR LEARNER_TYPE BY NOUN_TYPE AT T0 FOR CONTEXT 5 316

FIGURE 7.103. VIOLIN PLOT OF MEAN FORCED-CHOICE SCORES FOR LING LEARNERS IN CONTEXT1 319

FIGURE 7.104. EFFECT PLOT FOR FORCED-CHOICE SCORES OF TESTING_TIME BY NOUN_TYPE FOR LING LEARNERS IN CONTEXT 1 320

FIGURE 7.105. VIOLIN PLOTS OF MEAN FORCED-CHOICE SCORES FOR LING LEARNERS IN CONTEXT2 321

FIGURE 7.106. EFFECT PLOT FOR FORCED-CHOICE SCORES OF TESTING_TIME BY NOUN_TYPE FOR LING LEARNERS IN CONTEXT 2 322

FIGURE 7.107. VIOLIN PLOT OF MEAN FORCED-CHOICE SCORES FOR LING LEARNERS IN CONTEXT3 323

FIGURE 7.108. EFFECT PLOT FOR FORCED-CHOICE SCORES OF TESTING_TIME BY NOUN_TYPE FOR LING LEARNERS IN CONTEXT 3 324

FIGURE 7.109. VIOLIN PLOT OF MEAN FORCED-CHOICE SCORES FOR LING LEARNERS IN CONTEXT4 325

FIGURE 7.110. EFFECT PLOT FOR FORCED-CHOICE SCORES OF TESTING_TIME BY NOUN_TYPE FOR LING LEARNERS IN CONTEXT 4 326

FIGURE 7.111. VIOLIN PLOT OF MEAN FORCED-CHOICE SCORES FOR LING LEARNERS IN CONTEXT5 327

FIGURE 7.112. EFFECT PLOT FOR FORCED-CHOICE SCORES OF TESTING_TIME BY NOUN_TYPE FOR LING LEARNERS IN CONTEXT 5 328

FIGURE 7.113. VIOLIN PLOT OF MEAN FORCED-CHOICE SCORES FOR TRAD LEARNERS IN CONTEXT1 330

FIGURE 7.114. EFFECT PLOT FOR FORCED-CHOICE SCORES OF TESTING_TIME BY NOUN_TYPE FOR TRAD LEARNERS IN CONTEXT 1 331

FIGURE 7.115. VIOLIN PLOTS OF MEAN FORCED-CHOICE SCORES FOR TRAD LEARNERS IN CONTEXT2 332

FIGURE 7.116. EFFECT PLOT FOR FORCED-CHOICE SCORES OF TESTING_TIME BY NOUN_TYPE FOR TRAD LEARNERS IN CONTEXT 2 333

FIGURE 7.117. VIOLIN PLOT OF MEAN FORCED-CHOICE SCORES FOR TRAD LEARNERS IN CONTEXT3 334

FIGURE 7.118. EFFECT PLOT FOR FORCED-CHOICE SCORES OF TESTING_TIME BY NOUN_TYPE FOR TRAD LEARNERS IN CONTEXT 3 335

FIGURE 7.119. VIOLIN PLOT OF MEAN FORCED-CHOICE SCORES FOR TRAD LEARNERS IN CONTEXT4 336

FIGURE 7.120. EFFECT PLOT FOR FORCED-CHOICE SCORES OF TESTING_TIME BY NOUN_TYPE FOR TRAD LEARNERS IN CONTEXT 4 337

FIGURE 7.121. VIOLIN PLOTS OF MEAN FORCED-CHOICE SCORES FOR TRAD LEARNERS IN CONTEXT5 338

FIGURE 7.122. EFFECT PLOT FOR FORCED-CHOICE SCORES OF TESTING_TIME BY NOUN_TYPE FOR TRAD LEARNERS IN CONTEXT 5 339

FIGURE 7.123. VIOLIN PLOT OF MEAN FORCED-CHOICE SCORES FOR NOEX IN CONTEXT 1 341

FIGURE 7.124. EFFECT PLOT FOR FORCED-CHOICE SCORES OF TESTING_TIME BY NOUN_TYPE FOR NOEX LEARNERS IN CONTEXT 1 342

FIGURE 7.125. VIOLIN PLOTS OF MEAN FORCED-CHOICE SCORES FOR NOEX IN CONTEXT 2 343

FIGURE 7.126. EFFECT PLOT FOR FORCED-CHOICE SCORES OF TESTING_TIME BY NOUN_TYPE FOR NOEX LEARNERS IN CONTEXT 2 344

FIGURE 7.127. VIOLIN PLOT OF MEAN FORCED-CHOICE SCORES FOR NOEX IN CONTEXT 3 345

FIGURE 7.128. EFFECT PLOT FOR FORCED-CHOICE SCORES OF TESTING_TIME BY NOUN_TYPE FOR NOEX LEARNERS IN CONTEXT 3 346

FIGURE 7.129. VIOLIN PLOT OF MEAN FORCED-CHOICE SCORES FOR NOEX IN CONTEXT 4 347

FIGURE 7.130. EFFECT PLOT FOR FORCED-CHOICE SCORES OF TESTING_TIME BY NOUN_TYPE FOR NOEX LEARNERS IN CONTEXT 4 348

FIGURE 7.131. VIOLIN PLOTS OF MEAN FORCED-CHOICE SCORES FOR NOEX IN CONTEXT 5 349

FIGURE 7.132. EFFECT PLOT FOR FORCED-CHOICE SCORES OF TESTING_TIME BY NOUN_TYPE FOR NOEX LEARNERS IN CONTEXT 5 350

FIGURE 7.133. BAR PLOT OF MEAN FORCED-CHOICE GAIN SCORES FOR ALL LEARNER GROUPS IN CONTEXT 1 353

FIGURE 7.134. EFFECT PLOT FOR FORCED-CHOICE SCORES OF LEARNER_TYPE BY TESTING_TIME BY NOUN_TYPE IN CONTEXT 1 354

FIGURE 7.135. BAR PLOT OF MEAN FORCED-CHOICE GAIN SCORES FOR ALL LEARNER GROUPS IN CONTEXT 2......355

FIGURE 7.136. EFFECT PLOT FOR FORCED-CHOICE SCORES OF LEARNER_TYPE BY TESTING_TIME BY NOUN_TYPE IN CONTEXT 2......356

FIGURE 7.137. BAR PLOT OF MEAN FORCED-CHOICE GAIN SCORES FOR ALL LEARNER GROUPS IN CONTEXT 3......357

FIGURE 7.138. EFFECT PLOT FOR FORCED-CHOICE SCORES OF LEARNER_TYPE BY TESTING_TIME BY NOUN_TYPE IN CONTEXT 3......358

FIGURE 7.139. BAR PLOT OF MEAN FORCED-CHOICE GAIN SCORES FOR ALL LEARNER GROUPS IN CONTEXT 4......358

FIGURE 7.140. EFFECT PLOT FOR FORCED-CHOICE SCORES OF LEARNER_TYPE BY TESTING_TIME BY NOUN_TYPE IN CONTEXT 4......359

FIGURE 7.141. BAR PLOT OF MEAN FORCED-CHOICE GAIN SCORES FOR ALL LEARNER GROUPS IN CONTEXT 5......360

FIGURE 7.142. EFFECT PLOT FOR FORCED-CHOICE SCORES OF LEARNER_TYPE BY TESTING_TIME BY NOUN_TYPE IN CONTEXT 5......362

FIGURE 7.143. VIOLIN PLOT OF MEAN GAIN PERCENTAGE BY TASK FOR EACH LEARNER TYPE FROM T0 TO T1.....365

FIGURE 7.144. EFFECT PLOT GAIN PERCENTAGE OF LEARNER_TYPE BY TASK_TYPE FROM T0 TO T1......367

FIGURE 7.145. VIOLIN PLOT OF MEAN GAIN PERCENTAGE BY TASK FOR EACH LEARNER GROUP FROM T0 TO T2.368

FIGURE 7.146. EFFECT PLOT GAIN PERCENTAGE OF LEARNER_TYPE BY TASK_TYPE FROM T0 TO T2......370

FIGURE 7.147. VIOLIN PLOT OF MEAN GAIN PERCENTAGE BY TASK FOR EACH LEARNER GROUP FROM T1 TO T2.371

FIGURE 7.148. EFFECT PLOT GAIN PERCENTAGE OF LEARNER_TYPE BY TASK_TYPE FROM T1 TO T2......374

List of Abbreviations

AJT	acceptability judgment task
EFL	English as a foreign language
ENGL	native-speakers of English (baseline group)
ESIT	elicited-sentence imitation task
ESL	English as a second language
FCET	forced-choice elicitation task
GenSLA	Generative Second Language Acquisition
ISLA	Instructed Second Language Acquisition
L1	first language
L2	second language
LING	linguistically-informed instruction group (experimental group)
NNS	non-native speaker
NOEX	no extra instruction group (control group)
NS	native speaker
RQ1	research question 1
RQ2	research question 2
RQ3	research question 3
RQ4	research question 4
SLA	second language acquisition
SPRT	self-paced reading task
T0	pre-test
T1	immediate post-test
T2	three-week-delayed post-test
TRAD	traditional instruction group (experimental group)

Chapter 1: General Introduction & Research Aims

"I have many homework to do tonight.
The teacher always gives so many."

– AN ESL STUDENT

The quote above is an example of a sentence that I have heard first language- (L1-) Mandarin, second language- (L2-) English learners say many times since I started my career as an English as a Second Language instructor in August 2015. For L2 learners, the distinction between countable and uncountable nouns may not be as clear in English as it may be in their native language, potentially slowing down their acquisition process. For instance, English has a grammaticized and morphological distinction between definite and indefinite articles and countable and uncountable nouns. Mandarin nouns, on the other hand, are grammaticized for atomic and non-atomic, classifiers for the countable and uncountable distinction; and features of definiteness are encoded not only with the use of demonstratives but also syntactically for bare nouns. Thus, the aim of the present study is to explore the non-native English acquisition of noun type distinctions in different article contexts by Mandarin-speaking students studying L2 English in the Midwestern United States and subsequently contribute to research in the field.

To pursue this aim, the present study follows the Generative approach to second language acquisition (GenSLA) and assumes that L2 acquisition is the result of universal knowledge of language, the learners' L1, and language input. As Rothman and Slabakova (2017) state:

> the aim of much research in GenSLA from its beginning in the 1980s has been to provide an understanding of the interplay between knowledge pertaining to all human languages […], knowledge that comes from the mother tongue […], and knowledge that comes from exposure to the target language.
>
> (Rothman & Slabakova, 2017, p. 3)

GenSLA will be explored and applied in this study to explain the acquisition of some of the most subtle complexities of language: definiteness, countability, atomicity, and plurality. This dissertation seeks to bring GenSLA into the instructed second language acquisition (ISLA) paradigm by creating a new instructional context to aid in the acquisition of these subtle language features. In a review of previous research on this topic, Marsden and Slabakova (2019) found the results of the limited field to be mixed and have called for more research and "consideration of linguistic research on grammatical meaning in the context of grammar teaching and textbooks" (p. 154). They believe that language learners and instructors alike would benefit from further consideration and incorporation of GenSLA theoretical findings in ISLA pedagogical research.

1.1 | Rationale

Errors with English articles and noun types are frequent and, sometimes, substantial. Many L2 learners misuse or misinterpret L2-English noun type distinctions. Beyond that, many nouns have either singular or plural forms depending on their type and how they are being used. With noun types, many students make mistakes when it comes to uncountable-object nouns, but sometimes issues arise with article misuse in combination with a certain noun type. The following examples have been collected from English language learners at a university in the Midwestern United States.

(1) Mr. Thomas-Wilhelm gave us so many <u>homeworks</u> this weekend.

Misuse of plural: *Homework* is an uncountable noun, meaning that it does not have a plural form. Here, the student is failing to add a countable noun, e.g., *assignments*, or change the modifier from *many* to *much* and omit the morphological *-s*.

(2) Today I saw _____ <u>dog</u> in the road on my way to class. He was cute!

Noun type conversion: In this example, the student forgot the obligatory indefinite article, causing the countable noun, *dog*, to be shifted into an uncountable-substance noun. The mental image we are left with is not pleasant.

(3) She likes _____ <u>cat</u>, but I do not.

Misuse of singular: This next example could be attributed to either a missing article, *the*, or the misuse of the singular form. In this sentence, the student was referring to the basic kind, *cats*, but failed to use the plural form of the countable noun to refer to it as a category.

In addition to noun type misusage, there are three frequent errors that are made by L2 learners when it comes to L2-English articles: article misuse, article omission, and article overuse. Article misuse occurs when English language learners use a definite article when a native speaker (NS) would typically use an indefinite article, or vice versa. The second error type, article omission, occurs when an article is not used in an obligatory context. The final common article error happens when the definite or indefinite article is used in a context in which an NS would typically use the zero article. The following are examples of these frequent article errors from Mandarin-speaking students at a university in the Midwestern United States.

(4) I am looking on websites because I am going to rent <u>the</u> house.

Article misuse: A definite article is used instead of an indefinite article.

(5) For me, it is difficult to get _____ driver's license.

Article omission: No article is used where there is an obligatory context for an article.

(6) I went to <u>the</u> Walmart this weekend and bought <u>the</u> groceries.

Article overuse: This is the use of definite articles in contexts where no article is needed (need to use a null article in the first position and a zero article in the second).

In the last decade and a half, there has been a great deal of GenSLA research into the acquisition of L2-English articles (Cho & Slabakova, 2014; Ionin, Ko, & Wexler, 2004; Ionin & Montrul, 2010; Snape, 2009a; Snape, Leung, & Ting, 2006; Snape & Yusa, 2013; Trenkic, 2008) and L2-English noun types (Choi & Ionin, 2017; Choi et al., 2018; Choi, Zhu, & Ionin, 2019; Hua & Lee, 2005). There has yet to be a study that explores the acquisition of articles and noun types together. While there is a plethora of research in GenSLA that has investigated the distinction between different noun types and their semantic universals, no research has been done on how noun types are influenced by the article context they are in.

This dissertation specifically aims to apply the results of GenSLA research to the language classroom and measure whether the use of semantic universals in the English as a second language classroom aid in the acquisition of L2-English articles and noun type combinations. Inspired by Lopez (2014, 2015, 2017), this project has designed linguistically-informed teaching materials that have their inspiration and creation rooted in GenSLA, thereby bringing GenSLA into the grammar classroom for teaching. Recent works (e.g., Lopez, 2014, 2015, 2017; Lopez & Sabir, 2017; Whong, 2011; Whong, Gil, & Marsden, 2014, 2013b) have recognized the need to bridge the gap between GenSLA research and classroom pedagogy. In response to these works, the present project hopes to contribute to both the fields of GenSLA and classroom pedagogy in order to bring these two areas closer together. As it stands, instructors could benefit from knowing what is difficult to learn and, therefore, what requires more practice. GenSLA researchers, on the other hand, could benefit from understanding realistic instructional contexts for their research. Only then will research inform pedagogy, and pedagogy inform research. This dissertation seeks to fill this gap by creating an instructional context informed by GenSLA findings and realistic instructional expectations so that learners might reassemble English article and noun type features.

1.2 | Research Questions

There are four general research questions which have motivated this study and will guide us through the theoretical and analysis chapters.

Research Question 1

To what extent will L1 features be present in the participants' L2-English articles and noun types prior to intervention, as measured by the potential differences between the L2 learners' and native speakers' performance in an elicited-sentence imitation task, an acceptability judgment task, and a forced-choice elicitation task?

Research Question 2

Does type of instruction mediate the reassembly of L1 article and noun type features for the L2, as measured by an elicited-sentence imitation task, an acceptability judgment task, and a forced-choice elicitation task?

Research Question 2.1

Is there any significant development in imitation scores, acceptability judgments, and forced-choice selections of noun types in different article contexts from T0 to T1 and from T0 to T2 for linguistically-informed instruction learners?

Research Question 2.2

Is there any significant development in imitation scores, acceptability judgments, and forced-choice selections of noun types in different article contexts from T0 to T1 and from T0 to T2 for traditional instruction learners?

Research Question 2.3

Is there any significant development in imitation scores, acceptability judgments, and forced-choice selections of noun types in different article contexts from T0 to T1 and from T0 to T2 for non-extra-instruction learners?

Research Question 3

What type of instruction will lead to greater gains in the reassembly of L1 article and noun type features for the L2 at both immediate and delayed post-test, as measured by an elicited-sentence imitation task, an acceptability judgment task, and a forced-choice elicitation task?

Research Question 4

What is the effect of task type on overall improvement and its interaction with type of instruction?

These questions are the foundation for the more specifically formulated hypotheses and predictions in Chapter 6. The general research questions introduced above will be directly answered in the discussion and conclusion chapters once the analysis has been dealt with. The overreaching hypothesis is that explicit instruction will lead to improvements in article and noun type combination imitations, judgments, and forced-choice selections since the linguistically-informed materials (LIMs) will have a measurable effect on the learner's ability to correctly use and comprehend articles and noun types together.

This study was carried out by means of quantitative data obtained through three experimental tasks (i.e., elicited-sentence imitation task, acceptability judgment task, and forced-choice elicitation task) conducted on L1-Mandarin, L2-English students, with a pre-test, post-test, and delayed post-test design. The participants in the study included 30 linguistically-informed instruction learners (LING), all of whom received explicit instruction in a one-hour language workshop on English articles and noun type distinctions, with linguistically-informed materials developed based on the learners' language background. Another 18 learners received one-hour explicit instruction using their assigned grammar textbook, *Grammar & Beyond 4* (Bunting, Diniz, & Reppen, 2009), which will be referred to as traditional instruction (TRAD), and 17 learners received no extra instruction (NOEX). There was also a control group of 25 native speakers of English (ENGL) who participated in one round of data collection in order to provide baseline data and establish some standards for the improvement of the L2 learners. Pre-test data as well as both the immediate and delayed post-test data were collected for the LING, TRAD, and NOEX groups.

1.3 | Organization of the Dissertation

The structure of the dissertation is as follows. Chapter 2 provides an introduction to the semantic universals of atomicity, countability, plurality, and definiteness, followed by a crosslinguistic comparison of the two languages involved in the study: English and Mandarin. The second chapter closes with a summary and overview of the linguistic items to be analyzed. In Chapter 3, a literature review of Generative theories in second language acquisition is presented, with a special focus on the Feature Reassembly Hypothesis (Lardiere, 2008, 2009a, 2009b) and the Bottleneck Hypothesis (Slabakova, 2008, 2009a). Chapter 4 focuses on instructed second language acquisition. It delves into the implicit/explicit distinction in relation to L2 knowledge, learning, and teaching, then hones in on different instructional contexts for language acquisition. Chapter 5 introduces previous empirical research on L2 acquisition of English articles and noun type distinctions. The fifth chapter closes with a presentation of the context of the study and a summary of the previously presented literature review. Chapter 6 is the methodological chapter. It opens with an overview of the research design and a description of the participants involved in the study. The bulk of this chapter discusses each of the data collection instruments in detail, followed by a detailed description of the intervention and LIMs. This chapter also includes an overview of the data collection procedures, as well as the downloading, coding, and analysis of the experimental data. The end of the chapter revisits the research questions, and detailed hypotheses and predictions are presented with them. Chapter 7 presents the results of the experimental study following the order of each individual research question. Chapter 8 is dedicated to a discussion of the results and research questions, as well as the acceptance or rejection of the individual hypotheses. Finally, Chapter 9 provides a summary of the study and its findings, as well as a discussion of the pedagogical implications. This chapter also identifies the project's limitations and new areas for further research in the field. The appendices, which include examples of every task and copies of the administrative paperwork that was required in order to conduct the experimental study, can be found at the end of the dissertation.

Chapter 2: Linguistic Background

"Ian, who's translating, stops to explain this archaic spiral of language as an eighteenth-century legal description of the amount of land, measured by how long it would take two oxen to plough it. We have, it seems, two plowing days worth of property."

– FRANCES MAYERS, *UNDER TUSCAN SUN*

For decades, linguistics and philosophers have extensively discussed how languages encode the distinction between definiteness and indefiniteness (see Abbott, 2008; Frege, 1982; Russell, 1905; Trenkic, 2008; among others), as well as which nouns are 'count nouns' (e.g., *dog*) and 'mass nouns' (e.g., *furniture*) (Bale & Barner, 2009; Barner & Snedeker, 2006; Borer, 2005; Bunt, 1985; Chierchia, 1998a, 1998b, 2010; Gillon, 1992; Krifka, 1989, 1995; Link, 1983; Francis Jeffry Pelletier, 1975; Francis Jeffry Pelletier, 2012; Francis Jeffry Pelletier, 1979, 2009; Quine, 1960; Rothstein, 2010, 2017). In this chapter, we look at the linguistic background of definiteness, countability, atomicity, and plurality.

This chapter will be organized as follows: Section 2.1 will give an overview of linguistic properties of articles. It will focus on the semantic feature [±definite], which will later be used to describe article selection in English NPs. In Section 2.2, we will look at the linguistic properties of noun types in English. The semantic features under investigation in this section are [±count] (whether or not nouns can be counted and whether or not they can take the indefinite article *a/an*), [±atomic] (whether or not nouns denote indivisible units), and [±plural] (whether or not they denote more than one entity and whether or not they can take plural morphology). Section 2.3 examines the English noun phrase and how article selection works at the interface of syntax and semantics. Section 2.4 presents a crosslinguistic analysis of determiners and noun types in Mandarin and English. It presents how definiteness, countability, atomicity, and number are each expressed in Mandarin and how that differs from English. In the final section, Section 2.5, we will summarize the chapter, establish the main linguistic assumptions for the study, and describe the choice of linguistic items that will be tested.

2.1 | Linguistic Properties of Articles

Articles belong to the determiner class of words (DET), which is a function closed class that consists of articles (*a/an*, *the Ø*), demonstratives (*this*, *that*, *these*, *those*), possessives (*my*, *your*, *his*, *her*, etc.), quantifiers (*many*, *much*, *some*, etc.), and numbers (*one*, *two*, *three*, etc.). Determiners in English have two main functions: referring and quantifying (Tallerman, 2011). This class of words is only paired with nouns, and does not co-occur with other word classes. By knowing that determiners pair up with nouns, we can use their distribution to test for word classes. Crosslinguistically, determiners are common and typically occur either initial in the noun phrase (NP) or final, rather than in the middle of the phrase. As we will discuss, there are many languages without the range of determiners that we find in English (Tallerman, 2011). One of these particular languages is Mandarin, which is of particular interest to this research project.

Determiners in English express a variety of features, including definiteness, number, proximity, and distance (Lobeck & Denham, 2014). The English article system is used to mark definiteness on the nouns and there are three contexts which mark definiteness and/or indefiniteness. Two of these contexts include morphological elements, while one context is absent of any morphological element. In English, *the* is a morphological item that marks definiteness, while *a/an* are used to mark indefiniteness. As we will see in further analysis, the determiner phrase with uncountable nouns in an indefinite context do not use an article, but rather have Ø in the syntactic position of the determiner. However, definiteness is not the only feature that is expressed by English articles. Among other features, number is an important one that will be discussed in a later section. Although the definite article is not sensitive to number, the indefinite article is. See the examples in (1)–(4) below.

(1) I fed the dog.

(2) I fed the dogs.

(3) I fed a dog.

(4) I fed Ø dogs.

While both singular and plural nouns can be preceded by the definite article *the*, only singular nouns can be preceded by the indefinite article *a/an*. This distinction between number and indefinite reaches into the distinction between countable and uncountable nouns, which will be discussed later. In the next section, we will focus on definiteness as the relevant feature under analysis of articles in the dissertation.

2.1.1 | Definiteness

In general terms, definiteness is a way of expressing "old" or known information. Quirk, Greenbaum, Leech, and Svartvik (1985) define definiteness as "referring to something which can be identified uniquely in the contextual or general knowledge shared by speaker and hearer" (p. 265). In this definition, the 'something' may be any kind of noun phrase referent. Indefiniteness expresses contexts in which "the reference of *X* is not uniquely identifiable in the shared knowledge of speaker and hearer" (Quirk et al., 1985, p. 272). Thus, *a/an* is typically used when the referent has not been mentioned and is assumed to be unfamiliar to either the speaker or the hearer.

One important property of definiteness is that it is expressed, either overtly (morphologically marked) or covertly (not marked), in all of the world's languages (Cho & Slabakova, 2014; Heim, 1991, 2011; Trenkic, 2008). For many languages, the expression of definiteness is a question of pragmatics, but even languages which do overtly mark definiteness differ in which contexts exactly they require an article. Trenkic (2008, p. 5) attributes this variation to the slow and gradual process of language change in which a demonstrative typically develops into a definite article. There are a number of semantic ways in which [±definite] can be expressed and discussed, but the scope of this literature review will only cover three accounts: (i) Russellian Definites (Russell, 1905), (ii) Fregean Definites (Frege, 1982), and (iii) Abbott's Four Properties of Definiteness (Abbott, 2008).

The Russellian Analysis (Russell, 1905) and The Fregean Analysis (Frege, 1982) are two historical accounts of definiteness. According to Heim (2011, p. 997), definite and indefinite articles have their logical denotations as seen in (5) (from Russell, 1905) and (6).

(5) $[\![the]\!] = \lambda P. \lambda Q. \exists x[\forall y[P(y) \leftrightarrow x = y] \land Q(x)]$

The *F* is *G* expresses that proposition which is true if there is exactly one *F* and it is *G*, and which is false otherwise.

(6) $[\![a]\!] = \lambda P.\lambda Q.\exists x[P(x) \land Q(x)]$

A *F* is *G* expresses that proposition which is true if there is at least one *F* that is *G*, and false otherwise.

Such an analysis says that a sentence like (7), which contains a definite DP, will be true if and only if (iff) there exists a unique dog, and such dog is eating food. If there exists no dog, or if more than one single dog exists, or if a unique dog exists but is not eating, the sentence will be false.

(7) The dog is eating food.

In the literature, though, this analysis of definiteness has been pointed out to be problematic for the following reason. Take the (infamous) sentence in (8) as an example.

(8) The King of France is not bald.

(9) It is not the case that there exists a unique King of France and he is bald.

(10) There exists a unique King of France, and it is not the case that he is bald.

This is problematic because there is no king of France because France is a republic. Under Russell's analysis, (8) predicts the reading in (9). Under this reading, (9) is true because France is a republic and, therefore, does not have a king. Under the Russelian analysis (see Heim, 1991 for more examples and discussion), speakers should not have a problem accessing the reading and considering (9) to be true. The problem lies in the fact that the bizarre reading is (10), which states that there exists a king of France. The behavior of Russelian definites has led to the presuppositional view of definites, which will be described following the Fregean Analysis (Frege, 1982).

An informal definition of a presupposition is that it is a statement that must be true in order for another statement to have a truth-value at all. Heim (2011, p. 8) describes it as follows:

(11) Let *p* and *q* be (possibly partial) propositions. Then *q* is a semantic presupposition of *p* iff *q* is true at every world-time pair where *p* is true or false. (emphasis added)

See the statements in (12) and (13). In these statements, (12) would only hold true if Mr. Thomas used to drink wine in the evenings and has stopped doing so.

(12) Mr. Thomas has stopped drinking wine in the evenings.

(13) At some time prior to the present, Mr. Thomas drank wine in the evenings.

In order for the proposition in (12) to be false, Mr. Thomas would have to be continuing to drink wine in the evenings. The following question arises: *What if Mr. Thomas has never drunk wine in the evenings in the first place?* This would mean that the proposition in (12) will not have a truth-value—it will be neither true nor false. This would mean that the proposition in (13) is a presupposition of (12), meaning: in order for (12) to have a truth-value, it is necessary that (13) be true. Thus, (13) becomes a presupposition of the hearer when the speaker utters (12).

The Fregean Analysis, or presuppositional analysis, has been applied to definites. According to this analysis, the definite article, *the*, carries presuppositions of *existence* and *uniqueness*, as stated in (14) (Heim, 1991, p. 9).

(14) **The *F* is *G*** expresses that proposition which is

a. true at index *i*, if there is exactly one *F* at *i*, and it is *G* at *i*,

b. false at an index *i*, if there is exactly one *F* at *i*, and it is not *G* at *i*,

c. truth-valueless at an index *i*, if there is not exactly one *F* at *i*.

If we look again at the sentence about *the dog* in (15), we can agree that we live in a world with multiple dogs. With that being said, we can also agree that there is always more than one dog in existence. Therefore, this statement should have no truth-value. This statement, though, can be a felicitous utterance if there is a unique dog in some contextually given domain.

(15) The dog is eating food.

It is important to note that previous discourse is not always necessary for establishing uniqueness. Uniqueness can be defined with respect to the context given, which is typically a subset of the set of all individuals. See the statements in (16)–(18).

(16) Every man is a racecar driver.

(17) The man is a racecar driver.

(18) The winner of this race will receive a prize.

Although the statement in (16) can be understood in the sense that every man in the universe is a racecar driver, in many situations, the speaker might have a more specific, restricted set in mind over which the quantifier *every* runs. This becomes more apparent in (17) with the definite description.

Previous discourse is not always necessary to establish uniqueness. There are many cases in which the uniqueness presupposition is satisfied as a result of *shared world knowledge*. The notion of *shared world knowledge* (Gillon, 1992) will come up again in the analysis of noun types. In order for (18) to be felicitous, it is not necessary that the speaker and the hearer share the knowledge of some salient winner. Instead, given our *shared world knowledge* that a tournament typically has only one winner, the uniqueness presupposition for this definite is satisfied.

Finally, it is important to note that the Russellian Analysis and Fregean Analysis can both be generalized to plurals (Sharvy, 1980). According to Heim (1991, p. 22), if the Fregean analysis is to be extended to plural DPs, a definite plural like *the dogs* is presupposed to contain a "greatest element", where "a greatest element of a set M is an element of M which has all other elements of M as parts".

In 1999, another analysis of definiteness was given by Lyons, who pointed out that 'familiarity/identifiability' (Chistophersen, 1939) and 'uniqueness/inclusiveness' (J. Hawkins, 1978) were two of the major components of the meaning of DPs that use definite and indefinite articles. In his book, Chistophersen (1939) states that a fundamental property of definiteness is familiarity, which means that definite NPs are unambiguous. As J. Hawkins (1978) points out, the use of the definite English article is not restricted to contexts where the hearer is familiar with the NP referent that the speaker has given. In other words, definiteness goes beyond just the expression of relationship, but rather both the speaker and the hearer must have shared knowledge of the relationship in question. In other words, while familiarity is a component of definite DPs, the speaker and hearer both must be able to identify the referent in the definite DP, even if it is not familiar.

In the literature, Lyons (1999, p. 253) states that uniqueness, 'inclusiveness' in a more general term, tends to be preferred by semanticists whereas familiarity/identifiability, is preferred by the pragmatists. Although there is a difference between uniqueness/inclusiveness and familiarity/identifiability, Lyons (1999), believes that uniqueness and familiarity do not completely define the concept of definiteness. Instead, he offers a grammatical explanation of definiteness which includes a discussion of the Determiner Phrase (DP) hypothesis which claims that the noun phrase "is a phrase projection, not of the noun, but of the determiner (Det or D). It is therefore DP, not NP" (Lyons, 1999, p. 42).

Lyons (1999) points out that the weakness in a definition such as the one given above lies in the fact that this definition states that a definite DP signals that the information is *shared world knowledge* for the speaker and hearer which, therefore, marks the phrase as definite. This is not the case, however, since not all definite DPs are referential.[1] Thus, it will be discussed later that current pedagogy for English article (and noun type) instruction is not sufficient and the teaching of semantic universal features might prove to be more successful.

Another analysis of the properties of definiteness was put forth by Abbott (2008). In her analysis, she gives the four properties uniqueness, familiarity, strength, and specificity as the "essence of definiteness" (p. 124). The first two of these terms have been up for much debate for quite some time and are relevant to the present study. The third property, strength, and the fourth property, specificity, will not be discussed in detail.

The first property that Abbott (2008) discusses is uniqueness. The idea of uniqueness as a "characterization of the difference between definite and indefinite NPs" (Abbott, 2008, p. 125) first emerged with Russell (1905). In this classic characterization, a referent is identified as unique if and only if there is a proposition where there is a referent. If we return to the famous Russellian sentence given in (19):

[1] Referentiality is beyond the scope of this dissertation and will not be discussed. For information regarding referentiality see Donnellan (1996) and Lyons (1999).

(19) The King of France is bald.

Lyons (1999, citing Russell, 1905) explains that there are three propositions represented by this sentence. The first, which Lyons refers to as the existential clause, states that there is a King of France. The second proposition is the uniqueness clause, and this states that there is only one King of France. Finally, the third proposition states that it is this individual (the King of France, who exists and of whom there is only one) who is bald. Abbott (2008) explains that the source of the debate is that the existential and uniqueness propositions are believed to be different to the third (baldness) proposition precisely because they are presupposed. Ionin (2006, p. 189) states that a presupposition is "a statement presupposed to be true by *both speaker and listener*". Furthermore, the difference between referring to something and "asserting that a description applies uniquely" (Abbott, 2008, p. 129) has importance because the use of the definite article, *the*, in English does not imply that there is only one unique entity, but rather that it is possible to identify a unique referent for the NP.

The second property of definiteness from Abbott (2008) is familiarity. Familiarity is often considered to be the opposing theory of definiteness to the notion of uniqueness. She goes on to argue that familiarity has mostly been surpassed by the notion of identifiability (Abbott, 2008, p. 136). The difference is that familiarity implies that the hearer has been previously acquainted with the unique referent, whereas identifiability expresses that the hearer *should be able* to identify a unique referent once they take into account the contextual information alongside any speaker-provided description.

The current dissertation investigates the use of definiteness as it relates to article choice between *a/an*, *the*, and Ø. As we will see later, while article choice based on definiteness is related to the context of the sentence, indefinite article choice (the use of *a/an* or Ø) is influenced by a number of semantic and syntactic features of the noun it is preceding. Other aspects of English articles (e.g., specificity and referentiality) are beyond the scope of this dissertation, as they are not influenced by the semantic and syntactic features of the nouns in the NPs. For this reason, an in-depth discussion of all of the properties of the definiteness, as well as the properties of specificity, will not be discussed in this dissertation. We now turn our attention to the linguistic properties of noun types, how they relate to the number feature, and how they are expressed in the English NP.

2.2 | Linguistic Properties of Noun Types

If you are a native speaker of English, or a learner of English in a formal instruction setting, you have more than likely heard the schoolroom definition of a noun: *A noun is a person, place, thing, or idea*. One issue with this definition is that we may not all agree on what counts as a 'thing'. We should also consider whether nouns like *furniture*, *mail*, and *cutlery* fit the 'traditional' definition of a countable noun.

2.2.1 | Countability

The countable/uncountable noun distinction can be essentially characterized in terms of quantificational differences between noun types. Countable nouns such as *dog*, *cat*, and *boy* are discretely quantified as individuals and pluralities, as seen in(20)–(22).

(20) a dog

(21) two cats

(22) many boys

On the other hand, uncountable nouns such as *furniture*, *toothpaste*, *mustard*, etc. cannot be pluralized, counted, or individuated, as seen in (23)–(25). Notice that the property of non-individuation, does not necessarily fallout from the nature of the entity being denoted by the uncountable noun.

(23) *a furniture

(24) *two toothpastes

(25) *many mustards

For example, *furniture* is an uncountable noun purely based on the fact that it does not get quantified by individuation; however, *furniture* itself does constitute a class of individual objects such as *desks* and *chairs*. As we will see later, this is a unique class of nouns of which is actually divided into two sub-classes: uncountable-object nouns (e.g., *furniture*, *mail*, and *money*) and uncountable-substance nouns (e.g., *toothpaste*, *mustard*, and *salt*).

The third class of nouns to be discussed is that of flexible nouns. Flexible nouns are unique due to the fact that they shift between being a countable noun and an uncountable noun. Look at the examples in (26)–(30).

(26) chocolate

(27) chocolates

(28) a chocolate

(29) two chocolates

(30) much chocolate

What we see in (26) is that flexible nouns are semantically-ambiguous and, therefore, morphologically- and syntactically-dependent. These nouns will be discussed in further details in Sections 2.2.3 and 2.2.3. When we speak of a noun being quantified over individuals, the assertion is made with respect to the syntactic possibilities within the larger question. For example, there are ways of denoting individuated instances of uncountable referents by means of "classifier" constructions. That is, one can speak of *three pieces of furniture*, thus semantically quantifying over individuals by measuring. However, it is, syntactically, the measure word *piece* being quantified not *furniture*. This is something that is prevalent in General Classifier Languages (GCLs) such as Mandarin, which will be discussed later. What we can see here is that noun type distinctions for a particular language, if it has a distinction, is not defined just by the manner in which the noun is quantified (or counted), but by how the language syntactically realizes that difference. In English, one can characterize the differences in terms of syntactic constructions that only allow countable nouns in contrast with those that only allow uncountable nouns. These situations will be discussed later in a section dedicated to NPs (Section 2.3).

The traditional notion of the distinction of 'count' versus 'mass' nouns was based purely on the semantic feature [±count]. Rothstein (2017, pp. 86-89) gives a number of arguments against a perceptual basis to division of countable and uncountable nouns, which can be summarized as follows:

i. Being as we perceive collections (e.g., *dogs* and *furniture*) to be a collection of objects even while referring to them as uncountable nouns, we cannot rely on our perceptions to establish a grammatical correlation between collections of objects and count nouns.

ii. While some languages, including English, have near-synonyms for many (e.g., *carpet(s)* versus *carpeting*), there are extreme cases of this in which the same word can have both a countable and uncountable form (e.g., *stone* versus *stones*), in which nouns that have both a of these forms are referred to as flexible nouns (cf. Barner & Snedeker, 2006).

iii. Not all languages have a strict grammatical distinction between countable/uncountable nouns, as the case in Mandarin, where all nouns show the grammatical properties of uncountable nouns, and none are able to be directly counted.

In Rothstein (2017), *Semantics for Counting and Measuring*, she gives an overview of three approaches to the countable/uncountable distinction: (i) an approach by Gillon (1992) which places countable and uncountable noun denotations in the same domain, (ii) an approach by (Francis Jeffry Pelletier, 2012) that claims that nouns are neither [+count] nor [+mass], and (iii) an approach by Krifka (1989) which takes a typological approach to the distinction.

2.2.1.1 | A Single Domain Approach

When looking at a domain-based proposal, Gillon (1992) was one of the first to propose that countable and uncountable nouns have their semantic denotations in the same domains. He argues that countable nouns and uncountable nouns are marked for [+count] and [–count] respectively. While the [+count] feature allows for either a singular or plural morphology and denotation, it does require the predicate to be true of all the minimal parts. The [–count] feature, on the other hand, requires that the nouns are singular and denote a singleton set, whose member is the greatest aggregate of which the noun or noun phrase holds. Thus, *furniture* denotes the singleton set containing the aggregate of all the pieces of furniture in the relevant context. This proposal allows for us to incorporate a separate feature [±atomic] to account for nouns which have singleton sets (e.g., *furniture* and *dogs*) from those which do not (e.g., *toothpaste* and *mustard*).

Rothstein (2010, 2017) claims this account explains the *contrast* between uncountable and plural countable nouns by treating them as singleton sets but misses the *analogies* between them. In other words, these analogies suggest that uncountable nouns denote plural sets and not singletons.

Rothstein (2010, 2017) and Krifka (1989) approach the distinction between countable and uncountable nouns from a different point of view. They begin with the assumption that countable nouns denote sets of objects which are countable and then ask how countability is grammatically encoded. Both answer that uncountable nouns are more basic, and countable nouns are derived from them in a semantic operation which adds the 'countability' property to their basic meaning, but they do this in different ways.

2.2.1.2 | A Blind Lexicon Approach

(Francis Jeffry Pelletier, 2012) sets out the main challenges for formalizing the countable/uncountable distinction in English. If this distinction is encoded lexically as syntactic features of nouns, one runs into the frequent problem that not all nouns are exclusively countable or uncountable (e.g., *chocolate(s)*). In contrast, if [+count] and [+mass] are semantic features, one finds a problem with mismatches between the meanings of nouns and their grammatical behavior; for instance, uncountable-object nouns such as *furniture*, which are semantically countable (you can count the *pieces of furniture*), but syntactically uncountable, as well as pairs of countable and uncountable nouns with similar reference (e.g., *carpets* versus *carpeting*). Based on these problems, (Francis Jeffry Pelletier, 2012) puts forth a proposal that the lexicon is blind to the distinction between items that are countable and those that are uncountable. Therefore, a noun such as *chocolate* has a denotation that comprises both of the countable noun *chocolate(s)* and the uncountable-substance noun *chocolate*. (Francis Jeffry Pelletier, 2012) suggests that it is then the combination of countable syntax and a noun that activates a semantic rule that removes the uncountable part of the meaning of the noun. Although his approach avoids much of the massive ambiguity in the lexicon, it fails to account for uncountable-object nouns such as *furniture*, which still need to be treated in a special way.

2.2.1.3 | A Typological Approach

Krifka (1989) argues that uncountable nouns are predicates of type <e,t> applying to a plural domain. This domain is the closure under sum of a set of partially specified minimal elements, e.g. *toothpaste*. In contrast, countable nouns like *dog* have two-place relations between numbers and entities which incorporate a numerical meaning. Countable nouns are then derived from an abstract uncountable noun via a 'count' operation. This countable operation applies to a predicate type <e,t>, and gives an expression at type <n,<e,t>> as seen in (40), whereas **NU** is defined as natural units and is assumed to be as general as possible. In this example, the countable noun *dog* has the meaning in (31) and is derived from the abstract uncountable predicate DOG. This relationship is found in (32).

(31) $\lambda n\lambda x.\,\mathrm{DOG}'(x, n)$

(32) $\lambda n\lambda x.\,\mathrm{DOG}'(x, n) \leftrightarrow \mathrm{DOG}(x) \wedge \mathrm{NU}(\mathrm{DOG})(x) = n$

In this way, the countable noun either combines with a numerical or *n* argument that is existentially quantified. *One dog* or *a dog* denotes (33), while *five dogs* denotes (34), and the bare plural *dogs* denotes (35).

(33) $\lambda x.\,\mathrm{DOG}'(x, 1)$

(34) $\lambda x.\,\mathrm{DOG}'(x, 5)$

(35) $\lambda x.\,\exists n[\mathrm{DOG}'(x, n)]$

To summarize the argument by Krifka (1989), countable nouns differ structurally from uncountable nouns since they are born as type <n,<e,t>>, while uncountable nouns are born as predicates of type <e,t>. He states that singular countable nouns are not semantically distinguished from plurals but are simply functions from the number 1 to sets of singleton dogs. Plural marking is a matter of agreement: *one* or *a* induce singular morphology on the head noun, while *five* induces plural morphology. It is important to note that in his theory, the distinction between countable and uncountable nouns is lexical. While uncountable nouns are <e,t> and countable nouns are <n,<e,t>>, this lexical distinction is neutralized as soon as a noun is inserted into a nominal phrase. Krifka (1989) proposes that we treat counting as a form of measuring in which counting is putting individual entities in a one-to-one correspondence with natural unites, and measuring is assigning a measure value to a quantity on a dimensional scale—a scale which is independent of the internal structure of the quantity being measured.

In summary, countability as a semantic feature is not enough to distinguish between all of the noun types under discussion in the dissertation. As we have discussed briefly, natural atomicity holds a significant role in distinguishing the semantic differences between countable and uncountable nouns, as well as different types of uncountable nouns. In this dissertation, we adopt single domain view by Gillon (1992) which places the denotations of both countable and uncountable nouns in the same domain with the features [+count] and [–count]. While Rothstein (2017) explains the problem with this view as to whether or not uncountable nouns denote singleton sets or plural entities, we will see that this is resolved with the additional semantic feature of atomicity, which will be presented next.

2.2.2 | Atomicity

Although countable and uncountable nouns can be easily identified by the difference in the semantic feature [±count], in order to understand the difference between uncountable-substance and uncountable-object nouns, we need to examine the semantic feature [±atomic]. Landman (1989, 2011) and Chierchia (1998a, 1998b, 2010) have proposed that the object/substance contrast relates to the notion of *atomicity*, or whether or nouns denote individual things. The definition for *atomicity* is given in (36) from Choi and Ionin (2017, p. 1):

(36) A noun is atomic iff it cannot be divided into smaller parts which still bear the property denoted by the NP.

While English has a clear distinction between countable and uncountable nouns, the mapping of atomicity is not directly mapped onto this distinction. For example, while *furniture* is an uncountable noun in English, it is object-denoting rather than substance-denoting and is, therefore, atomic. There is a clear boundary between one piece of furniture and the next (e.g., one chair and another chair, or a desk and a chair), and not all parts of furniture are furniture (e.g., a leg of a chair is not furniture, but a chair is). These uncountable-object nouns like *furniture*, *mail*, and *money* are called 'fake mass nouns' by Chierchia (2010), according to whom they are limited to plural marking, non-classifier languages, like English. There is evidence, though, that atomicity is also present in GCLs such as Korean and Mandarin, where count and mass classifiers exhibit different syntactic behavior (Cheng & Sybesma, 1998, 1999; Choi & Ionin, 2017; Choi et al., 2018; Kim, 2005).

While Rothstein (2010, 2017) agrees with many of the claims by Krifka (1989) regarding the treatment of counting as counting with respect to a specific noun, she goes on to say that counting also "presupposes that the predicate is atomic and that disjointed minimal entities in the denotation of N can be individuated" (Rothstein, 2017, p. 107). She argues that countability is not the only feature at work but that atomicity is grammatically encoded in count noun denotations. Rothstein (2010, 2017) suggests that countable and uncountable nouns are of different types. She suggests that uncountable nouns denote a set of (plural) entities and is of type <e,t>, while countable nouns denote sets of indexed entities e_k where e is an entity and the index k indicates the context in which e counts as atomic. Countable nouns, then, are of type $<e \times k,t>$. This difference is then preserved as the NP structure is built up, and allows DPs headed by countable nouns to be distinguished from DPs headed by uncountable nouns. Rothstein (2010, 2017) assumes, then, that uncountable-object nouns like *furniture* denote atomic root nouns and are fully naturally atomic since their atoms are naturally disjoint.

This account of noun type distinctions has a number of advantages (Rothstein, 2017): (i) countable nouns and uncountable nouns are of different types, so, therefore, they have grammatical sensitivity to different operations and can be explained by sectional restrictions; (ii) there is distinction in types between countable and uncountable NPs and between countable and uncountable DPs; (iii) semantically atomic predicates are countable predicates in which context-dependent atomicity is grammatically encoded; (iv) counting is restricted to countable nouns. Rothstein (2010, 2017) summarizes her proposal for atomicity by saying that natural atomicity is neither necessary nor sufficient for a noun being countable. For instance, countable nouns like *dog* and *girl* are naturally atomic, but a noun like *fence* or *wall* is not as there is not always a clear individuation where one *fence* ends and the other beings. Countable nouns are associated with a grammatically encoded set of atoms, indexed for the context in which they are atomic, and it is the context-dependent encoded atomicity which makes them countable. We now turn our attention to the semantic universal of number and plurality to see its effects on both articles and noun types in English.

2.2.3 | Number

Many languages in the world mark nouns and noun phrases according to their number (Tallerman, 2011). In English, the number system is a binary system with two settings: [–plural] or [+plural], otherwise singular or plural. Countable nouns in English, unsurprisingly, can be either singular or plural, as they refer to items that can be counted. In other words, the absence of plural morphology with countable nouns entails singularity.

As stated by Payne and Huddleston (2002, p. 340) in *the Cambridge Grammar of the English Language*, "Most nouns have both singular and plural forms … The singular is identical with the lexical base and the plural is formed from the base by suffixation or some other morphological process." This contrast is exemplified by Quirk et al. (1985) who state that English has a two-term contrast in the number system: (i) singular, which denotes 'one' and (ii) plural, which denotes 'more than one' (p.

297). According to Quirk et al. (1985, pp. 297-298), the number of a noun phrase is determined by its head, which falls into one of three main number classes of nouns, shown in(40)–(.

(37) **singular invariable nouns:** most proper nouns and all uncountable nouns

(38) **plural invariable nouns:** nouns occurring only in the plural

(39) **variable nouns:** countable nouns

a. **regular:** plural form that is predictable from the singular form

b. **irregular:** plural form that is not predictable from the singular form

By looking at these classes, we can see that uncountable nouns are characterized as "singular invariable nouns," meaning that they cannot take any form of plural suffixation. As for countable nouns, they are classified as variable nouns and subdivided into two subclasses: (a) regular and (b) irregular. Regular countable nouns are nouns that take the inflectional morphological *–s* as a suffix, while irregulars are the form of some other morphological suffix.

As aforementioned, it is possible for uncountable-substance nouns to be combined with plural morphology. When this occurs, the noun is shifted into a *type* or *kind* meaning. See the examples in (40)–(45).

(40) John likes wine.

(41) John likes Spanish wine.

(42) John prefers Spanish wines.

(43) John likes some Spanish wines.

(44) Can you grab coffee for everyone on your way to the office?

(45) Can you grab coffees for everyone on your way to the office?

In (42) and (43), it can be seen that when plural morphology is added to the uncountable-substance noun, the noun begins to refer to a certain *kind.* While (40) denotes to wine in general, and (41) denotes wine that is produced in Spain, (42) gives the denotation that wine is made in more than one country and therefore is a different *kind* of wine and of those *kinds*, John prefers the *kinds* that are produced in Spain. In other words, it refers to individual types of wine that are made in different countries. The sentences in (44) show the "container" effect that can happen when pluralizing some uncountable-substance nouns. In (44), the speaker is asking the hearer to bring a quantity of coffee that is enough for everyone in the office, while (45) is asking the hearer to bring an individual *cup of* coffee for each person in the office. In semantics, this is referred to as *packaging*. In the current dissertation, only regular variable nouns (e.g., countable nouns that *predictably* take a plural –*s*) and uncountable nouns that are not easily *packaged* are considered as linguistic items for analysis. This decision was made due to the fact that uncountable nouns that can be easily *packaged* (e.g., *coffee* or *tea*) can be interpreted in more than one way, which may cause ambiguous results. The items that were included in the data collection and analysis will be presented in more detail later. Table 2.1 summarizes the semantic features of English noun types. Notice the distribution of each of the features and how flexible nouns are either [+count, +atomic] or [–count, –atomic].

Table 2.1. Distribution of universal semantic features on English noun types

	countability	**atomicity**	**number**
countable nouns	[+count]	[+atomic]	[±plural]
uncountable-object nouns	[–count]	[+atomic]	[–plural]
uncountable-substance nouns	[–count]	[–atomic]	[–plural]
flexible nouns (+count context)	[+count]	[+atomic]	[±plural]
flexible nouns (–count context)	[–count]	[–atomic]	[–plural]

This table clearly shows how countability differs between countable and uncountable nouns, while atomicity differs between nouns that denote individuals and those which do not. In the next section, we will consider these features and how they can be used to create subcategorization and selection rules for articles in the English NP.

2.3 | The Noun Phrase and Determiner Phrase

In English, all nouns should be preceded by an article. Singular countable nouns, especially, must be preceded by an overtly expressed (pronounced) English article in order to maintain their

[+count] status. The differences between countable and uncountable nouns, in English, can easily be characterized in terms of their syntactic constructions—that is, constructions that allow only countable nouns in comparison to those that only allow uncountable nouns. In the scope of the present study, we will restrict our attention to simple noun phrases. These phrases have the form in (46).

(46) (Det) (Adj) N $\longrightarrow$ NP

According to Radford (2004), singular count nouns cannot stand on their own as a complete noun phrase. Furthermore, they are unable to function as such even if premodified by an adjective, "rather, a singular count noun requires a premodifying determiner like *a/the/another/this/my*, etc." (p. 40). With this description, the form of the noun phrase in (46) would need to be improved in order to account for the fact that singular countable nouns *must* be preceded by a determiner. Thus, we have the NP form of (47):

(47) Det (Adj) N $\longrightarrow$ NP

With this notation, we can now require that a determiner precedes the head noun in order to create a noun phrase. As discussed earlier, the determiners that are under investigation in the current study are the definite article *the* and the indefinite articles *a(n)* and Ø. We will now turn our discussion to the subcategorization and selection of articles based on the grammatical properties of the noun types. As Radford (1997, p. 40) states, "Determiners tend to be restricted to modifying nouns which have specific *number/countability* properties." Following Gordon (1982) for our analysis of simple NPs, we will be interested in two kinds of rules:

(48) **subcategorization rules:** specify whether the noun type requires a determiner

(49) **selection rules:** specify co-occurrence restrictions of particular determiners with singular countable, plural countable, or uncountable nouns

Subcategorization rules allow us to express the facts, as seen in Figure 2.1 where singular countable nouns require a determiner whereas plural countable and uncountable nouns do not.

	Ø [no article]	**the**	**a, an**
singular	**a**	**c**	**e**
plural	**b**	**d**	**[f]**[a]

Our archetypical uncountable noun is *furniture*. Any noun that behaves like *furniture* is functioning as an uncountable-noun

a) I bought furniture.

b) *I bought furnitures.

c) I bought the furniture.

d) *I bought the furnitures.

e) *I bought a furniture.

Our archetypical countable noun is *dog*. Any noun that behaves like *dog* is functioning as a countable noun.

a) *I bought dog.

b) I bought dogs.

c) I bought the dog.

d) I bought the dogs.

e) I bought a dog.

----

[a] By definition, singular indefinite articles do not co-occur with plural nouns, so environment *f* is an impossibility.

Figure 2.1. Noun type distinctions and their potential environments (adopted and adapted from Teschner and Evans (2007, p. 126, Figure 5c))

The ungrammaticality in Figure 2.1 can be accounted for on the basis of the rules outlined above. That is, the ungrammaticality of (a) in the table is due to the fact that a [+count, +atomic, –plural] noun requires a determiner. It is possible then for us to further specify the subcategorization rules to state that [–count] nouns may not be pluralized (as mentioned in the previous linguistic description). We can specify the subcategorization rules by the notations in (50).

(50) Noun Subcategorization Rules (adapted from Gordon (1982, p. 7))

a. $[_{\text{NOUN}} +\text{count} \quad +\text{atomic}] \quad \rightarrow \quad / \quad \begin{cases} \text{Det} \quad \_\_ \quad [-\text{plural}] \\ \text{Det} \quad \_\_ \quad [+\text{plural}] \end{cases}$

b. $[_{\text{NOUN}} -\text{count} \quad \pm\text{atomic}] \quad \rightarrow \quad / \quad \text{Det} \quad \_\_ \quad [-\text{plural}]$

The rules in (51) are article selection rules (Heim, 2011). These rules are used to specify the selection properties of determiners. In other words, their notations provide information such as whether nouns must be in the singular or plural form. In these rules, we are specifying the rules over determiners that require singular countable nouns to follow them versus those which take plural countable nouns, as well as uncountable nouns. Here, we are simply attempting to account for distributional properties of article and noun type selection, in an adequate and descriptive manner.

(51) Article Selection Rules (adapted from Heim (2011, p. 999))

a. $[_{\text{DET}} - \text{DEF}] \rightarrow a(n) \ / \ \_\_ \ [_{\text{NOUN}} +\text{COUNT} \quad +\text{ATOMIC} \quad -\text{PLURAL}]$

b. $[_{\text{DET}} - \text{DEF}] \rightarrow \emptyset \ / \ \_\_ \begin{cases} [_{\text{NOUN}} +\text{COUNT} \quad +\text{ATOMIC} \quad +\text{PLURAL}] \\ [_{\text{NOUN}} -\text{COUNT} \quad +\text{ATOMIC} \quad -\text{PLURAL}] \\ [_{\text{NOUN}} -\text{COUNT} \quad -\text{ATOMIC} \quad -\text{PLURAL}] \end{cases}$

c. $[_{\text{DET}} + \text{def}] \rightarrow the \ / \ \_\_ \begin{cases} [_{\text{NOUN}} +\text{count} \quad +\text{atomic} \quad -\text{plural}] \\ [_{\text{NOUN}} +\text{count} \quad +\text{atomic} \quad +\text{plural}] \\ [_{\text{NOUN}} -\text{count} \quad +\text{atomic} \quad -\text{plural}] \\ [_{\text{NOUN}} -\text{count} \quad -\text{atomic} \quad -\text{plural}] \end{cases}$

As we will see in the next section of this chapter, expression of articles (definiteness and indefiniteness) and noun types (countability, atomicity, and number) can vary crosslinguistically, and may pose a problem for L2 learners (to be discussed in Chapter 3). For now, we turn to examine the crosslinguistic variation between English and Mandarin with regard to the linguistic features that we have talked about thus far: definiteness, countability, atomicity, and number.

2.4 | Crosslingustic Variation: Articles & Noun Types in Mandarin

To begin with, Mandarin as a GCL does not have a fully grammaticized countable/uncountable distinction in the nouns. In addition, it does not have an article system that is used to express definiteness. In this section, we will investigate the grammatical properties of Mandarin and examine the difference in mappings between atomicity and countability morphosyntax, as well as the expression of definiteness in the language.

2.4.1 | Expression of Definiteness

Contrasting with English, Mandarin does not have an article system. Therefore, in order to understand how definiteness is expressed in Mandarin, this section will outline some of the properties of the language, including word order and sentence structure. The information in this section will be contrasted with the information on English definiteness marking in order to develop a better understanding of the two languages.

When describing the basic sentence structure of Mandarin, Li and Thompson (1981) explain that a topic-comment relationship should be referred to instead of a subject-predicate relation like English. Although Mandarin is described as a topic-prominent language, there is no obligatory morphological topic marker (Lyons, 1999). In Mandarin, the topic always comes first in the sentence because it explains what the sentences is about and always refers to something that is assumed the hearer has knowledge of (Li & Thompson, 1981). They give the sentence in (52) as an example (Li & Thompson, 1981, p. 15). As Li and Thompson (1981) point out, there is no need for a direct semantic relationship between the subject and the verb.

(52)	zhei	ke	shu	yezi	hen	da
	this	CL	tree	leaf	very	big
	"This tree, (its) leaves are very big"					

According to Li and Thompson (1981), word order can be a signal for definiteness. They state that "[pre-verbal] position is a signal for definiteness for topics, subjects, and objects, that is, for whether these topics, subjects, and objects are already known to both the speaker and hearer" (Li & Thompson, 1981, p. 20). This exemplifies a key difference between Mandarin and English, where, in Mandarin, semantic factors determine how major constituents are ordered in relation to the verb, rather than grammatical features as in English. Robertson (2000) agrees but extends his explanation to the use of demonstratives as another marker of definiteness on the Mandarin NP, if and when it is marked. He goes on to explain that indefinite NPs cannot occupy a preverbal topic position, and post-verbal subjects are nearly always indefinite. Robertson (2000) explains that the same restriction applies to object NPs. They can move from their post-verbal position if the speaker wishes to emphasize that the object NP is definite (p. 141).

While Mandarin primarily uses word order and syntactic distribution[2] to mark definiteness, indefinite and definite reference may also be marked by demonstratives or numerals/measure word phrases (Yip & Rimmington, 2003). With the help of a demonstrative or measure word, nouns may receive definite refence in a post-verbal position. On the contrary, indefinite-referenced

[2] We will use the term *context-dependent* in reference to the distribution of the [definite] feature which is interpreted not only in the use of demonstratives and measure words but also word order in Mandarin.

nouns cannot normally be featured in pre-verbal position even with the help of a demonstrative or measure phrase (Yip & Rimmington, 2003). In light of this description, rather than a dedicated morphological or grammatical element that formally marks definiteness, it seems to be the case that the use of demonstratives in Mandarin mark definiteness, but are "broader than the grammatical definiteness associated with lexical or morphological marking by an article, since it embraces all generically interpreted noun phrases" (Lyons, 1999, p. 236). In other words, Mandarin appears to express definiteness not only via the use of demonstratives in many instances where English would have *the* (Lyons, 1999) but also the syntactic distribution of noun phrases which can provide signals of definiteness for topics, subjects, and objects (Li & Thompson, 1981).

2.4.2 | Expression of Countability, Atomicity, & Number

GCLs do not have a fully grammaticized distinction between countable and uncountable nouns, and, furthermore, the use of plural marking is optional, and according to Cheng and Sybesma (1998, 1999, 2014), the plural marker in Mandarin can only combine with [+human] nouns and is mandatory with proper nouns. Therefore, bare singular nouns in Mandarin can be interpreted as either singular or plural, see (53).

(53) diannao-zhuo
computer-table
"computer table(s)"

Both countable and uncountable nouns in Mandarin combine with classifiers to be counted, as in (54)–(57). According to Cheng and Sybesma (1998, 1999, 2014), in GCLs, the link between atomicity and the countable/uncountable morphosyntax is more direct, arguing that the count/mass distinction is reflected in the classifier system, with each of these types of classifiers behaving syntactically different. In addition, there is evidence that atomicity is also reflected in the Mandarin classifier system. Cheng and Sybesma (1998, 1999, 2014) propose a broad two-way grouping of classifiers based on their syntactic behavior: (i) sortal classifiers: those that encode ontological properties of the referents of the nouns they select, and (ii) measural classifiers (or massifiers): those that provide units of measure for counting the noun denotations. See the examples in (54)–(57) from Hua and Lee (2005, p. 139).

(54) San zhang diannao-zhuo
three.NUM[3] CL.SORTAL[4] computer-table
"Three computer tables"

(55) Mei ge xiangfa
every. DET CL.SORTAL[5] idea/thought
"Every idea/thought"

(56) Liang bei shui
two.NUM CL-glass idea/thought
"Two glasses of water"

(57) Ji xiang zhengju
every. DET CL-item idea/thought
"Several items of evidence"

As can be seen in these examples, *zhang* in (54) selects nouns whose referents are thin, flat objects. There are also examples of nouns being used as measural classifiers in (56) and (57). These classifiers, in (56) and (57), are able to stand on their own as nouns. Cheng and Sybesma (1998, 1999, 2014) suggest that sortal classifiers correspond to count-classifiers and measural classifiers correspond to mass-classifiers. This distinction between count and mass classifiers is reflected in their syntactic distributions (Hua & Lee, 2005).

3 NUM = numeral

4 CL = classifier; *zhang* is a sortal classifier for thin, flat objects

5 *ge* is a general sortal classifier

As aforementioned, countable and uncountable nouns can appear in singular bare forms. That is, both substance- and object-denoting nouns can occur in bare singular forms. See the examples below from Choi et al. (2018, p. 153).

(58) wo chuqu mai shu
1SG out go buy book
"I'll go out to buy a book/the book/books."

(59) wo mai-le liang ben shu
1SG buy-ASP two.NUM CL book
"I bought two books."

(60) diban shang you shui
floor on have water
"There is water on the floor."

(61) zuozi shang you san bei shui
table on have three.NUM CL-glass water
"There are three glasses of water on the table."

These examples further exemplify that in order for nouns to combine with a numeral in Mandarin, they must have a classifier between the numeral and the noun. While Mandarin has a plural marker, *-men,* it is restricted to use with [+human] nouns and is completely obligatory with pronouns, unlike the English plural *–s*. See examples (62)–(67) below from Choi et al. (2018, p. 154).

(62) wo kandao xuesheng(-men)
1SG see student(-PL)
"I saw (the) students."

(63) ni
2SG
"you (singular)"

(64) ni-men
2-PL
"you (plural)"

(65) shu(*-men)
book(-PL)
"book(s)"

(66) jiaju(*-men)
furniture(-PL)
"furniture"

(67) shui(*-men)
water(-PL)
"water"

While the plural marker in Mandarin is limited to [+human] nouns, and by definition all [+human] nouns are [+atomic], we cannot use this plural marker as a diagnostic for atomicity. In other words, this plural marker does not distinguish between atomic and non-atomic inanimate nouns. As suggested by Cheng and Sybesma (1998, 1999, 2014) and Choi et al. (2018), atomicity is reflected in the classifier system of Mandarin.

Although not obligatory, all nouns in Mandarin can be combined with a classifier. As aforementioned, Cheng and Sybesma (1998, 1999, 2014) put forth the broad distinction between count classifiers which 'name the unit' and mass classifiers which 'create a unit of measure'. There have been diagnostics proposed to distinguish mass and count classifiers, including placement of the modification marker *de* and ability to combine with adjectives (Cheng & Sybesma, 1998, 1999, 2014; Rothstein, 2017).

(68) a. liang bei kafei
two.NUM CL-cup coffee
"two cups of coffee"

(69)

liang	zhang	zuozi
two.NUM	CL	table

"two tables"

Furthermore, object-uncountable nouns, those nouns with the features [–count, +atomic], occur with the count classifier *jian*, as seen in (70)–(73) below from Choi et al. (2018, pp. 154-155).

(70)

fangjian	li	zhi-you	yi-jian	jiaju
room	in	only-have	one.NUM-CL	furniture

"There is only one piece of furniture in the room"

(71)

zuozi	shang	you	yi-jian	shoushi
table	on	have	one.NUM-CL	jewelry

"There is a piece of jewelry on the table"

(72)

wo	you	yi-ge	fangfa
1SG	have	one.NUM-CL	method

"I have a method"

(73)

wo	you	yi-tiao	xinxi
1SG	have	one.NUM-CL	information

"I have a piece of information"

These examples provide evidence that in Mandarin, atomicity is encoded directly in the countable/uncountable morphosyntax, but the role of atomicity is only visible in the domain of classifiers, and not in plural marking.

2.4.3 | Mandarin Nominal Phrases

As we examined, all nouns in Mandarin, with the exception of [+human] referents, can be treated as uncountable nouns until they combine with a classifier. According to Snape (2009b), being as Mandarin lacks articles, all nouns are semantically treated like 'mass nouns' and have category-type mapping. Chen (2003, 2004), on the other hand, has recently argued that the numeral *yi* (one) and the demonstrative *nage* (that) are beginning to emerge as grammatical categories in Mandarin to be used as a form of determiners or articles. This supports the claim by Chierchia (1998a) that *nage*, *nei*, and *yi* + *classifier* are not used frequently by all speakers and, as investigated by Partee (2006), that demonstratives and numerals in Mandarin do not yet have the same range of functions as articles in a language like English. The following examples of Mandarin show instances, as argued by Chen (2003, 2004), where Mandarin speakers are beginning to use numerals and demonstratives (*yi* for *one* and *nage* for *that*) in syntactic positions where English would permit, even require, an article or demonstrative (cited in Snape (2009b) taken from Chierchia (1998b, p. 354) and Huang (1999, p. 85)).

(74) a. yi li mi
one.NUM CL rice
"one (grain of) rice"

(75) liang li mi
two.NUM CL rice
"two (grains of) rice"

(76) yi zhang zhuozi
one.NUM CL table
"one table"

(77) liang zhang zhuozi
two.NUM CL t able
"two tables"

(78) ranhou nage lingban yizhi gaosu
then that boss always tell
"then that boss always says that"

Given that Mandarin is a language that lacks articles and a clear countable/uncountable noun distinction, we need to look at the individual items to be analyzed in this study in order to make appropriate predictions in the following chapters.

2.5 | Summary & Linguistics Items to be Analyzed in the Data

After having explored some of the most recent developments concerning the article system and noun type distinctions in English and Mandarin, the present study adopts the following semantic and syntactic assumptions in order to provide a theoretical background to the data analysis.

2.5.1 | Appropriate Noun Phrase Construction

As exemplified in the linguistic descriptions above, we will consider two sets of rules for the English NP, subcategorization rules (Gordon, 1982, p. 7) and selection rules (Heim, 2011, p. 999). The rules are given again in (79) and (80).

(79) Noun Subcategorization Rules:

a. $[_{\text{NOUN}}\ \text{+count} \quad \text{+atmoic}] \ \rightarrow\ / \ \begin{cases} \text{Det} \ \_\_ \ [-\text{plural}] \\ (\text{Det}) \ \_\_ \ [+\text{plural}] \end{cases}$

b. $[_{\text{NOUN}}\ -\text{count} \quad \pm\text{atmoic}] \ \rightarrow\ / \ (\text{Det}) \ \_\_ \ [-\text{plural}]$

(80) Article Selection Rules:

a. $[_{\text{DET}} - \text{DEF}] \ \rightarrow\ a(n) \ / \ \_\_ \ [_{\text{NOUN}}\ +\text{COUNT} \quad +\text{ATOMIC} \quad -\text{PLURAL}]$

b. $[_{\text{DET}} - \text{DEF}] \ \rightarrow\ \emptyset \ / \ \_\_ \ \begin{cases} [_{\text{NOUN}}\ +\text{COUNT} \quad +\text{ATOMIC} \quad +\text{PLURAL}] \\ [_{\text{NOUN}}\ -\text{COUNT} \quad +\text{ATOMIC} \quad -\text{PLURAL}] \\ [_{\text{NOUN}}\ -\text{COUNT} \quad -\text{ATOMIC} \quad -\text{PLURAL}] \end{cases}$

c. $[_{\text{DET}} + \text{def}] \ \rightarrow\ the \ / \ \_\_ \ \begin{cases} [_{\text{NOUN}}\ +\text{count} \quad +\text{atomic} \quad -\text{plural}] \\ [_{\text{NOUN}}\ +\text{count} \quad +\text{atomic} \quad +\text{plural}] \\ [_{\text{NOUN}}\ -\text{count} \quad +\text{atomic} \quad -\text{plural}] \\ [_{\text{NOUN}}\ -\text{count} \quad -\text{atomic} \quad -\text{plural}] \end{cases}$

2.5.1.1 | Countable Nouns

English countable nouns are semantically [+count, +atomic, ±plural]. Following the rules presented above, it is evident that countable nouns must be preceded by an article. Appropriate article choice for countable nouns will depend on the context (definite vs. indefinite) of the noun phrase, as well as the number. If the noun phrase is in a [+definite] context, then there is no choice, as the noun must select the English definite article *the*, regardless of plural morphology. If the countable noun is presented in a [–definite] context, then the morphology of the noun must be considered. If the countable noun is morphologically marked as [–plural], the noun phrase must take the indefinite article *a/an* in order to be grammatical. If the noun is morphologically [+plural] in [–definite] contexts, then the noun must combine with the zero article to complete the NP. Thus, the motivation for article selection is based not only on definiteness, but also on the number morphology of the countable noun.

2.5.1.2 | Uncountable Nouns

English uncountable nouns are semantically [–count, ±atomic, –plural]. Being as uncountable nouns lack plural morphology and, therefore, are always marked as [–plural], the construction of a noun phrase is based purely on the definiteness of the context, rather than the number marking. If the uncountable noun is presented in a [+definite] context, then the noun must select *the* as an article to precede it in the phrase. If the noun is presented in a [–definite] context, the noun must select the zero article for appropriate grammaticality for the noun phrase. Thus, for uncountable nouns, the motivation for article selection is based only on the definiteness of the context of the noun phrase.

2.5.1.3 | Flexible Nouns

Flexible nouns are a semantically-ambiguous group that are unmarked for countability, atomicity, and number in their base form. In the noun phrase construction, these nouns can either be interpreted as countable nouns [+count, +atomic, ±plural] or uncountable-substance nouns [–count, –atomic, –plural]. Article selection within the noun phrase is also influential in the interpretation of flexible noun phrases. The possible interpretations are presented in Table 2.2.

Table 2.2. Interpretation of semantically-ambiguous nouns in the noun phrase construction

	±definite	**±count**	**±atomic**	**±plural**
a. the chocolate	+	+	+	–
b. the chocolates	+	+	+	+
c. the chocolate	+	–	–	–
d. a chocolate	–	+	+	–
e. Ø chocolates	–	+	+	+
f. Ø chocolate	–	–	–	–

In Table 2.2, the difference between (a) and (c) is that (a) refers to the countable item (e.g., *the one chocolate*), while (c) refers to the substance *chocolate*. Therefore, with noun phrases that have semantically-ambiguous or flexible nouns in them, the interpretations are going to be dependent on all of the factors (definiteness, countability, atomicity, and number) being interpreted at the NP level.

2.5.2 | Appropriate Noun Morphology

With regard to the linguistic descriptions provided earlier, we have seen that plural noun morphology and number are closely related to countability in English. Therefore, under particular attention will be the appropriate [+plural] marking on countable nouns in English. Furthermore, as it has been seen that the division between nouns in Mandarin is more closely related to atomicity, we might see frequent errors when L2 English learners interpret English countability to be the same as Mandarin atomicity. Thus, under particular analysis will be the differences in morphology between countable [+count, +atomic] nouns and uncountable-object [–count, +atomic] nouns. Additionally, as aforementioned, if a countable noun does not occur with a morphologically-marked article (e.g., *a/an* or *the*), then it must also have the [+plural] morphological marker *–s*.

2.5.3 | Linguistic Items to be Analyzed in the Data

Having considered the semantic and syntactic properties of articles and noun types in English and Mandarin, a brief note on the kind of sentences and the critical linguistic items on which native and non-native informants were tested throughout the experiments of the present study is in order (see Chapter 6 for a detailed explanation about the individual tasks and items).

The following grammatical linguistic items in (81)–(83) were considered in the data on L1 Mandarin, L2 English students in an instructed second language acquisition environment:

(81) $[_{\text{DET}} - \text{DEF}] \rightarrow a(n) \;/\; \_\_ \; [_{\text{NOUN}} +\text{COUNT} \quad +\text{ATOMIC} \quad -\text{PLURAL}]$

(82) $[_{\text{DET}} - \text{DEF}] \rightarrow \emptyset \;/\; \_\_ \begin{cases} [_{\text{NOUN}} +\text{COUNT} \quad +\text{ATOMIC} \quad +\text{PLURAL}] \\ [_{\text{NOUN}} -\text{COUNT} \quad +\text{ATOMIC} \quad -\text{PLURAL}] \\ [_{\text{NOUN}} -\text{COUNT} \quad -\text{ATOMIC} \quad -\text{PLURAL}] \end{cases}$

(83) $[_{\text{DET}} + \text{def}] \rightarrow the \;/\; \_\_ \begin{cases} [_{\text{NOUN}} +\text{count} \quad +\text{atomic} \quad -\text{plural}] \\ [_{\text{NOUN}} +\text{count} \quad +\text{atomic} \quad +\text{plural}] \\ [_{\text{NOUN}} -\text{count} \quad +\text{atomic} \quad -\text{plural}] \\ [_{\text{NOUN}} -\text{count} \quad -\text{atomic} \quad -\text{plural}] \end{cases}$

In (84) and (85), you can find the ungrammatical linguistic items that were included in the data on L1 Mandarin, L2 English students in an instructed second language environment:

$$(84) \quad [_{\text{DET}} - \text{DEF}] \rightarrow \emptyset \; / \; \_\_ \begin{cases} [_{\text{NOUN}} + \text{COUNT} \quad + \text{ATOMIC} \quad - \text{PLURAL}] \\ [_{\text{NOUN}} - \text{COUNT} \quad + \text{ATOMIC} \quad + \text{PLURAL}] \\ [_{\text{NOUN}} - \text{COUNT} \quad - \text{ATOMIC} \quad + \text{PLURAL}] \end{cases}$$

$$(85) \quad [_{\text{DET}} + \text{DEF}] \rightarrow the \; / \; \_\_ \begin{cases} [_{\text{NOUN}} - \text{COUNT} \quad + \text{ATOMIC} \quad + \text{PLURAL}] \\ [_{\text{NOUN}} - \text{COUNT} \quad - \text{ATOMIC} \quad + \text{PLURAL}] \end{cases}$$

2.5.3.1 | Definite & Indefinite Noun Phrases

The following examples exemplify the contexts presented above. Singular countable nouns must be preceded by a morphologically-marked article. In indefinite contexts, that article is *a/an*.

- **Countable Nouns**
  - Definite Contexts
    - Skye is friends with the girls who live down the street.
    - I was wondering if the girl had found her way to the bus or not.
  - Indefinite Contexts
    - When I was on the bus, I saw a girl who looked like she was lost.
    - I like ∅ girls and my broth does, too.
    - *I saw there was ∅ girl in the park earlier.

Uncountable nouns, both atomic and non-atomic, are not preceded by the indefinite article *a/an*. In indefinite contexts, they are preceded by the zero article.

- **Uncountable-Object Nouns**
  - Definite Contexts
    - *Do you think **the** furniture**s** belong to them?
    - They have **the** furniture in the garage.
  - Indefinite Contexts
    - *We have **a** furniture in that room.
    - *I could not understand why **∅** furniture**s** were spread all over the room.
    - Would you believe me if I told you that I have **∅** furniture older than you?

- **Uncountable-Substance Nouns**
  - Definite Contexts
    - ***The** toothpaste**s** contain some mint.
    - We would bring **the** toothpaste to the kids.
  - Indefinite Contexts
    - *There is **a** toothpaste on the table but I am not sure if it is good.
    - *∅ Toothpaste**s** come in tubes.
    - Did you use ∅ toothpaste this morning?

Being as flexible nouns are grammatically acceptable in all contexts, when they are interpreted as a countable noun, they will be preceded by the indefinite article *a/an* and in definite contexts by the article *the*. When these nouns are interpreted as uncountable-substance nouns, they will be preceded by *the* in definite contexts and the zero article in indefinite contexts.

- **Flexible Nouns**
  - Definite Contexts
    - **The** chocolate**s** from Switzerland are for us.
    - We need **the** chocolate to finish baking the cake.
  - Indefinite Contexts
    - They want **a** chocolate.
    - She bought ∅ chocolate**s** for everyone in the office.
    - I have ∅ chocolate for you since it is your birthday.

2.5.3.2 | Plural & Singular Noun Morphology

In English, number is only overtly marked on countable and flexible nouns with countable interpretation. In other words, uncountable noun types do not have a morphological marker for number and do not appear in a plural form. Countable nouns are acceptable in the plural form, but cannot occur with the zero article in the singular form.

- **Countable Nouns**
  - Singular Contexts
    - I was wondering if **the** girl had found her way to the bus or not.

        - When I was on the bus, I saw **a** girl who looked like she was lost.
        - *I saw there was ∅ girl in the park earlier.
    - <u>Plural Contexts</u>
        - Skye is friends with **the** girl**s** who live down the street.
        - I like z∅ girl**s** and my brother does, too.

Because uncountable nouns are [–count], they are unable to occur in a plural form. Therefore, all plural forms of uncountable nouns make the sentences ungrammatical.

- **Uncountable-Object Nouns**
    - <u>Singular Contexts</u>
        - They have **the** furniture in the garage.
        - *We have **a** furniture in that room.
        - Would you believe me if I told you that I have ∅ furniture older than you?
    - <u>Plural Contexts</u>
        - *Do you think **the** furniture**s** belong to them?
        - *I could not understand why ∅ furniture**s** were spread all over the room.
- **Uncountable-Substance Nouns**
    - <u>Singular Contexts</u>
        - **The** toothpaste contains some mint.
        - *There is **a** toothpaste on the table but I am not sure if it is good.
        - Did you use ∅ toothpaste this morning?
    - <u>Plural Contexts</u>
        - *We would bring ∅ toothpaste to the kids.
        - *∅ Toothpaste**s** come in tubes.

Being as flexible nouns are grammatically acceptable in all contexts, they will be interpreted as countable nouns when they are marked with a plural *–s*. When they are not marked with a plural *–s* in an indefinite context with the zero article, they will be interpreted as an uncountable-substance noun. Interpretation of an unmarked flexible noun in a definite context with the article *the* might be interpreted as singular countable or uncountable-substance.

- **Flexible Nouns**

- Singular Contexts
    - We need **the** chocolate to finish baking the cake.
    - They want **a** chocolate.
    - I have ∅ chocolate for you since it is your birthday.
- Plural Contexts
    - **The** chocolate**s** from Switzerland are for us.
    - She bought ∅ chocolate**s** for everyone in the office.

All of the explained linguistic items are essential in the study of L2 English articles and noun types. Furthermore, the semantic and syntactic assumptions adopted in this dissertation account for the distinctions between nouns which are countable, uncountable, and flexible and the definite and indefinite contexts they can be found in. These assumptions are essential for providing a comprehensive analysis of the acquisition of articles and noun types in the English NP. In the next chapter, we will get an introduction to the Generative Second Language Acquisition framework, as well as a comprehensive explanation of the Feature Reassembly Hypothesis (Lardiere, 2008, 2009a, 2009b), the Bottleneck Hypothesis (Slabakova, 2008, 2009a, 2009b), and the Cline of Difficulty (Slabakova, 2009a) which might explain how these phenomena are acquired by L2 learners. In Chapter 4, we will look at previous studies on the L2 acquisition of English articles and noun types, which will reveal that studying these phenomena together as the English Noun Phrase is a gap in current research.

Chapter 3: Generative Second Language Acquisition

"He who loves practice without theory is like the sailor who boards ship without a rudder and compass and never knows where he may cast"

– LEONARDO DA VINCI

This chapter provides an overview of relevant theoretical contributions to the field of Generative Second Language Acquisition (GenSLA). It explores SLA processes considering the role that Universal Grammar (UG) and the native language (L1) play in the process of L2 acquisition. Findings and shortcomings will be revealed through an in-depth analysis of these theories, which will be considered later in the data analysis. This chapter is organized into two primary sections. Section 3.1 will explore GenSLA by starting with some historical theoretical accounts and focus on L1 transfer and UG access in GenSLA. Section 3.2 will focus on L2 acquisition of features and feature assembly as it discusses two prominent hypotheses in this area: the Feature Reassembly Hypothesis (Lardiere, 2007, 2008, 2009b) and the Bottleneck Hypothesis (Slabakova, 2009a, 2009b). The chapter closes in Section 3.3 with the theoretical assumptions which will guide us through the remainder of the dissertation.

3.1 | SLA and Principles & Parameters

Prior to the 2000s, the study of GenSLA relied on the principles and parameters laid out by Chomsky (1981) in the Universal Grammar (UG) theory. This theory claims that all humans are born with an innate language faculty that is comprised of universal principles and parameters that control the shape of all human languages. While principles are invariant and universal to all languages, parameters are described as a finite set of options that allow differences between languages and at the same time restrict the possible range of syntactic variation across languages

(Chomsky, 1981). The Principles and Parameters approach to L2 acquisition argues that the L2 learner constructs a mental representation of the target L2 from input by accessing principles and parameters of UG, in the same way that one does when acquiring a L1. Being as it is argued that principles are universal and apply to all natural languages, the learning task facing the L2 learner is to reset parameters from the L1 value into the appropriate L2 value. This variation is hypothesized to be primarily within functional categories which consist of a bundle of features that cause various surface (realized) differences between languages.

White (2003b) gives a number of examples to demonstrate these variations. For example, consider one of the parametric differences between Romance and Germanic languages. If we compare Spanish and English, as in (1) and (2), we see that the functional category NUM in Spanish contains the strong number feature, which triggers noun raising from N to NUM in order for feature checking over adjectives. This gives the word order N+ADJ, as shown in (1). On the other hand, English has weak NUM features and, therefore, nouns do not raise, resulting in the word order ADJ+N, as in (2) (examples from White, 2003, p. 14).

(1) la blusa roja
the blouse red

(2) the red blouse

When investigating the setting of this particular parameter, L1 English speakers acquiring L2 Spanish would have to reset their L1 parametric value (e.g., weak number feature) to the Spanish value (e.g., strong number feature) in order to produce the correct word order. Failure to reset this parameter results in incorrect word order production. The non-native-like behavior of incorrect Spanish word order produced by many adult L1 English speakers is due to the fact that the L2 leaner has failed to reset the appropriate parameters.

Within the UG framework, "language use is assumed to be based upon an abstract linguistic system, a mental representation of grammar" (White, 2015, p. 34). In other words, UG can be conceptualized as a blueprint to the most generalizable facts about language and contains information that is common to all human languages (Rothman & Slabakova, 2017). Thus, the aim of GenSLA research is to provide an understanding of "the interplay between knowledge pertaining to all human languages, knowledge that comes from the mother tongue, and knowledge that comes from exposure to the target language" (Rothman & Slabakova, 2017, p. 3).

As White (2003b, p. 58) states, "while some researchers have proposed that interlanguage grammars are 'wild', hence not fully UG-constrained, there are alternative analyses of the phenomena in question which can accommodate the potentially problematic data." While in L1 acquisition UG is the initial state, L2 initial state is much different. In L2 initial state, the learner already has an L1 grammar. This has led to determining the role that UG and the L1 have at the onset of SLA. This, in turn, sheds light on the nature of acquisition as the intermediate and final states of acquisition as well. With regard to these states, SLA research has focused on the nature of linguistics knowledge and to what extent, if at all, UG is available and constrains SLA. These two aspects were originally framed around Full / Partial / No Access to UG and Full / Partial / No Transfer of the L1. In this section, we will explore different possible combinations of these two aspects, which refer to different SLA theories that are still under debate.

3.1.1 | Full Transfer / Full Access

In the mid- to late-1990s, Schwartz and Sprouse (1994, 1996, 2000) put forth the Full Transfer / Full Access Hypothesis, according to which L2 initial state is a particular grammar. Within this hypothesis, learners transfer the grammar that they already have from their mother tongue. In contrast with other theories, Schwartz and Sprouse (1994, 1996, 2000) propose the notion of *full transfer*: The entirety of abstract properties from the L1 grammar constitutes the initial state. It is hypothesized that changes can be made to this initial state grammar; in other words, the L2 learner is not 'stuck' with the representations that are transferred. Once the transferred L1 grammar is unable to accommodate properties of the L2, the learner then turns to UG options not instantiated in the L1. Therefore, in order to arrive at an analysis more appropriate for L2 input, the learner turns to UG for new parameter settings, functional categories, and feature values, although this analysis still may not be native-like. This results in interlanguage grammars that are UG-constrained, hence, the term *full access*. The Full Transfer / Full Access Hypothesis can be schematized as in Figure 3.1, taken from White (2003b, p. 61).

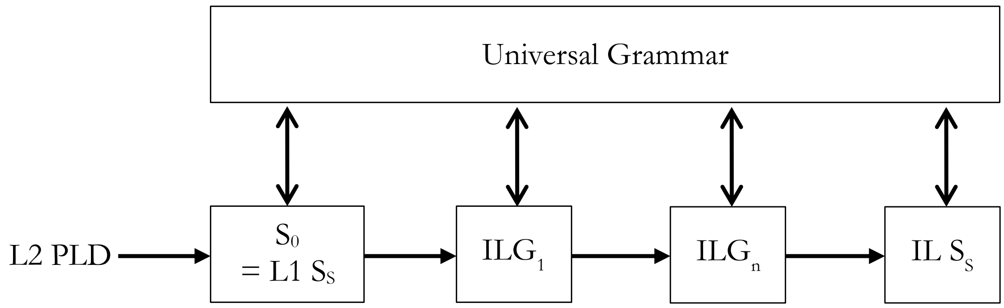

Figure 3.1. Full Transfer / Full Access (White, 2003b, p. 61)[6]

In summary, Full Transfer is the claim Schwartz and Sprouse (1994, 1996, 2000) make about the initial state, while Full Access is their claim about the subsequent grammar restructuring in the developing state. As White (2003b, p. 68) puts it, "One needs to think of [this theory] as in some sense a copy (or clone) of the L1 grammar, a copy which can be modified without affecting the original." Furthermore, the L2 learner is not limited to L1-based representations. As Schwartz and Sprouse (1994, 1996, 2000) hypothesize, if the L1 grammar fails to account for a property, the L2 grammar is UG-constrained and will look to UG for the missing property. The final outcome of this hypothesis is not guaranteed to be a native-like grammar, as the interlanguage grammars may lead to analyses of input that differ from those of native speakers (NSs).

3.1.2 | Partial Transfer / Full Access

In contrast to Full Transfer / Full Access presented above, the Partial Transfer / Full Access position to the initial state of SLA states that L2 learners have access to UG and only certain (partial) aspects of the L1. The two hypotheses that represent this position are the Minimal Trees Hypothesis by Vainikka and Young-Scholten (1994, 1996a, 1996b) and the Valueless Features Hypothesis by Eubank (1993/1994, 1994, 1996).

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[6] PLD = primary linguistic data; S_0 = initial state grammar; S_S = steady-state grammar; ILG = interlanguage grammar

3.1.2.1 | The Minimal Trees Hypothesis

The Minimal Trees Hypothesis was put forward by Vainikka and Young-Scholten (1994, 1996a, 1996b). Under this approach, only part of the L1 grammar is seen to be part of the L2 initial state. In other words, it is claimed that the initial grammar lacks functional categories all together but transfers the lexical categories. Although functional categories are not realized in the initial grammar, UG does carry a full inventory of functional categories that remain available. These functional categories are claimed to be gradually added to the interlanguage grammar, on the basis of L2 input[7] and, eventually, are able to project the associated projections (e.g., IP, CP, DP, etc.). The process through which these functional categories are added to the interlanguage grammar from the UG is considered to be 'bottom up', meaning there is an IP stage before CP. In other words, the presence of CP in the interlanguage grammar implicates IP—one can have IP without CP, but they cannot have CP without IP.

The authors of this proposal state that learners of different L1s will differ, depending on the headedness characteristics of the L1's lexical categories. According to Vainikka and Young-Scholten (1996a), it is the headedness of lexical categories that will be reset to the appropriate L2 value before any functional categories appear. Being as functional categories are not transferred from the L1, there is no stage or grammar in which properties of the L1 functional categories are found.

In summary, this proposal differs from Full Transfer / Full Access because only lexical categories, and no functional categories, are transferred from the L1, hence, *partial transfer*. In addition, the developmental stages involve the addition of these functional categories from a 'bottom up' approach. In the end, the final outcome is that the L2 learners should converge on the L2 grammar, at least for L2 functional projections, since it is L2 data triggering the relevant properties that are available in UG.

[7] These claims are made in the context of the Weak Continuity Hypothesis for L1 acquisition (Clahsen, Eisenbeiss, & Penke, 1996; Clahsen, Eisenbeiss, & Vainikka, 1994; Clahsen, Penke, & Parodi, 1993/1994; Vainikka, 1993/1994, among others), whereby initial state child language presents lexical categories with an underspecified functional projection and gradually, on the basis of input, do the rest of the functional categories emerge.

3.1.2.2 | The Valueless Features Hypothesis

The Valueless Features Hypothesis (Eubank, 1993/1994, 1994, 1996) claims that the initial state is a grammar that is the result of 'weak' transfer. This 'weak' grammar results in an interlanguage initial state that is largely, but not entirely, similar to that of the L1 grammar. This position is similar to that of the Full Transfer / Full Access Hypothesis, in which it claims that L1 lexical and functional categories are present in the initial interlanguage grammar. The difference between these hypotheses lies in that the Valueless Features Hypothesis claims the transfer of functional categories, but not their feature values. In other words, feature strength does not transfer with the functional categories, so instead of being strong or weak features in the initial state grammar, they are 'valueless' or 'inert'. This temporary characteristic of valueless or inert features in the initial state of SLA and feature strength is assumed to be acquired during the course of development in which morphological paradigms are acquired. As Eubank (1993/1994, p. 206) states, "[…] the presence of particular values derives from the presence in the lexicon of the relevant inflections."

To summarize, the Valueless Features Hypothesis claims that the interlanguage initial state is a grammar that contains both functional and lexical categories transferred from the L1, but feature strength is claimed to be inert. While feature strength will be acquired, it is assumed to be acquired in relation to the emergence of inflectional morphology. The final outcome, ultimately, is that the L2 learners should converge on the L2 grammar.

3.1.3 | Full Transfer / Partial Access

There are two primary hypotheses that originally take the position of Full Transfer / Partial Access. These are the Fundamental Difference Hypothesis (Bley-Vroman, 1990, 1996) and the No Parameter Resetting Hypothesis (Liceras, 1996, 1998, 2003; Liceras & Díaz, 1999). The primary claim of this approach is that all properties of the L1 are initially transferred to the L2 and UG is only available through the L1. While UG is not directly accessible in this approach, this approach differs from the No Access Hypothesis in the sense that UG properties remain accessible through the L1. Although the proponents of this approach agree that all L1 properties are transferred to the initial L2 state, the extent to which the L2 has access to UG has been accounted for in different ways, hence "Partial Access". While these two hypotheses are quite similar, the following two subsections examine each of them individually.

3.1.3.1 | The Fundamental Difference Hypothesis

The Fundamental Difference Hypothesis was put forth by Bley-Vroman (1990, 1996, 2009). The main claim of this hypothesis is that adult L2 acquisition lacks success and displays great variability among learners. When Bley-Vroman conducted a thorough analysis of the fundamental differences between L1 acquisition and L2 acquisition, he concludes that while L1 acquisition has access to UG and makes use of domain-specific learning procedures, these are different in L2 acquisition. In L2 acquisition, the learner must make use of L1 knowledge and the only mechanisms available are domain-general problem-solving strategies. However, even if the language faculty is not operative in adult L2 acquisition, it is possible for adult learners to achieve high competence in a foreign language. This leaves us with the logical problem: how does a learner acquire a second language?

Since the L2 learner already possesses knowledge of their L1, Bley-Vroman (1990, 1996, 2009) claims that UG can be accessed through the L1 principles. This access is only partial, though, as while all principles are available, not all parameters are accessible. If a parameter setting is absent in the L1, then it is not accessible in L2 acquisition. In this situation, the L2 learner must make use of non-linguistic cognitive skills in order to incorporate new L2 linguistic structures. In other words, the learner resorts to strategies such as induction, analogy, and negative evidence in order to carry out "construction-by-construction" acquisition. The Fundamental Difference Hypothesis is illustrated as seen in Figure 3.2.

Child Language Development	**Adult L2 Acquisition**
• Universal Grammar • Domain-specific learning procedures	• Native language knowledge • Domain-general problem solving strategies

Figure 3.2. The Fundamental Difference Hypothesis (Bley-Vroman, 1990, 1996, 2009)

In this hypothesis, L1 development happens via access to UG and domain-specific learning procedures. As for L2 acquisition, UG access is restricted to the principles and parameters instantiated in their L1, and the learner is only able to produce structures which resemble UG due to their use of negative evidence, analogy and explicit data. This leads them to learn linguistic structures as particular facts and, therefore, may cause them to have parsing difficulties resulting in the inability to judge sentences as ungrammatical. As Bley-Vroman (1990) puts it, "The end result can be a system of knowledge which, while weakly equivalent to the native language grammar in certain areas, has a quite different origin and, presumably, a different psychological status" (p. 92). In other words, the final state of the L2 grammar, under this view, is quite variable. Being as the L2 learners can only access UG through the L1, they must rely heavily on general learning mechanisms to learn the L2. While this might work very well for some learners, it may not work well for others and is, therefore, inevitably different from that of the native language grammar of the target language. For some learners, it is possible to acquire a grammar that is similar in certain aspects to that of the native language grammar, but it maintains a status that is psychologically different from that of the L1.

3.1.3.2 | No Parameter Resetting Hypothesis

The No Parameter Resetting Hypothesis (Liceras, 1996, 1997, 1998, 2003; Liceras & Díaz, 1999; Tsimpli & Roussou, 1991) claims that the L2 initial state, as well as interlanguage states, are comprised of the learner's L1 grammar. Unlike other hypotheses, the parameters are not assumed to breakdown and resetting the L1 parameters on their L2 values is considered to be impossible due to the fact that the parameters have "matured" or "grown" and already have set their corresponding abstract features. This implies that L2 adult learners are unable to set parameters to a new L2 value (Ouhalla, 1993; Tsimpli & Roussou, 1991). Some proponents of this hypothesis (Tsimpli & Roussou, 1991), argue that the interlanguage grammar (which has the L1 parameter settings) is able to accommodate L2 data that differ considerably vis-à-vis an analysis which is both UG-constrained and L1-based. Liceras (1997) makes a different claim, arguing "the effect of being restricted to L1 parameter settings is that learners have to resort to ad hoc local fixes to their grammars" (White, 2003b, p. 119).

Assuming that parameter resetting is not accessible to adults, Liceras (1996, 1997, 1998) argues that L2 learning is not sensitive to abstract features of functional categories, but they can access L2 input through "secondary-level domain-specific learning procedures" (Liceras, 1998, p. 87). This produces a non-native grammar that presents properties associated to a certain parameter. As Liceras (1998, p. 76) puts it, "information that is in a cognitive system becomes progressively explicit knowledge to that system". In other words, *secondary-level domain-specific learning mechanisms* are explicit and modularized and are not sensitive to L2 triggers, whereas the *domain-specific learning procedures*, which guide L1 acquisition, are non-explicit, non-modularized, and sensitive to parameter setting. The approach by Liceras (1996, p. 33) is illustrated in Figure 3.3.

Child L1 Acquisition	**Adult L2 Acquisition**
- Universal Grammar - Domain-specific learning procedures	- Previous linguistic experience - Secondary-level domain-specific learning mechanisms - General problem-solving systems

Universal Grammar: initial state
Previous linguistc experience: UG (mature state); L1; other L2s
Domain-specific learning procedures: non-modularized, non explicit
Secondary-level domain-specific learning mechanisms: modularized, explicit

Figure 3.3. Liceras's (1996) approach to second language acquisition.

In conclusion, Liceras (1998) claims that in SLA, UG is in a mature form and secondary domain-specific learning procedures are always available to the adult learner. Furthermore, the younger the L2 learner is, the less mature UG and domain-specific procedures will be. As a consequence, L2 acquisition may lead to the same results as L1 acquisition. In conclusion, this approach to transfer and access makes it clear that L2 acquisition is not like L1 acquisition and that the L2 learner must rely on superficial structures in order to restructure and construct the non-native grammar.

3.1.4 | Full Access / No Transfer

The Full Access Hypothesis (Epstein, Flynn, & Martohardjono, 1996, 1998; Flynn, 1996; Flynn & Martohardjono, 1994) is not, strictly speaking, a hypothesis about the initial state, but it has clear implications for the nature of the initial state. This hypothesis differs from the other hypotheses in that there is no transfer, and UG must constitute the initial state. Epstein et al. (1996, 1998) argue that the interlanguage grammar is UG-constrained at all stages. In other words, this means that UG remains accessible in non-primary acquisition. This hypothesis differs from the Full Transfer / Full Access hypothesis in that Epstein et al. (1996, p. 751) reject the notion that the initial state is formed from the L1 grammar although the authors do recognize that the L1 affects interlanguage grammars. The final outcome for L2 learners is linguistic competence that will be effectively identical to that of native speakers (Flynn, 1996) and any apparent differences between NSs and NNSs can be attributed to performance factors. White (2003b, p. 90) schematizes the hypothesis in Figure 3.4.

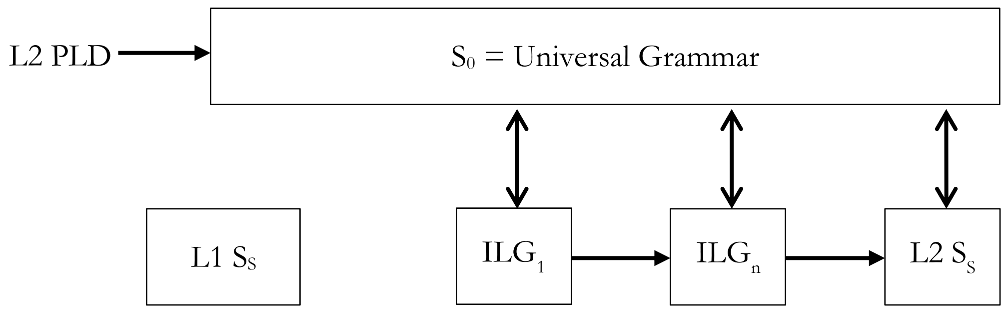

Figure 3.4. Full Access / No Transfer (White, 2003b, p. 90)

3.1.5 | No Transfer / No Access

The No Transfer / No Access approach does not involve influence from the L1 grammar, and the approach does not consider access to UG at any stage of L2 acquisition. Its primary claim maintains that UG is no longer accessible to adult L2 acquisition after it has driven L1 acquisition. Therefore, the L2 learners cannot have access to any UG principles and are unable to reset parameters to the L2 value. This claim implies that L1 acquisition and L2 acquisition are completely different and L2 development makes use of non-linguistic cognitive skills. This position has been studied by Clahsen and Muyksen (1986) and Meisel (1997) and maintains the unavailability of UG. Both papers claim that interlanguage grammars are unnatural and are developed not through linguistic cognitive skills, but general learning strategies.

Meisel (1991, 1997) holds the most extreme position in this approach. He analyzes French and German as L1s and L2s and observes a direct relationship between the occurrence of overt morphology and verb raising in L1 acquisition but not L2 acquisition. For Meisel, this is evidence of unavailability to UG in interlanguage grammars. Furthermore, the author claims that L2 learners make use of linear order strategies, rather than access UG principles. As has been discussed in the above subsections, plenty of research has shown that interlanguage grammars are constrained by and compatible with some access, partial if not full, to UG.

As White (2003b, p. 17) states, "As hypotheses about UG access developed, interest began to shift from overarching questions like 'Is UG available?' or 'What kind of UG access is there in L2' to a closer examination of the interlanguage grammar, with particular focus on whether interlanguage grammars exhibit properties characteristic of natural language." Table 3.1 below summarizes the views of L1 transfer and UG access that have been discussed.

Table 3.1. Initial state and beyond: hypotheses compared (some text adapted from White, 2003b, p. 94)

	Full Transfer / Full Access	**Partial Transfer / Full Access**		**Full Transfer / Partial Access**		**Full Access / No Transfer**	**No Transfer / No Access**
		MINIMAL TREES	VALUELESS FEATURES	FUNDAMENTAL DIFFERENCE	NO PARAMETER RESETTING		
Initial State	L1 lexical and functional categories, features, and feature strength transferred; full access to UG	L1 lexical categories transferred, but no functional categories; full access to UG	L1 lexical and functional categories and (some) inert features transferred; full access to UG	L1 lexical and functional categories transferred; access to UG restricted to L1 principles and parameters	L1 lexical and functional categories transferred; access to UG restricted to matured principles and parameters	No functional nor lexical categories transferred from the L1; only full access to UG	No L1 functional nor lexical categories; no access to UG
Developing State	Different path for learners of different L1s, at least initially. Restructuring of functional properties in response to L2 input.	Emergence of functional categories in stages, in response to L2 input	Inert features replaced by L2 feature in relation to the emergence of inflectional morphology	Development via negative evidence, analogy, and explicit data	Learners must rely on superficial structures in order to restructure and construct the L2 grammar	Development is UG-constrained with interlanguages sanctioned by UG	Development via the use of non-linguistic cognitive skills (e.g., general learning strategies)

	Full Transfer / Full Access	**Partial Transfer / Full Access**		**Full Transfer / Partial Access**		**Full Access / No Transfer**	**No Transfer / No Access**
		MINIMAL TREES	VALUELESS FEATURES	FUNDAMENTAL DIFFERENCE	NO PARAMETER RESETTING		
Initial State	L1 lexical and functional categories, features, and feature strength transferred; full access to UG	L1 lexical categories transferred, but no functional categories; full access to UG	L1 lexical and functional categories and (some) inert features transferred; full access to UG	L1 lexical and functional categories transferred; access to UG restricted to L1 principles and parameters	L1 lexical and functional categories transferred; access to UG restricted to matured principles and parameters	No functional nor lexical categories transferred from the L1; only full access to UG	No L1 functional nor lexical categories; no access to UG

In analyzing the syntactic theories in GenSLA, we can see how the field has evolved from the original Principles and Parameters approach into looking at L1 transfer and UG access within feature-based accounts. Adult SLA is much different from that of child L1 or L2 acquisition, since adult learners come with a fully formed grammar. This has led to the need for SLA theories to adopt the most recent syntactic approaches, in order to exactly pinpoint difficulties and have more focus on the specific learning tasks at hand for the learners.

3.2 | The Acquisition of Features

There is no doubt that SLA is a complex process that is influenced by many different factors. According to the Minimalist approach (Chomsky, 1995), language variation is due to differences among features that are bundled on functional categories such as Complementizer (C), Tense (T), Determiner (D), Negation (NEG), and Number (NUM). These categories consist of one or more features such as [±wh], [±past], and [±definite], to name a few. As Slabakova (2016, p. 197) states, "a mainstay of the Minimalist Program is the proposal that features come from a universal repository, made available to the child." Of course, acquiring a L2 differs from L1 acquisition in the sense that it involves acquiring a second set of features—a set that is assembled differently than the L1.

Failure to reset parameters within the Principles and Parameters framework has been explained by a research paradigm called the Representational Deficit approach. An earlier version of this approach was formulated under the name Failed Functional Features Hypothesis (R. Hawkins, 1998; R. Hawkins & Chan, 1997) and, more recently, as the Interpretability Hypothesis (R. Hawkins, 2001; R. Hawkins & Hattori, 2006; Tsimpli & Dimitrakopoulou, 2007). Being one of the most recent proposals within the Representational Deficit approach, the Interpretability Hypothesis states that all uninterpretable features in the UG inventory are available to the child, but those which have not been selected during L1 acquisition become unavailable after the Critical Period. According to Cho (2012),

> interpretable features have effects on the semantic interpretation of syntactic expressions (e.g., [definiteness], φ-features on nouns). Uninterpretable features make no difference in interpretation but have effects on the morpho-phonological realization of syntactic expressions, that is, uninterpretable features are relevant to (un)grammaticality of syntactic expressions (e.g., φ-features on verbs, the [Case] feature) and are responsible for constituent movement.
>
> (Cho, 2012, p. 8)

What this means is that unselected uninterpretable features become unavailable for acquisition of L2 grammar. In other words, uninterpretable features become unavailable, while interpretable features are permanently available. R. Hawkins and Hattori (2006) speculate that an advantage to having interpretable features available is that they are required for learning new open-class lexical items,[8] such as nouns, verbs, and adjectives. Being as languages are constantly adding new lexical items, interpretable features are necessary to learn these new items. As for uninterpretable features, they are only specified in a small number of closed-class items of functional categories. Eubank and Gregg (1999) give a very speculative example of a possible disadvantage to having uninterpretable features permanently available throughout life. For example, if the pro-drop parameter is permanently available to English speakers, they will doubt its value every time they hear an imperative sentence, but may learn to compensate for this by using more general learning mechanisms (e.g., raised awareness and/or noticing of pro-drop patterns).

On the one hand, there are a large number of studies that show that adult L2 learners can successfully acquire uninterpretable features (cf. Haznedar, 1997; Lardiere, 2008; Slabakova, 2000; Yuan, 1998). These pose a real challenge to the Representational Deficit approach. On the other hand, the literature can also attest to a number of studies in which interpretable features can be the locus of fossilization (cf. Lardiere, 2004; White, 2003b). These inconsistencies suggest the need for other explanations to account for L2 acquisition. In an effort to find a solution to these inconsistencies, we turn our attention to two more recent and prominent approaches to L2 acquisition that are also based on feature acquisition: the Feature Reassembly Hypothesis (Lardiere, 2008, 2009a, 2009b) and the Bottleneck Hypothesis (Slabakova, 2008, 2009a, 2009b, 2013).

3.2.1 | Feature Reassembly Hypothesis

One approach to feature acquisition in SLA is selecting or resetting features and values from the L1 to the L2. This is known as the Feature Reassembly Hypothesis (Lardiere, 2008, 2009a, 2009b). Lardiere (2008, 2009a) points out that considering L2 acquisition as simply selecting parametric

[8] 'Lexical' here is used to contrast with functional. The same term is used by Lardiere (2009b) in a different sense to refer to language-specific morphemes with functional features (e.g., *the*, *-s*, *who*, etc.).

values is too broad and general to explain the actual nature of learning problems and learner variability. According to Hegarty (2005), functional categories have these features assembled differently in different languages. In her proposal for the Feature Reassembly Hypothesis, Lardiere (2008, p. 4) states that "the ways in which grammatical features are morphologically combined and conditioned may well affect their acquirability and overt realization in SLA." Under her hypothesis, it is not the interpretability of features that causes the most difficulty for the learners, but rather the assembly of those features in the L2 assembly and how that differs from the L1. Therefore, "it is the task of the language acquirer to discern these specific configurations of features from the properties and placement of particular lexical items present in the linguistic input" (Lardiere, 2009b, p. 174).[9] Thus, depending on how features are assembled (either overt or covert realization is possible) and conditioned, interpretable features can be just as difficult as uninterpretable features. Lardiere (2009b, p. 175) gives a list of challenges confronting the L2 learner:

i. With which functional categories are the selected features associated in the syntax, and how might this distribution differ from the features-matrices of functional categories in the L1?

ii. In which lexical items of the L2 are the selected features expressed, clustered in combination with what other features?

iii. Are certain forms optional or obligatory, and what constitutes an obligatory context? More specifically, what are the particular factors that condition the realization of a certain form (such as an inflection) and are these phonological, morphosyntactic, semantic or discourse-linked?

Let us consider some examples from Lardiere (2008, pp. 111-112) regarding the [+past] feature. English, Irish, and Somali have all selected the feature [+past], but it does not encode a unitary interpretable feature. Since these languages all have selected this [+past] feature, English speakers learning the past tense in Irish or Somali would find this easy in the parameter resetting perspective.

[9] Lardiere (2009a) uses the term 'lexical item' to refer to language-specific morphemes with functional features such as *the*, *-s*, *-ed*, and *who* as well as null morphemes.

However, the learning task is much more difficult. Although each of these languages as selected the feature [+past], it is assembled differently in each of them. For example, the formal feature encodes not only past events, but also perfective aspects, (3), and irrealis mood, (4).

(3) The cow *jumped* over the moon.

(4) If I only *had* a brain…

The Irish [+past] is marked on complementizers in the CP to agree with past tense of the embedded clause. See (5) below from (McCloskey, 1979) as cited in Lardiere (2008, pp. 111-112). On the other hand, in Somali, [+past] agreement also encodes temporal habitualness (7), visible evidentiality of the referent to the speaker, (8), or even alienable possession in predicative genitive constructions (9). In addition, [+past] is marked on determiners and adjectives in DPs (examples from McCloskey (1979) and Lecarme (2003, 2004) as cited in Lardiere (2008, p. 112)).

(5)	Deir	sé	*gur*L	thuig	sé	an	scéal
	says	he	that-PAST	understood	he	the	story
	"He says that he understood the story."						

(6)	árday-*gii*	hore
	student-DET.M.PAST	before
	"the former student"	

(7)	(Weligay)	dúhur-*kii*	baan	wax	cunaa
	(always)	noon-DET.M.PAST	F.1SG	thing	eat.PRES
	"I (always) eat at noon."				

(8)	Inán-*tii*	hálkée	bay	joogta?
	girl-DET.F.PAST	place-DET.M.Q	F.3SG	stay.F.PRES
	"Where is the girl?"			

(9)	Búug-gani	waa	búug-gíi	Maryan
	book-DET.M.DEM	FOC	book-DET.M.PAST	Maryan
	"This book is Maryan's book."			

Under the parameter resetting approach, English speakers acquiring Irish or Somali past tense would not need to reset the parameter since both the L1 and the L2 have selected the [+past] feature. The conditioning factors, though, for the same feature [+past] in each of these languages is quite different. Therefore, the learning task the English speakers are presented with is not to reset the parameter, but to learn that in Somali, for instance, [+past] appears on DPs and indicates habitualness, evidentiality, and alienable possession in predicative genitive constructions. Thus, this is a challenging task for a language learner whose L1 has the same feature but encodes it quite differently.

One of the assumptions of the Feature Reassembly Hypothesis is that learners look for morpholexical correspondences between their L1 and the L2. To demonstrate this, Lardiere (2009b) looks at the assembly of plural-marking in classifier languages, such as Korean and Mandarin, in comparison to English. She examines the suffix *-men* in Mandarin and finds that it does appear to be some kind of plural-marker in Mandarin but must be interpreted as [+definite] and can only be affixed to [+human] nouns. In English, on the other hand, plural marking is not restricted to [+definite] interpretation or [+human] nouns but dependent on the presence of [+count] feature of the noun and articles and determiners that allow these nouns. Lardiere (2009b) explains that the presence of plural marking in both Mandarin and English is facilitative for the learner—they do not have to acquire a new lexical item—they still have to re-assemble this feature and its expression. In other words, Mandarin possesses plural suffixation tightly associated with the [+definite] and [+human] features, meaning that a plural-marked noun in Mandarin must be definite and human. English, on the other hand, realizes the [+plural] feature obligatory to agree with countability and denoting 'more than one' on common nouns, which is strictly prohibited in Mandarin.

In assuming full transfer, Mandarin speakers learning English may display very restrictive uses of plural-marking with [+definite] contexts and [+human] nouns, while a NS of English learning Mandarin, is likely to initially overgeneralize the use of plural marking in Mandarin. In other words, "a native English speaker acquiring [Mandarin] would need to learn that, in addition to a [+plural] feature , *-men* also bears a [+definite] feature that presumably must be checked" (Lardiere, 2009b, p. 198). On the other hand, a Mandarin speaker learning English might show developmental undersuppliance of plural-marking, having not yet reassembled the features properly. Therefore, by learning that English plural marking can occur with [–human] nouns, [–definite] contexts, and quantified expressions, the learner would demonstrate that they have successfully reassembled their features (Lardiere, 2009b).

The proposal by Lardiere (2008, 2009b) does not come without criticism. In her response (Lardiere, 2009a), she outlines a number of criticisms that were raised by her colleagues and responds to each of them individually. As White (2009) points out, the predictive power of this hypothesis is unclear because it is difficult to determine in advance "if certain L1/L2 combinations will be more difficult than others due to the kind of feature re-assembly required" (p. 420). Lardiere (2009a) answers this in a very straightforward way, stating that the degree of difficulty for reassembly may not be the same for each case. In other words, she suggests that predictions be made based on a case-by-case, or language-pair-by-language-pair, basis due to the fact that reassembly might happen in one direction for L1*x* acquiring L2*y* may be quite different from that for L1*y* acquiring L2*x*.

While there is still little research applying the predictions of the Feature Reassembly Hypothesis (Lardiere, 2008, 2009a, 2009b), it has begun to engage the imagination of SLA researchers throughout. As Slabakova (2016, pp. 200-201) puts it, "[the Feature Reassembly Hypothesis] is one of the most promising future directions for SLA research because it compels researchers to build a more complex picture of the acquisition process". This is because it requires the researcher to pay attention to meaning, syntactic expression, functional morphology conditioning environments, as well as the learning of the features of the same affix. In summary, under the Feature Reassembly Hypothesis (Lardiere, 2008, 2009a, 2009b), the problem for adult SLA is not likely to stem from limited processing capacity or representational resources, as proposed by Hegarty (2005) for child L1 acquisition. In SLA, the adult learner brings a fully developed system of assembled features on both functional and lexical items, which will then need to be disassembled and reassembled in order to work for the L2.

3.2.2 | Bottleneck Hypothesis

Following the proposal for the Feature Reassembly Hypothesis (Lardiere, 2008, 2009a, 2009b), Slabakova (2009a) makes predictions for learnability based on what is 'easy' and what is 'hard' to acquire. She predicts that learning situations where re-assembly of grammatical features is required are more challenging than situations in which simple remapping of L1 to L2 morphemes are required. Slabakova (2008, 2009a) calls this the Bottleneck Hypothesis.

In order to illustrate her point, Slabakova gives the example of the acquisition of grammatical gender. For example, in English, it is assumed that the feature [gender] is not absent in English NPs, but rather encoded through context; therefore, it will be quite challenging for L1 English speakers to learn a L2 with grammaticalized [gender] features (e.g., English speakers learning Spanish or German [gender] morphology). Likewise, learning a language where some reassembly is required would be easier; in other words, learning a L2 with gender features by someone whose L1 has gender features would be easier than a L1 English speaker (e.g., Spanish speakers learning German [gender]). The learning difficulty here is that Spanish NPs fall into two gender categories (masculine or feminine), while German NPs fall into three (masculine, feminine, or neuter). Finally, it would be easiest to learn a language where no reassembly, but simple mapping of L1 and L2 morphemes, is required. For example, a Dutch speaker learning German gender would face a far easier learning task than an English speaker learning German or Spanish would.

Slabakova (2009a, p. 321) illustrates her predictions on the degrees of difficulty in feature mapping in the figure below. In Figure 3.5, $F_{morpheme}$ stands for a functional feature whose value is encoded by dedicated morphophonological means, while $F_{context}$ stands for a feature whose values are fixed by discourse tracking and inconsistent signals which require discourse observations. *Reassembly* refers to "figuring out different conditioning environments for the expression of grammatical meanings" (Cho & Slabakova, 2014, p. 166).

(easier to acquire) ⟷ (harder to acquire)

Learning Task	$F_{morpheme}$ to $F_{morpheme}$ (no reassembly required)	$F_{morpheme}$ to $F_{morpheme}$ (reassembly required)	$F_{context}$ to $F_{morpheme}$
Example	*L1 Dutch learning L2 German [gender]*	*L1 Spanish learning L2 German [gender]*	*L1 English learning L2 German [gender]*

Figure 3.5. Cline of difficulty in grammatical feature acquisition (Slabakova, 2009b)

As can be seen in this figure, Slabakova's predictions are concerned with three learning situations: (i) morpheme to morpheme (no reassembly required), (ii) morpheme to morpheme (reassembly required), and (3) context to morpheme. As Cho (2012) points out, Slabakova does not explicitly spell out predictions about three other possible learning situations: (i) morpheme to context, (ii) context to context (no reassembly required), and (iii) context to context (reassembly required). Slabakova does discuss how the acquisition difficulty of L1 covertly expressed features might have implications for the acquisition of L2 covertly expressed features.

One important factor in adult SLA is the time required for observation and indexing of the discourse in order to figure out the importance of a feature value. Furthermore, it is more challenging to remap overtly marked L1 features onto those that are encoded covertly, or directly through context, in the L2. This is due to the necessity of confirming evidence that is difficult to come by. While Slabakova (2009a) does not explicitly spell-out these additional learning situation, she does discuss the difficulty of the L1 acquisition of covertly marked features, which, in turn, has implications for the acquisition of L2 covertly expressed features. In other words, adult L2 learners are looking in the L2 for an equivalent of their L1 functional morpheme, and when they are unable to find it, they turn to context. Context, however, is difficult to track, and lexical meaning can vary from sentence to sentence and situation to situation. Thus, it is possible that there will be no clear form-to-meaning mapping.

Cho and Slabakova (2014) combine these three additional learning situations with Slabakova's (2009a) learning situations, and extend Slabakova's proposal on the degrees of difficulty in feature acquisition in Figure 3.6. Cho (2012, p. 20) states that "the time required for observation and indexing of the discourse in order to figure out a feature value is an important factor in L2 acquisition." Furthermore, it is even more challenging to re-assemble features that are covertly marked in the L1 to those that are also encoded covertly through context in the L2 due to the necessity of confirming evidence, which would be difficult to come by. In other words, "Indirect encoding of a feature always brings on added difficulty" (Cho & Slabakova, 2014, p. 166), which is why it is most difficulty to acquire features that are encoded covertly, or only in the context of the usage.

(easier to acquire) (harder to acquire)

Learning Task	$F_{morpheme}$ to $F_{morpheme}$ (no reassembly required)	$F_{morpheme}$ to $F_{morpheme}$ (reassembly required)	$F_{context}$ to $F_{morpheme}$	$F_{morpheme}$ to $F_{context}$	$F_{context}$ to $F_{context}$ (no reassembly required)	$F_{context}$ to $F_{context}$ (reassembly required)
Example	*L1 Dutch learning L2 German [gender]*	*L1 Spanish learning L2 German [gender]*	*L1 English learning L2 German [gender]*	*L1 German learning L2 English [gender]*	***	***

Figure 3.6. Cline of difficulty in grammatical feature acquisition in six learning situations (Cho & Slabakova, 2014, p. 166)

As a caveat, Cho (2012) states that it is unclear whether or not there are language pairs for the two right most learning tasks on the cline. As she puts it, "if in a Language A a feature is fixed by context, how would that same feature be expressed differently in Language B, but still through context?" (p. 21, footnote 5). It is, therefore, possible that these two learning tasks are only hypotheticals.

In summary, the Bottleneck Hypothesis (Slabakova, 2008, 2009a, 2009b) focuses on learnability within language variation. It states that "if language variation is (predominantly) captured in the lexicon, and more specifically in the functional lexicon, then it makes sense to think of language acquisition as acquiring the functional lexicon of the target language" (Slabakova, 2016, p. 46). Slabakova (2016) goes on to say that the motivation for her proposal is practical: areas of grammar that are more difficult should get more instructional effort and attention. The 'Bottleneck' of language learning, therefore, lies in functional morphology. Slabakova (2016, p. 402) gives a number of reasons why functional morphology serves as the bottleneck of language learning:

i. the functional morphology is the main locus of grammatical meanings and the locus of difference between languages;

ii. it is difficult to process and attend to for second language learners as well as native speakers without much experience with that morphology;

iii. since narrow syntax is universal, understanding complex structures is not a problem when all the grammatical features are in place and acquired;

iv. since meaning calculation is universal, meaning comes for free when the functional morphology is available;

v. in order to acquire syntax and meaning in a second language, the learner cannot bypass the bottleneck of the functional morphology

As Slabakova states, the bottleneck is not solid, nor is it rigid; it expands with practice. "The tight place is functional morphology. Without it, sentences would sound unacceptable to native speakers of the language. Without integrating functional morphology in comprehension, we will be reduced to shallow processing" (Slabakova, 2016, p. 402). Therefore, teachers should know what is difficult to learn and therefore require more practice. They should also be aware of what is universal, so that it can be easily learned.

3.3 | Theoretical Assumptions in the Present Study

After having described and analyzed the most recent and relevant developments in the field of GenSLA, the present thesis adopts the following theoretical assumptions with respect to adult SLA and will use them to elaborate the hypotheses in order to analyze the data under study.

With regard to adult L2 acquisition, the present study assumes Full Transfer / Full Access put forth by Schwartz and Sprouse (1994, 1996, 2000). Under this approach, we will assume that L2 learners transfer the grammar that they already have from their L1 to their L2. Throughout the acquisition process, the learners have access to UG options to accommodate properties of the L2 that are absent in the L1. This may result in an interlanguage grammar that is UG-constrained, but a steady-state grammar that is not entirely native-like.

Furthermore, following the predictions for adult SLA laid out above from the Full Transfer / Full Access Hypothesis, we will assume that with the transferred L1 grammar, the learner will dis-assemble, and then re-assemble the parametric values in the interlanguages to achieve a native-like steady-state grammar. Following the Feature Reassembly Hypothesis by Lardiere (2008, 2009a, 2009b), we will assume that the learners will assess their interlanguage grammars and rebuild the features to become more native-like. While it may be possible to create a steady-state grammar that is similar to a NS, their ability to produce structures that are similar to those of the of a NS may take longer to develop. Additionally, the Bottleneck Hypothesis (Slabakova, 2008, 2009a, 2009b) predicts that functional morphology is especially difficult for L2 learners and that this will considerably slow down their acquisition process. In the current project, it is predicted that learning the functional morphology of English noun types will be particularly difficult for these L2 learners, as the L2 grammar is much different from the L1 grammar. This highlights the importance of what requires more focus in language instruction.

Chapter 4 will review types of instruction and linguistic knowledge. It will give an overview of instructed second language acquisition, which will help to set the scene for the current project before reviewing a series of previous studies on the acquisition of English articles and noun types. Chapter 4 will review types of instruction and linguistics knowledge. It will give an overview of instructed second language acquisition, which will help to set the scene for the current project before reviewing a series of previous studies on the acquisition of English articles and noun types.

Chapter 4: Instructed Second Language Acquisition

"The prisoner explained that in her statement she used a phrase
'a cup of coffee' merely as denoting 'a certain quantity of coffee'.
You yourselves will be able to judge whether that is
a usual and natural form of expression."

– D. L. SAYERS, *STRONG POISON*

In most second language acquisition (SLA) research, there has always been the basic distinction between instructed and uninstructed SLA. According to Housen and Pierrard (2005, p. 1), *uninstructed* SLA includes "naturalistic, spontaneous, unguided, untutored, [and] informal" processes of acquisition, while *instructed* SLA (ISLA) includes "guided, tutored, [or] formal" SLA. In other words, whether the second language (L2) is learned through authentic social situations with spontaneous communication or under pedagogical guidance determines whether it is considered to be uninstructed or instructed (N. C. Ellis, 1994; R. Ellis, 1985; Klein, 1986; Larsen-Freeman & Long, 1991; McLaughlin, 1987).

Traditionally, Generative SLA research (GenSLA) has dismissed instruction as playing a role in acquisition since the processes of *acquisition* and *learning* have been viewed as distinct. As discussed earlier in the dissertation, research on L1 transfer and UG access suggests that L1 and L2 acquisition are very different processes. This is problematic because theoretical GenSLA is not commonly implemented in practical ways in the L2 classroom (Whong, Gil, et al., 2013a; Whong, Marsden, et al., 2013). According to Nassaji (2012), there is a gap between GenSLA research and language pedagogy. In her study, she found that language teachers view GenSLA research as being inaccessible or irrelevant due to its nature of research questions that focus on solving theoretical puzzles, whereas language pedagogy research explores questions that tend to be more pedagogical in nature with results that are more practical and applicable for the language classroom.

This chapter is organized as follows. Section 4.1 will give an overview of language acquisition and language learning. Section 4.2 will discuss the nature of second language knowledge, as well as acquiring and measuring types of L2 knowledge. Lastly, Section 4.3 will look at instruction in the L2 classroom. It will present arguments against and in support of the teaching of L2 grammar. Additionally, this section will look at and compare two types of teaching: standard (traditional) explicit instruction and linguistically-informed instruction. Section 4.4 will attempt to bridge the gap between Generative Second Language Acquisition (GenSLA) and Instructed Second Language Acquisition (ISLA) by presenting the common ground between GenSLA and ISLA as well as the gap that this project seeks to fill. The final section summarizes the theoretical assumptions of the present study and sets the stage for the review of relevant empirical studies in Chapter 5.

4.1 | The Acquisition & Learning Distinction

What exactly happens when a speaker learns or acquires a second language? Most linguists would agree that there is a cognitive process, or series of processes, that a speaker undergoes in order to learn or acquire a second language. One of the first theories developed specifically for SLA (VanPatten & Williams, 2015) was the Monitor Model put forth by Krashen (1978). This model was a collection of five hypotheses that constituted major assumptions and claims about how a second language was acquired, (1)–(5). In sum, this model was meant to explain why what is taught is not always acquired and why what is acquired may not have been taught.

(1) The Acquisition-Learning Hypothesis: there exists a dichotomy between acquisition, a subconscious process that involves the Language Acquisition Device, and learning, a conscious process.

(2) The Monitor Hypothesis: learners only consult their rule knowledge when they have sufficient time to do so; learned knowledge works as a monitor.

(3) The Natural Order Hypothesis: learners follow specific sequences in their acquisition of specific forms (e.g., grammatical morphemes).

(4) The Input Hypothesis: leaners can only acquire language in one way, that is the understanding of messages in the L2 (e.g., comprehensible input).

(5) The Affective Filter Hypothesis: learners must be comfortable and receptive to L2 input in their learning environment.

A major component of the Monitor Model was that instruction is only beneficial for learned knowledge (Krashen, 1978, 1981, 1982, 1985). This *learned knowledge* is defined as explicit knowledge of L2 rules. He argued that learned knowledge is not helpful for spontaneous, communicative language use, but helpful in very limited instances when easy grammar rules enable learners to monitor their own output. On the other hand, previous research suggests that ISLA can be beneficial, but it is still unknown to what extent. Furthermore, L2 instruction as a whole may be beneficial, but questions still remain as to for what or to what extent it is beneficial. In reality, an important goal of many learners is to be able to communicate effectively, or in a meaningful way, in the L2. This brings us to the idea of communicative competence proposed by Canale and Swain (1980), who propose the four different competences in (6)–(9).

(6) Linguistic competence: the learners' knowledge of the L2 morphosyntax, lexis, and phonology

(7) Sociolinguistic competence: the learners' ability to use language appropriately in various social contexts

(8) Discourse competence: the learner's knowledge of how to produce coherent and cohesive written and oral language

(9) Strategic competence: the learners' ability to deal with communication difficulties

For the most part, ISLA research has focused on (6), but (7) has begun to grow in more recent literature. As for (8)(6), it has primarily been investigated in the context of L2 writing, which may very well be viewed as a complement to ISLA research. Finally, (9)is at play in the interactionists approaches to SLA, most notably in relation to learners' negotiation of meaning (Long, 1996). If the primary goal of L2 instruction is to produce learners who can communicate effectively, then it is important to consider the nature of the knowledge that enables them to do so. In a broad overview of SLA, there are similar positions to types of knowledge, although terms may differ from one theory to another. Regardless, DeKeyser (2007b) and R. Ellis (2005a) maintain a distinction between knowledge which consists of information about the language and knowledge which allows leaners to unconsciously use the language in spontaneous communication.

4.2 | The Nature of L2 Knowledge

The nature of L2 knowledge is often discussed as a dichotomy between explicit and implicit knowledge. Explicit knowledge is often defined as 'knowledge about' language. It is described as knowledge that learners are aware of and can retrieve consciously from memory (Loewen, 2015). In other words, learners know that they possess this information and are able to verbalize it in the form of a description of L2 use or an L2 rule (Ur, 2011). Learners may use metalinguistic knowledge to give these descriptions and rules, but explicit knowledge is not necessarily comprised of technical terminology (Basturkmen, Loewen, & Ellis, 2002; Gutiérrez, 2013). Implicit knowledge has been called 'knowledge of' language rather than 'knowledge about'. The primary distinction between these two types of knowledge lies in awareness. Ur (2011, p. 510) gives the following definitions of implicit and explicit knowledge:

> Implicit knowledge of grammar is that which is demonstrated through students' actual production of speech or writing in communication and does not imply the ability to explain underlying rules. Explicit knowledge is the ability to verbalize a rule or description of usage, often using grammatical metalanguage.
>
> (Ur, 2011, p. 510)

Loewen (2015, p. 20) gives the examples in (10) of how L2 knowledge might be verbalized to express the formation of first-person, present, simple tense in Spanish. (10) uses technical terms, while (11) uses more lay terms.

(10) The first-person singular morpheme –*o* is added to the base form of the verb.

(11) I use –*o* at the end of a word when I want to say that I usually do something or am doing it at the moment.

Regardless of which way something is expressed, (10) or (11), learners are showing that they possess explicit knowledge of this linguistic rule.

From a cognitive perspective (R. Ellis et al., 2009; Rebuschat, 2013), learners do require the use of more resources in order to retrieve explicit knowledge from memory. A consequence of explicit knowledge retrieval being cognitively effortful is that the time taken to access explicit knowledge does not allow for quick, uninterrupted language production (R. Ellis, 2009a). Implicit knowledge, on the other hand, is accessed quite quickly, effortlessly, and unconsciously, which allows it to be used for spontaneous speech production. For example, if a native speaker of English were presented with the sentences in (12), they will most likely say that (12)–(14) are grammatical, but (15) is not even though it follows the same pattern as (13). Examples sentences are taken from Loewen (2015, p. 21).

(12) She gave the book to him.

(13) She gave him the book.

(14) She donated the book to the library.

(15) *She donated the library the book.

If a native speaker were asked to explain the reasoning for their judgments, they might have a difficult time explaining why (15) is ungrammatical and (13) is grammatical. One might find that the L1 speaker is unable to articulate why they find such sentences to sound *better* or *worse* than others. Due to the speaker drawing on their implicit linguistic knowledge to give judgments to the sentences, they are unable to verbalize why some sentences are grammatical and others are ungrammatical, unless they have had some formal training in English grammar of linguistics. As the example above shows, the presence of implicit knowledge does not imply the existence of explicit knowledge (Ur, 2011). While it is possible for L2 learners to be unaware of the linguistics knowledge they possess, this is more likely for naturalistic learners, rather than instructed learners. In other words, L1 speakers tend to possess far more implicit knowledge than explicit knowledge, while it is often the case that L2 learners have more explicit metalinguistic knowledge of the grammar than L1 speakers (Alderson & Hudson, 2013).

Another prominent view on the distinction between types of knowledge is Skill Acquisition Theory (DeKeyser, 2007a, 2007b, 2007c), under which the distinction in types of knowledge lies between automatized knowledge that is used without awareness, and knowledge that learners can verbalize (termed as declarative knowledge). Skill Acquisition Theory, which is a more general psychological theory of learning (DeKeyser, 2007b; Segalowitz, 2003) also deals with the nature of L2 knowledge and the mental representation of that knowledge. This theory is not specific to language as it proposes that developing communicative competence in an L2 is similar to the same trajectory as learning other skills (e.g., playing an instrument or sport). Similar to the cognitive approach, though, Skill Acquisition Theory maintains a distinction between two types of knowledge. Instead of referring to these types of knowledge as implicit and explicit knowledge, they are called procedural and declarative knowledge. As aforementioned, declarative knowledge includes knowledge that leaners can verbalize, while procedural knowledge is automatized, and leaners have difficulty verbalizing it. According to R. Ellis (2009a), implicit and explicit knowledge are viewed as modular, meaning that they are stored in two different places in the brain and, therefore, do not intermingle. Procedural and declarative knowledge, on the other hand, are viewed to be part of the same continuum, with declarative knowledge being able to be proceduralized or automatized through practice (DeKeyser, 2007b).

4.2.1 | The Acquisition of L2 Knowledge

It is generally viewed that the type of knowledge acquired is closely related to the type of learning that has occurred. If the two types of learning are considered to be different processes, the results are then stored in different parts of the brain (N. C. Ellis, 2007b). Therefore, it is assumed that implicit learning occurs without intention or awareness and results in implicit knowledge, while explicit learning is considered to be intentional and overt and, therefore, results in explicit knowledge (Krashen, 2003; Macaro & Masterman, 2006; Rebuschat, 2013).

For example, in a more traditional classroom approach, L2 language learning has been viewed as an accumulation of explicit knowledge about grammatical rules and vocabulary (Littlewood, 2011). This perception stems from lesson plans from L2 languages that focus on specific rules or grammatical forms in hopes of the L2 learners using these rules and forms to build up a complete knowledge of the L2 grammar. Loewen (2015, p. 25) explains why it is generally considered easy to teach explicit knowledge:

> Explicit grammar instruction works well because it results in explicit, declarative knowledge about language (Doughty, 2003). The grammatical rules of an L2 are relatively clear, and they can be explicitly presented to learners. … Additionally, learners feel that they are learning something because they are able to articulate the L2 rules that have been presented to them.
>
> (Loewen, 2015, p. 25)

Although explicit rule learning is very important to successful L2 acquisition, being aware of a rule does not necessarily mean that it is easily used in communication (R. Ellis, 2005b, 2009a). Implicit knowledge, on the other hand, is considered to be very difficult to teach; in fact, Krashen (2003) even argues that it cannot be taught. Krashen (2003) and Hulstijn (2002) both agree that implicit knowledge takes a considerable amount of time to develop, and it only happens as learners are exposed to L2 input and gradually build up their cognitive systems to recognize the patterns that the input presents them with. According to (DeKeyser, 2007a), the development of L2 implicit knowledge requires large amounts of time, practice, and input, and providing L2 learners with sufficient L2 practice can be difficult, especially where large classes and a full curriculum are concerned.

Therefore, learners in L2 classroom would benefit from not only explicit instruction, but a supplementation of implicit learning opportunities, too. While explicit knowledge is relatively easy to learn but difficult for production, implicit knowledge is relatively difficult to learn but easy for production. This continues to be one of the most important issues in ISLA: how the L2 classroom becomes an environment which provides optimal opportunity for learners to take their L2 explicit knowledge and convert it into L2 implicit knowledge.

4.2.2 | The Interface Hypothesis

The previous section concluded that implicit and explicit knowledge are different types of knowledge which are. What remains to be determined is in what ways in which they are related. The Interface Hypothesis (N. C. Ellis, 2005), addresses whether or not explicit knowledge can become implicit knowledge. There are three positions within the Interface Hypothesis: (1) 'No Interface Position' (Krashen, 1978, 1981, 1982, 1985)., (2), 'Strong Interface Position' (DeKeyser, 1995, 1997), and (3) 'Weak Interface Position' (N. C. Ellis, 2005, 2007a, 2007b; R. Ellis, 1994/2008). One might imagine these positions to fall on some kind of continuum as in Figure 2.1.

'Strong Interface' ←———— 'Weak Interface Positions' ————→ **'No Interface'**

Figure 4.1. The Interface Hypothesis and its positions

The 'No Interface Position' within the Interface Hypothesis explores a relationship between explicit and implicit L2 knowledge where there is there is an absolute separation between implicit and explicit knowledge inside the learner's mind as proposed by Krashen (1978, 1981, 1982, 1985).

While Krashen did not specifically refer to his Acquisition-Learning Hypothesis as a 'No Interface Position', he suggested that it is possible to have implicit and explicit knowledge about similar linguistic features without this knowledge being connected in any way. The only purpose of language instruction would be, according to his view, a source of L2 input that can support acquisition, as a method of monitoring output. He proposes that for successful language acquisition, input must be comprehensible—a little beyond the learner's current state of acquisition. In response to this, Pienemann (1985, p. 45) explains the shift in ISLA from instruction as a series of taught grammatical rules to "providing linguistic input for acquisition in the classroom".

One objection to the 'No Interface Position' is that the idea of storing linguistic information about a structure, for instance, in two separate linguistic systems is clearly an inefficient way for the brain to cope with and store information (Gass, Behney, & Plonsky, 2013). Another objection to the 'No Interface' distinction between acquisition and learning is the consideration of learners who learn a language in only a formal setting. For example, if these learners mainly receive instruction in their native language, rather than the L2, we would expect that they have a learned system and not an acquired system since there is no way to "pick up" information from the environment. In sum, the 'No Interface' position seems counterintuitive, as there seem to be no means of evaluating the claims since Krashen does not appear to give any kind of specific criteria for this position.

The 'Strong Interface Position' (DeKeyser, 1995, 1997) views language learning much like any other kind of learning, both cognitive and psychomotor. This is the position that proposes the sequence that learning progresses from declarative knowledge to procedural knowledge to, finally, full automatization of the procedural knowledge. In other words, this position claims that explicit knowledge can, and does, become implicit knowledge over time. DeKeyser states that declarative knowledge is obtained through observation and analysis, verbal instruction, or a combination of both. Under this view, the movement from one stage to the next is facilitated by learner practice. The learner needs to perform in order to practice (e.g., practice producing or understanding language). This is only the beginning, as in order for procedural knowledge to become fully automatized, it needs to become fast and without deliberation. In other words, practice is imperative to ensure that behaviors are quick, and attention spent is diminished. It is only at this point that it will finally become automatized knowledge. This position was tested and corroborated by DeKeyser (1997) with a study in which learners of an artificial language were presented with four rules and different types of instruction: (i) one group received comprehensive practice for two rules and production practice for the other two; (ii) another group received production practice for the first two rules and comprehensive practice for the other two rules; (iii) a third group received equal amount of production and comprehension practice for all the rules. The results suggested that declarative knowledge followed by practice led to grater proceduraliazation and automaticity. This position was further supported by de Jong (2005), who performed a similar study with L2 Spanish learners. The results corroborated DeKeyser (1997) in that aural comprehension yielded greater speed in comprehension.

The third position, the 'Weak Interface Positions' (N. C. Ellis, 2005, 2007a, 2007b; R. Ellis, 1994/2008), actually consists of more than one view. There is no one single 'Weak Interface Position'. Instead, *Weak Interface* is a way of categorizing the positions which fall between the 'Strong Interface Position' and the 'No Interface Position'. One weak face model, put forth by R. Ellis (1994/2008), says that developmental features of language can be converted into implicit knowledge but only when the learner is at the correct developmental stage, one example of this would be acquisition of third person *-s*. For variational features, though, (e.g., copula *be*), they can be converted form explicit to implicit knowledge at any point. Another weak interface model proposed by (N. C. Ellis, 2005, 2007a, 2007b) states that implicit and explicit knowledge can cooperatively work together, with implicit knowledge being the most important for learning. N. Ellis proposes that this cooperation is true for any learning task, whether it be language-based or not.

To summarize, while the GenSLA paradigm has traditionally viewed acquisition and learning as two different processes, there is growing acknowledgement within GenSLA literature that instruction may be beneficial to L2 proficiency. According to Whong, Gil, and Marsden (2013b), understanding the distinction between learning and acquisition is important when considering whether instruction is effective in the development of not-easily-acquired-properties. They go on to state that research needs to further explore different types of language input, as well as the interface between learned and acquired knowledge. Clearly, there continues to be a gap between GenSLA theory and the results of pedagogy research. To inform this research gap, GenSLA theory needs to become informed by findings in pedagogy research and vice-versa. This gap, and work within it, will be discussed in more detail in the following sections.

4.2.3 | The Measurement of L2 Knowledge

While a working model of SLA in which there is a clear distinction between implicit and explicit knowledge is important, just as important is having instruments with which to collect valid and reliable measurements of implicit and explicit knowledge. It is possible that, through the development of appropriate instruments, researchers can measure and investigate changes in learners' explicit and implicit knowledge. However, it remains difficult to strictly measure implicit and explicit knowledge separately. While recent researchers have invested time and effort into instruments that may be better measures of either type of knowledge (R. Ellis, 2005b, 2009a; R. Ellis et al., 2009), it is no guarantee that any one instrument is going to exactly probe any one type of knowledge.

As R. Ellis (2005b) and R. Ellis et al. (2009) state, there are a number of generally accepted ways researchers measure learners' explicit knowledge. Generally, these include direct probing of the L2 knowledge in question via very explicit instruments. For instance, after learners have been instructed on a specific grammatical form, they may be tested on their ability to explicitly verbalize the rule and then apply it in a variety of contexts. Some of the explicit instruments used for collecting information on and measuring explicit grammatical knowledge include: making grammatical judgments about sentences, providing grammatical rules for certain structures, providing corrections to sentences rated as ungrammatical, and even some forms of cloze or fill-in-the-blank tasks.

As for implicit knowledge, it is considered to be much more difficult to collect, and, ideally, requires samples of learners' spontaneous oral production. If learners do possess implicit knowledge of a certain grammatical form, they should be able to quickly and effectively use it in spontaneous speech with making little to no mistakes. However, this method of measuring implicit knowledge can result in a number of difficulties, the first of which concerns explicit knowledge. It is possible that learners may be able to monitor their speech production and, therefore, use explicit knowledge of the rules. Additionally, they may consciously remind themselves of the form and then pause mid-sentence to remind themselves of the appropriate form. Another prominent issue with spontaneous speech production is that learners may avoid, or under produce, certain structures. This does not mean that they do not possess implicit knowledge, but they may be more comfortable using other structures or might not find the context to be suitable for the grammatical form under investigation (Loewen, 2015).

Much recent research has systematically investigated ways in which both implicit and explicit knowledge might be assessed (cf. R. Ellis, 2005a; R. Ellis et al., 2009; Rebuschat, 2013). In their recent research, they have concluded that implicit knowledge is accessed quickly and with little cognitive effort, while explicit knowledge retrieval requires more time and cognitive research.

Therefore, they have determined that the instruments which will be used to measure different types of knowledge require both time pressured and unpressured context. "The assumption is that time pressure will predispose learners to draw on their implicit knowledge, while a lack of time pressure may encourage the use of explicit knowledge" (Loewen, 2015, p. 29). R. Ellis et al. (2009) have acknowledged that, more than likely, is it not possible to obtain a pure measure of either type of linguistic knowledge because learners may have the ability to access their explicit knowledge and consult a grammatical rule or form even with only a little time to reflect. In the end, to prevent bias in the interpretation of results in ISLA research, it is important that projects include valid and reliable instruments that test both implicit and explicit knowledge in order to inform their results.

4.3 | Instruction in the Second Language Classroom

de Graaff and Housen (2009) define L2 instruction as "any deliberate attempt to promote language learning by manipulating the mechanisms of learning and/or the conditions under which these operate" (p. 726). While the role of instruction in SLA has been widely investigated, it has been controversial since the beginning (see Richards & Rodgers, 2001, for an extensive overview). For obvious reasons, most language instructors have assumed that the role of instruction is influential in the acquisition process, but the literature in SLA is quite divided and tells a different story. Early proponents of intervention (R. Ellis, 1991, 1997, 2005a; Long, 1983, 1988; Rutherford & Sharwood-Smith, 1985) believe that L2 instruction can make a difference in how well learners acquire a second language, but acknowledge that it may not be necessary in order to achieve competence. This is, of course, supported by a large body of research from different studies including studies that compare L2 instruction with naturalist exposure or meaning-focused communication in both second and foreign language contexts (R. Ellis, 1994/2008, 1997; Larsen-Freeman & Long, 1991; Long, 1983, 1988).

Other studies have also investigated the different types of L2 instruction in comparison to control conditions (R. Ellis, 2001, 2002; Norris & Ortega, 2000). DeKeyser (2000) and Doughty (2003) even proposed theoretical arguments that L2 instruction may be imperative for successful L2 acquisition for some types of learners (e.g., adult or foreign language learners who have little contact with the L2 outside of an instructional context), for some non-salient aspects of L2 grammar, and even L2 proficiency. Regardless otherwise, most researchers today believe that "SLA is a process which can be influenced by instruction, though not necessarily *ad libitum*, and it is exactly this relative openness of SLA to instruction which as to be explored" (de Graaff & Housen, 2009, p. 727).

In ISLA literature, the terms *effect* and *effectiveness* often appear. *Effect* refers to observable changes in learner outcome (e.g., knowledge, disposition, or behavior that can be attributed to the use of instruction), and *effectiveness* (or interchangeably *efficacy* or *usefulness*) refers to the extent in which the intended or desired effects of instruction match the actual outcomes of instruction. As de Graaff and Housen (2009, p. 728) put it, "Effective instruction, then, is context-appropriate instruction, that is, goal-appropriate, learner-appropriate, and resource-appropriate." L2 acquisition literature often contrasts L2 acquisition with L1 acquisition, which often raises the question as to whether instruction is necessary for acquisition. Over the past decade, there has been a plethora of publications on this topic, as well as several summaries and meta-analyses that provide an overview of the research in this area (de Graaff & Housen, 2009; Housen & Pierrard, 2005; Lightbown, 2000; Loewen, 2015; Norris & Ortega, 2000; Richards & Rodgers, 2001; Slabakova, 2016; Spada & Tomita, 2010; Whong, Gil, et al., 2013a). These publications provide valuable insights into the impact of instruction in different ISLA environments, and what types of instruction (short-term versus long-term, explicit versus implicit) have proven to be most beneficial. One thing is clear, within the literature it is well documented and accepted that instruction for SLA does have benefits for L2 learners. However, the role that instruction plays in the process of acquisition is still being debated within GenSLA literature.

Whong (2011) claims that metalinguistic knowledge can compensate for weakness in L2 syntax and morphology which can lead to native-like production. She points out that the effects of instruction are limited as to whether language development is facilitated by instruction. In the end, the L2 learning process can be affected by any one of the three basic dimensions described by R. Ellis (1994/2008) and Klein (1986):

i. instruction may affect the *route* of L2 acquisition

ii. instruction may affect the *rate* of L2 acquisition

iii. instruction may affect the *ultimate levels of attainment* and the *end-state* of L2 acquisition

Synthesizing a number of studies conducted on ISLA (Eckman, Bell, & Nelson, 1988; R. Ellis, 1989, 1994/2008; Larsen-Freeman & Long, 1991; Long, 1983, 1988; Pavesi, 1986; Pica, 1983;

Pienemann, 1989), de Graaff and Housen (2009, pp. 728-729) give the following claims with respect to the effects of instruction on second language acquisition put forth by R. Ellis (1994/2008) and Klein (1986). First, both instructed and non-instructed learners follow the same orders and proceed through similar sequences of acquisition when measured by spontaneous production tasks. That is, grammatical aspects of language that are developmentally-constrained by natural processing mechanisms or by universal principles seem to be overridden in instructional contexts. Second, instruction can assist learners to move faster along the natural route of instruction when target structures are within the learners "developmental reach". Therefore, their acquisition is accelerated when compared to non-instructed learners. Finally, instructed learners attain higher levels of interlanguage and grammatical accuracy in comparison to their non-instructed counterparts. As a caveat, instructed learners do not necessarily achieve higher levels of communicative fluency, but they may be able to overcome premature fossilization of specific grammatical systems that go by unnoticed on the basis of mere exposure.

It is important that effectiveness of instruction is not limited to the claims above. For instance, recent research indicates that "learner-external" features may be at play, such as the perceptual salience of linguistic features in the input and/or the communicative value of specific linguistic features (Goldschneider & DeKeyser, 2001), as well as motivation, aptitude, and cultural status (Lighbown & Spada, 2013; Macaro, 2010).

4.3.1 | Arguments in Support of Instruction

In the SLA literature, ISLA research regularly tackles questions such as *Which type of instruction is of most use?* and *Which language features most benefit from classroom input?* While these questions have been asked and investigated in a number of studies, in order for ISLA research to have theoretical value, Housen and Pierrard (2005, pp. 3-4) call for answers to a number of fundamental questions:

i. What is the nature of the learning mechanisms involved in instructed SLA and how do they differ from the learning mechanisms at work in uninstructed SLA?

ii. What is the nature of the L2 knowledge that instructed L2 learners develop, and how does it differ from the L2 knowledge the develops in naturalist, uninstructed SLA?

iii. What is the nature of L2 performance and L2 processing in instructed L2 contexts?

iv. What is the nature of L2 instruction?

v. What is the relationship between instruction, acquisition, knowledge, and processing in an L2 and how do they interact?

The goal of this section is to provide a brief review of the work surrounding ISLA and the most recent research findings, while also presenting the gap in the current research, notably question 5 above from Housen and Pierrard (2005, p. 4).

Norris and Ortega (2000) conducted a quasi-experimental study investigating the effectiveness of L2 instruction and different measures of L2 knowledge. In their study, they use directly comparable measures of effect size to synthesize empirical research to investigate types of L2 instruction and the instruments used to measure the effectiveness of that instruction. In their study, the authors categorized instruments as metalinguistic judgments, selected response, constrained constructed response, and free constructed response. The results of their meta-analysis showed that explicit instruction was more effective than implicit instruction overall. Additionally, their results also showed that the effectiveness depended on the instruments used to assess that development. If a study employed an instrument in which learners' performance would benefit from explicit knowledge, then it showed a greater effect than studies that employed instruments that would expect explicit knowledge to play less of a role. Therefore, while type of instruction might be one influence on L2 knowledge development, the way in which that knowledge is measured may also be due to the instruments being used to measure it. In other words, the instrument being used to measure linguistic knowledge gives information as to what kind of linguistic knowledge is under investigation.

Loewen (2015) states that recent research in ISLA has been informing the question of "whether explicit instruction leads to the acquisition of explicit knowledge in L2 learners" (p. 31). While it is generally assumed that explicit knowledge is a result of explicit instruction (Doughty, 2003), the effect of different types of explicit instruction on explicit knowledge is still unknown. A common methodology for determining whether or not explicit instruction has an effect of explicit knowledge is comparing groups of learners that are exposed to different L2 instructional contexts. Spada and Tomita (2010) conducted a meta-analysis of 41 studies conducted between 1990 and 2006. They investigated the effects of implicit and explicit instruction on the acquisition of (what they termed to be) simple and complex English grammatical features. In this analysis, "instruction" was considered to be explicit when it involved the explanation of grammar rules, while it was implicit when it included interactions and recasts that did not provide grammatical explanations or any attempt to raise learners' awareness. A major variable in their analysis was linguistic complexity. Their definition of simple versus complex grammatical feature is based on the derivational rules and measured by the number of transformations each form must undergo to arrive at the target form. The results of their meta-analysis showed that explicit instruction led to greater gains than implicit instruction for both simple and complex grammatical features, although implicit instruction did yield some gains.

Another example is an empirical study conducted by Bowles (2011). In her study, she compared the L2 linguistic knowledge of three different Spanish speaker groups: native speakers, university students who had received intermediate-level L2 Spanish instruction, and heritage speakers who had grown up in a Spanish-English bilingual environment with less than two years of explicit Spanish instruction. Her results found that instructed learners performed at higher levels than heritage speakers on tasks that measured explicit knowledge, but the reverse was found on tasks that measured implicit knowledge. She attributes these findings to the learning environment of the speakers—the university students had learned in an ISLA environment, while the heritage speakers had learned via considerable amounts of communicative input.

Another quasi-experimental study, conducted by Sonbul and Schmitt (2013) investigated the effects of type of instruction on the knowledge of vocabulary collocations from the medical field. In their study, 35 L1 English speakers and 43 advanced L2 English speakers were divided into three groups, each receiving different treatment: (i) enriched input: collocations embedded into a reading passage, (ii) enhanced input: collocations highlighted in bold red font in a reading passage, and (iii) direct input: collocations taught in isolation using a PowerPoint presentation. Their results found durable gains on explicit knowledge tasks regardless of treatment. In contrast, there was no effect on implicit knowledge from any of the groups. These findings suggest that the development of explicit vocabulary knowledge can be supported by either implicit or explicit instruction.

Bruhn de Garavito (2013) further examined the effect of formal instruction and argues that the methodological decisions surrounding grammar instruction often depend on the theoretical position about the role of input. She related L2 Spanish object pronoun instruction with GenSLA empirical research finding about the acquisition of object pronouns. She investigated how they were taught in language textbooks and how input that learners received might be improved. Bruhn de Garavito identified differences between English and Spanish object pronouns that cause confusion to L2 Spanish learners. She considered these differences in how they relate to the findings in GenSLA research on clitic position, and further suggested how these findings might be applied to language teaching. The author concluded that the most important takeaway message should be that "research carried out within the generative tradition has something to say regarding language teaching" (p. 32). She identifies this as a two-way street, though. While GenSLA empirical findings can inform language pedagogy, language pedagogy should also inform the research that is conducted within GenSLA, and that all the work in both fields needs to be more comprehensible to those in the other field.

4.3.2 | Standard (Traditional) Instruction

The current teaching approach in many grammar courses is that of focus on formS (FoFS). The students have a textbook that covers different grammatical elements in each chapter. Within each chapter, new grammatical structures and rules are presented, followed by activities that require the leaners to use those specific rules and structures. As a class moves on from day-to-day, the students move from one grammatical function to the next. Many grammar books currently in publication do not incorporate the use of formal linguistics or take any formal linguistics approach. The reality of the matter is (at some universities), each day learners receive 60 minutes of decontextualized grammar with a focus on a different area.

In the field of TESOL, article instruction is often minimized in the curriculum, or left out, due to its complex and difficult nature for both instruction and learning. For example, in the curriculum at the United States Midwestern University at which the research project took place, the curriculum at the level from which participants were recruited does not include formal article or noun type instruction. Therefore, the learners are expected to have *mastered* this already or should plan to spend many hours with self-study in order to master it. To try and overcome this, recent research in applied linguistics has tried to bridge the gap between teaching pedagogy and SLA research.

An issue with classroom teaching of indefinite and definite articles is often found in the over-simplification of definitions. For example, a simplified definition of the definite article might say, "Use *the* when the noun is unique" (Blass, Innuzzi, Savage, Gordon, & Reppen, 2012, p. 138). Although this definition is still widely used in pedagogy, it is oversimplified and can lead to confusion for the English language learners. A review of two textbooks currently being used for FonFS in an ESL program serves as the basis for analysis and description of standard instruction. Two sets of examples are included below—one from an intermediate-level grammar textbook and one from an advanced-level textbook (within the same series, *Grammar & Beyond*)—to demonstrate the misunderstandings that arise in their current explanations of article choice and noun type distinctions.

Intermediate-Level Text: *Grammar & Beyond 3*

- Count nouns are nouns that you can count and make plural. Use a singular or plural verb with count nouns. Use a determiner such as *a/an*, *the*, *this*, and *his* with singular count nouns. You can use a plural count noun with or without a determiner such as *a few*, *many*, *some*, *these*, and *those*.

- Noncount nouns are nouns that cannot be counted. Use a singular verb with noncount nouns. You can use a noncount noun with or without a determiner after you have already mentioned the noun and wish to give more information.

(Blass et al., 2012, pp. 121-122)

- Use *a/an* before a singular count noun when the noun is a part of a category of if it is a profession. Use *a/an* to introduce a singular count noun when you first mention it. Use *a/an* before a singular count noun to give definitions or make generalizations.

- You can use *the* before singular count nouns, plural count nouns, and noncount nouns. Use *the* before a noun when you mention it a second time. Use *the* when a noun gives more information about a previously mentioned noun. The second noun is associated with the first noun. Use *the* when the listener or reader and physically see or visualize the noun. Use *the* when the noun is unique. Use *the* before a singular noun used to present a whole class or category. This is very formal.

- Use no article when a noncount noun or a plural count noun is used to make a generalization.

(Blass et al., 2012, p. 138)

Advanced-Level Text: *Grammar & Beyond 4*

- Use *the* when both the writer and the reader share common knowledge or information about the noun. Use *the* when the noun was introduced earlier in the text and you give more information, or when the noun is related to a noun mentioned earlier. Use *the* when you are writing about "which one" (when there is additional information that identifies the specific noun).

- Use *a/an* with a singular count noun when the noun is not specifically identified, or when it is first mentioned and new to the reader. Do not use *a/an* with noncount or plural nouns. Use *some* or Ø. Use *a/an* when introducing a count noun. Use the indefinite article when making generalizations: Ø for noncount nouns and plural nouns, *a/an* for singular nouns. Use the definite article if it refers to a specific noun that is known to the reader.

(Bunting et al., 2009, pp. 104-105)

As can be seen in these examples, both from the *Grammar & Beyond* series which provides many of its examples and explanations based on corpus data, the definitions sometimes given to these concepts interchange the terminology of definiteness and specificity, which can lead the students to making numerous errors. Since instructors regularly work with materials like these, it is only natural that at times they themselves are confused by the use of this terminology. Additionally, these explanations do not draw on any information that the students already know about language and how language works. While these textbook explanations are well-accepted and used throughout the field, they are not motivated by theoretical research, and do not provide any kind of linguistic analysis for the learners to work through the language. This provides a real disadvantage for the learners and has motivated this dissertation's creation of a linguistically-informed set of materials. These instructional materials will be discussed in further detail in Chapter 6 and will be generally introduced in the next section.

4.3.3 | Linguistically-Informed Instruction

The use of linguistically-informed instruction engages the notions of FoFS and formal instruction for ISLA. FonFS is "based on the assumption that classroom or second language learning derives from general cognitive process and, and thus entails the learning of a skill" through three stages (Sheen, 2002, pp. 303-304):

i. providing understanding of the grammar by a variety of means (including explanation in the L1, pointing out differences between the L1 and L2);

ii. exercises entailing using the grammar in both non-communicative and communicative activities for both comprehension and production;

iii. providing frequent opportunities for communicative use of the grammar to promote automatic, accurate use.

Lopez (2015) is one of the few studies that sought to create an instructional context informed by GenSLA findings on definiteness and specificity. Lopez's linguistically-informed materials were designed following the Sheen (2002) description of the stages of FonFS. The first stage to designing the materials was to look at the traditional method of teaching English articles and noun types and find where the descriptions were vague and/or overlapping. These materials took into consideration previous GenSLA research, as well as the notions of L1 transfer and UG access, in order to create a new approach to language teaching that is more linguistically-focused, rather than descriptive with vague rules. In order to make the materials accessible to students, definitions (such as the following example from Ionin et al., 2004, p. 5) had to be simplified as to explain the information but still be as accurate as possible.

(16) Definiteness and Specificity: informal definitions

a. If a Determiner Phrase (DP) of the form [D NP] is…

i. [+definite], then the speaker and the hearer presupposed the existence of a unique individual in the set denoted by the NP.

ii. [+specific], then the speaker intends to refer to a unique individual in the set denoted by the NP and considers this individual to possess some noteworthy property.

These definitions, at face value, are incomprehensible to not only instructors, but also students, so the definitions were changed to more *pedagogical* definitions (Lopez, 2015, 2017). Therefore, the pedagogical definitions for definiteness and specificity were presented to the learners in defining the semantic universals. The *pedagogical* definition that Lopez (2015, p. 110; 2017, p. 10) put forward can be found in (1).

(1) Definiteness and Specificity: pedagogical definitions

a. If a noun phrase is...

i. [definite], then *both* the speaker *and* the listener can identify the noun, and answer the question 'Which one?'

ii. [specific], then the speaker is referring to one particular individual.

Lopez (2015, p. 111) explained that she chose not to overload the learners with complex rules, examples, and exceptions, and thus decided to present the use of the definite and indefinite English articles as a simple choice, as in (2) below.

(2) Three things to ask

a. Can the noun be identified by both the speaker and the listener?
   i. YES. Definite article 'Pass me the book.'
b. If not, is it a mass noun?
   i. YES. No article 'I like to eat _ chocolate.'
c. If not, is it singular?
   i. YES. Indefinite article 'I need to buy a pen.'
   ii. NO. No article. 'I like _ dogs.'

These materials were all part of the presentation part of the lessons, but she made a decision to adapt current textbooks for practice materials. While the results of the implications of these materials are mixed, there is still motivation to continue research in the area. As put by Lopez (2015, p. 70):

> If language teaching develops explicit metalinguistic knowledge, and this can lead to native-like performance but not acquired knowledge, then there is still an argument for teaching learners about the abstract structures of language and providing sample examples in the classroom input.
>
> (Lopez, 2015, p. 70)

In the current dissertation, we take this notion of linguistically-informed instruction and expand on it. While we opt to use definitions similar to (Lopez, 2015, 2017), we present the differences between definite and indefinite articles using semantic features. This is done similarly with the presentation of countable and uncountable nouns. In addition, we add a section that explains crosslinguistic variation and differences between the L1 and L2, as well as a final section of common mistakes learners make based on their language background. More details on the design and implementation of our linguistically-informed materials will be presented in the Methodology chapter. The following chapter, Chapter 5, will review previous SLA studies on L2 English article and noun type acquisition and their implications for the present dissertation before methodological details of the experimental design are explained.

Chapter 5: Second Language Acquisition of English Articles & Noun Types

"Literatur ist ein Plural Begrif"
("Literature is a plural concept")
– GUNTER GRASS

Over the past few decades, numerous studies have focused on article, noun type, or plural marking errors amongst second language (L2) learners of English at all different proficiency levels. Researchers have spent their time examining the distributions of such errors amongst different populations and theorizing the sources of them. While most of the previous work has focused on adult L2 learners (Master, 1997, 2002; Trenkic, 2008; Whong, Gil, et al., 2013b), there has also been some work with children (Barner & Snedeker, 2005, 2006; Gathercole, 1985). This body of research has produced a number of hypotheses on relating to the acquisition of articles, noun types, and semantic features: the Article Choice Parameter and the Fluctuation Hypothesis (Ionin, 2003, 2006; Ionin, Ko, & Wexler, 2003; Ionin et al., 2004; Ionin, Zubizarreta, & Maldonado, 2008; Ionin, Zubizarreta, & Philippov, 2009), the Feature Reassembly Hypothesis (Lardiere, 2007, 2008, 2009a, 2009b), the Bottleneck Hypothesis (Slabakova, 2009a, 2009b), among others.

In this chapter, we will provide an overview of key findings in both seminal and more recent L2 English article and noun type acquisition research. This chapter will be divided into three main parts. The first part of Section 5.1 will look at L2-English article acquisition research. It will begin with an overview of early L2 article acquisition studies and then give a detailed summary of how the feature definiteness, as defined in Chapter 2, has been applied to explain patterns of article misuse. In the second part of Section 5.1, we will look at classroom intervention studies regarding L2-Englsih article acquisition and misuse. Section 5.2 will shift the focus to theoretical studies on the L2 acquisition of English noun types. It will focus in on more recent research that explores the role of semantic features as defined in Chapter 2. Section 5.3, will look at the only study, to my knowledge, that investigates the acquisition of *both* L2-English articles and noun types. In the final section, we will consider the implications of and gaps in the findings of the previous research. This will set the stage for the present study which explores the acquisition of L2-English articles and noun types by L1 speakers of Mandarin in an Instructed Second Language acquisition (ISLA) context.

5.1 | Second Language Acquisition of Articles

Prior to the early 2000s, many studies focused on the semantic properties of 'specific referent', that is the noun in reference is a unique individual in the set denoted by the noun phrase (NP), and 'hearer knowledge', or the knowledge of the noun in reference that the hearer holds as assumed by the speaker. This work was later developed into the Article Choice Parameter (ACP) by Ionin (2003). Following this seminal piece of work, much research was carried out trying to provide evidence for or reject the ACP and the Fluctuation Hypothesis (FH) (Ionin et al., 2004). Around 2010, many studies moved away from the notions of the ACP and FH and began to consider the effects of classroom intervention on the second language acquisition of articles. This section has two main goals: first, it will discuss previous research surrounding the ACP and FH in the second language acquisition and misuse of articles and, second, it will review intervention studies that investigated the effect of instruction on the second language acquisition of articles.

5.1.1 | Previous Research on Second Language Article Acquisition & Misuse

Between 2000 and 2010, much research was conducted considering article acquisition and misuse. Early studies focused on the semantic properties of 'specific referent' and 'hearer knowledge', which were both considered to be required for use of the definite article. These concepts were later developed into the Article Choice Parameter (Ionin, 2003) and the Fluctuation Hypothesis (Ionin et al., 2004). The Article Choice Parameter (ACP) (Ionin, 2003, p. 12) was a proposed parametric variation that that suggested the possibility that two-article languages select articles on the basis of either specificity or definiteness. In languages that take the Definiteness Setting, such as English, "articles are distinguished on the basis of definiteness" and in languages that select the Specificity Setting, like Samoan, "articles are distinguished on the basis of specificity." These two possibilities are visually represented in Table 5.1 below (Ionin et al., 2004, p. 13).

Table 5.1. Article grouping cross-linguistically: Two-article languages

Article Grouping by Specificity

	+definite	–definite
+specific		
–specific		

Article Grouping by Definiteness

	+definite	–definite
+specific		
–specific		

Ionin (2003) conducted a series of studies using a written elicitation task and a forced-choice elicitation task. Her results suggested that L2 learners who lack an article system in their L1 fluctuate between correct and incorrect usage of definite and indefinite articles in English. She hypothesized that errors would be made more frequently in either [+definite, –specific] or [–definite, +specific] contexts, see examples in (3) and (4) below (Ionin et al., 2004), because of the two possible article groupings as proposed by the ACP, and L2 learners from an article-less L1 then fluctuate between the two parameter-settings of the ACP. The Article Choice Parameter was then used to explain the experimental results obtained in the three studies of Korean and Russian adult learners of L2 English conducted by Ionin (2003) and published in Ionin et al. (2004).

(3) [+definite, –specific]: Narrow scope

a. Reporter: Several days ago, Mr. James Peterson, a famous politician, was murdered! Are you investigating his murder?

b. Police officer: Yes. We are trying to find (a, the, –) murder of Mr. Peterson—but we still don't know who he is.

(4) [+definite, –specific]: No scope interactions, denial of speaker knowledge

a. Bill: I'm looking for Erik. Is he home?

b. Rick: Yes, but he's on the phone. It's an important business matter. He is talking to (a, the, –) owner of his company! I don't know who that person is—but I know that this conversation is important to Erik.

(5) [–definite, +specific]: Wide scope

a. Jeweler: Hello, this is Robertson's Jewelry. What can I do for you ma'am? Are you looking for some new jewelry?

b. Client: Not quite—I heard that you also buy back people's old jewelry.

c. Jeweler: That is correct.

d. Client: In that case, I would like to sell you (<u>a</u>, the, –) beautiful silver necklace. It is very valuable

(6) [–definite, +specific]: No scope interactions, explicit speaker knowledge

a. Roberta: Hi, William! It's nice to see you again. I didn't know that you were in Boston.

b. William: I am here for a week. I am visiting (<u>a</u>, the, –) friend from college—his name is Sam Brown, and he lives in Cambridge now.

Following the seminal work by Ionin (2003), Ionin et al. (2004) conducted a study to further support the proposal that L2 learners of English fluctuate between the two settings of the ACP, that is selecting articles on the basis of definiteness and/or selecting articles on the basis of specificity. Ionin et al. (2004) conducted a forced-choice elicitation task that covered four contexts, as well as previous-mention definites and partitive indefinites—both of which are obligatorily specific. The task included 76 dialogues that covered four contexts, as seen in examples (7)–(10) (from Ionin et al., 2004, pp. 22-23).

(7) [+definite, +specific]

a. Kathy: My daughter Jeannie loves that new comic strip about super mouse.

b. Elise: Well, she is in luck! Tomorrow, I'm having lunch with (a, <u>the</u>, –) creator of this comic strip—he is an old friend of mine. So I can get his autograph for Jeannie!

(8) [+definite, –specific]

a. Bill: I'm looking for Erik. Is he home?

b. Rick: Yes, but he's on the phone. It's an important business matter. He is talked to (a, <u>the</u>, –) owner of his company! I don't know who that person is—but I know that this conversation is important to Erik.

(9) [–definite, +specific]

a. Meeting on a street

b. Roberta: Hi, William! It's nice to see you again. It didn't know that you were in Boston.

c. William: I am here for a week. I am visiting (a, the, –) friend from college—his name is Sam Brown, and he lives in Cambridge now.

(10) [–definite, –specific]

a. Chris: I need to find your roommate Jonathan straight away.
b. Clara: He is not here—he went to New York.
c. Chris: Really? In what part of New York is he staying?
d. Clara: I don't really know. *He is staying with (a, the, –) friend—but he didn't tell me who that is.* He didn't leave me any phone number or address.

To explain their results, Ionin et al. (2004), propose the two-part Fluctuation Hypothesis (FH): "(a) L2 learners have full access to UG principles and parameter-settings" and "(b) L2 learners fluctuate between different parameter-settings until the input leads them to set the parameter to the appropriate value" (p. 16).

The way in which Ionin (2003) and Ionin et al. (2004) present the ACP and FH does not appear to be very clear and could lead to misunderstanding. While the ACP considers article systems that encode definiteness and specificity, this can be viewed as cutting across a conceptual distinction being as both definite and indefinite articles (e.g., English) can receive either [+specific] or [–specific] interpretations regardless of any morphological marking for it. The opposite can be said about an article system that has morphology for specificity but not for definiteness being as a specific or non-specific articles (e.g., Samoan) could receive either [+definiteness] or [–definite] interpretations regardless of any morphological marking for it. This becomes problematic when [+definite, –specific] contexts are considered more closely: "While indefinite environments take well the subdivision into specific and non-specific both conceptually … and linguistically …, this is less clearly the case for definite contexts" (p. 7). In other words, the claim made by Ionin et al. (2004) that a phrase like "whoever is your father" is [+definite, –specific] appears to be weakly based on the premise that possessive nominal phrases are "always grammatically definite in English" (Trenkic, 2008, p. 7). Trenkic goes on to state that this claim overlooks a number of issues, such as the fact that possessives are not semantically compatible with indefinites, and "more crucially, that the given phrase [is] not even headed by a possessive but by an indefinite pronoun" (p. 7).

Ionin et al. (2004) gathered their results via a forced-choice elicitation task (Ionin et al., 2003) conducted on groups of L1-Russian and L1-Korean learners of L2 English. For the [+definite, –

specific] dialogues, the error rates for the Russian and Korean learners were 33% and 14% respectively, whereas the [–definite, +specific] contexts, the error rates for the two groups for the learners were slightly higher at 36% and 22% respectively (Ionin et al., 2004). In contrast, both [–definite, –specific] and [+definite, +specific] resulted in error rates below 10% for Russian learners and below 5% for Korean learners. The authors attribute these results to a systematic pattern of misuse errors amongst these learners based on [±definite] and [±specific], and, therefore, support the Fluctuation Hypothesis which states that learner errors will fluctuate between possible UG parameter settings in the ACP—the definiteness setting and the specificity setting—until there is sufficient evidence from the input to select the correct settings.

In order to look at performance across the four contexts, Ionin et al. (2004) divided the learners into four possible patterns of article use, seen in (11)–(15) below.

(11) Definiteness Pattern: correct parameter-setting
- a. ≥75% *the* use in [+definite, +specific] contexts
- b. <25% *the* overuse in [–definite, –specific] contexts
- c. One of the following:
  - i. no specificity distinction with definites or indefinites OR
  - ii. a small (<25%) specificity distinction with definites only OR
  - iii. a small (<25%) specificity distinction with indefinites only

(12) Fluctuation Pattern:
- a. ≥75% *the* use in [+definite, +specific] contexts
- b. <25% *the* overuse in [–definite, –specific] contexts
- c. Evidence for a specificity distinction:
  - i. more overuse of *the* with [+specific] than with [–specific] indefinites
  - ii. less use of *the* with [–specific] than with [+specific] indefinites
- d. Evidence for a definiteness distinction:
  - i. more overuse of *the* with [+specific] definites than with [+specific] indefinites
  - ii. the specificity distinction with indefinites does not exceed the specificity distinction with definites by more than 50% (and vice versa)

(13) Specificity Pattern: parameter-mis-setting
- a. ≥75% *the* use in all [+specific] contexts

b. <25% *the* use in all [–specific] contexts

c. Equally high use of *the* with [+specific] definites and [+specific] indefinites

(14) Partial Fluctuation Pattern:

a. ≥75% *the* use in [+definite, +specific] contexts

b. <25% *the* overuse in [–definite, –specific] contexts

c. One of the following:

i. the specificity distinction is made only with definites OR

ii. the specificity distinction is made only with indefinites OR

iii. the specificity distinction is much (>50%) larger with indefinites than with definites (or vice versa)

(15) Miscellaneous Pattern: any patterns that do not fit into the above four categories

Following the publication of their results, Ionin et al. (2004) came under intense scrutiny because while both learner groups showed significant effects with regard to definiteness and specificity, individual results did not hold up. Nine learners showed Partial Fluctuation Patterns and another thirteen showed Miscellaneous Patterns which could not be accounted for by the Fluctuation Hypothesis. The authors argue that only four of the learners show random behavior, with the other nine leaning towards Fluctuation Patterns or Definiteness Patterns. The reason for not classifying these learners as one of the particular patterns is because they fall below the somewhat arbitrary cut-off of 75% of article use which matches either the Fluctuation Pattern, the Definiteness Pattern, or the Specificity Pattern. In the end, there does not appear to be any recognizable effect of the L1 on the behavior of the learners in this study. This has led to alternative explanations of article acquisition such as R. Hawkins et al. (2006) and Trenkic (2008), which will be discussed later.

Another point of interest in the research conducted by Ionin et al. (2004) is that the data from their written production task did not provide enough [+definite, –specific] contexts to test the theory of [–definite] article overuse. In addition, there was some observance of omission of the [+definite] article in such contexts. Ionin et al. (2004, p. 48) give the examples in (16)–(18) as learner errors taken from the production data of their study.

(16) My husband met us in airport and drove us to our new home. Then we went to our neighbours' house for <u>the small party</u>.

(17) When I was a boy, I found a mine (I mean, an armour, from the World War Two). I liked this kind of things, so I kept it initially in <u>the secret place</u> in our yard and then at home.

(18) On Thanksgiving week-end we went to NY for the first time. We took <u>the room</u> in the New-Yorker Hotel and went outside to seethe town.

These examples clearly show overuse of the [+definite] article with [–definite, +specific] contexts, since the speaker appears to have a particular referent in mind, according to Ionin et al. (2004). The way in which Ionin et al. (2004) operationalize specificity in their study can be viewed as problematic. For example, specificity was often operationalized via the notion of noteworthiness. Ionin et al. (2004, p. 5) define noteworthiness as when "a Determiner Phrase (DP) of the form [D NP] is … [+specific], then the speaker intends to refer to a unique individual in the set denoted by the NP and considers this individual to possess some noteworthy property". The vague notion and definition of noteworthiness becomes problematic in the formulation of the FH using the ACP. For example, Trenkic (2008, p. 8) suggests that the idea of noteworthiness "may inadvertently lead to the blurring of [the] distinction" between *having a referent in mind* (speaker specificity) and *intending to refer to it* (intent to refer). Ionin et al. (2004) label this difference between "speaker knowledge" and "no speaker knowledge" as a way of operationalizing specificity in their study. In other words, two unrelated factors were often conflated: the speaker's *explicit statement of her familiarity* with the person/object being talked about and the *intention to refer* to a person/object (specificity). Therefore, Ionin et al. (2004) were effectively testing the distinction between "intent to refer" and "speaker specificity" rather than actually testing [±specific], meaning that the ACP does not adequately explain the results of their study. Furthermore, the results of the production task presented by Ionin et al. (2004) are far less conclusive than the results for the elicitation task, where the contexts could be more easily controlled.

R. Hawkins et al. (2006) conducted a study to test the FH and claims made by Ionin et al. (2004) in two L2 upper-intermediate/advanced populations of L2-English learners (Japanese and Greek). Being as Greek encodes definiteness, they hypothesized that the L1-Greek speakers would transfer the marking of definiteness from Greek into their interlanguage grammar of English, while the L1-Japanese speakers would fluctuate between selecting English articles on the basis of definiteness (the correct setting) or specificity (the incorrect setting). To test their hypothesis, they devised a forced-choice elicitation task very similar to that used by Ionin et al. (2004) but with some minor modifications such as number (see R. Hawkins et al., 2006, pp. 115-116). The results for the Japanese speakers supported the FH as they found this group fluctuated between interpreting *the* as a marker of definiteness and specificity, but the same could not be said about the Greek speakers. The Greek speakers, on the other hand, overwhelmingly selected *the/a* to mark definiteness and specificity. They take these results to suggest that fluctuation does not happen as part of a "general L2 developmental phenomenon" (p. 18). Instead, speakers of an L1 that does have an article system that marks definiteness establish early on that English articles also mark definiteness. They further argue that the individual results of the Japanese speakers in their study do not suggest fluctuation patterns as posited by the FH but instead propose an alternative account of the data within UG based on Distributed Morphology (Halle & Marantz, 1993; Harley & Noyer, 1999). More specifically, R. Hawkins et al. (2006) explained the transfer of features from the L1 to the L2 at the level of feature assembly in the lexicon and then insertion into syntactic terminal nodes.

Snape et al. (2006) also tested the Fluctuation Hypothesis with L1 speakers of Japanese, Mandarin, and Spanish at an intermediate proficiency level. Their empirical data came from previous studies conducted by Reid et al. (2006), who tested 14 Japanese and 9 Spanish learners of English with an intermediate proficiency level, and Ting (2005), who tested 8 Mandarin learners and 5 Spanish learners of English at an intermediate proficiency level. When taking these data together, the findings of Snape et al. (2006) support the FH for Japanese learners, but not for Spanish learners. Furthermore, the L1-Mandarin speaker data also did not fluctuate between definiteness and specificity as predicted. They take these data to further reject the patterns posited by the FH.

A study conducted by Trenkic (2008) in a classroom environment using a forced-choice elicitation task explored the acquisition of articles with 43 L1-Mandarin, L2-English participants. In her study, she employed the notion of explicitly stated knowledge (ESK) to further investigate the contexts and conclusions in Ionin et al. (2004) and "test the predictions that specificity (i.e. speaker intent to refer) plays a role in L2 learners' article choices on a forced-choice elicitation task]" (p. 12). In her study, [±definite] was crossed with three combinations of [±specific] and [±ESK], yielding the six contexts seen in)–(.

(19) [–definite], [+specific; +ESK]

(20) [–definite], [–specific; –ESK]

(21) [–definite], [+specific; –ESK]

(22) [+definite], [+specific; +ESK]

(23) [+definite], [–specific; –ESK]

(24) [+definite], [+specific; –ESK]

Each context in)–(was represented by four items in a forced-choice elicitation task. Examples of each item can be found below (Trenkic, 2008, pp. 12-13).

(25) **[–definite], [+specific; +ESK]:** The speaker has a specific referent in mind, and she explicitly states that she knows the identity of the person being talked about.

a. Gary: I heard that you just started college. How do you like it?
b. Melissa: It's great! My classes are very interesting.
c. Gary: That's wonderful. And do you have fun outside of class?
d. Melissa: Yes. In fact, today I'm having dinner with (<u>a</u>, the, –) girl from my class—her name is Angela, and she is really nice!

(26) **[–definite], [–specific; –ESK]:** The speaker does not have a specific referent in mind, and she explicitly denies that she knows the identity of the person being talked about.

a. At a university
b. Professor Clark: I'm looking for Professor Anne Peterson.
c. Secretary: I'm afraid she is busy. She has office hours right now.
d. Professor Clark: What is she doing?
e. Secretary: She is meeting with (<u>a</u>, the, –) student, but I don't know who it is.

(27) **[–definite], [+specific; –ESK]:** The speaker has a specific referent in mind, but she explicitly denies that she knows the identity of the person being talked about.

a. Office gossip
b. Gina: …and what about the others?

c. Mary: Well, Dave is single, Paul is happily married, and Peter… he is engaged to (a, the –) merchant banker, but none of us knows who she is, or what she's like.

(28) **[+definite], [+specific; +ESK]:** The speaker has a specific referent in mind, and she explicitly states that she knows the identity of the person being talked about.

a. Paul: Do you have time for lunch?
b. Shelia: No, I'm very busy. I am meeting with (a, the, –) president of our university, Dr. McKinely; it's an important meeting.

(29) **[+definite], [–specific; –ESK]:** The speaker does not have a specific referent in mind, and she explicitly denies that she knows the identity of the person being talked about.

a. Bill: I'm looking for Erik. Is he home?
b. Rick: Yes, but he's on the phone. It's an important business matter. He's talking to (a, the, –) owner of his company. I don't know who that person is—but I know that this conversation is important to Erik.

(30) **[+definite], [+specific; –ESK]:** The speaker has a specific referent in mind, but she explicitly denies that she knows the identity of the person being talked about.

a. Paul: Will Bob join us for lunch?
b. Shelia: No, he's very busy. He is meeting with (a, the, –) director of his company. I don't know who that person is, but he will decide whether Bob gets his promotion or not.

Trenkic (2008) believed that the addition of [±ESK] within the [±specific] feature will allow for her to test the prediction of the Fluctuation Hypothesis by Ionin et al. (2004) versus the predictions of the alternate hypothesis, "that the choice is influenced by the stated/denied familiarity with 'identifying attributes' of the person being talked about" (Trenkic, 2008, p. 12).

Analysis of the results found that L1 Mandarin speakers overused *the* more in [–definite, +specific, +ESK] than in either [–definite, –specific, –ESK], or, crucially, [–definite, +specific, –ESK] environments. Additionally, they overused *a* more in both [+definite, –specific, –ESK] and [+definite, +specific, –ESK] environments than in [+definite, +specific, +ESK] ones. These results supported the alternate hypothesis put forth by Trenkic (2008) that learners were influenced by the stated/denied familiarity with "identifying attributes" of individuals, rather than positive or negative values of the feature [±specific]. Furthermore, the results reject the notion that L2 learners fluctuate between two settings postulated by the Article Choice Parameter and falsify the prediction of the Fluctuation Hypothesis. Trenkic (2008) states "the findings are consistent with the view that articles may be misrepresented as adjectives in L2 grammars, to which learners assign referential meanings of 'definite' (= identifiable) and 'indefinite' (= non-identifiable)" (p. 14).

To address the relevance of L2 input, L1 transfer, and UG-based knowledge and the ACP and FH, further work was conducted by Ionin et al. (2008). Their study tested two hypotheses within the FH (p. 560):

(31) Possibility 1. Fluctuation overrides transfer

a. All L2 learners should fluctuate between definiteness and specificity in their L2 article choice.

(32) Possibility 2. Transfer overrides fluctuation

a. L2 learners whose L1 has articles transfer article semantics from their L1 to their L2. L2 learners whose L1 lacks articles exhibit fluctuation.

To test their hypotheses, they contrasted the results of an elicitation task (Ionin et al., 2003, 2004) conducted on speakers of L1 Russian (an L1 with no article system) and L1 Spanish (an L1 with a two-article system). Major concerns about this study come from the research design. First and foremost, there are major differences in the age and proficiency levels of the two groups of learners, as seen in Table 5.2 below (Ionin et al., 2008, p. 563).

As can be seen in Table 5.2, based on the descriptive statistics above, these learner groups appear not to be very comparable. In addition, there was seemingly no reference to how these groups are statistically comparable nor any reference to statistical power and effect size to determine real significance of the results between and within the groups in their study. Furthermore, the country of residence of the two different language backgrounds was different—the Russian speakers were residents in the United States, while the Spanish speakers were recruited and tested in Mexico. Both of these factors could introduce variables which weaken any statistical differences between the L1 groups.

Table 5.2. Cloze test results by participant group from Ionin et al. (2008)

	# subjects	Range of scores	Age (years)
L1-Russian, L2 English			22-72
Beginners	8	2-27	(*M* = 43, *Mdn* = 40)
Intermediate	10	30-56	
Advanced	5	67-100	
L1-Spanish, L2-English			19-28
Beginners	15	11-28	(*M* = 22, *Mdn* = 21)
Intermediate	8	31-57	
Advanced	1	67	
L1-English Control	6	81-110	19-25 (*M* = 21)

According to Ionin et al. (2008), the results of the L1-Russian speakers were found to support the Fluctuation Hypothesis, whereas the Spanish speakers' use of articles was claimed to be influenced by the L1 being as no effect of specificity was found. Therefore, the authors conclude that transfer overrides fluctuation, which is one of their initial hypotheses. Another profound result was the effect of proficiency level with regard to the Spanish speakers in comparison to the Russian speakers. For Spanish speakers, as proficiency level increased, they became significantly more accurate in their use of L2 English articles, whereas the effect of proficiency was less pronounced with regard to Russian speakers. This is a stark contrast from the results of Ionin et al. (2004), which reported a developmental effect for the L1-Russian, L2-English learners, although the effect was not observed with regard to their L1-Korean participants. Another finding from Ionin et al. (2008) was that the L1-Spanish participants showed high rates of article omission, even though their L1 had the same definiteness setting as English. They linked this to L1 transfer, since the majority of omissions occurred before a single item, which would not require an article in the L1 if directly translated. This fluctuation, as well as the association of Full Transfer, was further investigated by García-Mayo (2008) and Morales (2011a), to be discussed later; neither of whom reported such high rates of article omission as Ionin et al. (2008).

Zdorenko and Paradis (2008) also tested the FH put forth by Ionin et al. (2004) by looking at longitudinal data from oral narrations of 17 children whose first languages do and do not have articles. The data presented in the study include article use with singular nouns and specific nouns due to the nature of the story-telling task. In their study, fluctuation is understood as "… L2 learners of English misusing *the* in specific indefinite contexts" (Zdorenko & Paradis, 2008, p. 238). They conclude that fluctuation is a developmental process that overrides transfer in L2 acquisition of English articles by children. Interestingly, the authors bring up the issue of directionality in the kinds of article misuse errors that L2-English learners make. As reported in their conclusions, Robertson (2000), Lardiere (2004), and White (2003a) found that learners of L1s that lack an article system are significantly more accurate in choosing the definite article in definite contexts than they are in choosing the indefinite article in indefinite contexts. As Zdorenko and Paradis (2008) point out, differential accuracy by context does not follow the FH directly, but data from Ionin et al. (2008) and R. Hawkins et al. (2006) do. Furthermore, Lardiere (2004, p. 335) suggests that this higher accuracy with definite articles could be due to the fact that "… definite articles in English need not take number and the count/mass distinction into account, which makes them featurally less complex that indefinites in at least that one respect." Therefore, while Zdorenko and Paradis (2008) found evidence for such directionality in their longitudinal study, these results suggest that the pattern could be a more general property of L2 acquisition (p. 246).

García-Mayo (2008) investigated the possible effect of proficiency on learners' use of articles with regard to semantic transfer from the L1 and possible fluctuation patterns. The data was collected via the same forced-choice elicitation task used in Ionin et al. (2004) with 60 adult L1-Spanish, L2-English speakers and a control group of 15 native speakers of English. García-Mayo (2008) established two proficiency groups: a low-intermediate group (n = 30) and an advanced group (n = 30). Both groups of participants had been studying L2 English for an average of 13 years in a classroom setting. In addition, none of the participants had spent more than one month in an English-speaking country. The elicitation task contained a total of eight contexts: four definite, two [+specific] and two [–specific], and four indefinite, two [+specific] and two [–specific]. Each context contained eight dialogues where one choice was to be provided.

Considering the directionality issue observed in previous work (Lardiere, 2004; Robertson, 2000; White, 2003a; Zdorenko & Paradis, 2008), García-Mayo (2008) found effects in the low-intermediate group, but not the advanced group. She takes this finding to suggest that "at higher levels of proficiency directionality effects no longer exist" (p. 33). Furthermore, when looking at additional test items that were included, she actually found the opposite result: the advanced group showed a significant difference in their accurate use of definite article in previous-mention definites when compared to their indefinite use in first-mention [–specific] contexts. When considering the fluctuation between the features [±definite] and [±specific], García-Mayo (2008) concluded that L1-Spanish learners of English are highly accurate in their article use in English for both definites and indefinites. She takes this result to provide "strong empirical evidence that L1 transfer (Schwartz & Sprouse, 1996) is operative at the level of article semantics" (p. 32). In other words, in support of Possibility 2 of the FH (see (32) above) with Ionin et al. (2008), in the case of L1-Spanish, L2-English learners, transfer overrides fluctuation. This can also be found in other aspects of acquisition of articles (García-Mayo, 2008). In contrast, these results are different from those reported by Zdorenko and Paradis (2008), who stated that fluctuation overrides transfer with children. Finally, to address the role of proficiency in the acquisition processGarcía-Mayo (2008) found that there were significant differences between groups in [+definite, –specific] contexts and [–definite, +specific] contexts, stating that "in the former the low-proficiency group performed in a native-like way unlike the advanced group" (p. 32). In the latter, the groups performed as expected. García-Mayo (2008) suggests all of these results present "robust evidence for transfer at the level of article semantics" (p. 33) and that more research is needed in the area still.

Snape (2009a) conducted a study to explore the difficulties Mandarin speakers had with the acquisition of English articles. To do this, he employed three different hypotheses: the FH (Ionin et al., 2004), the Representational Deficit Hypothesis (Tsimpli & Roussou, 1991), and the Prosodic Transfer Hypothesis (Goad & White, 2004, 2006, 2008). While the Representational Deficit Hypothesis claims that interpretable features are acquirable, it also claims that L2 learners' syntax is selectively impaired and lacks parameterized uninterpretable features that are not present in the L1 and are, therefore, no longer accessible following the critical period for acquisition. Although definiteness is interpretable in syntax (R. Hawkins et al., 2005), all count nouns share an uninterpretable number feature, meaning that L2 learners of English from language without articles will be unable to acquire the syntactic number feature as it has not been activated in the primary grammar. As for the Prosodic Transfer Hypothesis (Goad & White, 2004, 2006, 2008), the strong interpretation is that L2 learners of English will delete articles if they come from an L1 that does not have articles because they lack the corresponding L1 prosodic structure. For L1-Mandarin, L2-English speakers, that means that they are expected to omit articles, unless they have grammaticalized *nage* (that) in the L1 (Goad & White, 2008).

The data in Snape (2009a) was collected from 38 adult speakers of Mandarin who were residing in Canada at the time. The two tasks used in the study were a forced-choice elicitation task based on Ionin et al. (2004) and an oral-elicited picture description task created and used by Goad and White

(2008). Analysis of their results found that the L1-Mandarin, L2-English learners are consistent with the FH proposed by Ionin et al. (2004). In their study, they found that L2 learners fluctuated between the two features [+definite] and [+specific], meaning they overused *the* in [–definite, +specific] contexts and overused *a* in [+definite, –specific] contexts. While these results support the FH, they were not fully consistent with the Representational Deficit Hypothesis. In addition, the results support a weaker interpretation of the Prosodic Transfer Hypothesis as target-like articles were supplied in obligatory contexts. Snape (2009a) takes these results to imply that L2 learners have full access to the L2 syntax and phonology, which is consistent with the Full Transfer/Full Access model proposed by Schwartz and Sprouse (1996).

Ionin and Montrul (2010) conducted a study with Korean and Spanish speakers to investigate the role of transfer and recovery from the transfer at the syntax-semantics interface in the interpretation of articles with definite plurals in L2 English. The study consisted of three research questions that investigated proficiency with regard to transfer and transfer recovery, as well as whether it is more difficult to shift interpretation from one category to another or to acquire a new category. Ionin and Montrul (2010) predicted that Spanish speakers would allow generic readings to English to a greater extent than Korean speakers who have no definite plurals in their L1. They divided their project into two studies: one conducted with students in an EFL context (in their home countries) and a smaller follow-up study conducted in an ESL context (learners in the United States).

The first study consisted of L1-Spanish (n = 24) and L1-Korean (n = 29) learners of English. The participants were tested in their home countries—Argentina and Korea, respectively. Ionin and Montrul (2010) used a cloze test of L2 proficiency, as well as an acceptability judgment task and a truth-value judgment task to collect their data. The participants always took the cloze test, followed by the truth-value judgment task and then the acceptability judgment task. The results in this first study clearly demonstrated differences between L1-Spanish and L1-Korean speakers of English. Ionin and Montrul (2010) found that the Korean speakers were significantly more accurate at interpreting [+definite, +plural] as [+specific] rather than [+generic]. Furthermore, they found evidence for transfer with the Spanish speakers interpreting English definite plurals as generics and Korean speakers interpreting bare plurals as specific. Being as the learners in this study had limited exposure to English in an EFL environment, the authors stop short of making any conclusions regarding recovery from transfer.

To further investigate any recovery from negative L1 transfer, Ionin and Montrul (2010) conducted a small follow-up study with advanced L1-Spanish (*n* = 11) and L1-Korean (*n* = 9) learners of English immersed in an English-speaking environment. The results from an acceptability judgment task found that for Spanish speakers, but not for Korean speakers, high article accuracy precedes target interpretation of definite plurals. The authors take these findings to suggest that recovery from L1 transfer is possible with advanced learners in an immersed English environment, but, at the same time, indicate that target-like attainment is not guaranteed as fewer than half of the advanced learners treated definite plurals as generics (unlike the NS control group). They suggest that their findings are fully compatible with the Full Transfer / Full Access model for SLA (Schwartz & Sprouse, 1994, 1996) stating that while the L1-Spanish, L2-English learners transferred their L1 interpretation of plural NPs to the L2, they were able to access Universal Grammar and shift these categories to be more like the L2. Recognizing the limitations of both of their studies, Ionin and Montrul (2010, p. 914) call for more research in the area to be conducted with a larger number of "advanced and/or immersed learners" to provide insight about whether learners who have acquired definite singular generics have also acquired the corresponding semantic constraints.

A small study conducted by Pierce and Ionin (2011) investigated the perception of L2 English articles by L1-Korean (*n* = 16) and L1-Mandarin (*n* = 14) speakers. They investigated the correlation between L2 proficiency and accurate perception of articles, as well as the influence of the L1 prosodic system. Data was collected by a cloze test designed to test overall English vocabulary and grammar knowledge, an acceptability judgment task targeting sensitivity to missing articles, and a transcription task. The cloze task consisted of 40 items in a passage with each blank accompanied by 3 multiple choice options. The acceptability judgment task consisted of 32 sentence pairs, where the participants had to rate the second sentence as acceptable or unacceptable on a binary YES / NO scale given the context of the first sentence. If they rated a sentence as unacceptable (NO), they were asked to provide a correction. The third data collection instrument, the transcription task, consisted of 18 grammatical sentences spoken by a NS of American English.

The results in Pierce and Ionin (2011) found that Korean speakers are more accurate than Mandarin speakers in transcribing articles from spoken stimuli even though the Korean speakers' results on the cloze task demonstrated they were "less proficient" (p. 127). Pierce and Ionin (2011) hypothesize that being as the Korean rhythmic system has more elements of prominence and reduction than the Mandarin system, this facilitates perceptual accuracy for the Korean participants. Furthermore, Pierce and Ionin (2011) found that the Korean speakers were more accurate with the written task (e.g., the acceptability judgment task) provided the Korean speakers had a perceptual advantage over the Mandarin speakers due to the fact that Korean rhythmic system has more elements of prominence and reduction than the Mandarin rhythmic system. In other words, the rhythmic system of Korean facilitates the perceptual accuracy of the Korean participants in the study. The authors emphasize that these results are purely suggestive and call for more research in this area involving different proficiency levels as well as other language backgrounds.

As can be seen, some of the research has agreed with the proposal of this ACP and FH by demonstrating that learners from L1s that lack articles appear to fluctuate between the two settings (Ionin et al., 2004; Ionin et al., 2008) or by showing that L2-English learners with an L1 that has the definiteness setting could transfer this to their use of English articles (García Mayo, 2009; R. Hawkins et al., 2006; Ionin et al., 2008). Other research, on the other hand, has provided substantial evidence for 'directionality' in the acquisition of articles in both children and adult learners from a variety of L1s (García Mayo, 2009; Lardiere, 2004; Robertson, 2000; Snape, 2009a; White, 2003a; Zdorenko & Paradis, 2008). Furthermore, all of the studies reviewed up to this point have focused on the ACP and the FH have the same methodology based on the forced-choice elicitation tasked used by Ionin et al. (2004) with the belief that collection of spontaneous production data would not provide enough examples of all the target contexts. Therefore, any evidence for optionality found by applying other data collection methods could strengthen the current body of evidence on how articles are used by learners of L2 English.

As discussed in Chapter 3, the Feature Reassembly Hypothesis (Lardiere, 2008, 2009a, 2009b) rose to prominence the late 2000s and early 2010s. In moving away from the ACP and FH in the study of article acquisition, new research was the conducted employing this hypothesis. One of the first studies to look at feature reassembly and the SLA of English articles was conducted by Cho and Slabakova (2014). In their study, they combine the Feature Reassembly Hypothesis with the Bottleneck Hypothesis (Slabakova, 2008, 2009a, 2009b) and propose that "reassembling features that are represented overtly in the first language (L1) and mapping them onto those that are encoded indirectly, or covertly, in the L2 will present a greater difficulty than reassembling features in the opposite learning direction" (p. 159). In other words, English NSs learning L2 Russian have to remap their overt L1 morphemes onto quite dissimilar, covert and indirect, L2 categories, therefore constituting significant feature reassembly, while Russian NSs learning L2 English, on the other hand, have to remap their covert and indirect L1 categories onto overt L2 morphemes. Korean NSs, on the other hand, must remap their covert and indirect expression of definiteness onto another covert and indirect expression in L2 Russian.

Cho and Slabakova (2014) investigated this feature reassembly phenomenon by conducting an offline felicity judgment task with three different experimental groups: a control group of Russian NSs (*n* = 56), English NSs (*n* = 49), and Korean NSs (*n* = 53) learning L2 Russian. Each of the L2 learner groups were divided into three proficiency levels to investigate developmental patterns: beginner, intermediate, and advanced. They made two predictions for their study:

(33) Intrinsic Connection: L1 information structure marking and definiteness will facilitate acquisition of the same L2 connection.

(34) Heuristic Connection: Word order and definiteness mistakenly associate L2 word order permutations with definiteness rather than information structure.

In other words, under the prediction in (21), Korean learners of Russian will be more accurate than English learners, while, under the prediction in (22), English speakers may mistakenly associate Russian word order permutations with definiteness, but this will give them clues to break into complex Russian indirect marking of definiteness, although not the whole picture.

To address their question as to "whether L2 learners acquire the overtly marked property, possessor-modifiers, earlier than covertly marked properties" (p. 175), all of the felicity judgment task scores were converted to accuracy scores and analyzed. Cho and Slabakova (2014) combined Slabakova's (2008, 2009a, 2009b) Bottleneck Hypothesis predictions with Lardiere's (2008, 2009a, 2009b) Feature Reassembly Hypothesis and make two diametrically opposed predictions: (1) considering an intrinsic connection between information structure marking and definiteness, Korean learners will be more accurate than English learners of Russian because they will be remapping the covertly realized [definite] feature from Korean to the covertly realized [definite] feature in Russian; (2) if English speakers establish a heuristic connection between word order and definiteness, they will be more accurate than Korean learners. That is, it is possible that English learners may mistakenly associate Russian word order with definiteness rather than information structure, which may give them a clue into reassembly. They found their prediction that Korean learners would be more accurate than English learners to be partially supported with regard to the complete indirect marking of definiteness in Russian (p. 172).

With regard to adjective and nominal possessors in definite contexts, the groups performed the same. The L1 Korean data regarding word order shows that the speakers did not successfully acquire appropriate word order, which indicates that remapping a covertly realized feature (in both the L1 and L2) presents the largest challenge in reassembly. The English data, on the other hand, appears to demonstrate more success in linking Russian definiteness with word order, indicating that they probably use a heuristic association between preverbal nominals and definites.

Although the Korean data did not show any specific developmental patterns across the proficiency levels, the English data did. The English beginner learners made a distinction between adjectival and nominal possessors in definite contexts and later, at the intermediate level, made a distinction between adjectival possessors in definite versus indefinite contexts. As they interpret these results, they speculate that "L2 learners initially have to notice that there are two types of possessor modifiers in Russian" (p. 183). They take this to mean that learners might have interpreted adjectival possessors for regular adjectives and assigned them as generics. While they state this is only speculation, they go on the suggest that this may be why there were differences in the data for the beginner learners for adjectival and nominal possessors, but not between adjectival possessors in [+definite] and [–indefinite] contexts. In the end, Cho and Slabakova (2014) acknowledge that they do not have enough data to support this and call for more research in the area. Cho and Slabakova (2014) conclude that if meanings are not represented by morphological means, their acquisition will be more difficult than if they were. Additionally, their results imply that the most challenging learning task is when there is non-morphological representation of a feature in both the L1 and the L2, suggesting that "the indirect nature of feature expression, as well as the overt and covert feature encoding, should be added as significant factors when considering feature reassembly in L2 acquisition" (p. 186).

One of the most significant considerations of the work by Cho and Slabakova (2014) is their methodological approach. It is clear that they carefully considered the way in which they collected the data and the items that were included. Additionally, it is one of the first studies to consider the acquisition of definiteness without using English as the L2 and moves away from the ACP and FH. In the end, the study is groundbreaking in research regarding both the Feature Reassembly Hypothesis (Lardiere, 2008, 2009a, 2009b) and the Bottleneck Hypothesis (Slabakova, 2008, 2009a, 2009b) as it set a solid foundation for future research regarding both of these hypotheses. By considering both of these hypotheses in their results, they approach the data with a solid theoretical explanation for the results using the Feature Reassembly Hypothesis, and then explain the developmental patterns with the Bottleneck Hypothesis.

It is evident that over the past 20 years, much research has been conducted on the second language acquisition of articles from a purely theoretical standpoint. While it has been observed that L2 article acquisition research employs diverse methodologies and provides different theoretical explanations for the implications of their research, few studies thus far have considered the effect of instruction. As aforementioned, this section is two-fold, and now we turn our attention to pedagogical and intervention studies. In order to get a full view of L2 article acquisition research, the next section will review studies that were conducted considering explicit instruction.

5.1.2 | Classroom Intervention & Second Language Article Acquisition

Early SLA morpheme studies were concerned with the order in which morphemes were acquired (e.g., Dulay & Burt, 1974), and researchers found that English articles—*the* and *a*—were ranked as the third most difficult morphemes to acquire. Early GenSLA research (e.g., Master, 1987) and, as reviewed in the Section 5.2.1, more recent studies have investigated the acquisition of L2 English articles and the nominal domain (Ionin et al., 2004; Ionin et al., 2008; Trenkic, 2008, amongst others), but these studies had little to no discussion on article instruction. As discussed in Chapter 4, there are a number of studies both in support of and rejecting the effects of explicit instruction on second language knowledge.

Whilst not as widespread as other research into the SLA of English articles, Master (1990, 1994, 1997, 2002) conducted a number of studies and reviews that investigated English article acquisition, function, and pedagogy. Master (1994) investigated the effectiveness of explicit instruction with high-intermediate and low-advanced learners of English with a variety of different L1s. The participants were divided into a group which received instruction and a control group which did not. To collect data, Master (1994) conducted a forced-choice elicitation task in which the learners were asked to choose *a*, *the*, or no article at all. This task was administered to both groups as a pre-test prior to intervention and then again after 9 weeks of instructional intervention. The instructional intervention focused on aspects of English articles such as distinctions between singular-plural, definite-indefinite, and specific-generic. The delayed post-test took place 1 week after instruction had ended. Master (1994) did find significant differences between pre- and post-test for the instructional intervention group, as the control group did not make any significant improvements over the course of the study. He takes these results to conclude that instruction on English articles, when done in a systematic way, is effective, but stops short of indicating whether these changes are effective on learner's underlying linguistic knowledge. Since the only post-test was administered one-week after the end of the intervention, it is not possible to address whether changes in explicit knowledge can be retained over a long period of time.

In his 2002 study, Master completed another intervention study, but this time formed three groups that were exposed to different instructional contexts: one group received instruction on information structure (*n* = 15), another received traditional instruction (*n* = 17), and one received no instruction (*n* = 16). Both instructional groups received three hours of instruction over a three-week period focusing on four areas: (1) the count/noncount distinction, (2) the definite, indefinite distinction, (3) the effect of post-modification on article choice, and (4) the generic/specific distinction (Master, 2002, p. 342). While the traditional instruction group received a traditional explanation of the article system regarding the four areas outlined above, the information structure group was taught information structure as an overarching guiding principle in applying the aforementioned areas. Data was collected using a forced-choice elicitation task that was administered prior to instruction and one month after instruction. The results of this study found that students who received information structure instruction performed better in selecting the correct articles in the forced-choice elicitation task than the traditional instruction group and the no-extra-instruction group. Master (2002) takes these results to suggest that an understanding of information structure may help L2-English learners gain control of the English article system. Once again, though, Master (2002) conducted a study using only explicit measures of L2 linguistic knowledge, making it impossible to draw any conclusions regarding underlying linguistic representations for the L2 learners.

In the early 2010s, a group of researchers (Bruhn de Garavito, 2013; Whong, 2011; Whong, Gil, et al., 2013a, 2013b; Whong, Marsden, et al., 2013) came forward and identified a large gap in the current body of SLA research: the need for GenSLA research theory and findings to be accessible and applicable in the L2 classroom. Whong, Marsden, et al. (2013) went as far as to suggest that L2 learners and the L2 classroom could benefit from more linguistically-informed generalizations. The remainder of this section is to take a look at generative empirical findings and classroom intervention to investigate the effects of instruction on L2 English article acquisition.

Akakura (2012) also conducted an instructional intervention study that focused on genericity and the effect of explicit instruction. Data was collected with four instruments—two which tapped into explicit knowledge (a grammaticality judgment task and a metalinguistic knowledge task) and two which tapped into implicit knowledge (an elicited imitation task and an oral production task). The participants were 94 English language learners of various language backgrounds residing in

New Zealand. The participants were randomly divided into two groups: an experimental group (*n* = 49) that received instruction on form/function mappings of articles and a control group (*n* =45) that did not receive instruction. Akakura (2012) found short-term improvement in article accuracy following explicit instruction. When taken with the research done by Master (1994, 2002), these intervention studies have found that learners can make measurable improvements over a short instructional period.

In a pilot study conducted by Snape and Yusa (2013), the researchers attempted to use empirical findings from GenSLA literature to teach L2 learners about the complexity of article choice as well as the perception of articles. In their study, they recruited 14 L1-Japanese, L2-English third-year university students and divided them into two groups: (1) an experimental group which received instructional intervention, and (2) a control group which did not receive any instructional intervention during the study. The study took place over a seven-week period. See Table X below.

Table 5.3. Data collection procedure for Snape and Yusa (2013, p. 172)

Week	Experimental Group (*n* = 7)	Control Group (*n* = 7)
1	Pre-test	Pre-test
2	Instruction (specificity and definiteness)	No instruction
3	Instruction (perception)	No instruction
4	Instruction (genericity)	No instruction
5	Post-test 1	Post-test 1
6		
7	Post-test 2	Post-test 2

The "experimental" group received 70 minutes of instructions each week over a three-week period. In week 2, the participants received instruction on the definiteness and specificity distinction. For week 3, they received instruction on the perception of articles, and week 4 provided them with instruction on genericity. At pre-test, post-test 1, and post-test 2, the participants completed three data collection tasks. The first task was the same forced-choice elicitation task as Ionin et al. (2004). The second task was an acceptability judgment task that included items based on the items used in Ionin, Montrul, Kim, and Philippov (2011). The third, and final task, was a transcription task that had been administered previously by Pierce and Ionin (2011).

The results of the forced-choice elicitation task showed that both groups performed better in selecting the definite article in [+definite, +specific] contexts but less so in [+definite, –specific] contexts. Furthermore, despite one group receiving instruction, there were no differences between the groups in both of these contexts. As for indefinite article selection, both groups performed similarly well by selecting the indefinite article in both [–definite, +specific] and [–definite, –specific] contexts. As for the acceptability judgment task, the instructed learners performed better at accepting the indefinite article for sentence-level generics and bare plurals in both NP-level and sentence-level generics, but both groups performed worse with the definite article in singular NP-level generic contexts. With regard to the transcription/perception task, there were no differences between or within groups in definite singular contexts. As for definite plurals, significant differences were found between groups at both post-test 1 and post-test 2. Furthermore, the instructed learners improved their perception of indefinite articles between pre-test and both post-tests. Overall, the results from Snape and Yusa (2013) showed that Japanese learners of English did not benefit greatly from explicit article instruction on definiteness, specificity, and genericity, although the learners did improve on their perception of English articles.

These results can be attributed to a number of factors and limitations that Snape and Yusa (2013) point out. For instance, the form of instruction may have been too difficult. As studies have shown, instruction can be beneficial for L2 learners (Trahey & White, 1993a, 1993b; White, 1991), but article instruction, in comparison to previous instruction studies, is quite complex. Furthermore, it is likely that language learners have never received such explicit instruction of article choice. Therefore, the learners may have found the instruction to be too difficult, and lessons on article choice may have actually led to confusion because the differences between definite, indefinite, and generic contexts are very subtle. Snape and Yusa (2013) suggest that the results of instruction may have been different if the learners had been taught in their L1, Japanese. While there were no significant differences between groups overall, both groups did much better selecting the indefinite article in [–definite, +specific] contexts than selecting the definite article in [+definite, –specific] contexts. This suggests that there should be a focus on teaching definiteness as important in English, and instruction should focus on the use of the definite article, rather than the indefinite article. The authors also suggest that research should be conducted over a longer instruction period as the short instruction period may have been insufficient.

Motivated by Snape and Yusa (2013) work and by the research gaps they identified, Lopez (2017) conducted an exploratory intervention study that investigated the effects of teaching the English article system with new instructional materials that were informed by GenSLA research. She called this "linguistically-informed instruction". The aim of the study was to "determine whether instruction on specificity could help lower-intermediate classroom-based learners improve their accuracy with English articles" (Lopez, 2017, p. 2) as well as overcome the systematic error patterns that have been previously reported in Ionin et al. (2004). Lopez (2017) hypothesized that by providing an instructional intervention that is informed by GenSLA findings and theoretical underpinnings, participants would overcome pre-test error patterns consistent with the FH (Ionin et al., 2004) at pre-test and re-set the ACP (Ionin, 2003; Ionin et al., 2004).

The study consisted of 50 low-proficiency L1-Mandarin, L2-English learners who were enrolled in a 10-week pre-sessional English course at a UK university. The participants were recruited from pre-formed language classes that were randomly assigned to one of three interventions: (1) No Instruction: no explicit instruction of articles during the course, (2) Standard Instruction: taught about definiteness using published teaching materials, (3) Specificity Instruction: (experimental) taught about definiteness and specificity using the linguistically-informed materials created by the researcher. The study consisted of a pre-/post-test design with instruction administered between the pre- and post-tests, and a delayed posted-test being administered nine months after the post-test.

Data was collected via two experimental tasks—a forced-choice elicitation task from Ionin et al. (2009) and a timed acceptability judgment task. The forced-choice elicitation task contained 60 dialogues: 6 items x 4 target contexts, as well as 12 additional article items and 24 filler items. The four target contexts considered are the same as those from Ionin et al. (2004), and many other previous studies: [+definite, +specific], [+definite, –specific], [–definite, +specific], and [–definite, –specific]. The acceptability judgment task targeted the same contexts and consisted of eight items for each context plus 18 fillers. Out of all the items, half were grammatical, and half were ungrammatical. While the forced-choice elicitation task was aimed at measuring explicit knowledge, the timed acceptability judgment task was aimed at measuring implicit knowledge, giving the participants 25 seconds to read and rate each item.

Table 5.4. Data collection procedure for Lopez (2017, p. 8)

Week	No Instruction	Standard Instruction	Specificity Instruction
1	Proficiency Test	Proficiency Test	Proficiency Test
2	Pre-test	Pre-test	Pre-test
3	Alternative grammar instruction (90 minutes)	Instruction on definiteness (90 minutes)	Instruction on definiteness (90 minutes)
4	Further instruction (as above)	Homework review/follow-up (90 minutes)	Instruction on specificity (90 minutes)
5			
6	Further instruction (as above)	Further instruction (as above)	Error correction exercise with some focus on definiteness and specificity
7	Further instruction (as above)	Homework review/follow-up (90 minutes)	Post-Test
8	Post-Test	Post-Test	

The instructional intervention in the study consisted of three 90-minute lessons. While the No-extra-instruction group received explicit instruction about sentence structure and prepositions, they did not receive any instruction over English articles. The Standard Instruction group received form-focused instruction on definiteness using their published grammar books, while the Specificity Instruction group received explicit instruction on definiteness and specificity using the researcher-created linguistically-informed materials. The linguistically-informed teaching materials used pedagogical definitions of definiteness simplified from those given in Ionin et al. (2004).

The pre-test results found that all groups showed similar patterns of accuracy despite significant differences in their overall scores. Overall, Lopez (2017) did not find any consistent pattern of reduced accuracy in [+definite, –specific] or [–definite, +specific] contexts in either task between groups. These overall results reject the FH proposed by Ionin et al. (2004). Lopez (2017) suggests that might be due to the L1 but states a more in-depth explanation is needed. With regard to the forced-choice elicitation task, the Specificity Instruction (experimental) group improved significantly over the course of the study, but their scores were generally lower than the other participant groups at each testing time. Any improvement, therefore, can potentially be attributed to improved proficiency due to attending intensive English grammar courses. The judgment task, on the other hand, paints a different picture. The experimental group actually showed a decrease in accuracy when placed under a time pressure. Lopez (2017) suggests this is due to the fact that learners were attempting to apply recent knowledge and, therefore, did not have enough time to appropriately answer.

In response to a lack of significant improvement by the experimental group, Lopez (2017) gives a number of limitations of her study. She states that it is possible explanations for linguistic concepts were oversimplified in order to be accessible by both instructors and the low-level learners. She states that there is not enough evidence in her results to make a concrete claim about the long-term effects of explicit instruction on L2 linguistic knowledge. Furthermore, she highlights that instructional intervention in this study went "beyond the time many teachers would spend focusing on one grammatical feature" (Lopez, 2017, p. 15). While she recognizes the limitations for her study, Lopez (2017) calls for more research in the area—research with different proficiency levels, (slightly) more complex definitions for linguistically-informed instruction, and continued work to strengthen the links between GenSLA theory and pedagogical practice.

Two other studies supporting the short-term effects of explicit instruction of article semantics were conducted by Umeda, Snape, Yusa, and Wilstshier (2017) and Snape and Umeda (2018). In these studies, they attempted to provide linguistically-informed instruction to a group of L1-Japanese, L2-English learners and examined whether these participants could determine the differences between the definite singular and indefinite singular generics. As with Lopez (2017), Umeda et al. (2017) emphasize that instructional intervention uses "descriptions of English articles grounded in linguistics research" (p. 2). While Ionin et al. (2011) and Snape and Yusa (2013) both found bare plurals to be unproblematic for L2 learners, Umeda et al. (2017) and Snape and Umeda (2018) follow up on this work to examine whether L2 learners benefit from "instruction on English articles that is informed by linguistic analyses rather than the rules of thumb that are typically taught to L2 learners in classrooms" (Umeda et al., 2017, p. 3). In addition, the authors wanted to investigate the effect of instruction 15 months after the beginning of the instructional period. The entire experimental procedure can be found in Table 5.5.

Table 5.5. Data collection procedure for Umeda et al. (2017, p. 8) and Snape and Umeda (2018, p. 177)

Week	Experimental Group	Control Group
1	Pre-test (n = 21)	Pre-test (n = 16)
2-3	Instruction (genericity)	
3	Post-test 1 (n = 21)	Post-test 1 (n = 16)
4-7	Instruction (definiteness and specificity)	
8-9	Review (genericity, definiteness, & specificity)	
10	Post-test 2 (n = 21)	Post-test 2 (n = 16)
22	Post-test 3 (n = 19)	Post-test 3 (n = 15)
74	Post-test 4 (n = 14)	Post-test 4 (n = 8)

Data was collected via an acceptability judgment task from 37 learners—21 participants in an instruction group and 16 in a control group. Additionally, nine native speakers of British English served as baseline data. In response to the limitations identified by Snape and Yusa (2013), Umeda et al. (2017) and Snape and Umeda (2018) expanded the instructional period from two 70-minute periods to nine 60-minute instructional periods that consisted mainly of metalinguistic explanations. According to Umeda et al. (2017) and Snape and Umeda (2018), the instructional sessions included time for participants to work on their own, in pairs, or in small groups. For productive practice, participants were given pictures and asked to write generic sentences of the type they had received instruction on. The acceptability judgment task consisted of 10 types of items, based on those in Ionin et al. (2004) and Ionin et al. (2011). A summary of the items can be found in

Table 5.6 below.

Table 5.6. Types and tokens in the acceptability judgment task from Umeda et al. (2017, p. 6)

Type	**Context**	**n**
Second Mention (distractors)	definite singular	4
	definite plural	4
Kinds (NP-level generics)	definite singular	12
	bare plural	12
General (sentence-level generics)	indefinite singular	12
	bare plural	12
Definiteness & Specificity	definite, specific	4
	definite, nonspecific	4
	indefinite, specific	4
	indefinite, nonspecific	4

The overall results showed that neither the instruction group nor the control group demonstrated much understanding of definite singular contexts at post-test. Post-test results after three weeks of instruction did demonstrate improved linguistic knowledge of definite singular NP-level generics between pre-test and post-test 1. As for delayed post-test, differences were also found between pre-test and post-test 2 as well as pre-test and post-test 3 for the instructional intervention group. As for indefinite singular (up to post-test 2) and bare plurals, the experimental group demonstrated improvements after receiving instruction. When these results are compared to those from Snape and Yusa (2013), it can be seen that the L2 learners in Umeda et al.'s (2017) study were much better at accepting definite singular NP-level generics after instruction. Despite these improvements, accuracy ratings decreased for the appropriate article for NP-level generics at delayed post-tests. Furthermore, the results in both studies (Snape & Umeda, 2018; Umeda et al., 2017) clearly revealed that any improvement demonstrated in a few short weeks cannot reliably address the issues of implicit knowledge.

These findings are in line with previous intervention studies conducted by White (1991), a study investigating the pedagogy and acquisition of English adverbs, and Lopez (2017), which suggest that any gains made in the short term are not retained in the long term. Similar to Lopez (2017), instruction by Umeda et al. (2017) and Snape and Umeda (2018) was targeted at learners who had not likely received constant, uninterrupted exposure to English. This suggests that regular classroom instruction may not be enough input or exposure for these learners. Umeda et al. (2017) state that "Although the present study found no real long-term effects of instruction, linguistic descriptions … may be useful for highly proficient L2 learners" (p. 18). These results only begin to bridge the gap between GenSLA research and language pedagogy, as Snape and Umeda (2018) call for more research in the area stating that using semantic features to teach definiteness could assist linguistically-informed language teaching guide L2 learners in the right direction in acquiring/reassembling features for nominal morphosyntax.

Sabir (2015, 2018) conducted another study that looked at the acquisition of article use in classrooms informed by GenSLA theory. In her study, she investigated specificity and article use with 54 Saudi (Hejazi) Arabic-speaking learners of English divided into two groups—an instructed group (*n* = 33) and an uninstructed group (*n* = 21)—and a group of native English speakers to serve as baseline data (*n* = 23). While Sabir (2018) states that the participants were divided by instruction group, descriptive statistics are only given for participants based on their proficiency, see Table 5.7 below.

Table 5.7. Participants' language level and language background information from Sabir (2018, p. 148)

Number of participants	Language Level	Score Range	Number of Years English Study	Age
18	Upper Intermediate	40-47	M = 9.06	M = 22
36	Lower Intermediate	30-39	M = 8.67	M = 22.67

While the participants in Sabir (2015) took three tasks (forced-choice elicitation task, acceptability judgment task, elicited written production task), only the results or the forced-choice elicitation task are reported in Sabir (2018). This elicitation task is the same one adopted by previous studies (e.g., Lopez, 2017, amongst others) based on Ionin et al. (2009). Data was collected at pre-test (three days before instruction), immediate post-test (three days after instruction), and delayed post-test (five weeks after the immediate post-test). The instrument included 48 short dialogues that targeted article use with singular count nouns—24 items covered non-generic contexts, and 24 items served as fillers. The instructional intervention consisted of two 60-minute sessions per week for three weeks. The instructed group received explicit instruction on definiteness and specificity, while the uninstructed group took regular language classes without explicit article instruction.

Inspired and motivated by previous research (Lopez, 2017; Snape & Umeda, 2018; Snape & Yusa, 2013; Umeda et al., 2017), the experimental instruction used metalinguistic expressions to provide a clear distinction between the meanings of the various articles in a linguistically-informed environment.

Table 5.8. Data collection procedure for Sabir (2018)

	Instructed Group (*n* = 33)	**Uninstructed Group (*n* = 21)**
Week 1	Pre-test	Pre-test
+ 3 days	Instruction on definiteness and specificity (60 minutes) x2	Regular language instruction (60 minutes) x2
Week 2	Instruction on definiteness and specificity (60 minutes) x2	Regular language instruction (60 minutes) x2
Week 3	Instruction on definiteness and specificity (60 minutes) x2	Regular language instruction (60 minutes) x2
+ 3 days	Post-test 1	Post-test 1
Week 8	Post-test 2	Post-test 2

To summarize the results, the Hejazi Arabic-speaking learners fluctuated between definiteness and specificity, which is similar to learners from article-less languages. The author attributes this unusual finding to the possibility of previous classroom instruction or characteristics of Arabic articles. One of the most striking results from this study specificity played a larger role in Hejazi Arabic speakers' L2-English article choice than definiteness. Sabir (2018) aimed at investigating the effect of explicit instruction on article choice. At both post-tests, the instructed group outperformed the uninstructed group, which suggests that explicit article instruction may have an effect on explicit knowledge. This positive effect of instruction was further demonstrated by the disappearance of an effect of specificity in post-test 2. This is in line with previous research on explicit instruction (e.g., Norris & Ortega, 2000, amongst others) that suggests language difficulties can be overcome by raising metalinguistic awareness.

One limitation of the study conducted by Sabir (2018) is that the only data collected was from the forced-choice elicitation task. This instrument is untimed and measures only offline knowledge. As Sabir (2018, p. 159) points out, "A fully informative account regarding the role of explicit instruction in article pedagogy should, furthermore, consider the use of free response measures and measures of online knowledge." This is not only a valid limitation, but an important one. In order to fully understand the effect of explicit knowledge, a number of instruments measuring both online and offline measures should be included. In addition, it is not clear what the proficiency level breakdown of each experimental group is. While Sabir (2018) states that groups were divided by "instruction" and "no instruction", she fails to give any descriptive statistics or proficiency level for each of these groups. Future research in this area would benefit from a number of experimental groups (e.g., instruction vs. no instruction) that also demonstrate similar L2 language proficiency levels.

The most recent study investigating classroom intervention and the reassembly of L2 features was conducted by Abumelha (2018) with 54 L1-Najdi Arabic speakers in three different instructional contexts: implicit instruction, explicit instruction, and uninstructed (control). Abumelha (2018, p. 197) had three research questions: (i) Will the results of Najdi Arabic second language learners of English reflect the levels of feature reassembly difficulty on the two generic contexts as proposed in the difficulty cline? (ii) Will classroom input provided in the study result in improvement from pre-tests and, if so, which type of input will be more effective—implicit or explicit? (iii) Will the effect of instruction hold over the eight-weeks delayed post-test period? To test these research questions, the author hypothesizes the Cline of Difficulty in Figure 5.1 below. This is inspired by Slabakova's (2009b, p. 321) Cline of Difficulty.

Harder to acquire		*Easier to acquire*
Morpheme to morpheme		**Morpheme to morpheme**
Reassembly required		**No reassembly required**
[–definite, –plural, +generic]	[–definite, +plural, +generic]	[+definite, –plural, +generic]
Indefinite singular generics	**Bare plural generics**	**Definite singular generics**

Figure 5.1. A proposed Cline of Difficulty for L1-Najdi Arabic speakers from Abumelha (2018, p. 196)

While Abumelha (2018, p. 197) states that participants were "randomly assigned to explicit, implicit, and control" groups, the distribution of proficiency levels per group seems to be disproportionate. Abumelha's (2018) participant group data can be seen in Table 5.9.

Table 5.9. Participants' language level from Abumelha (2018, p. 198)

Group	**Elementary**	**Lower-Intermediate**	**Upper-Intermediate**
Implicit Instruction (*n* = 22)	31.8%	45.4%	22.7%
Explicit Instruction (*n* = 22)	13.6%	68.1%	18.1%
Uninstructed (*n* = 10)	30%	60%	10%

As can be seen in the table, there are far fewer "elementary" learners in the explicit instruction group than the implicit instruction and uninstructed groups. Furthermore, proficiency level distributions for the explicit instruction and implicit instruction groups are quite different, which would make interpreting the results based on instruction—and not proficiency level—quite difficult.

Abumelha (2018) collected data via two instruments: a forced-choice elicitation task adopted from Ionin et al. (2004) and R. Hawkins et al. (2006), and a sentence transcription task adopted from Pierce and Ionin (2011) and Snape and Yusa (2013). The forced-choice elicitation task included 16 items in three different contexts: (a) eight items of [+definite, ±plural], (b) four items of [–definite, +plural, +generic], and (c) four items of [–definite, –plural, +generic]. The sentence repetition task involved listening to sentences (produced by native speakers) as many times as needed, and then transcribing them on paper. Abumelha (2018) states that the aim of this task is to investigate the ability to produce English articles in contexts. A methodological concern with this task, though, is how the learners are expected to produce articles different from those produced by the recording if they are permitted to listen to the sentences as many times as they would like prior to transcribing. While the author states the "type of knowledge this task would tap into is somehow restricted but less explicit than the forced choice" (Abumelha, 2018, p. 198), it is difficult to see how much less explicit this task is given its untimed nature. The sentence transcription task consisted of 18 sentences with twenty-four nouns in four contexts: (a) six items of [+definite, +plural], (b) six items of [+definite, –plural], (c) eight items of [–definite, +plural, +generic], and (d) four items of [–definite, –plural, +generic]. The participants were always given the sentence repetition task before the forced-choice elicitation task.

Table 5.10. Data collection procedure for Abumelha (2018)

Week	Explicit Instruction	Implicit Instruction	Uninstructed
1	Proficiency Test & Pre-tests	Proficiency Test & Pre-tests	Proficiency Test & Pre-tests
2	Instruction (2 hours)	Instruction (2 hours)	
3	Instruction (2 hours)	Instruction (2 hours)	
4	Instruction (2 hours)	Instruction (2 hours)	
5	Instruction (2 hours)	Instruction (2 hours)	
6	Instruction (2 hours) + Post-test 1	Instruction (2 hours) + Post-test 1	Post-test 1
14	Post-test 2	Post-test 2	Post-test 2

The study took place over a 14-week time period, see Table 5.10above. For instructional intervention, the two experimental groups received ten hours of instruction over a five-week period. The explicit instruction group received input through analysis of "authentic texts as examples of the 'research genre' on introductions, methods and results (Swales, 1990)" (Abumelha, 2018, p. 199). These texts were reinforced with the targeted noun types and provided a class through a sound file recorded by native speakers. In addition, explicit grammatical input of English generics was also given. As for the implicit instruction group, they were exposed to the same reinforced texts but without highlighting generic NPs or receiving any explicit grammatical instruction.

With regard to research question 1, the results found that L1-Najdi Arabic speakers did show non-target performance on the two generic contexts and target performance on the non-generic contexts. This is in line with the hypothesis that these learners would have more difficulty with the use of English articles in bare plural and indefinite singular generic contexts, as reflected in the proposed Cline of Difficulty in Figure 5.1 above. However, the results of the sentence transcription task revealed that all learners were non-target like in both [+generic] and [–generic] contexts. This finding is inconsistent with previous research L1-Arabic speakers (Almahboob, 2009; Azaz, 2014;

Sarko, 2009)[10], and one explanation may be that the task is particularly difficult for the proficiency level of learners in this study.

When looking at the results post-intervention, the overall accuracy of the participants' showed a significant increase in both of the experimental groups. Abumelha (2018) suggests that this indicates the reassembly process may have been accelerated by instructional intervention as the control group did not show such large improvements over between testing times. This results only lasted into the delayed post-test for the explicit instruction group. While this suggests explicit instruction proves to be more effective than implicit instruction over time, the proficiency levels of the groups must be considered as well. It is at this point that Abumelha (2018) considers the different proficiency make-ups of the experimental groups stating "it is difficult to decide if one experimental group was more 'proficient' than the other in a way that could have affected the results" (p. 207). This highlights the importance of considering proficiency level prior to data collection and intervention so that groups can be compared to each other over the course of the study. When the results are broken down by each instrument, they appear different. The results of the forced-choice elicitation task were far more predictable than the sentence transcription task. The primary contribution of Abumelha (2018) is that it provides empirical data with regard to feature reassembly and classroom intervention. The intervention provided to the two experimental groups was based on the assumptions of GenSLA theories that specify mapping difficulties related to L1 transfer and feature reassembly. As with previous studies in the area, Abumelha (2018) calls for more research using a wider variety of instruments (both more explicit and less explicit measures) and other types of classroom intervention informed by GenSLA theory.

While the results are somewhat mixed, the majority of studies support the notion that explicit instruction in the classroom can accelerate acquisition of L2 English articles and their features. A number of studies (Abumelha, 2016, 2018; Akakura, 2009, 2012; Master, 1994, 2002; Sabir, 2015, 2018; Snape & Umeda, 2018; Umeda et al., 2017) have shown that explicit instruction has short-term benefits on explicit knowledge, but that these benefits do not tend to become part of their long-term linguistic knowledge. In one study, Abumelha (2016, 2018) found that explicit

[10] These studies will not be reviewed as they are beyond the scope of this dissertation.

instruction had a longer lasting effect on participants' linguistic knowledge than implicit instruction. Furthermore, Snape and Yusa (2013, p. 178) emphasize that "article pedagogy is actually very complex – the semantics of definiteness and specificity is complex, and, conceptually, genericity is too complex to reasonably teach in a short period of time". They expand on this idea stating that the focus of article instruction should be on the use of the definite article in non-specific contexts. Umeda et al. (2017) state that while their study found no real long-term effects of instruction, "linguistic descriptions … may be useful for highly proficient L2 learners" (p. 18).

These findings only begin to bridge the gap between GenSLA research and language pedagogy, as Snape and Umeda (2018) call for more research in the area stating that using semantic features to teach definiteness could assist linguistically-informed language teaching and guide L2 learners in the right direction in acquiring/reassembling features for nominal morphosyntax. Lopez (2017) further highlights the importance of research in this area by saying, "any attempt to strengthen the links between theory and practice is surely of benefit to both parties" (p. 16). Sabir (2018) took this further by saying that the role of SLA researchers who also find themselves as language instructors, or simply interested in classroom pedagogy, should seek to deliver linguistic information to L2 learners that is often lacking in traditional language textbooks and curriculum. This aligns with Lopez (2017), who also found that the language instructors she worked with learned more about the complexities of language, while she, as a researcher, began to realize the difficulty in developing instructional materials that are both linguistically accurate and simple/clear enough for L2 learners. Finally, by appealing to GenSLA theories, Abumelha (2016, 2018) found that developing an instructional environment that is informed by Slabakova's (2008, 2009a, 2009b) Bottleneck Hypothesis and Cline of Difficulty, as well as Lardiere's (2008, 2009a, 2009b) Feature Reassembly Hypothesis, classroom instruction was able to accelerate feature reassembly. In her study, the effects of this explicit instruction were visible not only at the immediate post-test but the delayed post-test as well. It is evident that research over the past 10-15 years has produced a plethora of results on the effects of instruction in the L2 classroom, but further research is needed with regard to instructional interventions that employ theoretical underpinnings of GenSLA research. In the next section, we will turn to look at the second language acquisition of noun types, and the difficulties that noun types pose to L2 learners.

5.2 | Second Language Acquisition of Noun Types

Before the early 2000s, not much work was done concerning the second language acquisition of noun types. Much of the early research conducted in the 1960s through 1980s reviewed the properties of nouns and how they were categorized according to morphological and syntactic criteria (Allan, 1980; Bunt, 1985; Gathercole, 1986; Gleason, 1965; Gordon, 1982, 1985, 1988; McCawley, 1975; Mufwene, 1984; Francis Jeffry Pelletier, 1975, 1979; Quine, 1960). Throughout the 1990s and early 2000s, many studies were conducted with young infants and children learning English investigating their development of mass and count representations (Barner & Snedeker, 2005, 2006; Carey & Xu, 2001; Feigenson & Carey, 2003; Feigenson, Carey, & Hauser, 2002; Spelke, 1985; Wynn, 1992). While there is much research on the morphological and syntactic criteria for mass and count nouns, as well as research on child language development of this phenomena, it has only been recently that this topic has been taken up in GenSLA research. This section aims to give a comprehensive review of studies that investigated the L2 acquisition of English countable and uncountable nouns. Unlike the previous section which investigated the acquisition of articles in an instructed language context, there are currently no published studies that investigate the acquisition of noun types in an ISLA setting, which leaves a gap in the current research.

5.2.1 | Previous Research on Second Language Noun Type Acquisition & Misuse

Prior to the early 2000s, much of the research on the acquisition of noun types was with children and focused on first language acquisition of noun types and their modifiers (e.g., Gathercole, 1985, 1986). In addition, many studies also investigated quantity judgments of countable, uncountable, and flexible nouns (e.g., Barner & Snedeker, 2005, 2006). Many early studies, conducted with children in their first language, found that quantificational judgments were often made over countable nouns and object-uncountable nouns, but not substance-uncountable nouns.

One of the first SLA studies on English noun types was conducted by Hua and Lee (2005). They conducted a study with three groups of ESL learners in Shanghai—senior high school students (n = 9), first-year university students (n = 15)—and two groups in Hong Kong—first-year university students (n = 17) and second-year university students (n = 17). A small group (n = 6) native speakers was also included. The study was conducted in three parts. The first part of the study employed a grammaticality judgment task that investigated learners' sensitivity to the English count/mass distinction and analyzed "(a) the extent to which advanced L2 learners are sensitive to the selective contexts for count and mass nouns in English; and (b) whether the concrete-abstract ontological distinction will have any effect on the learners; cognition of the count-mass status of nouns" (p. 141). The task consisted of 20 nouns—8 count, 8 mass (i.e. substance-uncountable), and 4 collective (i.e., object-uncountable). All nouns were presented in three contexts: (1) a count context proceeded by a numeral; (2) a count context preceded by the quantifier *many*; and (3) a mass context preceded by the quantifier *much*. This gave a total of 60 items in the judgment task in which the learners rated each item as grammatical, ungrammatical, or not sure.

The second part of the study investigated the extent to which L1-Mandarin, L2-English learners mastered the English singular count noun rule. Again using a grammaticality judgment task, the participants were asked to rate 8 different countable nouns, either preceded by an indefinite article or in bare noun form, in different contexts: noun phrases in subject position used either generically or referentially, noun phrases in object position used either generically or referentially, and in prepositional object position. This created a total of 80 sentences for participants to rate. The third part of the study consisted of a forced-choice elicitation task in which the subjects had to rely on the context in order to select the appropriate noun form (determined noun and bare noun) to complete each sentence.

The results of the study conducted by Hua and Lee (2005) found that advanced L1-Mandarin, L2-English learners did demonstrate sensitivity to count-selective and mass-selective contexts in English, but did not understand the English count-mass distinction solely on a word-by-word basis. Additionally, the researchers claimed they found evidence of L1 transfer because the learners demonstrated sensitivity to the English singular count noun rule for noun phrases in object and subject position when the they are referential, but not when these noun phrases denote kinds. Hua and Lee (2005) also found that the learners understood the application of the singular count noun rule for concrete nouns sooner than abstract nouns. Their study is not complete without limitations. For instance, Hua and Lee (2005, p. 145) mention that "The senior high subjects for Part II were not all identical to the previous once, since some of the subjects in Part I failed the word translation task", but they fail to mention exactly how many participants were replaced. Furthermore, the authors do not give sufficient detail of the forced-choice elicitation task. They fail to mention how many total items were included of each context. While they do not mention it, further research needs to be conducted to investigate the interaction between the use of articles and noun forms to further establish the learning task for these participants.

In order to investigate the role of transfer in the acquisition and interpretation of plural noun phrases, Ionin, Montrul, and Crivos (2013) conducted a bidirectional study with English and Spanish. The aim of their study was to investigate the L2 acquisition process when both the L1 and L2 have articles, but the meanings of those articles are encoded in the two languages subtly different. The goals for their study were three-fold: (a) to determine, bidirectionally, if L1 transfer of form/meaning mappings take places in the domain of plural noun phrase interpretation; (b) to determine whether or not target-like attainment (compared to NSs); and (c) to determine the difficulties that adult L2 learners face when acquiring plural NP interpretation. The participants in the study were 40 L2-English learners—27 at an Argentinian university and 13 of them ESL students at a Midwestern United States university—as well as 19 native speakers of English, 43 L1-English, L2-Spanish speakers, and 17 native speakers of Spanish to serve as a baseline. Ionin et al. (2013) collected data via a forced-choice elicitation task, a truth-value judgment task, a metalinguistic acceptability judgment task, and a picture-matching task, although they only report the results of the forced-choice elicitation task and the truth-value judgment task in Ionin et al. (2013). The results of the other tasks were presented in Ionin and Montrul (2010), discussed earlier in Section 5.1.1.

The forced-choice elicitation task was a cloze task in which every seventh word was removed and replaced with three choices, totally 39 items. There was only one appropriate answer for each item. The truth-value judgment task was designed to focus learners' attention on sentence meaning, rather than grammaticality. Each item consisted of a picture accompanied by a story and a test sentence. The participants were asked to judge the test sentence as true or false given the context of the story and picture. In the English version of the task, each story appeared three times: (1) once containing a bare plural; (2) once containing a definite plural; and (3) once containing a demonstrative plural. There were a total of 24 test items and 36 fillers in this task. The results of the forced-choice elicitation task revealed that the L1-Spanish, L2-English learners needed to be divided into three proficiency groups: low, intermediate, and high-ESL. The high-ESL group consisted entirely of students from a large university in the Midwestern United States. The results of the truth-value judgment task found that the low and intermediate learners of English allowed, and preferred, generic readings of definite plurals, while the high-ESL group was more likely to give the target response to definite plurals. While the authors take this to suggest possible recovery from L1-transfer, they conducted a further study to investigate the learners' judgments of bare and definite plurals.

The second study consisted of different participants and collected data with a metalinguistic acceptability judgment task as an attempt to get absolute judgments rather than preferences. The task used 40 story-based contexts rather than single adjuncts to establish generic and specific contexts for interpretation. The participants were 32 L1-Spanish, L2-English learners from an Argentinian university, as well as 22 native speakers of English to serve as baseline data. The findings from this study revealed that the ratings of generic plurals were fully consistent with L1-transfer, rating definite plurals too high and bare plurals too low when compared to their NS counterparts. The results for specific plurals paint a different picture, as they are not as expected under L1-transfer. Ionin et al. (2013) gave the possible explanation that "the learners had learned the basic grammatical fact about English … but had not yet fully acquired the interpretation of bare versus definite plurals" (p. 510). The authors call for more research in the area, even highlighting a shortcoming of their own study by suggesting further research be completed on a variety of tasks with the same group of learners in order to obtain convergent evidence. Furthermore, studying the same phenomena but in a classroom instruction environment would open to research to investigating the influence of instruction on learners' behavior.

A study conducted by Inagaki (2013) investigated the syntax-semantics mappings of English countable and uncountable noun and the difficulty they pose to L2 learners of English. Inagaki's (2013) study consisted of three different experiments. The first experiment sought to examine how L1-Japanese, L2-English learners interpreted countable nouns, uncountable-substance nouns, and uncountable-object nouns and compare those results to a previous study with native speakers (see Inagaki & Barner, 2009). The participants consisted of 20 undergraduate students who made quantity judgments containing three classes of English nouns (i.e., countable, uncountable-substance, and uncountable-object). This task was adopted from previous research by Barner and Snedeker (2005) and consisted of 12 items (four for each noun class). In this task, the participants are presented with pictures containing two characters—one who had two late objects or two large portions of stuff, and the other who had six tiny object or six tiny portions of stuff—and asked *Who has more X(s)?*, to which participants provided their responses on a separate answer sheet. The results found that while L2-English learners were more likely to quantify uncountable-substance nouns, overall they performed similarly to L1-English speakers judgments on countable nouns, uncountable-object nouns, and uncountable-substance nouns, thereby demonstrating they are equally likely to quantify by number to their NS English counterparts.

In the second experiment, 39 undergraduate L1-Japanese, L2-English students completed a quantity judgment task (Barner & Snedeker, 2005) containing four flexible nouns (i.e., nouns that can be either countable or uncountable) along with their Japanese counterparts (from Inagaki & Barner, 2009). While 20 of the participants received the nouns presented in uncountable syntax (e.g., *more string*), the other 19 participants received the nouns presented in countable syntax (e.g., *more strings*). The results of experiment two found that unlike NS of English, L1-Japanese learners of English did not change interpretations based on whether the words were in countable or uncountable syntax. With their results split between two syntactic contexts, Inagaki (2013) suggests that the learners are indecisive with regard to countable-uncountable syntax, similar to how the NS of Japanese performed in the Japanese version of the task.

The third experiment was an extension of the second one and sought to investigate how L1-Japanese learners of English interpreted cross-linguistic variable nouns—that is nouns that vary in countable/uncountable status cross-linguistically—in English and French. The participants consisted 20 undergraduate students. As with the previous two experiments, the participants completed a quantity judgment task (Barner & Snedeker, 2005) that consisted of four cross-linguistic variable nouns in English along with their French and Japanese counterparts (from Inagaki & Barner, 2009). These results of this task suggest that syntax did not have a significant effect on L1-Japaneses learners of English, which were largely number-based, similar to the quantity judgments made by L1-French and L1-Japanese speakers in their respective languages.

In summary, Inagaki (2013) found that Japanese learners failed to distinguish the differences in interpretations of flexible nouns presented in countable and uncountable syntax. Additionally, the third experiment revealed that L1-Japanese, L2-English learners were more likely than L1-English speakers to base quantity judgments for cross-linguistic variable nouns, displaying complete disregard for the uncountable syntax in which they were presented. Inagaki (2013) takes these findings to suggest difficulty for Japanese learners of English: difficulty in learning the countable-uncountable distinction lies in a failure to map count syntax to individuals and uncountable syntax to non-individuals and these learners have difficulty using syntactic cues to disambiguate the two meanings associated with countable and uncountable nouns. While Inagaki (2013) calls for more research in the area, studies in this area would benefit from other approaches as well (i.e., collecting data via a variety of instruments), for instance using a grammaticality judgment task, to see how the learners react to countable and uncountable nouns in the different syntactic contexts.

Choi and colleagues (Choi & Ionin, 2017; Choi et al., 2018; Choi et al., 2019) conducted a number of studies investigating the acquisition of English countable and uncountable nouns by L1-Korean and L1-Mandarin learners of English. Choi and Ionin (2017) and Choi et al. (2018) wanted to examine the role of the semantic universal atomicity and its effect on the acquisition and processing of countable and uncountable nouns by L1 speakers of Generalized Classifier Languages (i.e., Korean and Mandarin) learning English. Generalized Classifier Languages do not have a fully grammaticized countable/uncountable distinction, which postulates the question as to whether or not the indirect mappings between atomicity and countable/uncountable morphosyntax provided difficulty with not only acquisition, but online processing, too.

Choi and Ionin (2017) specifically wanted to investigate how L1-Korean and L1-Mandarin learners of English map atomicity to the countable/uncountable distinction in English. They hypothesized that atomicity affects learners' implicit knowledge as well as their explicit knowledge. Testing 31 L1-Korean, L2-English learners, 37 L1-Chinese, L2-English learners, and 36 NSs of English, Choi and Ionin (2017) collected data via a self-paced reading task and a grammaticality judgment task. The same materials were used for both tasks, which consisted of 128 test items with 32 target sentences for this study and 32 target sentences for a different experiment. The 64 filler items were not related to either of the experiments. There were four conditions—atomic grammatical, atomic ungrammatical, non-atomic grammatical, non-atomic ungrammatical—and eight tokens per condition. The self-paced reading task was always administered before the grammaticality judgment task, and each item contained a yes/no comprehension question.

The results in Choi and Ionin (2017) supported their hypotheses and predictions. In the grammaticality judgment task, they found that the two learners groups showed sensitivity to incorrect plural marking on non-atomic uncountable nouns (e.g., *toothpastes*) but not for atomic ones (e.g., *furnitures*). The English NSs, on the other hand, were equally accurate with both atomic and non-atomic nouns. The results for the self-paced reading task revealed that NSs showed sensitivity to incorrect plural marking with both atomic and non-atomic nouns, but the L2 learners only demonstrated sensitivity with non-atomic nouns. The authors take these results to suggest that atomicity, which is a semantic universal, affects learners at both implicit and explicit levels and that while the learners may have integrated the incompatibility between plural marking and non-atomic nouns in their grammar, they still struggle to realize the incompatibility that exists between plural marking and atomic uncountable nouns (e.g., *furniture*).

Choi et al. (2018) conducted a study similar to Choi and Ionin (2017) but sought to investigate transfer of the semantics of plural marking from learners' L1 as well as examine whether L2 learners of English are influenced by the semantic universal of atomicity regardless of how plural marking works in their L1. In order to investigate this, Choi et al. (2018) collected data from 33 L1-Mandarin, L2-English learners and 33 L1-Korean, L2-English learners using a grammar task and a picture-matching task reported in Choi et al. (2019). The grammar task consisted of 48 items—24 target items and 24 fillers. Each item in the grammar task required the participants to provide the correct morphological form of a word or phrase in parentheses in a single English sentence. The 24 target items corresponded to six categories: concrete countable, concrete atomic uncountable, concrete non-atomic uncountable, abstract countable, abstract atomic uncountable, and abstract non-atomic uncountable. The results found that the L1-Korean and L1-Mandarin speakers performed nearly equally, despite the fact that Korean has atomicity encoded in the plural system. In other words, despite the fact that atomicity is encoded in the plural marking system of Korean, this does not transfer or provide any help in the acquisitional process of English atomicity and the countable/uncountable distinction for Korean speakers when compared to Mandarin speakers.

In order to confirm that Korean encodes atomicity in its plural marking system while Mandarin does not, Choi et al. (2018) conducted a second study with L1-Korean and L1-Mandarin speakers using a translation of their grammar task. After translating their grammar task from English to Korean and Mandarin, Choi et al. (2018) then collected data with Korean and Mandarin native speakers. They found that while Korean does encode atomicity with optional plural marking used with atomic nouns, Mandarin does not have any kind of plural marking for non-human nouns (aside from the classifier system, see Chapter 2). In other words, both of these learner groups correctly use *-s* with countable nouns and optionally overuse it with atomic uncountable nouns, but they do not use it with non-atomic uncountable nouns. They take this to provide further evidence, in line with Choi and Ionin (2017), that being as atomicity is a semantic universal, it influences L2 learners acquiring languages that encode it differently.

To support their argument for atomicity as a semantic universal, Choi et al. (2018) compare their results to Inagaki and Barner (2009) and Inagaki (2013) who also found that atomicity influences judgments of quantities regardless of the language (English or Japanese). All three of these studies have found that regardless of status, NS or L2 learner, atomicity is a semantic universal that influences the interpretation of noun types. Furthermore, atomicity as a semantic universal is also supported by the mere fact that speakers of English recognize that words like *furniture* or *mail* have uncountable morphosyntax (i.e., must combine with the quantifier *much* rather than *many*) fall back on atomicity when making quantity judgments of English uncountable-object nouns. Choi et al. (2018) go as far as to even make predictions about learnability of English countable and uncountable nouns based on their data and linguistic analysis. They predicted *-s* is overused with uncountable atomic nouns for advanced learners even when they are performing at near-ceiling levels with countable nouns and uncountable non-atomic nouns because the learners need to re-classify nouns on the basis of other linguistic evidence rather than just atomicity.

Being as atomicity is a semantic universal, as supported in the research conducted by Choi et al. (2018), it does find expression somewhere in the linguistic system. And even though this is a universal that may be encoded in the learner's system, it is not by itself sufficient for learners to transfer to the L2 target category (e.g., articles or plural marking). As discussed in Chapter 2, we have already determined that the English countable/uncountable distinction is quite learnable because there is much unambiguous evidence. For instance, the uses of *many* and *much* clearly point to whether a noun is countable or uncountable, and when it comes to combining with numerals, countable nouns can combine directly with numerals, while uncountable nouns require measure phrases (e.g., *a point of* or *a piece of*), as well as many other linguistic cues. The learning task the learners face is that they need to eventually re-classify nouns on the basis of other linguistic evidence rather than just the semantic universal of atomicity.

As a follow-up to Choi and Ionin (2017) and Choi et al. (2018), Choi et al. (2019) conducted another study to investigate the interpretation of countable and uncountable noun phrases by L1-Korean and L1-Mandarin learners of English. They wanted to know whether L2-English learners from generalized classifier languages (i.e., Korean and Mandarin) can acquire the countable/uncountable distinction. Using a picture-matching task that consisted of 16 target items corresponding to four categories—object-referring countable, object-referring uncountable, kind-referring countable, and kind-referring uncountable—they asked participants to select pictures that best matched the context of the sentence provided. The participants consisted of 33 L1-Korean and 33 L1-Mandarin learners of L2-English in addition to 32 English NSs. Similar to the results in Choi and Ionin (2017) and Choi et al. (2018), Choi et al. (2019) found that L1-Korean and L1-Mandarin learners of English allowed bare noun phrases to denote objects to a greater extent than English NSs. To confirm L1 transfer as a source of difficulty in L2 acquisition of English countable and uncountable nouns, Choi et al. (2019) conducted a second study with the same pictures as the first, but rewriting the sentences in Korean and Mandarin. When taking the L2-English data with the L1-Korean and L1-Mandarin data, the authors found that L1-Korean and L1-Mandarin speakers were influenced by their L1s in the interpretation of uncountable nouns. Furthermore, the found that while these learners tend to omit articles in production, they correctly interpret the indefinite article as requiring an object denotation of the following noun when it is semantically flexible (e.g., *a water* versus *water*).

There are a number of limitations in the studies conducted by Choi and colleagues (Choi & Ionin, 2017; Choi et al., 2018; Choi et al., 2019). For instance, Choi et al. (2019) collected data from tasks that asked about preference rather than absolute judgments. Because of this, the L1-English speakers in their experiment did not perform at ceiling. It might be beneficial to conduct a study that collects data on absolute judgments of bare singular noun phrases instead of just preferences. Furthermore, Choi et al. (2019) used the same pictures in both conditions of the task (with countable noun phrases and uncountable noun phrases). This could have created some kind of priming effect that influenced the participants' preferences of later sentences using the same pictures. In Choi et al. (2018), the data collected on participant background found the L1-Korean leaners to have resided in the United States longer, and they were older, than their L1-Mandarin counterparts. Furthermore, the L1-Mandarin speakers displayed a proficiency level that was 10% better than the L1-Korean speakers. Better control of proficiency levels and task design should lead to more robust results in future experiments.

This section has reviewed the most recent research regarding the second language acquisition of English noun types. As with other parts of this chapter, it has been observed that noun type acquisition research employs a variety of methodologies (picture-matching tasks, grammaticality judgment tasks, and sentence manipulation tasks) and provides a number of theoretical implications of the findings, such as atomicity being a semantic universal and how learners might use other linguistic evidence in to re-classify nouns that have been mis-classified during L1 transfer. Furthermore, these results can, and should, be used to inform classroom instruction. While there is a plethora of research from a theoretical standpoint on the acquisition of L2-English countable and uncountable nouns, no studies (to date) have considered the effect on instruction on the SLA of English noun types, which leaves a significant gap in the research for the present study.

5.3 | Second Language Acquisition of Articles & Noun Types

To the best of our knowledge, there is one study, to date, that considers the acquisition of both noun countability and article use. Yoon (1993) conducted a study that addressed the difficulty of article acquisition by examining the perception of noun countability. The study was designed to test the hypothesis that native and non-native speakers have different perceptions of what constitutes countability which would, therefore, affect the use of the zero and indefinite articles in different contexts (dependent on countability).

In his study, Yoon (1993) collected data with 27 L1-Japanese, L2-English learners and 31 English NSs using two tasks. The first task consisted of two essay-texts written by NSs of English with 87 nouns extracted. The NSs of English and L2 learners were asked to give intuitive judgements of countability for these nouns. In the second task, the original essay-texts were used with a cloze test procedure, providing opportunities for the raters to supply indefinite, definite, and zero articles. The purpose of this task was to examine to what extent an earlier decision on countability influenced the selection of article in the contexts of the essays. Yoon (1993) hypothesizes that noun countability would affect the use of indefinite and zero articles by L2-English learners. The author surprisingly found that there was only a 14% agreement between the L1 English speakers and L1 Japanese speakers as to what nouns were countable. Furthermore, he found that English NSs perceived 82% of the nouns to be countable, while the Japanese NSs found 73% of the nouns to be countable. In other words, "*both* groups seem to have a greater awareness of countability of nouns than non-countability regardless of language backgrounds" (Yoon, 1993, p. 277). When he took these results and compared them to the article choices, Yoon (1993) found that when subjects judged a noun as countable, they tended to choose the indefinite article. On the other hand, when the participants judged a noun as uncountable, the zero article was chosen. Therefore, when it came to countability, the L2-English learners favored the indefinite article in contexts with nouns that required the use of the indefinite article.

While Yoon (1993, pp. 283-284) does not give any direct theoretical implications of the research he conducted, he does give some fundamental questions that need further research: (1) "How do we make Japanese subjects see that a noun can be both countable and uncountable?" and (2) "How do we make [Japanese learners of English] us the context in the same way that native subjects use it for distinguishing between countability and non-countability of the noun in the given context?" The results obtained by Yoon (1993) challenge the fundamental concept of noun countability in many textbooks, therefore calling for researchers to inquire as to whether or not the perceptual system of noun countability used by native speaker of English is "describable, explainable or acquirable by second language learners" (p. 284). Yoon (1993) calls for further research be conducted in the area with studies that investigate both the English plural morpheme (*-s*) and indefinite article use being as both involve the distinction between countable and uncountable nouns.

5.4 | Summary of Previous Findings & Research Gaps to Explore

While this chapter has reviewed a number of studies that have investigated the L2-English acquisition of articles, noun types, and the combination of articles and noun types (see Table 5.11, Table 5.12, Table 5.13, and Table 5.14 on the following pages), it has also identified a number of research gaps. As we have seen, a number of studies have used the same data collection instruments—acceptability judgment tasks and forced-choice elicitation tasks—with many of them from the same authors (Ionin et al., 2004). Furthermore, not much of the recent research in article or noun type semantic has made use of more current theories in GenSLA (i.e., the Feature Reassembly Hypothesis and the Bottleneck Hypothesis). With there only being one published article, to my knowledge, investigating the role of countability and its effect on article choice, there is a clear gap in the current research that this dissertation can fill. The current dissertation also uses a variety of data collection tools—an elicited-sentence imitation task, an acceptability judgment task, and a forced-choice elicitation task—to explore the effect of explicit instruction on English article and noun type acquisition. We now turn our attention to Chapter 6, which will explain the experimental methodology, including the participants, data collection instruments, and final research questions, hypotheses, and predictions based on the literature review and previous research.

Table 5.11. Summary of L2-English article acquisition studies

Study	L1	Target Structure(s)	Instruments	Findings
Ionin et al. (2004)	Russian, Korean	[±definite] & [±specific]	FCET & written production task	L2-English learners associate *the* with [+specific], supporting the FH
R. Hawkins et al. (2006)	Greek, Japanese	[±definite] & [±specific]	FCET based on Ionin et al. (2004) with modifications to [number]	L1-Japanese, L2-English learners fluctuate with interpreting *the* as a marker for both specificity and definiteness; L1-Greek, L2-English learners overwhelmingly chose *the*/*a* to mark definiteness and specificity
Snape et al. (2006)	Japanese, Mandarin, Spanish	[±definite] & [±specific]	Data collected by Reid et al. (2006) & Ting (2005)	L1-Japanese, L2-English learners fluctuate with associating *the* with [+specific], supporting the FH; L1-Spanish, L2-English data rejected the FH
Trenkic (2008)	Mandarin	[±definite], [±specific] & [±ESK]	FCET based on Ionin et al. (2004)	L2-English learners do not fluctuate as postulated by the FH and [±ESK] influences interpretation of [±specific]
Ionin et al. (2008)	Russian, Spanish	[±definite] & [±specific]	FCET used by Ionin et al. (2003, 2004)	L2-English learners fluctuate as postulated by the FH

Study	L1	Target Structure(s)	Instruments	Findings
Zdorenko and Paradis (2008)	Various (children)	[±definite] & [±specific]	Longitudinal data collected from oral narrations	Fluctuation is a developmental process that overrides L1-transfer in child L2 acquisition
(García-Mayo, 2008)	Spanish	[±definite] & [±specific]	FCET used by Ionin et al. (2004)	L1-transfer overrides fluctuation
Snape (2009a)	Mandarin	[±definite] & [±specific]	FCET based on Ionin et al. (2004); oral elicited picture description task from Goad and White (2008)	L2-English learners showed patterns of fluctuation as postulated by the FH
Ionin and Montrul (2010)	Spanish, Korean	[±definite], [±generic] & [±plural]	TVJT & AJT	L2-English learners from a L1 with articles over-accepted generic interpretations of English definite plurals due to L1 transfer; recovery from L1 transfer is possible
Pierce and Ionin (2011)	Korean, Mandarin	*a*(*n*), *the*, ∅	cloze test (Ionin & Montrul, 2010), AJT & transcription task	L2-learners of English from L1s that are prosodically different than English have difficulty perceiving English articles

Study	L1	Target Structure(s)	Instruments	Findings
Cho and Slabakova (2014)	English, Korean (L2 Russian)	[±definite]	felicity judgment task	L2 learners face greatest difficulty acquiring a feature when it is marked overtly in the L1 but covertly in the L2

Table 5.12. Summary of L2-English article instructional intervention studies

Study	L1	Target Structure(s)	Intervention	Length of Intervention	Instruments	Post-Test(s)	Findings
Master (1994)	Various	*a*(*n*), *the*, ∅	explicit instruction with focus on distinctions between singular-plural, definite-indefinite, and specific-generic	6 hours (over 9 weeks)	FCET	1 week after instruction	beneficial effect of explicit instruction on explicit knowledge
Master (2002)	Various	*a*(*n*), *the*, ∅	explicit instruction in two groups: (1) information structure, (2) traditional instruction	3 hours (over 3 weeks)	FCET	1 month after instruction	understanding English information structure may help in successful acquisition
Akakura (2009, 2012)	Various	non-specific *a*(*n*), non-generic articles, generic articles	explicit instruction on form/function mappings of articles	3 hours (over 1 week)	GJT; metalinguistic knowledge task; elicited imitation task; oral production task	immediately & 6 weeks after instruction	short-term improvement on article accuracy following explicit instruction

Study	L1	Target Structure(s)	Intervention	Length of Intervention	Instruments	Post-Test(s)	Findings
Snape and Yusa (2013)	Japanese	specificity, definiteness, genericity, and perception of articles	explicit instruction on specificity, definiteness, genericity, and article perception	70 minutes of instruction each week (over 3 weeks)	FCET from Ionin et al. (2004); AJT from Ionin et al. (2011); transcription task from Pierce and Ionin (2011)	1 week & 3 weeks after instruction	improvement of article perception but no significant improvement from explicit instruction on definiteness, specificity & genericity
Lopez (2017)	Mandarin	specificity	explicit instruction in two groups: (1) specificity instruction, (2) traditional instruction	three 90-minute lessons with focus on definites and/or specificity (over 4 weeks)	FCET from Ionin et al. (2009); timed AJT	1 week & 9 months after instruction	pre-test results reject the FH; post-test results show no significant effect of instruction
Umeda et al. (2017) & Snape and Umeda (2018)	Japanese	definite singular & indefinite singular generics	explicit instruction of English articles grounded in linguistic research	nine 60-minute lessons (over 9 weeks)	AJT	1 week after genericity instruction & 1 week, 13 weeks & 15 months after instruction	significant effect of instruction in short-term, but not retained in long-term

Study	L1	Target Structure(s)	Intervention	Length of Intervention	Instruments	Post-Test(s)	Findings
Sabir (2015, 2018)	Hejazi-Arabic	specificity	explicit instruction on definiteness and specificity	6 hours (over 3 weeks)	FCET from Ionin et al. (2009)	3 days & 5 weeks after instruction	explicit instruction may have an effect on explicit knowledge
Abumelha (2016, 2018)	Najdi-Arabic	definiteness, genericity, plurality	two instruction groups: (1) explicit instruction, (2) implicit instructions	10 hours (over 5 weeks)	FCET from Ionin et al. (2004); transcription task from Pierce and Ionin (2011)	immediately & 8 weeks after instruction	overall significant increase post-intervention; reassembly process accelerated by instructional intervention

Table 5.13. Summary of L2-English noun type acquisition studies

Study	L1	Target Structure(s)	Instruments	Findings
Hua and Lee (2005)	Mandarin	[±count] + articles & quantifiers	GJT & FCET	L1-Mandarin, L2-English learners demonstrate sensitivity to count-selective & mass-selective contexts but did not make distinctions solely on word-by-word basis
Inagaki (2013)	Japanese	[±count]	PMT based on Barner and Snedeker (2005)	L2-English learners performed similarly to NSs in basing their quantity judgments on number for [+count] nouns and volume for [–count] nouns; L2-English learners' interpretation of flexible nouns was not altered by change in syntax
Ionin et al. (2013)	Spanish, English	[±definite], [±generic] & [±plural]	FCET & TVJT	L2-leaners at lower and intermediate proficiency levels preferred generic readings of English bare plurals due to L1 transfer, but advanced learners do not show this pattern, suggesting recovery from L1-transfer
Choi and Ionin (2017)	Korean, Mandarin	[±count], [±atomic], [±plural]	SPRT, GJT	L2-English learners displayed sensitivity to plural marking on [–count, –atomic] nouns but not [–count, +atomic] nouns as measured by the GJT; L2-English learners displayed sensitivity to plural marking on [–count, –atomic] nouns as measured by an SPRT; L2-English learners struggle with the incompatibility between plural marking and atomicity

Study	L1	Target Structure(s)	Instruments	Findings
Choi et al. (2018)	Korean, Mandarin	[±count] & plural marking in L2 Korean & L1 Mandarin	Cloze Task	L2-English learners correctly use *-s* with [+count] and optionally overuse it with [–count, +atomic] but do not use plural marking with [–count, –atomic]
Choi et al. (2019)	Korean, Mandarin	[±count] & object-/kind-reference	PMT	L1-Korean & L1-Mandarin learners of English allow bare phrases to denote objects to a greater extent than NSs.

Table 5.14. Summary of L2-English article and noun type studies

Study	L1	Target Structure(s)	Instruments	Findings
Yoon (1993)	Japanese	countable vs. uncountable nouns; the vs. a(n)vs. ∅	Essay-texts: nouns extracted for countability ratings, cloze test for article completion	Judgments of noun countability influenced article choice

Chapter 6: Methodology

"A change in Quantity
also entails a change in Quality."
– ENGELS FRIEDRICH

The aim of the dissertation is to investigate the acquisition of L2 English articles and countable/uncountable nouns in L1 speakers of Mandarin. The dissertation seeks to understand how the use of linguistically-informed teaching materials (LIMs) in explicit instruction—designed in the framework of Generative Second Language Acquisition (GenSLA)—assists in the acquisition of these phenomena in comparison to the use of traditional teaching materials. This chapter begins with an overview of the general research design. Following that, the participant groups will be discussed—their level of English, biodata and language use information, and their experience in an instructed SLA setting. Section 6.3 discusses each of the data collection instruments. In the Section 6.4, we will present the general research procedures, including research ethics approval, the pilot phase, the experimental data collection phase and the motivation and implementation of the intervention materials. In the final part of the chapter, the research questions (RQs) and hypotheses that were presented in Chapter 1 are revisited.

6.1 | General Research Design

The research design uses a pre-test/post-test design, with the same tasks (with different stimuli) being completed by the participants at all data collection times. As can be seen in Table 6.1, the experiment took place over a five-week period. Prior to the pre-test (T0), the participants received consent materials and completed pre-participation questionnaires. A copy of the consent materials can be found in Appendix A, and copies of the two pre-participation questionnaires can be found in Appendix B. The pre-test (T0) data was collected during week 1. The following week, week 2, the participants receiving additional instruction for the treatment attended the instructional intervention session prior to post-test 1 (T1) data collection. The intervention was presented as a "grammar workshop", during which one of the participant groups were taught about English articles and noun type distinctions vis-à-vis the use of semantic universals and a linguistic analysis of their native language (L1) and how it compares to English, henceforth linguistically-informed materials (LIMs). For another group, the treatment consisted of additional English article and noun type instruction vis-à-vis the use of their curriculum-assigned grammar textbook. The treatment session lasted one hour. A control group was also included in the study and did not receive any form of instructional intervention. After the instructional intervention, the participants had a small break before completing the immediate post-treatment experimental data collection (T1). Three weeks later, the participants returned to the same lab to complete the delayed post-test, post-test 2 (T2) data collection tasks.

Table 6.1. Research design and data collection times for all non-native speaker (NNS) participant groups

Before Week 1	**Week 1**	**Week 2**	**Week 3**	**Week 4**	**Week 5**
Pre-Participation Questionnaires	T0 (pre-test)	Treatment + T1 (immediate post-test)			T2 (delayed post-test)

Each data collection session consisted of three tasks. The three data collection tasks tapped into implicit knowledge and explicit knowledge, an elicited-sentence imitation task, an acceptability judgment task, and a forced-choice elicitation task. According to R. Ellis (2009b), it is "possible to develop [tasks] that will provide relatively separate measures of implicit and explicit knowledge" (p. 169). As to prevent the participants from noticing what linguistic features were being tested in the study's design, the more implicit task was always administered first, and the more explicit tasks followed. All three tasks were completed at each data collection time. Section 6.3 describes each of the data collection instruments in detail.

Prior to the experimental data collection, a small pilot study was completed with a small group of NSs of Mandarin (*n* = 7). This pilot study took place in on-campus computer labs at one of the same Midwestern United States universities as the experimental data collection later did. The pilot study revealed some methodological and technological concerns. Each of the methodological concerns will be discussed in their respective data collection tasks later in the chapter.

6.2 | Participants

The experimental participants in the study were 78 college-aged (17-30) L1-Mandarin learners of L2 English at a public university in the Midwestern United States. The participants were in English as a Second Language (ESL) courses in a credit-bearing program. The participants were receiving formal grammar instruction (3 hours a week), as well as formal instruction in a variety of other ESL courses (oral skills, reading, writing, and listening) for up to an additional 9 hours of ESL instruction each week. These participants were divided into three groups that received different interventions: (i) LING: those who received additional linguistically-informed instruction (n = 30), (ii) TRAD: those who received additional traditional instruction (n = 18), and (iii) NOEX: those who did not receive any additional hours of instruction (n = 17). All of these participants came from the same university-sanctioned credit-bearing ESL program. While all participants were enrolled in an ESL-credit program, they had the option to receive additional course credit for their participation in the study. The native speaker (NS) baseline group (n = 25), L1-English speakers (ENGL), were recruited from a general education course in a linguistics department at the same public university in the Midwestern United States. Similarly, these participants were also offered course credit for their participation in the study. We now describe each of the participant groups in detail.

6.2.1 | Experimental Group: Linguistically-Informed Instruction

The first experimental group of participants (n = 30) included 4 men and 21 women between the ages of 19 and 23 years (M = 20.4, SD = 1.12), all of whom were L1 Mandarin speakers who had come to the United States to pursue their undergraduate degrees; had at least 12 years of education in primary and secondary school prior to arrival in the USA; and had enrolled in one or more courses of formal ESL instruction during their time of their participation in the study. In order to establish a homogenous group since the participants did not come as a cohort from a pre-established language courses, they completed the Oxford Quick Placement Test (OQPT) prior to their participation in the study with scores out of 60 ranging between 20 and 54 (M = 35.9, SD = 6.13). This participant group received one hour of linguistically-informed instruction between testing times T0 and T1. Henceforth, this group will be referred to as LING. Their particular intervention will be discussed in more detail in Section 6.5.2.

6.2.2 | Experimental Group: Traditional Instruction

The second experimental group of participants (TRAD) (*n* = 18) included 9 men and 9 women between the ages of 17 and 24 years (*M* = 19.39, *SD* = 1.29), all of whom were L1 Mandarin speakers who had come to the United States to pursue their undergraduate degrees; had at least 12 years of education in primary and secondary school prior to arrival in the USA; and had enrolled in one or more courses of formal ESL instruction during their time of their participation in the study. In order to establish a homogenous group since the participants did not come as a cohort from a pre-established language courses, they completed the OQPT prior to their participation in the study with scores out of 60 ranging between 19 and 58 (*M* = 33.94, *SD* = 9.53). This participant group received instruction using their regular ESL textbook as their 1-hour intervention between testing times T0 and T1. This group will be referred to as TRAD for the remainder of the dissertation. The intervention for this particular group will be discussed in more detail in Section 6.5.1.

6.2.3 | Experimental Group: No Extra Instruction

The third experimental group of participants (*n* = 17) included 5 men and 12 women between the ages of 18 and 25 years (*M* = 19.47, *SD* = 1.87), all of whom were L1 Mandarin speakers who had come to the United States to pursue their undergraduate degrees; had at least 12 years of education in primary and secondary school prior to arrival in the USA and had enrolled in one or more courses of formal ESL instruction during their time of their participation in the study. In order to establish a homogenous group since the participants did not come as a cohort from a pre-established language courses, they completed the OQPT prior to their participation in the study with scores out of 60 ranging between 13 and 45 (*M* = 31.94, *SD* = 7.53). This participant group did not receive any intervention between testing times T0 and T1.

6.2.4 | Baseline Group: Native Speakers of English

The fourth group of participants (*n* = 25) was a group of undergraduate native speakers of English which included 4 men and 21 women between the ages of 19 and 23 years (*M* = 20.40, *SD* = 1.12), all of whom were native speakers (NSs) of English who had come to this university to pursue their undergraduate degrees and had at least 12 years of education in primary and secondary school prior to their university admittance. These participants were recruited from a general education university course, which is a course that is typically taken in the first year or two of their college educations. This course is required to meet the basic requirements of any bachelor's degree in the university. These participants were all degree-seeking students studying at a Midwestern university in the United States, and they all spoke American English natively. Although they spoke various dialects of American English, this did not contribute to any significant differences in the collection of the baseline data. Although these participants came from a convenience sample (Plonsky, 2013)—students in their first two years of university in a required general education course—they represented a vast majority of NSs at this age level who are enrolled in degree-seeking programs. For the NSs, assignment to a specific set of tasks (T0, T1, or T2) happened randomly so that each set of tasks received nearly the same number of participants.

6.3 | Data Collection Instruments

As aforementioned, there were three data collection times. All participants completed three data collection tasks at each data collection time. In the following sections, each of the data collection instruments (pre-participation and data collection) are discussed in detail. Descriptions of the pre-participation questionnaires are given first, followed by information about the data collection instruments in their pre- and post-pilot versions. It is important to note that the data collection instruments are presented in the same order in which the participants completed them.

6.3.1 | Biodata & Language Use Questionnaire

Prior to participation in the study, the participants were asked to complete two pre-participation questionnaires to demonstrate their willingness to participate in the study. The first pre-participation questionnaire was the Biodata and Language Use Questionnaire (BLUQ), adapted from Keijzer (2007), that was programmed into an online survey software, Qualtrics (Qualtrics, 2017). This questionnaire consisted of approximately 60 questions that tapped into the participants' biographical data, information about their native language, experience with the second language, and some questions pertaining to their length of residency in the USA and their exposure to ESL. This data was collected to ensure that the participant groups were as homogenous as possible, as well as representative of L1 Mandarin international students in the United States. There was a separate BLUQ for the NSs. This questionnaire had approximately seven questions. Copies of both version of the BLUQ can be found in Appendix B.

6.3.2 | English Proficiency Test

The second pre-participation questionnaire was the Oxford Quick Placement Test (OQPT) (U. C. L. E. Syndicate, 2001) that had been programmed into Qualtrics (Qualtrics, 2017), an online survey software. The OQPT is a multiple-choice test that assesses the general English proficiency level of students via a variety of reading, vocabulary, and grammar tasks that target a variety of simple and complex grammatical structures, with some questions focusing on meaning and others focusing on specific grammatical forms. This test gives a score of 60 that can then be mapped onto levels of the Common European Framework of Reference (CEFR). A copy of the OQPT can be found in Appendix B.

While the original version of the test consists of two separate parts with 30 questions each, all participants took a version which consisted of all 60 questions. The participants were instructed that they could skip any question that they found too difficult, although this would be calculated into their final score for the test. This test is well-known and used widely as a test of English language proficiency. For this reason, the proficiency level of participants in this study can be directly compared with that of participants in other published studies of the same level. The OQPT scores, along with descriptive statistics of the individual participant groups can be found in Table 6.2.

Table 6.2. Descriptive statistics of the participants in the experimental study

Learner Group	L1	Age	Gender	OQPT
LING (*n* = 30)	Mandarin	*M* = 20.38 (*SD* = 2.43)	male = 11 female = 19	*M* = 35.90 (*SD* = 6.13)
TRAD (*n* = 18)	Mandarin	*M* = 19.39 (*SD* = 1.29)	male = 9 female = 9	*M* = 33.94 (*SD* = 9.53)
NOEX (*n* = 17)	Mandarin	*M* = 19.47 (*SD* = 1.87)	male = 5 female = 12	*M* = 31.94 (*SD* = 7.53)

6.3.3 | Experimental Tasks

Three tasks were used for data collection: an elicited-sentence imitation task (ESIT), an acceptability judgment task (AJT), and a forced-choice elicitation task (FCET). All tasks measured four noun types (countable, uncountable-substance, uncountable-object, and flexible) combined with five article conditions (*the* + singular, *the* + plural, *a* + singular, Ø + singular, and Ø + plural). Since flexible nouns are grammatical in each of the five article conditions due to their shift in interpretation, the decision was made to include flexible nouns in the experimental tasks but omit them from the data analyses.

As Table 6.3 shows, the AJT and ESIT tested 60 sentences: grammatical and 21 ungrammatical statements. There were no fillers because it was determined that the experiments displayed multiple phenomena and the combinations of articles and noun types could not be spotted as the target structure. The uneven number of grammatical and ungrammatical conditions is due to the fact that the "grammatical conditions" were created purely by the article + noun type combinations. Since not every article + noun combination is even from noun type to noun type, this naturally created an uneven number of grammatical and ungrammatical sentences. The FCET only tested grammatical contexts for each noun, which equated to sentences. An additional 24 distractors testing only article choice and noun type choice brought the total number of items for the FCET to 63.

The reason for selecting three different measures was to gather as much information as possible about the participants' implicit and explicit knowledge and use of L2 English articles and noun type distinctions. The motivation for the two different types of tasks (implicit versus explicit) was to try and measure the two different types of grammatical knowledge, in order to get an overview of the acquisition of the structures by the participants and to test how explicit instruction affects both of these types of knowledge.

Table 6.3. Number of grammatical and ungrammatical sentences in each version of the ESIT and AJT

Noun Type	Grammaticality	# Sentences	Contexts
Countable Nouns	grammatical	12	*the* + singular *the* + plural *a/an* + singular Ø + plural
	ungrammatical	3	Ø + singular
Uncountable-Object Nouns	grammatical	6	*the* + singular Ø + singular
	ungrammatical	9	*the* + plural *a/an* + singular Ø + plural
Uncountable-Substance Nouns	grammatical	6	*the* + singular Ø + singular
	ungrammatical	9	*the* + plural *a/an* + singular Ø + plural
Flexible Nouns	grammatical	15	*the* + singular *the* + plural *a/an* + singular Ø + singular Ø + plural
	ungrammatical	0	N/A

Research by R. Ellis (2009a) states that instruments such as the ESIT measure more implicit knowledge and processing, while tasks like an AJT and FCET measure more explicit, metalinguistic knowledge. Accordingly, there is a great deal of research (see R. Ellis et al., 2009) that does indicate that each of these tasks tap into a different view of the participants' understanding and knowledge of L2 English articles and noun type combinations.

6.3.3.1 | Elicited Sentence Imitation Task

The first experimental task that all participants completed was a computer-delivered elicited sentence imitation task (ESIT). Similar to acceptability judgment tasks, ESITs are used to determine grammaticality. This task required participants to listen to English grammatical and ungrammatical sentences and provide an oral imitation of those sentences using correct English. This explored the participants' implicit knowledge of the article and noun type structures under study. According to Mackey and Gass (2016, p. 65), "The basic assumption underlying elicited imitation is that if a given [structure] is part of one's grammar, it will be easy to repeat; it is as if sentences are 'filtered' through one's grammatical system". In this task, sentences were presented auditorily (prerecorded by the researchers), and the participants were asked to repeat them and correct their potential ungrammaticality.

Within the field of SLA, this task has been widely used to elicit data in order to assess the acquisition of L2 oral proficiency (Burger & Chrétien, 2001; among others) and grammar (R. Ellis, 2005b; R. Ellis et al., 2009; R. Ellis, Loewen, & Erlam, 2006; Erlam, 2006; among others). R. Ellis (2005b) performed a study in which he compared the results of four data collection techniques to see if they provided relatively independent measures of implicit and explicit knowledge. R. Ellis (2005b) states that when operationalizing the constructs of L2 implicit and explicit knowledge, the use of metalinguistic knowledge is not required for implicit knowledge, while it is encouraged for explicit knowledge. Furthermore, implicit knowledge is best operationalized when responses are given under a time pressure and the primary focus of the task is meaning.

Although ESITs have been greatly debated, they have been proven to be a valid task in collecting data on a speaker's implicit knowledge (Erlam, 2009; Spada, Shiu, & Tomita, 2015). As R. Ellis (2005b, p. 45) states, participants' "failure to imitate a sentence at all or to reproduce it in such a form that they did not create an obligatory context for the target structure of a sentence [is] coded as 'avoidance'." If a participant appropriately imitates a sentence where the target structure is correctly supplied, then it is accepted that the form or structure has become part of the learner's implicit knowledge.

Designing such a task takes careful consideration and time. It is generally agreed that immediate imitation of the sentence should be avoided because it might lead to rote repetition. Our study designed the sentences as belief statements that provided a certain amount of meaning-focus to the participants. The belief statements were then followed by the question "Do you agree or disagree?", which allowed for the participants to focus on the meaning of the statement, and how they felt about it, rather than the explicit grammaticality or the form of the statements. Additionally, the optimal time latency between the prompt and the imitation might be influenced by the participants' proficiency. For this reason, this specific ESIT was designed with a 3000ms delay to avoid it being too short, but also not too long, before prompting for a repetition. A final consideration involved the length of the stimuli, which should not be too short as to be easily memorized, nor should it be too long in which it might go beyond the capacity of short-term memory (Bley-Vroman & Chaudron, 1994). Considering all of the factors mentioned above and following the work by Erlam (2009), this task consisted of 60 belief statements involving both grammatical and ungrammatical sentences containing the target article and noun type combinations. The instructions that the participants were presented with can be found in Figure 6.1.

> In this experiment, you will hear sentences and be asked whether you agree or disagree with them. After each sentence, you will indicate whether you agree or disagree with the belief statement that you heard. You will only have 3 seconds to record your answer. After recording your answer, the screen will advance, and you will need to repeat the sentence you heard earlier. You should repeat the sentence in correct English. Listen carefully to each sentence and do not speak until the screen says that you may record your sentence. Speaking before the cue is given will lead to the data not being properly recorded.
>
> The following five sentences are practice items. After the practice items, the experiment will begin.

Figure 6.1. Directions for the ESIT

This task was programmed in Ibex Farm[11]. The sentences were presented audibly to the participants, who were required to indicate whether they agreed or disagreed with the content of each statement. The only thing visible on the screen while the participants heard the stimuli was

[11] Ibex Farm is an open-source online program developed by Alex Drummond. It can be accessed online at http://spellout.net/ibexfarm.

the symbol "+". The screen then moved on to a message that prompted the students to agree or disagree with the stimulus. The final part of the task prompted the participants to repeat the sentences orally in *correct* English in order to explore their acquisition of the structures. Their responses were audio recorded.

The ESIT was piloted with a small group of NNS of English (n = 7). Aside from a few technological difficulties, the task appeared to be well-designed and ready for use in the study. The data for this task was collected in an on-campus audio lab. The participants all had headsets that played the stimuli and that they could record their responses via a microphone. Prior to beginning the experiment, the participants completed five practice items and had a chance to ask questions. Each participant group received the items in a different, randomized order, although all participants in any given data collection session received those stimuli in the same order. The recorded audio responses were saved in a password-protected database to later be transcribed and analyzed. Each imitated sentence was scored depending on their ability to correct the sentence. An imitated statement was given a 2 if the statement was grammatically imitated with an appropriate article and noun; a 1 was given if the statement was imitated with either an appropriate article or noun; and a 0 was given if the sentence was not imitated grammatically.

The grammatical and ungrammatical conditions and samples of the stimuli can be found in Table 6.4. A full list of the stimuli can be found in Appendix F. As has been noted, there are an uneven number of grammatical and ungrammatical conditions. This is due to the fact that the "grammatical conditions" were created purely by the article + noun type combinations. Since not every article + noun combination is even from noun type to noun type, this naturally created an uneven number of grammatical and ungrammatical sentences. The final version of the experiment consisted of 60 sentences; 39 of the sentences (65%) were grammatical and 21 (35%) were ungrammatical.

Table 6.4. Example stimuli from the ESIT

Type	Grammaticality	Example
the + singular	grammatical	I like the girl who is on the Today Show.
	ungrammatical[12]	
the + plural	grammatical	Sometimes the girls from your school cause problems.
	ungrammatical	People should eat the fruits every day.
a/an + singular	grammatical	Parents with a girl spend more money.
	ungrammatical	People eat a fruit in the morning.
Ø + singular	grammatical	Americans eat fruit with every meal.
	ungrammatical	In the park, girl doesn't get dirty.
Ø + plural	grammatical	They say girls misbehave often.
	ungrammatical	Most people like fruits from the store.

6.3.3.2 | Acceptability Judgment Task

A primary underlying theory of Universal Grammar (UG) is that "language is constrained by a set of principles that characterize core grammars of all natural languages" (Mackey & Gass, 2016, p. 57). Therefore, UG-based SLA research seeks to understand to what extent NNSs have the same understanding of these principles as NSs and "part of understanding what someone knows about language is understanding what they include in their grammar and what they exclude" (Mackey & Gass, 2016, p. 58). One way to determine this is using an acceptability judgment task (AJT). (Loewen, 2009) explains that unlike an ESIT, an untimed AJT shifts the participant's focus from meaning to form, since they are asked to operationalize their knowledge of metalanguage and apply rules in their degree of awareness. AJTs have been used extensively in SLA research and have been subject to many tests of reliability and validity (Cowan & Hatasa, 1009; Cowart, 1997; Gass, 1994;

[12] There is no possible *the* + singular noun type that makes an ungrammatical condition.

Ionin & Zyzik, 2014; Mackey & Gass, 2012; 2016; among others). Additionally, AJTs have been used extensively in article (Cho & Slabakova, 2014; Ionin et al., 2004; Ionin & Montrul, 2010; Ionin et al., 2011; Ionin et al., 2008; Ionin et al., 2009) and noun type distinction (Ionin, 2012; Ionin et al., 2013; Ionin & Zyzik, 2014) research for many years. In order to gain insight into the participants' explicit knowledge of the acceptability of article and noun type combinations, an untimed, computer-delivered AJT was created for this study where participants were asked whether a particular sentence is acceptable in the L2. Used in Ionin et al.'s (2004) seminal work, an acceptability judgment task can give information about a participant's understanding of *possible* sentences. Since judgment tasks of this type are not commonly used in pedagogy, participants received detailed instructions on how to complete the task in the L2 and received five practice items before beginning the task.

Speakers of a language seem to develop a *feel* for what is a possible sentence, even in many cases where they have never been taught any particular rule.

For example, in English, you might feel that the first sentence below sounds like it is a possible English sentence, while the second one does not.

1) *John is likely to win the race.*
2) *John is probably to win the race.*

Each of the following pages has one sentence on it. We want you to tell us for each one whether you think it sounds possible in English. Even native speakers have different intuitions about what is possible. Therefore, these sentences cannot serve the purpose of establishing one's level of proficiency in English. We want you to concentrate on how you feel about these sentences.

For the following sentences, please tell us whether you feel they sound like *very natural* sentences in English for you, or whether they sound like *not natural at all* English sentences for you.

Read each sentence carefully before you answer. Concentrate on the structure of each sentence. Ignore any problem with spelling, punctuation, etc. and try to imagine a context in which this sentence might be correct. Please mark only one answer for each sentence.

The following five sentences are practice items. After the practice items, the experiment will begin.

Figure 6.2. Directions for the AJT

In the present study, participants read 60 sentences, one at a time, and provided a judgment (on a 7-point Likert scale) of their acceptability (1 being a low score and 7 being a high score). The ratings were then averaged into acceptability scores (a score out of 7 on for grammatical and ungrammatical items, respectively, of each target construction). The written directions that the participants received were adopted from Mackey and Gass (2016) and are presented in Figure 6.2.

After reading the instructions, the participants had an opportunity to ask questions while they completed the five practice items. After completing the five practice items, the participants were instructed to work independently and at their own pace until they finished the task. Once a participant provided an answer for the sentence, the response would be recorded and there would be a one second break before the next sentence appeared. It was not possible for participants to change any of their answers or return to any previously rated sentences. All participants received the sentences in a different order as they were all randomized via the software they were presented in, Ibex Farm. A sample item from the AJT can be found in Figure 6.3 and a copy of the full task can be found in Appendix G.

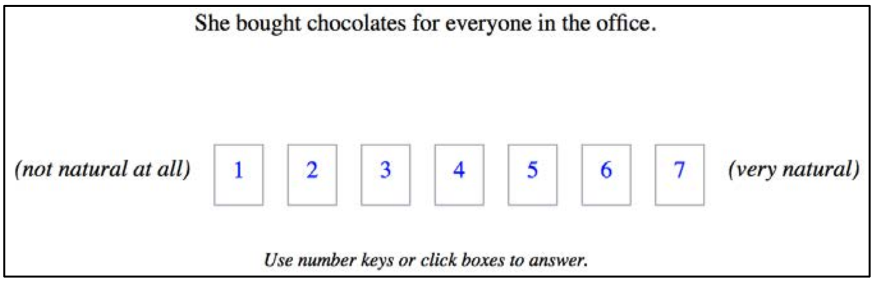

Figure 6.3. A sample item from the AJT

The AJT developed specifically for this study tested article and noun type combinations and involved three rounds of piloting. The first round was with Mandarin speakers (n = 7), and after making some adjustments—both major and minor—a "nearly final" version of the task was piloted with a small group of NSs of English (n = 7). At every stage of the piloting, the task consisted of 60 items: 5 article and noun combinations for each noun and three nouns per noun type. There was a total of four noun types in the study (countable, uncountable-substance, uncountable-object, and flexible). It is important to note that there were no fillers in the study as it was felt that testing various noun and article combinations served as distractors in themselves. An example of each item type from the final task can be found in Table 6.5. After the final pilot with NSs had been completed, each item was coded as either a target or non-target response. Any items that received more than two non-target responses were looked at in more detail.

Table 6.5. Sample items from the AJT

Type	Grammaticality	Example
the + singular	grammatical	The dog likes to eat dinner at 6:00pm.
	ungrammatical[13]	
the + plural	grammatical	Skye is friends with the girls who live down the street.
	ungrammatical	Do you think the furnitures belong to them?
a/an + singular	grammatical	Where is a glass that I can use for water?
	ungrammatical	We have a homework due tomorrow.
Ø + singular	grammatical	I have chocolate for you since it is your birthday.
	ungrammatical	There was boy on the ground.
Ø + plural	grammatical	We were in a large room surrounded by windows.
	ungrammatical	I have luggages to bring with me.

As was seen in Table 6.3, there are an uneven number of grammatical and ungrammatical conditions. This is due to the fact that the "grammatical conditions" were created purely by the article + noun type combinations. Since not every article + noun combination is even from noun type to noun type, this naturally created an uneven number of grammatical and ungrammatical sentences. The task consisted of 60 sentences with 39 of the sentences (65%) being grammatical and 21 (35%) being ungrammatical..

6.3.3.3 | Forced-Choice Elicitation Task

The final data collection instrument that the participants completed was an untimed, computer-delivered forced-choice elicitation task (FCET) or, more commonly known as, a gap-fill task. A gap-fill task was first used for research in article pedagogy by Master (1997) and later used by Ionin (2003) and Ionin et al. (2004) for other studies on L2 English article acquisition. Other versions,

[13] There is no possible *the* + singular noun type that makes an ungrammatical condition.

or adapted versions of the gap-fill tasks by (Ionin et al., 2003) and Ionin et al. (2004), have been used in their original or adapted formats by several studies (García-Mayo, 2008; R. Hawkins et al., 2006; Ionin et al., 2008; Ionin et al., 2009; Morales, 2011b; Snape & Yusa, 2013; Tryzna, 2009; among others). For this reason, this task can be considered as a standard measure for article usage in L2 English article research. In Choi and Ionin (2017), they moved from a "traditional" gap-fill task (open-ended with just blanks) to a "forced-choice" elicitation task where the participants had to fill in the gaps with a word or phrase from a small selection (*a/an*, *the*, or Ø).

Since FCETs present participants with two (or more) options, and those participants are instructed to choose the word/phrase that best completes each sentence, FCETs are designed in such a way that they directly answer the question *Is there a difference between these conditions?* In this way, there is the assumption that if there is no difference, random answering during the FCET should result in a 50/50 split of the responses. This task is considered to assess participants' explicit linguistic knowledge because it requires them to explicitly think about the meta-linguistic workings of L2 English and make informed decisions about the best response for each context. In other words, the use of their language is controlled in the sense that they only need to *choose from the available answers* (R. Ellis, 2009b). R. Ellis (2009b) conducted a study in which they tested the measure of linguistic awareness in various different explicit and implicit tasks. The study found that tasks which measured explicit knowledge more clearly required the learners to use metalinguistic knowledge. The FCET designed for this study required the participants to employ their explicit knowledge of the metalinguistic rules that apply to appropriate choice of articles and noun types to complete each context.

The written instructions for the FCET can be found in Figure 6.4. Although this task is similar to a gap-fill task the participants may have seen in their regular courses, this one started with five practice items, as with the other experimental tasks, to keep the presentation of all of the experimental tasks consistent.

Speakers of a language seem to develop a *feel* for what is a possible sentence, even in many cases where they have never been taught any particular rules. Additionally, speakers are able to complete sentences when certain elements or words of a sentence are missing. For example, in English, consider the sentences below and how the blanks in the sentences might be filled in.

<u>Sentences</u>
a) *She ______ going to win the race.*
b) *Joseph finally got an "A+" on ______ of his papers.*
c) *Two kids ______ playing in the park yesterday.*
d) *Do you know ______ she put the pencils?*

<u>Answers</u>
a) *She* ***is*** *going to win the race.*
b) *Joseph finally got an "A+" on* ***one*** *of his papers.*
c) *Two kids* ***were*** *playing in the park yesterday.*
d) *Do you know* ***where*** *she put the pencils?*

In this experiment, you will read sentences that have two blanks in them. You need to read each sentence and choose the best word or words to complete each sentence from the drop-down lists. Read each sentence carefully before you answer. Think of the sentences as spoken English and judge them accordingly. Work as quickly and accurately as you can.

Each sentence will appear similar to this:
I was to the party.

After each sentence click "Click here to continue".

The following five sentences are practice items. After the practice items, the experiment will begin.

Figure 6.4. Directions for the FCET

For this task, participants were presented with two sentences labeled "A" and "B". These sentences were not always intended to be a dialog, *per se*, but rather a way for Sentence A to provide the context for Sentence B. The participants were instructed to read the sentences together (A and then B) and choose the article and noun in the blanks that best completed Sentence B given the context in Sentence A. The participants could choose *a*, *an*, *the*, or blank for their article choice and were prompted to choose either a singular or plural form for the noun. Examples of each relevant context can be found in Table 6.6, and the entire list of tokens can be found in Appendix H.

Table 6.6. Test items for FCET

Target	Example
the + singular	A: I would really like to get a pet for the kids. B: Do you think [the] [dog] we saw yesterday would behave?
the + plural	A: Have you tried training them? B: I would like to think [the] [dogs] would behave if we trained them properly.
a/an + singular	A: What do you think about getting a pet for the kids? B: I do not know if our kids are ready for [a] [dog] or not.
Ø + singular	A: Do they need something? B: They will need [-----] [garlic] for the pasta they are making.
Ø + plural	A: Have you seen any up for adoption? B: There is someone down the street selling [-----] [dogs]. We should get one!
the (article only)	A: Where did Kari go? B: Oh, she took [the] dogs to the shelter today.
a/an (article only)	A: Did Skye bring something to the house earlier? B: Yeah, she had [a] paper to give Tanner.
Ø (article only)	A: Do you think this dish tastes bad? B: I think we should add [-----] garlic to this pasta dish.
singular (noun only)	A: What do you think of all the animals in the neighborhood? B: I cannot believe the [dog] that lives down the street is so big!
plural (noun only)	A: Oh, no! I cannot seem to find them. B: I put the [papers] that we got at the store on the table.

As with the AJT, participants were allowed to take as long as they needed, but once a sentence was submitted, they could not return to it. The majority of the participants completed this task in less than 20 minutes. The participants also had an opportunity to discuss the instructions with the investigator and ask any questions before the task began.

The FCET only tested grammatical contexts for each noun, which equated to 39 sentences and an additional 24 distractors. This brought the total number of items for the FCET to 63. The 24 distractors only had one blank—12 missing an article and 12 missing a noun. In total, there were 75 items although the 24 items with only one blank served as distractors and to gauge a general idea of the participants' ability to independently use articles and singular/plural nouns. Although this task is more complex than other elicitation or gap-fill tasks that precede it (Ionin et al., 2004; Ionin et al., 2009; Lopez, 2015), this did not seem to affect the participants' ability to complete the task appropriately, as is evident in the results presented in Chapter 7. A sample FCET item can be found in Figure 6.5.

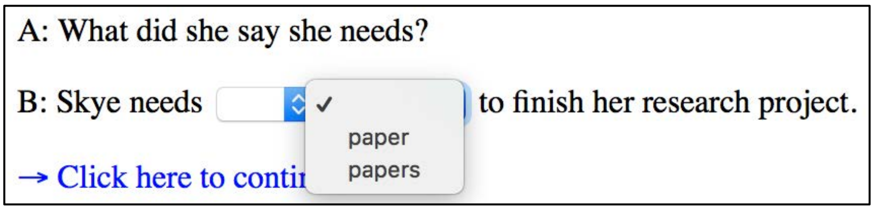

Figure 6.5. A sample item from the FCET

6.4 | General Procedure

In this section, the general research procedures are given. First, an outline of the research ethics approval will be given, followed by details on the pilot study conducted in spring 2017 and the experimental data collection that followed. In the final part of this section, we will present the motivation, design, and implementation of the intervention that was used in the study.

6.4.1 | Research Ethics

Prior to beginning any data collection for any research that requires human subjects, approval from the University of Iowa's Institutional Review Board (IRB) must be obtained. The process is known the be a lengthy one, and for that reason, was started very early. The review process begins with a 15-page application that is filled out by the researcher and then submitted to the IRB. The application probes the research project from many different aspects and angles to be sure that it does not violate any ethics codes in the USA. To avoid delaying the project and falling behind on pilot data collection, the original proposal was submitted on January 5, 2017. Copies of consent documents, participant questionnaires, LIMs, and access to all of the experimental tasks—in working order—was required. Additionally, since the data was going to be collected under the UI but then analyzed and published at UAB, a "Data Use Agreement" (DUA) was required to be signed by administration at both facilities. After three major modifications—8 submissions in total—official (and complete) IRB approval was received on April 6, 2017.

Receiving IRB approval was a greenlight to begin collecting pilot data and adjusting the tasks accordingly to prepare for the experimental data collection. In the spring of 2017, the pilot study was completed. In the fall of 2017, the experimental data collection began. A full description of the procedures for each of the data collection sessions will be provided in the following two sections.

6.4.2 | Pilot Study Data Collection

The first version of the study attempted to investigate the acquisition of L2 English articles and noun types by both L1 Spanish and L1 Mandarin speakers. Under this version of the project, a pilot study was conducted at two different Midwestern United States higher education institutions in order to reach both of the target populations. Due to the populations of ESL students available in different areas, the Spanish speakers were recruited from one institution while the Mandarin speakers from another. Data was collected from the Spanish speakers on April 3, April 10, and May 1, 2017. Many issues quickly arose with the data collection of the Spanish speaking participants during the pilot study. First, the participant group was much older than the anticipated 18- to 30-year-olds. The participants that attended the data collection ranged from 27 to 84 years old. Additionally, many of the participants did not have basic computer skills which made it highly difficult to collect the data in the 2-hour window that was allotted. The only data that was able to be collected on during the first meeting for a task that was ultimately not included in the study. Due to the difficulty in recruiting the appropriate L1 Spanish, L2 English population, the decision was made to drop Spanish as a L1 background and proceed with the dissertation as only considering L1 speakers of Mandarin.

Data for the Mandarin speakers for the pilot study was collected on April 7, April 14, and May 5, 2017. Although there were some recruitment issues for the Mandarin speakers, by the end of the pilot study, 7 participants had participated in each part required for full participation in the study. All pilot data was collected in on-campus computer labs that were similar, if not the same, as the ones they use in the regularly scheduled classes. Accordingly, these elements contributed a certain homage to ecological validity for the study.

After collecting data from the Mandarin speakers, some changes were suggested and made accordingly. The last phase of the pilot data collection was carried out with a small group (n = 9) of native speakers of English. The NSs completed the AJT and FCET to confirm the rating assigned to each of the sentences and responses given in the FCET. After conducting the pilot study with the NSs, it was determined that all items were valid and acceptable for the experimental study. Additionally, the length of the task did not seem too long, and no major adjustments had to be made.

6.4.3 | Experimental Study Data Collection

The experimental data collection took place in on-campus computer labs and classrooms to pay homage to ecological validity. As was seen in Table 6.1, the study took place over approximately five weeks with a three week break between T1 and T2. During participant recruitment, the potential participants were invited to an informative meeting to learn more about the research project. The NSs, though, did have the opportunity to contact the researcher before participating in the study to ask any questions about their potential involvement. As aforementioned, the informative meeting provided detailed information to the participants about their commitment to the study. After discussing the information with the researcher, the potential participants were allowed to discuss the study in their L1, but all questions had to be asked in the L2, English.

Once the participants agreed to be in the study, they were given the appropriate information to complete the pre-participation questionnaires. For the NNSs, this consisted of the BLUQ and OQPT. For the NSs, this only consisted of a shorter version of the BLUQ. As the Letter of Informed Consent that they were given stated, by completing the pre-participation questionnaires, they were demonstrating their willingness to participate in the full extent of the study. The participants were informed that if, for any reason, they needed to leave the study, they would be allowed to do so at their own discretion. The participants also received a full outline/timetable of the data collection during the information meeting.

In the first data collection session, T0, the participants first met in an audio lab. This lab was located in campus and was familiar to all of the participants (except for the NSs) because they attended regularly-scheduled communication skills courses in this lab. The participants took a seat in their assigned seats and were instructed to wait patiently until everyone arrived. Once everyone was present for the data collection, the researcher explained how the ESIT would work in the audio lab.

In order for things to be easier for the participants, a Google Sites website (https://sites.google.com/site/thomaswilhelmresearchstudy) was made that contained all of the links to the experimental tasks. Additionally, the final screen of each experimental task contained a link to the next task. This was more efficient and very easy for the participants to follow. After getting settled in the computer lab (in the same building as the audio lab), the participants were directed to the research website and instructed to begin the AJT and eventually the FCET. As aforementioned, all of the participants participated in the data collection instruments in the same order—most implicit to most explicit (ESIT > AJT > FCET). The participants finished the remaining data collection tasks in the computer lab. Upon completing the tasks, the participants were given a written reminder about the following week, which would also include the intervention, or grammar workshop. As for the NSs, they were only asked to participate in one data collection session and were randomly assigned to a set of tasks from either T0, T1, or T2.

Before collecting data for T1 in the audio and computer labs, the NNSs first went to a regular classroom that resembled that of their regularly scheduled classes. During this time, they received the intervention (see Section 6.5 for a detailed description of the intervention). Although the materials used for the intervention were quite long and provided a variety of activities (as can be seen in Appendix C and Appendix D), they were unable to complete some of the activities during the intervention. In that case, they were assigned to do the remaining activities after T1 data collection and return the completed packet at the T2 data collection. In this way, the grammar workshop intervention modeled a real ESL grammar class in which the students are assigned homework to continue practicing the complex grammatical forms that were presented during class. After the grammar workshop, the participants proceeded to the audio lab, where they completed the ESIT, and then they moved to the computer lab where the finished the other three data collection instruments. At the end of T1 data collection, they were given a written reminder of their final data collection session, T2, which would take place three weeks later.

At data collection T2, the participants first met in the audio lab to complete the ESIT as they did the previous two data collection sessions. After completing the ESIT, the participants went to the same computer lab to complete the remaining data collection instruments. Upon completion of the data collection instruments, the participants were informed that their participation in the study was complete. The participants were later invited to a face-to-face debrief during which the researcher explained the data collection and the purpose of the study with the participants, as well as the research questions, experimental hypotheses, and preliminary data analyses (descriptive statistics). All in all, from the informative meeting to the completion of the data collection (T2), the participants' involvement (including time to consider the participation) was approximately six weeks. In the following section, the conceptualization and design of the intervention and linguistically-informed materials will be presented.

6.5 | The Interventions

In this section, an overview of traditional grammar curriculum and materials will be provided and the intervention and linguistically-informed materials that were used in the study will be presented. Copies of the intervention materials can be found in Appendix C (for linguistically-informed instruction materials) and Appendix D (for traditional instruction materials).

6.5.1 | "Traditional Grammar Instruction" Intervention

The current teaching approach in many grammar courses is that of focus on forms (FoFS) (Long, 1988, 1991) with a textbook that covers different grammatical elements in each chapter. Within each chapter, new grammatical structures and rules are presented, followed by activities that required the leaners to use those specific rules and structures. As a class moves on from day-to-day, the students move from one grammatical function to the next. Many grammar books currently in publication do not incorporate the use of formal linguistics or take any formal linguistics approach such as the use of semantics or syntax to teach difficult grammar concepts or differences between L1s and the target language.

Additionally, curriculum at this stage in ESL education does not often include formal article or noun type instruction in this course. Therefore, the learners are expected to have *mastered* this function already, or plan to spend many hours with self-study to master it. The reality of the matter is (at some universities), each day learners received 60 minutes of decontextualized grammar with a focus on a different area. The "Traditional Grammar Instruction" intervention used the same textbook that the current ESL instructors were using in the course from which the students were recruited. A sample of the textbook material can be seen below.

<u>Advanced-Level Text: *Grammar & Beyond 4*</u>

- Use *the* when both the writer and the reader share common knowledge or information about the noun. Use *the* when the noun was introduced earlier in the text and you give more information, or when the noun is related to a noun mentioned earlier. Use *the* when you are writing about "which one" (when there is additional information that identifies the specific noun).

- Use *a/an* with a singular count noun when the noun is not specifically identified, or when it is first mentioned and new to the reader. Do not use *a/an* with noncount or plural nouns. Use *some* or Ø. Use *a/an* when introducing a count noun. Use the indefinite article when making generalizations: Ø for noncount nouns and plural nouns, *a/an* for singular nouns. Use the definite article if it refers to a specific noun that is known to the reader.

(Bunting et al., 2009, pp. 104-105)

As can be seen this example, many of the examples and explanations based on corpus data, the definitions sometimes given to these concepts interchange the terminology of definiteness and specificity, which can lead the students to making numerous errors. To maintain the consistency of the materials used, the intervention included using the same textbook, workbook, and PowerPoint presentations as the regular ESL grammar courses.

6.5.2 | Linguistically-Informed Instruction Intervention

In this section, the development of the linguistically-informed materials (LIMs) is presented chronologically. First, the gaps and inefficiencies of current grammar pedagogy in the field of ESL will be explained. The second part of this section will discuss the process of designing and piloting the materials. Finally, the third part of the section will discuss the final changes made to the materials following the piloting and the use of them in the study. A final version of the teaching materials can be found in Appendix C.

6.5.2.1 | Conceptualization: Inspiration & Roadblocks

In the field of TESOL, article instruction is often minimized in the curriculum, or left out, due to its complex and difficult nature for both instruction and learning, as seen in the previous section. To try and overcome this, recent research in applied linguistics has tried to bridge the gap between teaching pedagogy and SLA research. Sanz and Morgan-Short (2005) give a thorough summary of previous studies in which they separate them out into ones in which explicit rule presentation and/or explicit feedback have positive effects, negative effects, or no effects at all. In their results, they state "SLA research shows that L2 competence of adult learners seems to benefit from metalinguistic information, that is, from being given information regarding how the language works" (Sanz & Morgan-Short, 2005, p. 248). The authors do, of course, provide several reasons as to why one should approach the topic with caution, though. For example, many of the studies discussed only offered short treatments and assessments, and those which showed positive effects were generally limited to specific aspects of the language being acquired (see Sanz & Morgan-Short, 2005 'Summary and Future Research' for a full discussion).

As explained in Chapter 4 and Chapter 5, Lopez (2015, 2017) was one of the first studies to try and bridge the gap between GenSLA research and ESL pedagogy in regard to article instruction by developing LIMs. The results of her study found that the materials designed did lead to improvement of article acquisition, but these results were non-significant between groups that received LIMs and groups that received standard teaching materials. The author does acknowledge that the materials she had designed needed to be simplified in order to make them accessible to both instructors and students. In this study, however, the materials were not simplified for other instructors, as the researcher was the only "instructor" during the intervention. The design of the LIMs in the present study was driven by the philosophy that the use of universal concepts (e.g., semantic features and metalinguistic explanations) may make it easier for students of various language backgrounds to raise their awareness of how language works, rather than a word that "doesn't translate" into the L1.

The intervention and use of LIMs employs the notion of explicit instruction and explicit learning. N. C. Ellis (1994, p. 38) describes explicit learning as when "the learner has online awareness, formulating and testing conscious hypotheses in the course of learning." With that being said, this process occurs when a learner encounters a language-related problem or new language material and consciously and deliberately attempts to master it (Dörnyei, 2009). Explicit learning refers to the learning of explicit knowledge, including, but not limited to, metalinguistic knowledge (e.g., the explanations of universal semantic features). Often times in SLA or FLA, teachers and learners will draw on explicit knowledge and explicit learning. Roehr (2012) states there are three primary concerns with the explicit learning process: (i) the difficulty of learning specific linguistic constructions as either explicit or implicit knowledge, (ii) the effects of varying levels of learner awareness, and (iii) the interaction of explicit and implicit processes. The present study used these concerns as the base of developing the LIMs. It was decided that the intervention of the study would be one with materials that would explicitly and carefully explain metalinguistic information. To make this easier, accompanying comparisons and contrasts between the L1 (Mandarin) and the target L2 (English) were made.

As was discussed in Chapter 4, current grammar textbooks provide many of their examples and explanations based on corpus data and the definitions sometimes given to these concepts interchange the terminology of definiteness and specificity, which can lead the students to making numerous errors. Since instructors regularly work with materials like these, it is only natural that at times they themselves are confused by the use of this terminology. Additionally, traditional textbook explanations do not draw on any information that the students already know about language and how language works. This provided considerable motivation in the design of LIMs for this dissertation. Thus, we set out to conceptualize and design a set of materials informed by theoretical GenSLA findings and hypotheses (i.e., the Feature Reassembly Hypothesis and the Bottleneck Hypothesis) as well as Instructed Second Language Acquisition findings and hypotheses (i.e., the Interface Hypothesis) that encouraged learners to actively think about the building blocks of language in both their L1 and L2 to facilitate in reassembly their linguistic knowledge for successful L2 acquisition. In the following section, we present how these LIMs were designed, followed by a brief explanation of what the final product looked like.

6.5.2.2 | Designing Linguistically-Informed Materials

As mentioned in Chapter 4, the LIMs designed for this study engage the notions of formal instruction and some of the notions of focus on forms as to how new information beyond the metalinguistic explanations and syntactic and semantic descriptions were given. The LIMs were designed following Sheen (2002, pp. 303-304) description of the stages of focus on forms:

i. providing understanding of the grammar by a variety of means (including explanation in the L1, pointing out differences between the L1 and L2);

ii. exercises entailing using the grammar in both non-communicative and communicative activities for both comprehension and production;

iii. providing frequent opportunities for communicative use of the grammar to promote automatic, accurate use.

The LIMs in the current study sought to expand current focus on forms grammar teaching more explicitly in stage 1 (Sheen, 2002) above. Following the techniques and models in Lopez (2015, 2017), the LIMs were heavily focused on GenSLA, semantic universals, and a crosslinguistic comparison of the L1 and L2.

The first stage to designing the materials was to look at the traditional method of teaching English articles and noun types and find where the descriptions were vague and/or overlapping. In order to do this, a survey of nearly 10 different textbooks from 3 different grammar series were consulted. In addition, a thorough analysis of the differences and similarities between the L1 (Mandarin) and the target L2 (English) was conducted. This helped to form the second main part of the LIMs, which was a crosslinguistic comparison. After conducting this research, decisions had to be made on how to present materials to the learners that used GenSLA theory in the classroom but also remained accessible to the students given the amount of new material (e.g., use of semantics and the L1 to explain the differences between various noun types) that was being presented. The decision was made to design the materials in a presentation/practice lesson format, which fit with the goal of using explicit instruction. Although the overall results of this approach are inconclusive, it has been preferred to implicit instruction in recent work (Norris & Ortega, 2000). In addition to the packets that were made for the students—organized in a very similar fashion to a grammar textbook—the information was put into PowerPoint slides to make it easily presentable during the intervention. Although the LIMs in the present study were all presented by the researcher, there was a consultation with other instructors to gain feedback and insight to the materials that had been developed.

As previously discussed in Chapter 4, semantic definitions (such as the following example from Ionin et al., 2004, p. 5) had to be *slightly* simplified as to explain the information but still be as accurate as possible.

(35) Definiteness and Specificity: informal definitions

a. If a Determiner Phrase (DP) of the form [D NP] is…

i. [+definite], then the speaker and the hearer presupposed the existence of a unique individual in the set denoted by the NP.

ii. [+specific], then the speaker intends to refer to a unique individual in the set denoted by the NP and considers this individual to possess some noteworthy property.

As we addressed before, these definitions are incomprehensible to not only instructors, but also students. Therefore, the definitions were changed to more *pedagogical* definitions, taken from Lopez (2015, 2017). Definiteness was taught as 'shared knowledge' and specificity was left out entirely as it was not important in the present study.

(36) Articles: a word that introduces or identifies a noun and helps language users distinguish between general and specific statements and shared knowledge

- a. If an article is…
  - i. [+definite]: *both* the *speaker* and the *listener* can identify the noun and answer the question 'Which one?'
    - 1. In English, there is one article that is [+definite]: *the*
      - a. Definite Article: refers to an entity that is identifiable in a given context
  - ii. [–definite]: *only* the *speaker*, not the listener, can identify the noun
    - 1. In English, there are two articles that are [–definite]: *a*, Ø (zero)
      - a. Indefinite Article: refers to an entity that is not identifiable in a given context
      - b. Zero Article: refers to noun phrases that contain no article and refer to a general class of things or a substance

Additionally, information about the countable and uncountable nouns was presented as well. For instance, the introduction of the semantic universals [±count] and [±atomic] were also presented in the materials. Instead of using terms such as 'uncountable substance' and 'uncountable-object', semantic universals were first presented and then these terms were brought in later in the LIMs. Therefore, the pedagogical definitions for definiteness, countability, and atomicity that were used, and which were presented to the learners, can be found in examples)–(.

(37) Nouns: a word that refers to a person place, thing, or idea

- a. [±count]: the feature of a noun that determines whether or not it can have a plural form
- b. [±atomic]: the feature of a noun that determines if it is made up of individuals
- c. If a noun is…
  - i. [+count, +atomic]:
    - 1. In English, there is one type of nouns that is [+count, +atomic]:

a. Countable Nouns: it has separate singular and plural forms, and the plural form takes a morphological –s; these nouns can be counted individually (e.g., *dog, dogs*)

ii. [–count, ±atomic]:

1. In English, there are two types of nouns that are [–count]:

a. Uncountable-Substance Nouns [–atomic]: it refers to a substance that cannot be individuated or counted (e.g., *toothpaste*)

b. Uncountable-Object Nouns [+atomic]: it refers to a set of objects that can be individuated into countable items (e.g., *furniture*)

iii. [+flexible]: a semantically ambiguous noun that alternates between being [–count, –atomic] and [+count, +atomic] depending on the structure of the sentence and the speaker's target meaning

As can be seen in the examples above, the definitions for articles and noun types were given as semantic universals, but also included examples for the students to immediately see how each of these properties mapped onto example nouns in English. The original materials, which did not include the semantic universal of atomicity, were piloted with a small group of Mandarin speakers (n = 7). Although they proved favorable by the participants, many of whom actually stated that they had really felt like they had learned something, the decision was made to move to all semantic universals for the definitions of the articles and noun types. The initial design of the LIMs and the intervention consisted of a single one-hour classroom session. After the piloting, it was decided that the intervention and formal instruction would stay the same, but some additional definitions would be added (i.e., atomicity).Following the metalinguistic descriptions and crosslinguistic comparisons, the bulk of the LIMs adapted traditional grammar exercises (some from the materials that were surveyed) that incorporated the terminology and focus of the descriptions found in the first two parts.

6.5.2.3 | The Final Product: LIMs for Mandarin Learners of English

The previous section of the chapter has explained the inspiration and development for the intervention and LIMs used in the present study. Although the materials were not designed with pure consideration of instructors with no linguistic background, they were designed in a way in which an instructor with no GenSLA background could quickly learn to use and adapt. The final copy of the LIMs can be found in Appendix C. There were three main parts to the LIMs: (i) linguistic definitions, (ii) a crosslinguistic comparison, and (iii) grammar practice activities (some originally designed and some adapted and modified from current grammar textbooks). The PowerPoint and materials presented semantic notions in a way that their students could comprehend and apply to not only learning the L2, but they could use them to explain concepts in the L1 as well. In addition, the section that provided a crosslinguistic comparison to the NNSs' L1 seemed to bring about many instances of cognitive revelation during the presentation of the intervention and LIMs. Furthermore, during the 1-hour intervention, there were significant opportunities for the students to practice oral communication. Some of the activities included preparing responses to questions about shopping and purchasing quantities or amounts of countable and uncountable nouns and other role-playing opportunities. As far as ecological validity is concerned, the materials were presented and used in a way that was highly similar to any supplemental materials that an instructor might use in their ESL courses.

6.6 | Data Download, Transformation, Trimming, & Analysis

Before beginning the analyses, all of the data was downloaded from Ibex Farm and pre-processed using Microsoft Excel. The pre-processing procedures can be seen in Figure 6.6.

For the ESIT data, all of the sentences were transcribed and given an imitation score. The target structure of each imitation received one of three possible scores:

- 0 = ungrammatical production of article and noun type (i.e., imitation of ungrammatical sentences without correction or imitation of grammatical sentence making the grammatical items ungrammatical)
- 1 = grammatical production of either article or noun type (i.e., imitation of ungrammatical sentences correction either the article or noun type or imitation of grammatical sentences making one of the grammatical items ungrammatical)
- 2 = grammatical production of both article and noun type (i.e., imitation of ungrammatical sentences correcting both the article and noun type or imitation of grammatical sentences)

This was done for each participant and utterance. After the data was transcribed by the researcher, it was subjected to interrater reliability tests. To establish interrater reliability, two trained ESL instructors were recruited to code approximately 20 percent of the data. Fleiss' Kappa showed there was good agreement between the raters' judgments, $\kappa = 0.711$ (95% confidence interval, 0.6929 to 0.7293), $p < 0.05$. In the end, there were over 72 hours of data that was had been recorded, transcribed, and coded before it was cleaned and exported for data analysis.

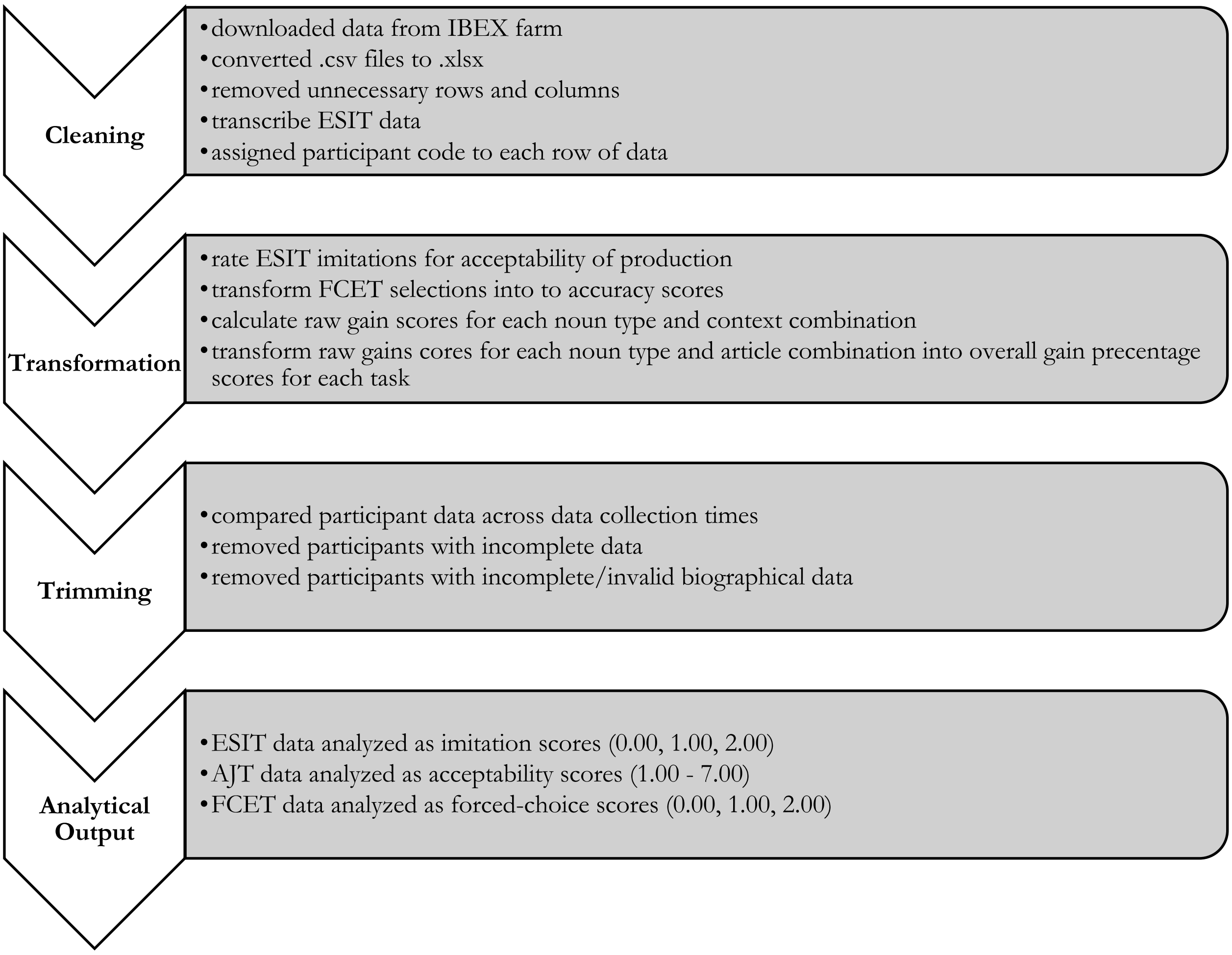

Figure 6.6. Data processing procedure

For the AJT, participants gave an acceptability rating ranging from one to seven on a Likert scale. The data for this task was downloaded from Ibex Farm and cleaned up in Microsoft Excel. For the initial analyses, these ratings were not subjected to any data transformation. Once the data had been cleaned, participant codes assigned, and incomplete data removed, it was exported for statistical analysis.

The FCET data was transformed similarly to the ESIT data, with the exception of assigning absolute scores for correct or incorrect selection of the article and noun type that fit the context that had been provided for each item. Therefore, each critical region of the FCET received a forced-choice score of 0, 1, or 2:

- 0 = no acceptable selection of article or noun type
- 1 = acceptable selection of either article or noun type
- 2 = acceptable selection of both article and noun type

These ratings were assigned in Microsoft Excel, and the data was then exported for statistical analysis.

For all tasks, gain scores were also calculated by finding the difference between mean scores for each noun type in each context between the testing times in the study. These were used to investigate the fine-grained linguistic gains made by each group in each of the tasks separately. Furthermore, a gain percentage score was calculated for every learner group (LING, NOEX, TRAD) and task (ESIT, AJT, FCET) for each time period (T0-T1, T0-T2, T1-T2). These were calculated by taking the raw mean gain score and dividing it by the highest possible score for that task. Being as the AJT was rated on acceptability scores, the ungrammatical combinations were divided by -7 (instead of 7) so that we could established a gain percentage reflecting the expected change in score for grammatical versus ungrammatical items. These gain percentages were used to investigate the interactions of task type and learner type in the fourth research question discussed below.

As aforementioned, all data was organized in Microsoft Excel and prepared in worksheets that could be exported to R (R Core Team, 2019) for statistical analysis. In R, the data was subjected to statistical analyses to investigate differences between noun types in each of the contexts using linear mixed-effects models in the *lme4* package (Bates, Maechler, Bolker, & Walker, 2015) and, in the case of statistical differences, they were subjected to pairwise comparisons using the *lsmeans* package (Lenth, 2016). The statistical analysis procedures are explained in more detail in Chapter 7.

6.7 | Revisiting the Research Questions, Hypotheses, & Predictions

This chapter has thus far presented information about the research design—the participants, the data collection instruments, and the intervention materials, and the downloading and coding of the experimental data. We will now conclude with a reminder of the research questions and hypotheses. The RQs were originally presented in Chapter 1, but now we will revisit them with further explanations of the hypotheses before moving onto the results of the data collection. The presentation of these RQs will guide us through the following chapter, Chapter 7, in which the results of the study are presented.

Research Question 1

To what extent will L1 features be present in the participants' L2-English articles and noun types prior to intervention as measured by the potential differences between the L2 learners' and native speakers' performances in an elicited-sentence imitation task, an acceptability judgment task, and a forced-choice elicitation task?

The theoretical approach to language acquisition adopted in the present study, Feature Reassembly Hypothesis (Lardiere, 2008, 2009a, 2009b), assumes the potential presence of L1 transfer during the acquisition process where learners will have to reassemble the features which have been transferred. The Feature Reassembly Hypothesis goes on to state that during the acquisition process, learners can access Universal Grammar to acquire features which are not present in their transferred knowledge. Previous research (Choi & Ionin, 2017; Choi et al., 2018; Choi et al., 2019; Hua & Lee, 2005) shows that generalized classifier languages (GCLs), such as Mandarin, do not have a fully grammaticized distinction between countable and uncountable nouns. According to Cheng and Sybesma (1998, 1999, 2014), in GCLs, the link between atomicity and morphosyntax of nouns is more direct than the countability distinction. While noun types in their bare form (i.e., without a classifier) provide a distinction between [+atomic] and [–atomic], the classifier system is grammaticized for a distinction between [+count] and [–count] features. In addition, while countability is encoded directly on the morphosyntax of the Mandarin classifier system, plural marking in Mandarin is restricted to [+human] nouns and can also be morphologically realized in the demonstrative determiners modifying nouns (Cheng & Sybesma, 1998, 1999, 2014). The feature [definite], on the other hand, can be either context-bound or morpheme-bound in Mandarin. In Mandarin, bare nouns in post-verbal position are always [–definite], but when they appear pre-verbally, they are [+definite]. Furthermore, when appearing with certain demonstratives, Mandarin nouns can have [+definite] reference in a post-verbal position. Therefore, the learning task for L1-Mandarin, L2-English learners is that they must reassemble their [count] and [atomic] features for noun types since English is not a GCL They must also reassemble their [plural] feature on to English nouns to include both [+human] and [–human] nouns. They must then appropriately reassemble their both context-dependent and morpheme-dependent [definite] feature to the articles in English. The reassembly process requires them to bundle the [count], [atomic], and [plural] features on English noun types and the [definite] feature on English articles.

> *Hypothesis 1*
>
> Following the Bottleneck Hypothesis (Slabakova, 2008, 2009a, 2009b) that functional morphology is especially difficult for L2 learners and that this will considerably slow down their acquisition processes, we hypothesize that the learners will still be in the process of reassembling. Therefore, there will be presence of L1 features by not having properly bundled the [count], [atomic], and [plural] features on English noun types and the [definite] feature on English articles. Furthermore, we hypothesize that reassembly will be shown to different extents based on the different processes the learners must go through as hypothesized by the Cline of Difficulty (Slabakova, 2009a).

Hypothesis 1 predicts that L1 features related to articles and noun types will be transferred to L2 English if applicable. Therefore, L1-Mandarin speakers learning English will have transferred their L1 [definite], [atomic], [count], and [plural] features to their L2 English, but then need to successfully reassemble features for L2 English articles and noun types. We expect L1-Mandarin, L2-English speakers to display non-native like patterns in the data collection tasks for all noun types. English object-uncountable nouns share their [+atomic] feature with countable nouns and their [–count] feature with substance-uncountable nouns. If these features have been transferred, but not properly reassembled, then we predict L2 learners will treat object-uncountable nouns more like countable nouns than substance-uncountable nouns prior to instruction due to influence of the [atomic] feature setting, which is grammaticized on nouns in Mandarin. If noun types are all treated similarly, then we predict that the learners have not yet reassembled the [count] feature successfully to provide a grammatical distinction between noun types in English. With regard to ESIT, we predict that non-native speakers will demonstrate significantly lower performance than native speakers in providing correction of ungrammatical stimuli and imitations of grammatical stimuli in the ESIT. For the AJT, we predict significantly different judgment scores of grammatical and ungrammatical sentences with respect to native speakers. Finally, we predict the FCET to be especially challenging since L2 learners will have to employ their linguistic knowledge to provide appropriate forced-choice selections of both articles and noun types based on a provided written context. Following the Bottleneck Hypothesis (Slabakova, 2008, 2009a, 2009b) and the Cline of Difficulty (Slabakova, 2009a), it is predicted that the [definite] feature will pose the greatest difficulty in the feature reassembly process because the learners will need to map and reassemble the L1 context-bound and morpheme-bound feature onto a morpheme in the L2. We also predict that learners will show greater difficulty with noun types in a context that has rich morphological representation for definiteness (i.e., definite-singular, definite-plural, and indefinite-singular) rather than those which do not have morphological cues of definiteness (i.e., zero-singular and zero-plural). In addition, the reassembly of the [atomic], [count], and [plural] features are predicted to pose moderate difficulty as they are features mapping from a L1 morpheme and reassembly to a L2 morpheme.

Research Question 2

Does type of instruction mediate the reassembly of L1 article and noun type features for the L2 as measured by an elicited-sentence imitation task, an acceptability judgment task, and a forced-choice elicitation task?

Research Question 2.1

Is there any significant development in imitation scores, acceptability judgments, and forced-choice selections of noun types in different article contexts from T0 to T1 and T0 to T2 for linguistically-informed instruction learners?

Research Question 2.2

Is there any significant development in imitation scores, acceptability judgments, and forced-choice selections of noun types in different article contexts from T0 to T1 and T0 to T2 for traditional instruction learners?

Research Question 2.3

Is there any significant development in imitation scores, acceptability judgments, and forced-choice selections of noun types in different article contexts from T0 to T1 and T0 to T2 for no extra instruction learners?

The theoretical approach to language acquisition adopted in the present study, the Feature Reassembly Hypothesis (Lardiere, 2008, 2009a, 2009b), assumes the presence of L1-transferred features during the acquisition process which learners will have to reassemble. We also adopt the Bottleneck Hypothesis (Slabakova, 2008, 2009a, 2009b) and the Cline of Difficulty (Slabakova, 2009a) which predict that functional morphology is especially difficult for L2 learners and that different acquisition processes pose varying levels of difficulty to the learners.

Hypothesis 2

Since there is strong evidence in support of explicit instruction (Bowles, 2011; Bruhn de Garavito, 2013; Loewen, 2015; Long, 1983, 2009; Lopez, 2017; Lopez & Sabir, 2017; Master, 1994, 2002; Norris & Ortega, 2000; Snape & Yusa, 2013; Sonbul & Schmitt, 2013; Spada & Tomita, 2010), it is hypothesized that explicit instruction will have a significant effect on the reassembly of transferred L1 features of articles and noun types. The learners will assess their interlanguage grammars during instruction and will begin to rebuild the features to become more native-like. While it may be possible to create a steady-state grammar that is similar to a native speakers, their ability to produce structures that are similar to those of the of a native speakers may take longer to develop due to the varying difficulty of the acquisition and reassembly processes they are undergoing. Therefore, it is hypothesized that there will be linguistic development in imitation scores, acceptability judgments, and forced-choice selections after instruction for both linguistically-informed and traditional instruction learners. The no-extra-instruction group is hypothesized to be more heavily influenced by the Bottleneck Hypothesis due to not receiving any instruction on English articles and noun types in the study.

It follows from *Hypothesis 2* that traditional and linguistically-informed learners will make linguistic gains from explicit instruction. Being as *Hypothesis 1* predicts the presence of L1 [definite], [atomic], [count], and [plural] features in the L2, *Hypothesis 2* makes specific predictions that instruction will facilitate in the reassembly of the L1 [definite], [atomic], [count], and [plural] features for the L2. Following the Cline of Difficulty (Slabakova, 2009a) and the Bottleneck Hypothesis (Slabakova, 2008, 2009a, 2009b), we predict instruction to show more immediate benefits for the [atomic], [count], and [plural] features, while the [definite] feature may take more time to develop. Therefore, we predict to see immediate effects of instruction with the reassembly of features for noun types in contexts with fewer [definite] feature morphological cues (i.e., zero-singular and zero-plural) than contexts rice with [definite] feature morphology (i.e., definite-singular, definite-plural, and indefinite-singular). Furthermore, following instruction, we predict the learners to successfully reassemble their [atomic], [count], and [plural] features for their L2. We predict they will begin to show a grammaticized distinction between noun types based on the [count] feature instead of the [atomic] feature. If they properly reassemble the [plural] feature with the [count] and [atomic] features on noun types, we will see improvement in their use of [+plural] with [+count] nouns but rejection of it with [–count] nouns. Therefore, it is predicted that explicit instruction will facilitate in the feature reassembly and second language acquisition process for both linguistically-informed and traditional instruction learners' explicit knowledge. Being as the no extra learners will not be receiving explicit instruction on L2-English articles and noun types, it is predicted that they will not make any linguistic gains and will maintain their current linguistic knowledge throughout the course of the study.

Research Question 3

What type of instruction will lead to greater gains in the reassembly of L1 article and noun type features for the L2 at both immediate and delayed post-test as measured by an elicited-sentence imitation task, an acceptability judgment task, and a forced-choice elicitation task?

Hypothesis 3

While both traditional and linguistically-informed learners will benefit from instruction, we follow Lopez (2017) assumption that development of explicit metalinguistic knowledge via the teaching of abstract structures of language will better facilitate the reassembly of [definite], [atomic], and [plural] features and the acquisition of a new [count] feature from Universal Grammar for more successful second language acquisition and ease the Bottleneck of second language acquisition (Slabakova, 2008, 2009a, 2009b). Also following the Cline of Difficulty (Slabakova, 2009a), these gains will affect each of the reassembly procedures differently.

While *Hypothesis 2* does predict that explicit instruction will be beneficial with regard to linguistic gains, *Hypothesis 3* draws specific attention to which form of explicit instruction will prove most beneficial. Although Lopez (2017) did not find significant gains in her method of linguistically-informed instruction, she states that there is a benefit to teaching abstract linguistic structures to develop metalinguistic knowledge. Therefore, it is predicted that linguistically-informed instruction, by the development of metalinguistic knowledge via teaching abstract linguistic structures, will foster an environment for more successful reassembly of the [atomic], [count], and [plural] features on English noun types and the reassembly of the [definite] feature for English articles than traditional and no instruction learners. Furthermore, linguistically-informed instruction is not only predicted to facilitate the feature reassembly process, but also position the L2 leaners to push through the Bottleneck (Slabakova, 2008, 2009a, 2009b) of language acquisition and learn the appropriate English morphology for the [definite] and [plural] features unlike traditional and no instruction learners.

Research Question 4

What is the effect of task type on overall improvement and its interaction with type of instruction?

Hypothesis 4

Previous research (R. Ellis, 2005b, 2009b) finds that different data collection instruments tap into different types of L2 linguistic knowledge. That is, more implicit tasks, like an elicited-sentence imitation task, is more reflective of implicit knowledge, while more explicit tasks, like an acceptability judgment task or a forced-choice elicitation task, are more reflective of explicit knowledge. Furthermore, previous research (DeKeyser, 2007a; Hulstijn, 2002; Krashen, 2003) agrees that it takes large amounts of time, practice, and input for L2 learners to develop their implicit L2 knowledge, while the literature also agrees that explicit instruction generally results in explicit knowledge about language (Doughty, 2003; Loewen, 2015). Therefore, it is hypothesized that there will be differences in measured overall improvement by each of the task types, which will also be dependent on the type of instruction received.

Hypothesis 4 makes specific predictions about the effect of task type on overall task performance and how this task effect might interact with type of instruction. It is agreed up on in the literature that different tasks employ different types of L2 knowledge, so *Hypothesis 4* predicts that the greatest gains will be observed in more explicit tasks in the study, the acceptability judgment task and forced-choice elicitation task. Furthermore, since linguistically-informed instruction is predicted to be most beneficial for explicit knowledge, as was predicted by *Hypothesis 3*, it is predicted that linguistically-informed learners will perform the best on the forced-choice elicitation task and the acceptability judgment task. Being as the instructional period in the project is limited to just one hour, for both traditional and linguistically-informed instruction, it is predicted that instruction will not have a large effect on implicit knowledge. Therefore, *Hypothesis 4* predicts little to no gains in learners' performance on the elicited-sentence imitation task. Therefore, we predict to observe the greatest gains in task performance for the linguistically-informed learners in both the acceptability judgment task and the forced-choice elicitation task than the elicited-sentence imitation task, followed by the traditional learners making fewer gains in each of these tasks. The no extra instruction group is predicted to not to demonstrate any differences in performance gains between tasks.

Chapter 6 has given details about the research study. First, a general overview of the research design and a timetable of the study was presented along with detailed information about the participant groups. The pilot study was also discussed. The bulk of the chapter focused on the design and implementation of the data collection instruments and intervention materials. This included a detailed description of the data collection procedures. Finally, the research questions and hypotheses were revisited at the end of the chapter. In the following chapters, Chapter 7 and Chapter 8, the results and a discussion of what these results mean will be presented, followed by concluding remarks, further research, and teaching implications in Chapter 9.

Chapter 7: Results

"'Begin at the beginning,' the King said gravely,
'and go until you come to the end: then stop'"
– LEWIS CARROLL, *ALICE IN WONDERLAND*

This chapter presents the data analysis and results of the four experimental tasks carried out with the three different learner groups and the native speaker (NS) baseline group. All second language (L2) learners attend a university in the midwestern United States where they study English as a Second Language (ESL) courses in their first year-or-two of their undergraduate studies. Recall that the aim of this study is to investigate the acquisition and (re)assembly of L1-Mandarin semantic features for L2 English, namely the features associated with English articles, [±definite], and noun types [±plural], [±atomic], and [±count]. The study explores this acquisition in three different learning contexts: (i) linguistically-informed (LING), where participants received 1 hour of instruction on L2-English articles and noun types using the aforementioned semantic universals; (ii) traditional (TRAD), where participants received 1 hour of instruction using their course textbook; and (iii) a group which received no additional instruction outside of their ESL grammar course (NOEX). Let us now revisit the objectives of this dissertation.

i. In order to provide and explanation to the research questions and test our hypotheses, the data analysis in the present chapter will specifically tackle the following objectives for each experimental task under investigation:

ii. Compare the NS and NNS data for different noun types (countable, object-uncountable, and substance-uncountable) in each context (definite-singular, definite-plural, indefinite-singular, zero-singular, and zero-plural) at T0.

iii. Compare the reassembly of features within learner groups from T0 to T1, T0 to T2, and T1 to T2 for each noun type and context.

iv. Compare the linguistic gains of feature reassembly between learner groups from T0 to T1, T0 to T2, and T1 to T2 for each noun type and context.

v. Compare the linguistic gains in each data collection instrument within and between learner groups from T0 to T1, T0 to T2, and T1 to T2.

These objectives will be pursued in data analysis in the R environment (R Core Team, 2019) using the *lme4* package (Bates et al., 2015). In the case of significant differences, the models were subjected to pairwise comparisons investigating the effects within the same context using a Tukey Honest Significant Differences (Tukey HSD) test in the *lsmeans* package (Lenth, 2016)[14].

In order to investigate effect of instruction and feature reassembly, the following models will be used:

(1) Models for data analysis[15]:

a. Model 1: L1 Mandarin vs. L1 English
b. Model 2: Noun_Type vs. Testing_Time (within group)
c. Model 3: Learner_Type vs. Testing_Time vs. Noun_Type (between group)
d. Model 4: Learner_Type vs. Task_Type (between group)

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[14] Pairwise comparisons were conducted using the Tukey Honest Significant Differences (Tukey HSD) test. Tukey HSD is a very conservative test that penalizes the *p*-value for a number of reasons: (1) a lack of statistical power due to small group sizes; (2) a large number of pairwise comparisons are being made, or (3) a weakly significant global effect. Therefore, there will be times in which the Tukey HSD pairwise comparisons do not confirm the model analysis, due to the test's conservative nature.

[15] The level of significance will be $\alpha = 0.05$ throughout all the analyses.

As addressed in Chapter 2, atomicity is grammaticized in Mandarin, but not in English, while countability is grammaticized in English, but not in Mandarin. For this reason, object-uncountable nouns will be used as the baseline in data analysis being as they overlap with countable nouns in the feature [+atomic] but overlap with substance-uncountable nouns with the feature [–count].

This chapter will be organized as follows. The results of each task will be presented separately, in the same order that they were administered to the participants: elicited-sentence imitation task (ESIT), acceptability judgment task (AJT), and forced-choice elicitation task (FCET), except in the task comparison in Research Question 4. Within each section, a brief overview of the data collection, coding, and data transformation procedures will be presented, followed by descriptive statistics and inferential for all contexts under investigation presented by research question within eat task. At the end of the chapter there will be a brief summary before moving into the next chapter which will interpret these results.

7.1 | Elicited-Sentence Imitation Task

The ESIT data was subjected to the statistical analysis presented in introduction of this chapter. In the ESIT, participants heard a statement in English that contained a specific article and noun type combination. They were asked to repeat the sentence after a 3000-millisecond delay. The recorded responses were collected and transcribed by the researcher, and then subjected to rating of acceptable production of the critical region by the researcher and two other trained ESL instructors. The critical region, that is the target article and noun combination, in each sentence was rated for acceptability (1 for acceptable and 0 for unacceptable) of the production for both the article and the noun. Therefore, an imitation score for each production received one of three scores:

- 0 = ungrammatical production of article and noun type (i.e., imitation of ungrammatical sentences without correction or imitation of grammatical sentence making the grammatical items ungrammatical)
- 1 = grammatical production of either article or noun type (i.e., imitation of ungrammatical sentences correction either the article or noun type or imitation of grammatical sentences making one of the grammatical items ungrammatical)
- 2 = grammatical production of both article and noun type (i.e., imitation of ungrammatical sentences correcting both the article and noun type or imitation of grammatical sentences)

Approximately 20 percent of the data was rated by two additional trained ESL instructors.[16] Fleiss' Kappa showed there was good agreement between the raters' judgments, $\kappa = 0.711$ (95% confidence interval, 0.6929 to 0.7293), $p < 0.05$.

The sentences varied not only in the content, but also the critical context was manipulated with different article and noun type combinations, reflecting the features under analysis: definiteness, countability, atomicity, and plurality. Linear mixed-effects models (LMMs) were fit to nominal response data, and each model included fixed effects (specified in Section 1) and participant and item random effects. As previously mentioned, in the case of significant interactions, pairwise comparisons investigated the effects within the same context using the *lsmeans* package (Lenth, 2016).

7.1.1 | Research Question 1: Presence of L1-Mandarin Features in L2 English

In order to explore the first research question, which investigates the presence of L1 features in the L2, we compared the L2 imitation scores given for noun types in each of the different contexts to those of native speakers. For noun types, the semantic features of [±count] and [±atomic] are combined to create three noun types: countable [+count, +atomic], object-uncountable [–count, +atomic], and substance-uncountable [–count, –atomic]. For context, the semantic features of [±definite] and [±plural] are combined to create five contexts: definite-plural, definite-singular, indefinite-singular, zero-plural, and zero-singular. This allows for investigation of the presence of L1 features in the L2 prior to instruction. The descriptive statistics are presented followed by inferential statistics. As specified in the Methodology chapter, NS baseline group (n = 25) completed the task at one point in time and the L2 learner groups (LING, TRAD, and NOEX) completed the tasks at three different testing times (T0, T1, and T2). These means for NSs in in Table 7.1 and the violin plots in Figure 7.1 are compared with the T0 data for the L2 learners.

[16] Thanks are due to Sarah Lowen and Nicole Metzger, two colleagues of mine from the University of Iowa, who served as second-raters for the ESIT data.

Table 7.1. Means and standard deviations for elicited-sentence imitation scores for NSs and NNSs learners at T0

		English NSs (*n* = 25)		L2 Learners (*n* = 65)	
Context	**Noun_Type**	**M**	**SD**	**M**	**SD**
definite-plural	count	1.97	0.23	1.85	0.50
	* object	1.76	0.49	1.41	0.72
	* substance	1.80	0.40	1.46	0.59
definite-singular	count	2.00	0.00	1.83	0.51
	object	2.00	0.00	1.76	0.57
	substance	1.99	0.11	1.78	0.51
indefinite-singular	count	1.99	0.11	1.71	0.53
	* object	1.81	0.39	1.28	0.51
	* substance	1.77	0.42	1.28	0.56
zero-plural	count	2.00	0.00	1.79	0.50
	* object	1.87	0.34	1.35	0.58
	* substance	1.68	0.52	1.42	0.64
zero-singular	* count	1.87	0.34	1.59	0.60
	object	2.00	0.00	1.56	0.54
	substance	1.97	0.16	1.48	0.74
	grammatical	1.99	0.09	1.73	0.58
	ungrammatical	1.79	0.42	1.40	0.61

** ungrammatical context and noun type combination*

The NSs demonstrated imitation scores as predicted. This data was collected as a baseline in order to shed light on feature assembly in L1 English and how those features are assembled in L2 English. There will be no detailed discussion of NSs beyond RQ1. As expected, just by looking at the grammatical versus ungrammatical mean scores, the NSs performed as expected, providing imitation scores that are near ceiling level. They demonstrated the ability to provide grammatical imitations and corrections of ungrammatical combinations of articles and noun types. It is important to note that the lowest imitation scores are found with substance-uncountable nouns in a zero-plural context (e.g., *∅ toothpastes* could refer to different types or brands of toothpastes, while *∅ toothpaste* refers to the substance in general). Overall, the standard deviations show the imitation scores were quite similar among English NSs

When these imitation scores are compared to NNSs, we can see that NNSs tend to display much greater variation in their imitations of noun types in different contexts. With regard to the violin plots in Figure 7.1, we can see that there are far more instances of NNSs receiving a score of 0 on their imitation scores than NSs. This is due to their inability to provide some kind of grammatical imitation of the article and noun type combinations they heard. These plots also show how different the L2 learner groups are from one another, which is why they are only compared to one another in RQ3, which investigates the linguistic gains made by each group.

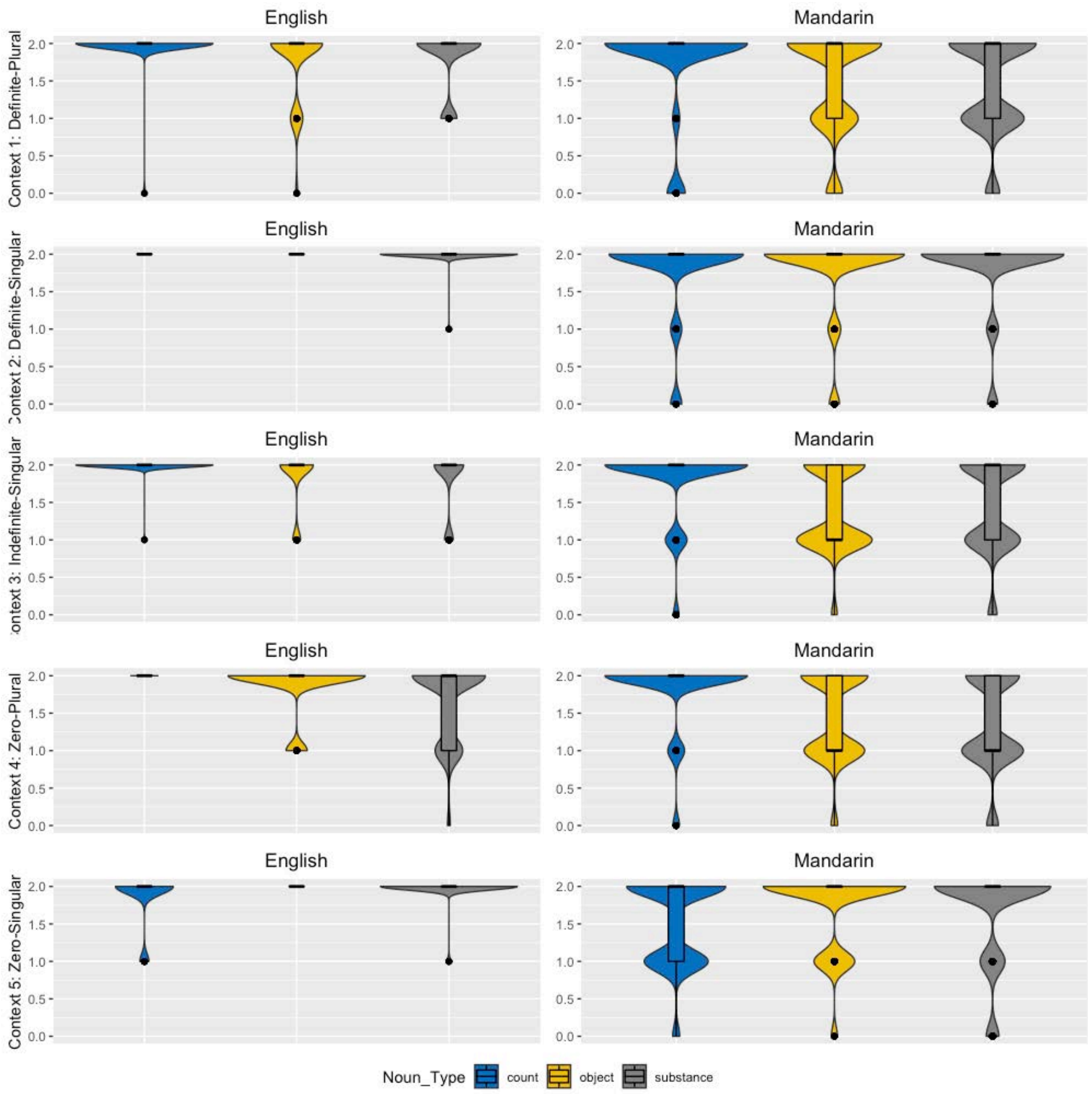

Figure 7.1. Violin plots of mean elicited-sentence imitation scores for English NSs and L2 learners at T0

In order to investigate any statistical differences between the ENGL and L2 learner groups, two separate linear mixed-effects models were run. Model 1 investigates NSs and NNSs. In this model, the baseline (intercept) levels were L1:Mandarin and Noun_Type:Object. In this LMM, any main effects of L1 will be comparing English NSs to Mandarin NSs, and any main effects of Noun_Type will be comparing that noun type (countable or substance-uncountable) to the baseline, object-uncountable, for the baseline L1 group, Mandarin. The interactions of these variables will investigate how similar or different the Mandarin and English groups treat countable and substance-uncountable nouns to object-uncountable nouns when compared to one another. The model also included by-participant and by-item random intercepts. Here, we will summarize the significant effects and interactions. The full model output tables can be found in Appendix I.

The first context under investigation is definite-plural. In this context, countable nouns are grammatical, while substance- and object-uncountable nouns are ungrammatical. The results of Model 1 is summarized in (2).

(2) Context 1: definite-plural

a. Model 1:

i. Main effect of L1:English ($p < 0.01$)

ii. Main effect of Noun_Type:Count ($p < 0.05$)

iii. No significant interaction predictors

As predicted, Model 1 (NNSs vs NSs) revealed a significant main effect of L1:English ($\beta = 0.29$, $t(123.35) = 2.69$, $p < 0.01$), which means that L2-English learners were significantly less accurate in their ability to provide grammatical imitations for stimuli that included object-uncountable nouns presented in a definite-plural context. In addition, the model found a significant main effect of Noun_Type:Count ($\beta = 0.35$, $t(27.54) = 2.75$, $p < 0.05$), which means the NNSs were significantly higher with their imitation scores of countable nouns than uncountable-object nouns in a definite-plural context. Model 1 failed to reveal any significant interaction predictors. These effects are plotted in Figure 7.2

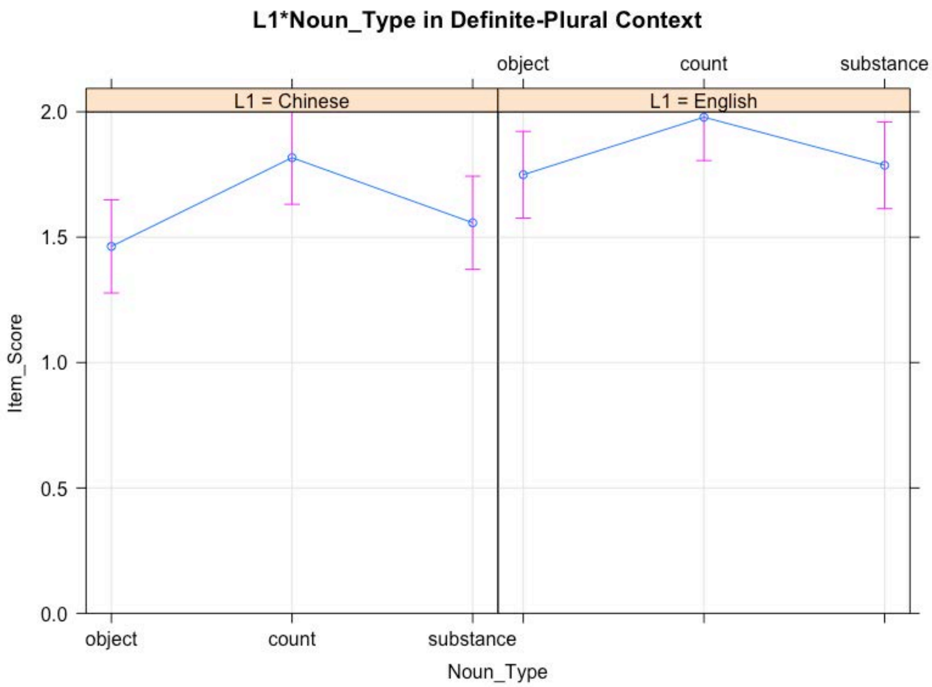

Figure 7.2. Effect plot for elicited-sentence imitation scores for L1 by Noun_Type at T0 in Context 1

To investigate any significant post-hoc comparisons, a Tukey Honest Significant Difference (Tukey HSD) analysis was run on both models. The post-hoc analysis did not find any significant differences between NSs and NNSs nor between ENGL and each of the learner groups.

The second context under investigation is definite-singular. In this context, all noun types are acceptable. The results of Model 1 are summarized in (3).

(3) Context 2: definite-singular
- a. Model 1:
  - i. Main effect of L1:English ($p < 0.01$)
  - ii. No significant interaction predictors

Unexpectedly, Model 1 found a significant main effect of L1:English ($\beta = 0.24$, $t(128.26) = 3.07$, $p < 0.01$), which indicates that English NSs were significantly more accurate in their grammatical imitations of object-uncountable nouns than L2 learners in a definite-singular context. Model 1 failed to produce any significant interaction predictors. These effects are plotted in Figure 7.3.

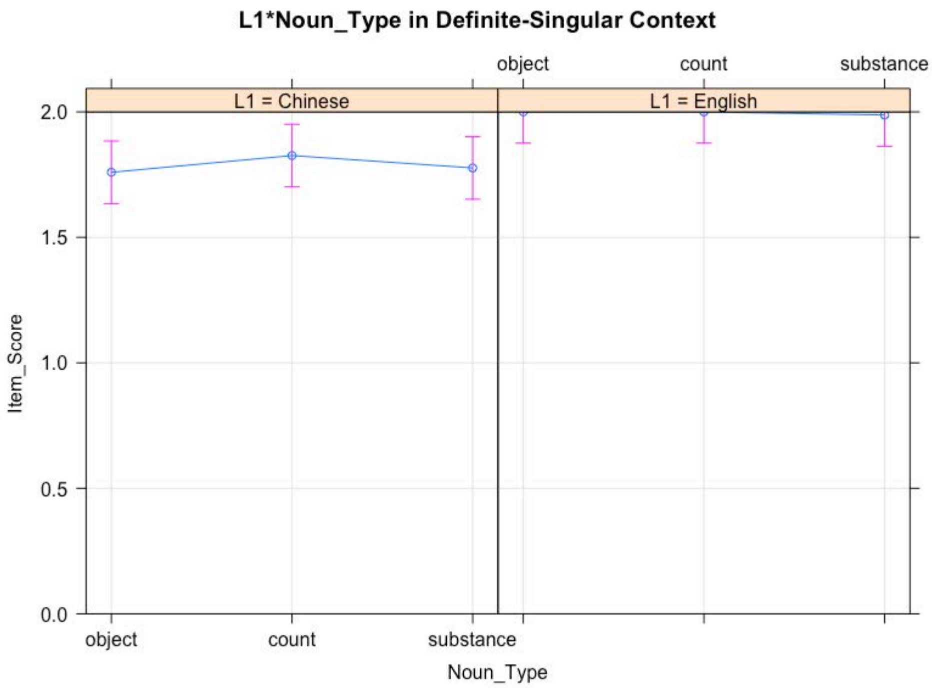

Figure 7.3. Effect plot for elicited-sentence imitation scores for L1 by Noun_Type at T0 for Context 2

A Tukey HSD post-hoc analysis revealed a number of significant differences. For Model 1, the post-hoc analysis confirmed Model 1's main effect that Mandarin speakers performed significantly less accurate ($p < 0.05$) than English NSs with imitations of object-uncountable nouns in a definite-singular context.

The third context under investigation is indefinite-singular. In this context, only countable nouns are grammatical. Substance- and object-uncountable nouns are ungrammatical. The results of Model 1 are summarized in (4).

(4) Context 3: indefinite-singular

a. Model 1:

i. Main effect of L1:English (p < 0.001)

ii. Main effect of Noun_Type:Count (p < 0.01)

iii. No significant interaction predictors

Model 1 revealed two main effects. The first significant main effect of L1:English($\beta = 0.47$, $t(113.03) = 5.15$, $p < 0.001$) revealed that L1 English speakers were significantly more accurate than L2 learners with acceptable corrections of object-uncountable nouns presented in an indefinite-singular context. Model 1 also found a significant main effect of Noun_Type:Count ($\beta = 0.36$, $t(23.83) = 3.16$, $p < 0.01$), which indicates that NNSs performed significantly better with their imitations of countable nouns than object-uncountable nouns in an indefinite-singular context. The model did not produce any significant interaction predictors. These effects are plotted in Figure 7.4.

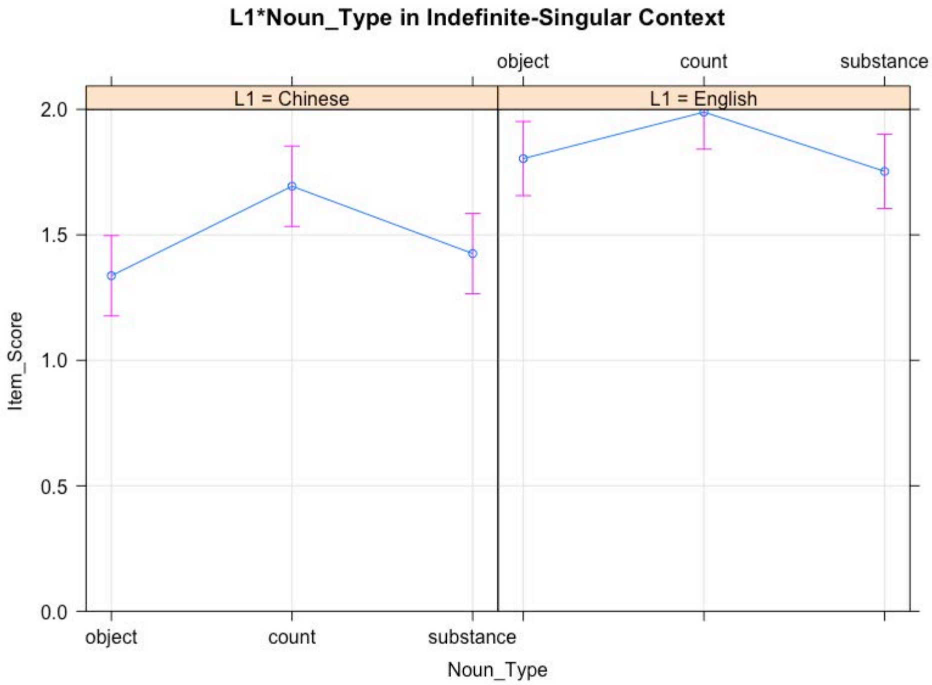

Figure 7.4. Effect plot for elicited-sentence imitation scores for L1 by Noun_Type at T0 for Context 3

Due to the significant main effects, Tukey post-hoc comparisons were run on both models. The post-hoc analysis on Model 1 confirmed the main effect and found that Mandarin learners of English performed significantly lower than English speakers with regard to grammatical corrections of object-uncountable nouns ($p < 0.001$) presented in an indefinite-singular context. It also found that English learners were significantly more accurate in producing grammatical imitations when substance-uncountable nouns ($p < 0.01$) and countable nouns ($p < 0.05$) were presented in an indefinite-singular context in the stimuli.

The fourth context under analysis is zero-plural. In this context, countable nouns are grammatical, and substance- and object-uncountable nouns are ungrammatical. The results of Model 1 are summarized in (5)

(5) Context 4: zero-plural

a. Model 1:

i. Main effect of L1:English ($p < 0.001$)

ii. Main effect of Noun_Type:Count ($p < 0.01$)

iii. No significant interaction predictors

Model 1 found a significant main effect of L1:English ($\beta = 0.48$, $t(153.63) = 4.51$, $p < 0.001$), indicating that NSs are far more accurate in correcting stimuli when uncountable-object nouns are presented in a zero-plural context. This model also found a main effect of Noun_Type:Count ($\beta = 0.41$, $t(33.18) = 2.98$, $p < 0.01$), which indicates that NNSs are far more accurate in providing grammatical imitation when countable nouns are presented in a zero-plural context than object-uncountable nouns. Model 1 did not yield any significant interaction predictors. These effects are plotted in Figure 7.5.

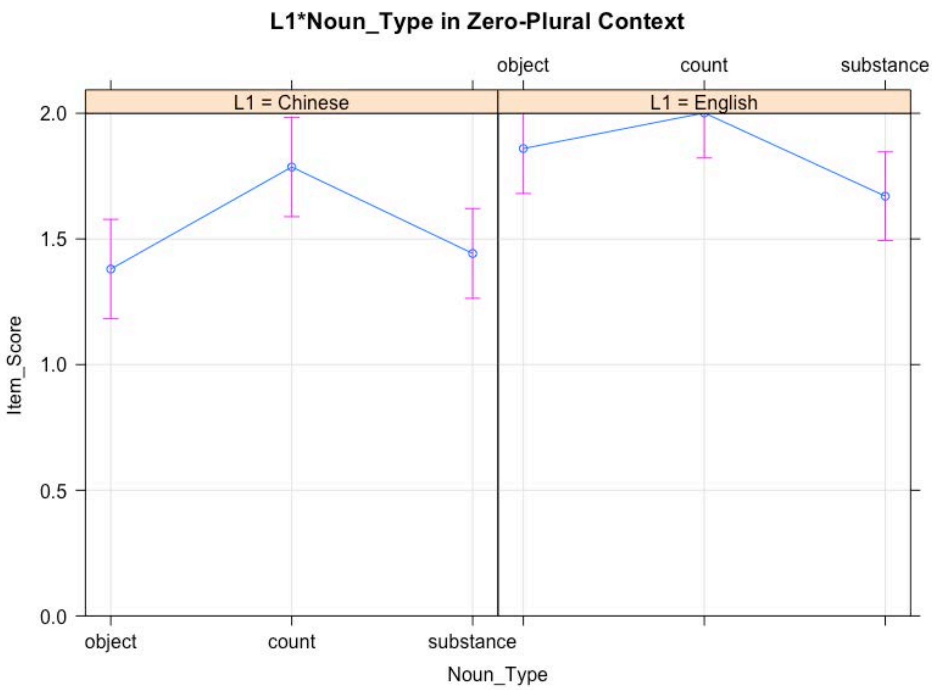

Figure 7.5. Effect plot for elicited-sentence imitation scores for L1 by Noun_Type at T0 for Context 4

Post-hoc comparisons using the Tukey HSD test indicated that mean imitation scores for Mandarin speakers were significantly lower than English NSs with regard to stimuli that contained object-uncountable nouns in a zero-plural context. ($p < 0.001$).

The fifth, and final, context under investigation is zero-singular. In this context, substance- and object-uncountable nouns are grammatical, and countable nouns are ungrammatical. The results of Model 1 are summarized in (6).

(6) Context 5: zero-singular

a. Model 1:

i. Main effect of L1:English ($p < 0.001$)
ii. No significant interaction predictors

As expected, and in line with the results of the other contexts, Model 1 revealed a significant main effect of L1:English ($\beta = 0.45$, $t(104.24) = 5.13$, $p < 0.001$), indicating that NSs were far more accurate with correcting countable nouns presented in a zero-singular context. The effects are plotted in Figure 7.6.

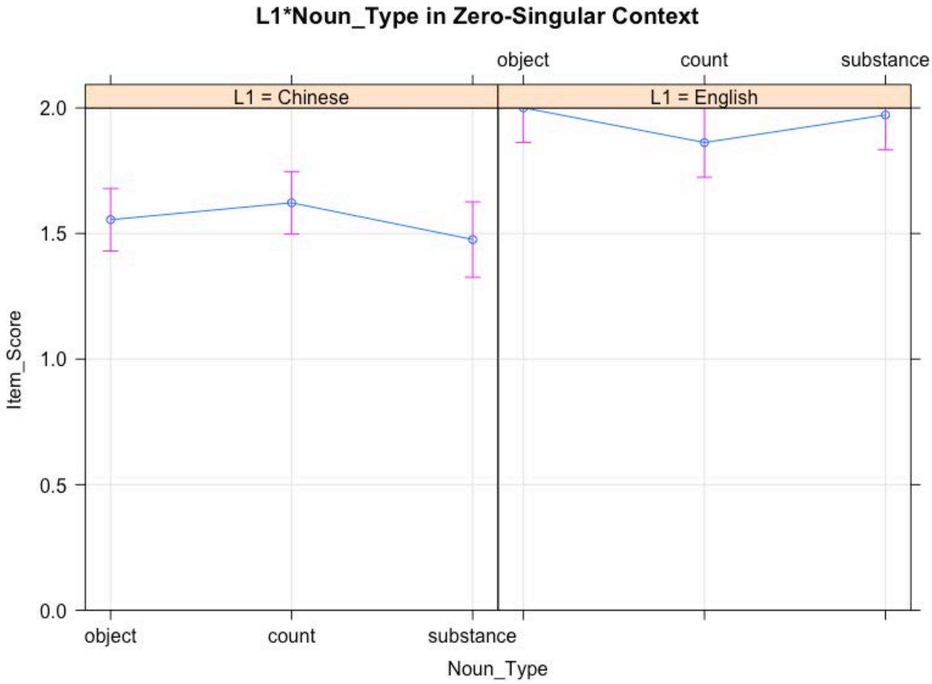

Figure 7.6. Effect plot for elicited-sentence imitation scores for L1 by Noun_Type at T0 for Context 5

Tukey post-hoc comparisons confirmed the main effects of the models. For Model 1, the post-hoc comparison found that L2-English learners were significantly lower than English NSs with regard to substance-uncountable nouns ($p < 0.001$) and object-uncountable nouns ($p < 0.001$) when the stimuli presented these noun types in a zero-singular context.

The null hypothesis for LMMs is that the means obtained for each group and noun type are the same. As can be seen in (2)–(6) above, there is a main effect of L1 in all contexts, meaning that NNSs consistently perform significantly different from NSs with regard to the noun types and contexts under investigation. The estimates for this effect of L1 show that L2 learners are less accurate in providing grammatical imitations of object-uncountable nouns in all five contexts under investigation, even including definite-singular where uncountable nouns are presented grammatically in the stimuli. Furthermore, there was even a significant interaction of L1 and

Noun_Type in the indefinite-singular context. These main effects and interaction support the hypothesis that L1 features are present in the L2 prior to instruction. The estimates show that, in all contexts, L2 learners tend to also be less accurate with imitations of stimuli with substance-uncountable nouns, but this interaction was non-significant. These differences, although non-significant, are also expected and suggest that the L2 learners are under the influence of their L1. Furthermore, the culmination of the RQ1 results suggest that L2 learners may be interpreting [+atomic] as a grammatical distinction in English, rather than [+count] due to reliance on their L1-Mandarin linguistic knowledge and feature assembly.

7.1.2 | Research Question 2: Within Group Analysis of L2 Feature Reassembly

The second research question investigates the effect of instruction on L2 feature reassembly. To do this, we compared ESIT imitation scores for noun types in each of the different contexts within group across time. The data will be presented for each learner group separately. We will first present the descriptive statistics, followed by the inferential statistics for each context under analysis. In order to investigate any statistical differences between noun types within each group, a linear mixed-effects model[17] was run. In this model, the baseline (intercept) levels were Testing_Time:T0 and Noun_Type:Object for Model 2-A and Testing_Time:T1 and Noun_Type:Object for Model 2-B. This model had to be releveled for Testing_Time in order to investigate any statistical differences between the immediate and delayed post-intervention data collection times. In this LMM, any main effects of Testing_Time will be comparing object-uncountable nouns from the baseline Testing_Time to the main effect testing time. Any main effects of Noun_Type will be comparing object-uncountable nouns at the baseline Testing_Time to the main effect noun type at the baseline Testing_Time. The interactions of these variables will investigate how similar or different countable and substance-uncountable nouns are treated in comparison to object-uncountable nouns across time. This will allow for investigation of feature reassembly by noun types either drifting apart or closer together over the course of the study. This model also included both by-participant and by-item random intercepts. Here, we will summarize

[17] The level of significance will be $\alpha = 0.05$ throughout all the analyses.

the significant effects and interactions of each model. The full model output tables can be found in Appendix J.

7.1.2.1 | Linguistically-Informed Instruction

The means and standard deviations across testing times for the participants in the LING group (*n* = 30) can be seen in Table 7.2. Recall that the LING group received on hour of linguistically-informed instruction that used the semantic universals [±definite], [±count], [±atomic], and [±plural] to teach articles and noun types. The table shows that the means by noun type in each context that is analyzed, as well as the total grammatical and ungrammatical article and noun type combinations.

Table 7.2. Means and standard deviations for elicited-sentence imitation scores for LING learners (n = 30) at T0, T1, and T2

		T0		**T1**		**T2**	
Context	**Noun_Type**	**M**	**SD**	**M**	**SD**	**M**	**SD**
definite-plural	count	1.90	0.37	1.92	0.37	1.83	0.50
	* object	1.36	0.74	1.73	0.49	1.61	0.53
	* substance	1.44	0.60	1.72	0.62	1.32	0.63
definite-singular	count	1.84	0.45	1.91	0.32	1.86	0.49
	object	1.77	0.56	1.82	0.49	1.93	0.33
	substance	1.83	0.43	1.93	0.36	1.90	0.40
indefinite-singular	count	1.74	0.51	1.94	0.23	1.90	0.34
	* object	1.22	0.49	1.47	0.56	1.64	0.50
	* substance	1.29	0.57	1.66	0.54	1.60	0.54
zero-plural	count	1.81	0.49	1.94	0.23	1.91	0.32
	* object	1.31	0.55	1.56	0.52	1.58	0.56
	* substance	1.41	0.64	1.43	0.69	1.19	0.54
zero-singular	* count	1.48	0.67	1.70	0.53	1.56	0.54
	object	1.56	0.52	1.86	0.35	1.92	0.31
	substance	1.37	0.78	1.88	0.36	1.74	0.51
	grammatical	1.77	0.52	1.90	0.38	1.90	0.38
	ungrammatical	1.36	0.62	1.61	0.58	1.50	0.57

** ungrammatical context and noun type combination*

For nouns presented in a definite-plural context, there is an increase in mean imitation scores from T0 to T1 for all noun types, but a decrease from T1 to T2. For uncountable-object nouns, there is a large increase from T0 to T1 and, although the scores decrease from T1 to T2, the overall mean imitation scores increase from T0 to T1. At T1 and T2, it can also be seen that the standard deviations for uncountable-object nouns are smaller, showing less variation in the data after instruction. With regard to nouns presented in a definite-singular context, there is an increase for all noun types from T0 to T1 and T2. As with the definite-plural context, the general trend is lower variation in the data after instruction, which can be seen in lower standard deviations. The indefinite-singular context is where the lowest initial scores can be observed for uncountable nouns. These imitations scores do increase from T0 to T1 and T2, but there is also more variation in the data after instruction. For nouns presented in a zero-plural context, there is increase for countable and uncountable-object nouns from T0 to T1 and T2, but a sharp decrease for uncountable-substance nouns from T0 to T2. This is the only noun type and context where such a negative trend is observed. Finally, for nouns presented in a zero-singular context, we see improvement for all noun types from T0 to T1 and T2, as well as a general decrease in the variation of the data. General improvement across times demonstrates patterns similar to those predicted (most notably from T0 to T1), but those linguistic gains do not always extend into the delayed post-test.

The first context under analysis is definite-plural. In this context, countable nouns are grammatical, while substance- and object-uncountable nouns are ungrammatical. The distribution of the data can be found in Figure 7.59. These violin plots show the distribution and shift in imitation scores for each noun type at T0, T1, and T2. We can see that from T0 to T1, mean imitation scores increase and show less variation, with the exception of a few outliers. When we look at the shift from T1 to T2, we see that the data spreads to lower imitation scores and more variation.

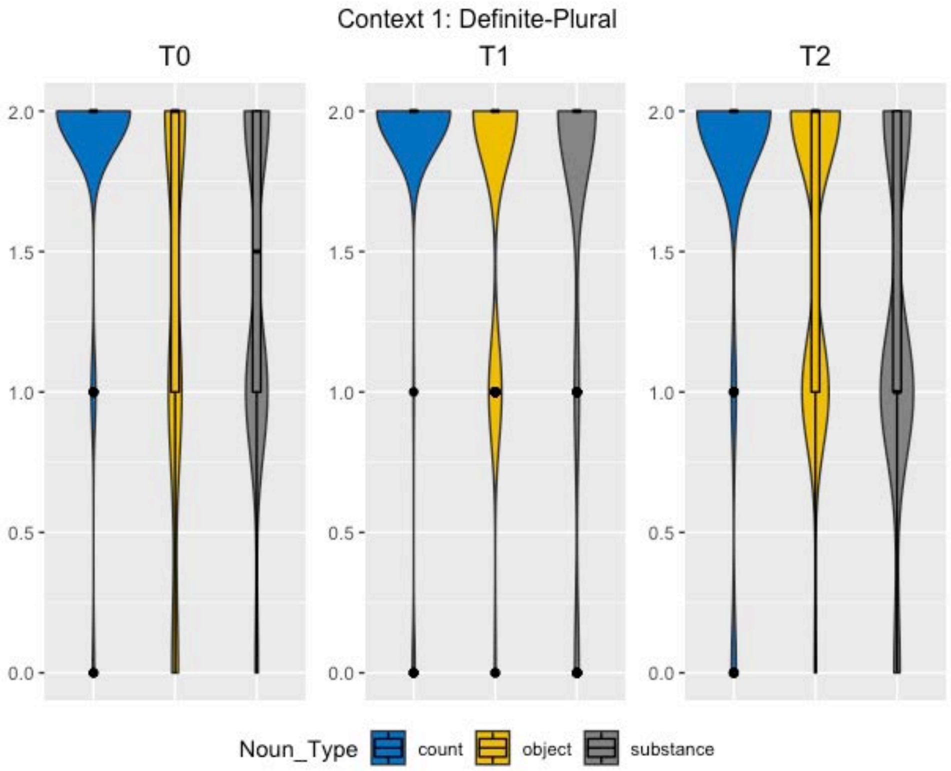

Figure 7.7. Violin plots of mean elicited-sentence imitation scores for LING learners in ContexT1

The results of the regression model are summarized in (7).

(7) Context 1: definite-plural

a. Model 2-A:

i. Main effect of Testing_Time:T1 ($p < 0.05$)

ii. Main effect of Noun_Type:Count ($p < 0.01$)

iii. No significant interaction predictors

b. Model 2-B:

i. Main effect of Testing_Time:T0 ($p < 0.05$)

ii. No significant interaction predictors

Model 2-A revealed a significant main effect of Testing_Type:T1 ($\beta = 0.39$, $t(23.45) = 2.35$, $p < 0.05$), indicating that LING learners were more accurate in providing grammatical imitations of object-uncountable nouns at T1 than T0 This model also found a significant main effect of Noun_Type:Count ($\beta = 0.54$, $t(20.3) = 3.13$, $p < 0.01$), suggesting that learners were more accurate with their imitations of countable nouns at T0 than object-uncountable nouns. Model 2-B failed to reveal any significant main effect apart from those revealed by Model 2-A. Neither of these models revealed any significant interaction predictors. The main effects of Testing_Time:T1

(Model 2-A) and Testing_Time:T0 (Model 2-B), suggest that instruction may have been beneficial in feature reassembly of [+count, +atomic] nouns at immediate post-test. In Figure 7.8, we see the effect plot for imitation scores of stimuli with noun types presented in a definite-plural context.

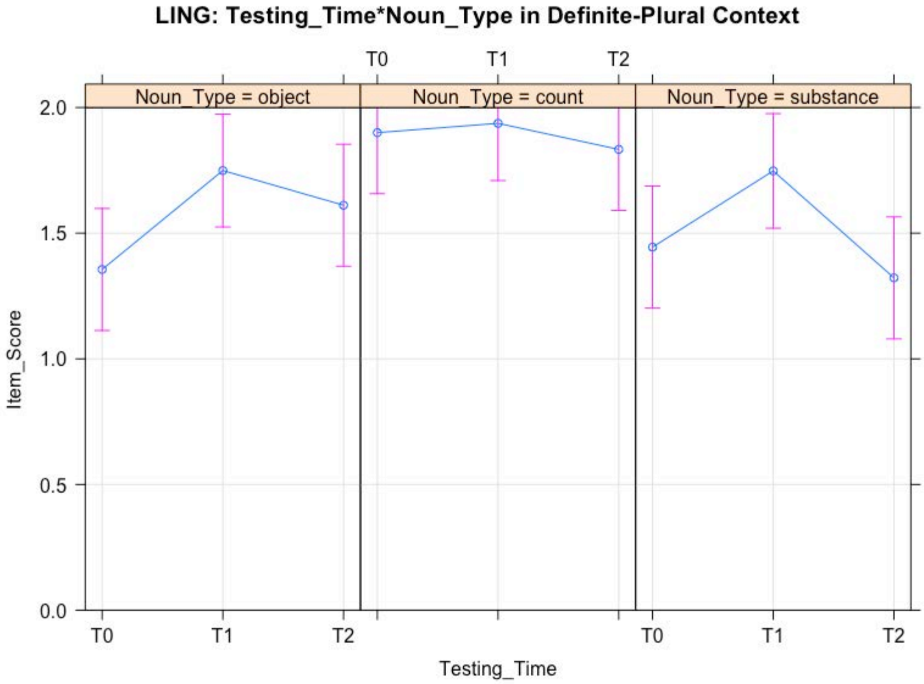

Figure 7.8. Effect plot for elicited-sentence imitation scores of Testing_Time by Noun_Type for LING learners in Context 1

Being as the model produced significant main effect predictors of testing time and noun type, planned Tukey HSD pairwise comparisons were calculated to determine any other significant gains for noun types across time. These post-hoc comparisons did not yield any significant differences.

The next context under investigation is definite-singular. When nouns are presented in a definite-singular context, they are all grammatical, regardless of noun type. The descriptive statistics are plotted in Figure 7.9, and the inferential statistics are summarized in (8).

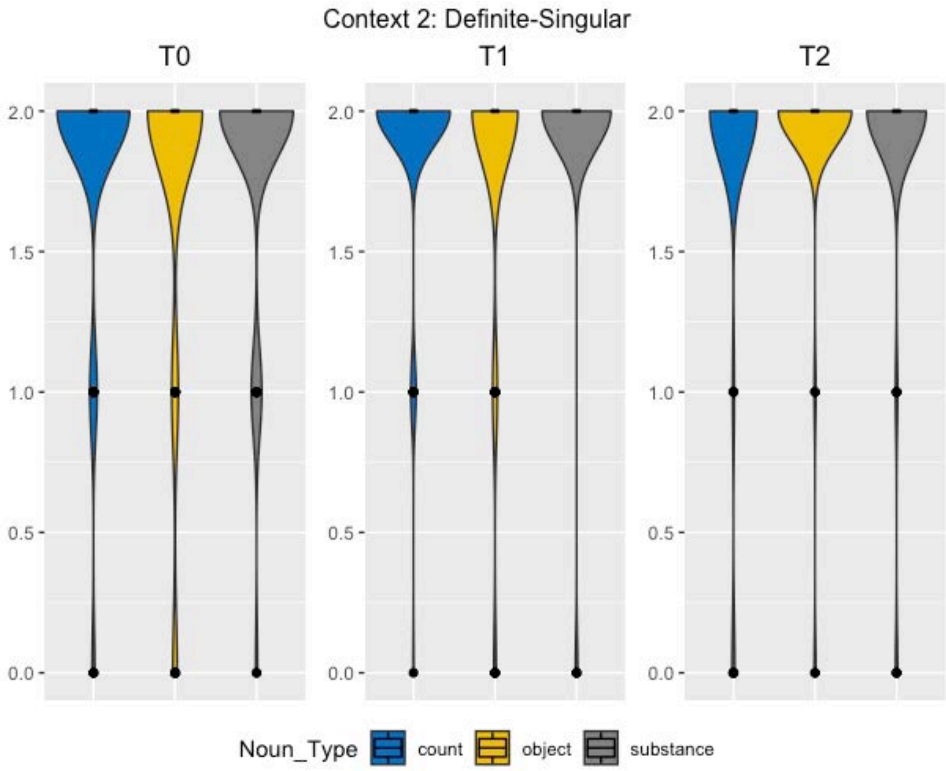

Figure 7.9. Violin plots of mean elicited-sentence imitation scores for LING learners in ContexT2

As expected, the models found no significant predictors for noun types presented in this context. This is likely due to the fact that LING learners, prior to instruction, demonstrated their ability to provide grammatical imitations of noun types in a definite-singular context. As can be seen in the violin plots, LING learners perform at nearly ceiling levels for noun types in this context. These results are summarized in (8).

(8) Context 2: definite-singular

a. Model 2-A: No significant predictors

b. Model 2-B: No significant predictors

These effects are plotted in Figure 7.10.

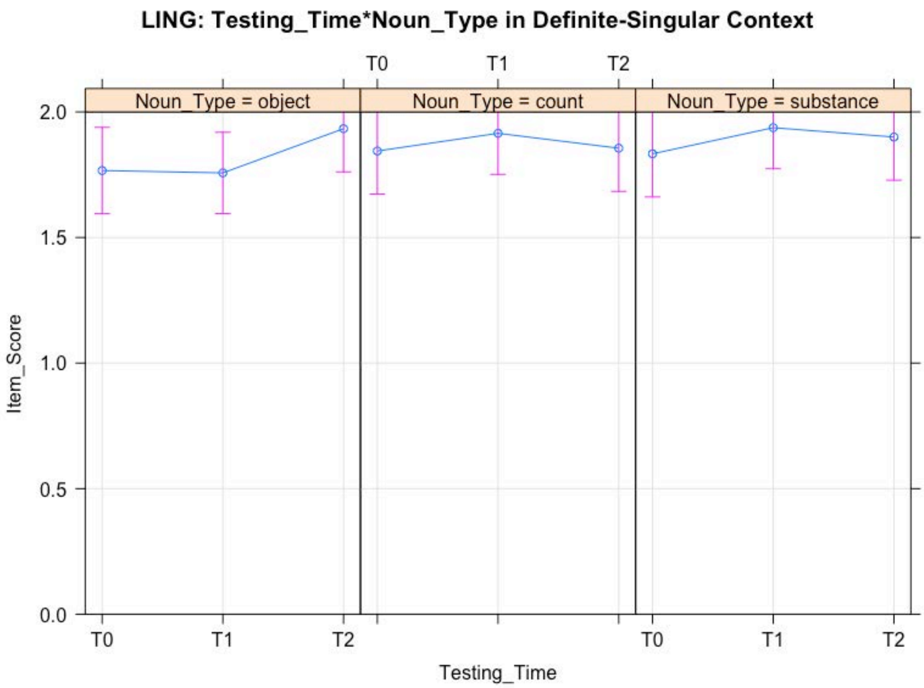

Figure 7.10. Effect plot for elicited-sentence imitation scores of Testing_Time by Noun_Type for LING learners in Context 2

Being as there were no significant main effect or interaction predictors, the post-hoc pairwise comparisons also failed to reveal any significant differences. While the LING group performed rather high at T0, the descriptive statistics still show improvement from T0 to T1 for both countable and substance-uncountable nouns, although these differences are non-significant. LING learners demonstrated their ability to produce grammatical combinations in their imitations of grammatical stimuli for noun types presented in a definite-singular context.

The third context under investigation is indefinite-singular. In an indefinite-singular context, only countable nouns are grammatical and uncountable nouns are ungrammatical. The descriptive statistics are presented in Figure 7.11.

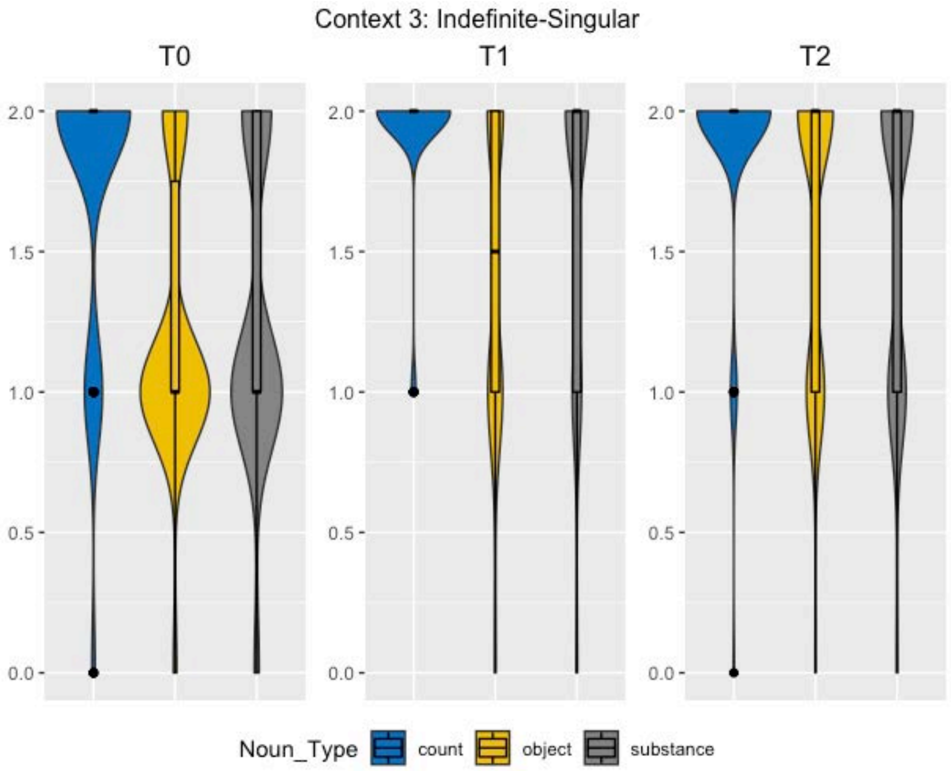

Figure 7.11. Violin plots of mean elicited-sentence imitation scores for LING learners in Context3

The results of the models are summarized in (9).

(9) Context 3: indefinite-singular

a. Model 2-A:

  i. Main effect of Testing_Time:T2 ($p < 0.01$)

  ii. Main effect of Noun_Type:Count ($p < 0.01$)

  iii. No significant interaction predictors

b. Model 2-B:

  i. Main effect of Noun_Type:Count ($p < 0.01$)

  ii. No significant interaction predictors

Model 2-A revealed a main effect of Testing_Time:T2 ($\beta = 0.42$, $t(14.18) = 3.00$, $p < 0.01$), indicating that LING learners were significantly more accurate in providing grammatical imitations of object-uncountable nouns at T2 than T0. This model also found a significant main effect of Noun_Type:Count at T0 ($\beta = 0.52$, $t(14.18) = 3.71$, $p < 0.01$). This main effect shows that the LING learners, at T0, were significantly more accurate with their imitations of countable nouns than object-uncountable nouns when the stimuli presented them in an indefinite-singular context. When the model was releveled, Model 2-B found a main effect of Noun_Type:Count, which indicates that LING learners were still significantly more successful with their imitations of countable nouns than object-uncountable nouns at T1. Neither of these models produced any significant interaction predictors. The effect plots for this context can be found in Figure 7.12.

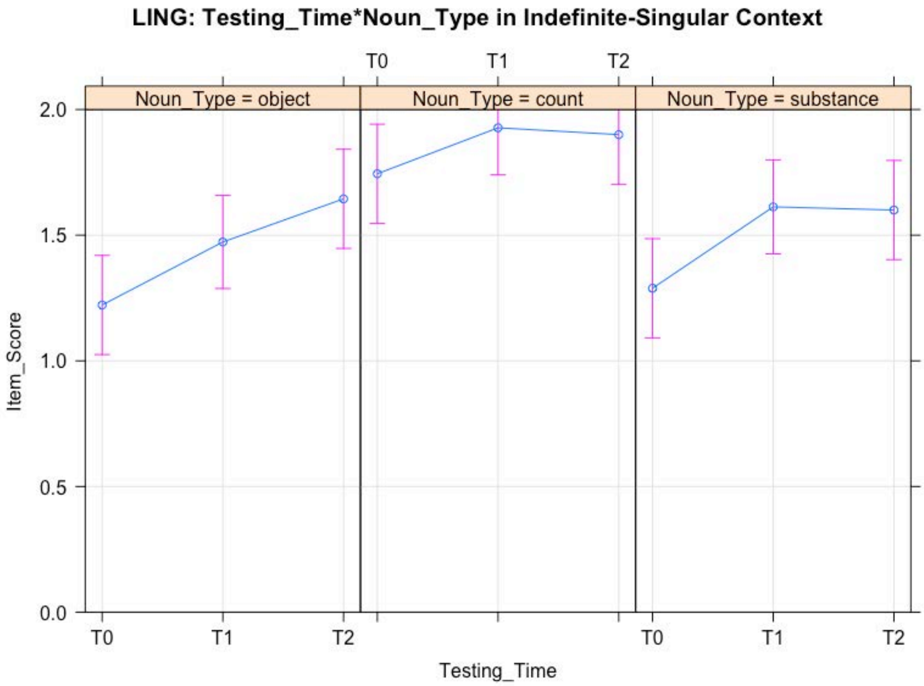

Figure 7.12. Effect plot for elicited-sentence imitation scores of Testing_Time by Noun_Type for LING learners in Context 3

We can see that the imitation scores do trend to increase from T0 to T1 and T2 for all noun types, but the Tukey pairwise comparisons did not find any other significant differences. Interestingly, though, the post-hoc analysis did find that the difference in scores for countable and object-uncountable nouns at T1 was just marginally non-significant (p = 0.0512). This suggest that learners, at T1, continued to display more difficulty with object-uncountable nouns that countable nouns in this context.

The fourth context under investigation is zero-plural. In this context, only countable nouns are grammatical, as uncountable nouns do not have a plural form. The distribution of the data can be found in Figure 7.13. These violin plots show a shift in imitation scores when moving from T0 to T1 for all noun types, but they spread out again from T1 to T2. For both substance- and object-uncountable nouns, we see mean imitation scores increase from T0 to T1 and T0 to T2, but not much change from T1 to T2.

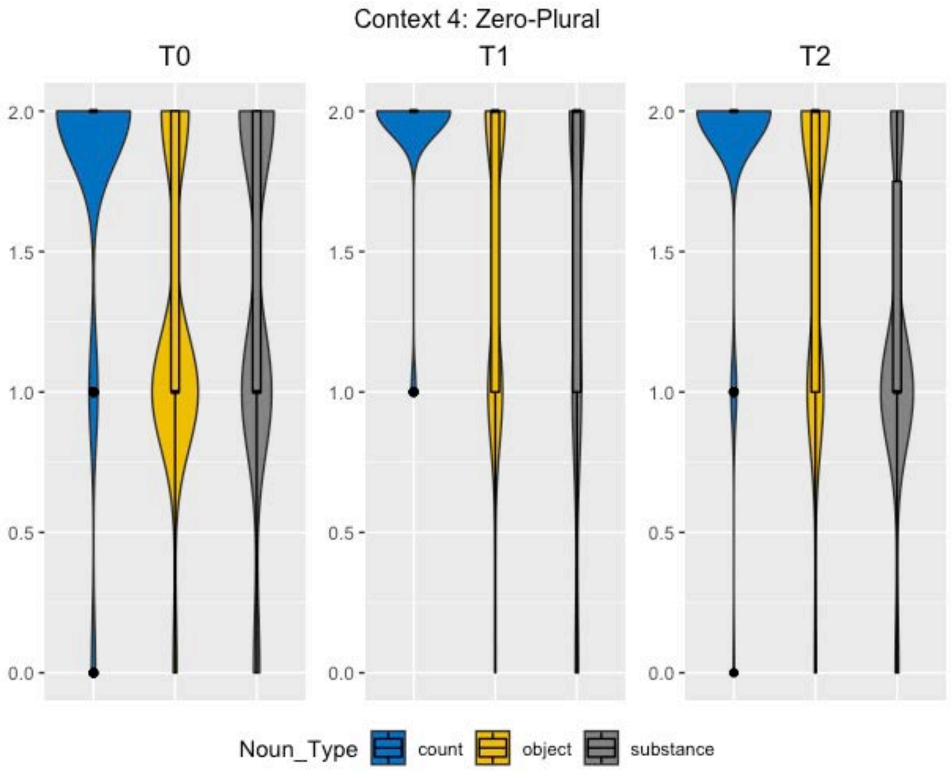

Figure 7.13. Violin plots of mean elicited-sentence imitation scores for LING learners in Context4

The results of the regression model are summarized in (10).

(10) Context 4: zero-plural

a. Model 2-A:

i. Main effect of Noun_Type:Count (p < 0.01)

ii. Interaction of Testing_Time:T2*Noun_Type:Substance (p < 0.05)

b. Model 2-B:

i. Main effect of Noun_Type:Count (p < 0.05)

ii. No significant interaction predictors

In this context, these models found a significant main effect of Noun_Type:Count at both T0 (β = 0.50, t(19.28) = 3.40, p < 0.01) and T1 (β = 0.34, t(23.85) = 2.40, p < 0.05). These main effects indicate that LING learners are far more successful with their imitations of countable nouns than with their corrections of object-uncountable noun in a zero-plural context at both T0 and T1. Model 2-A also found a significant interaction of Testing_Time:T2 by Noun_Type:Substance (β = -0.49, t(19.28) = -2.41, p < 0.05). This interaction found that the difference between imitation scores of object-uncountable nouns and substance-uncountable nouns was greater at T2 than at T0. In other words, LING learners performed more similarly with these two noun types at T0 than they did at T2. The results of the regression model are plotted in Figure 7.14. As can be seen, as the imitation scores for object-uncountable and countable nouns increase from T0 to T1 and T2, for some reason they decrease for substance-uncountable nouns from T1 to T2.

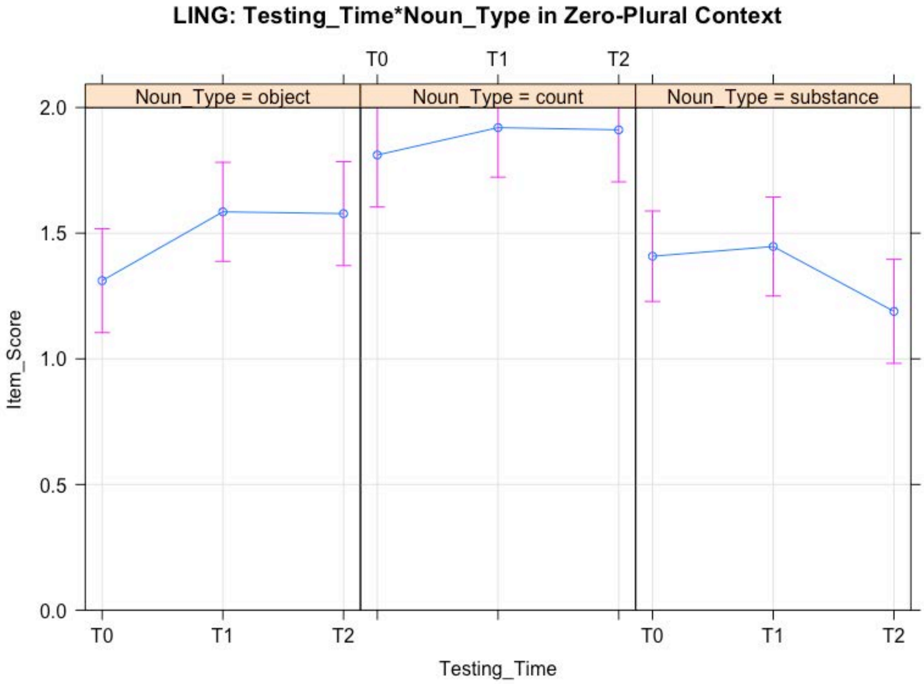

Figure 7.14. Effect plot for elicited-sentence imitation scores of Testing_Time by Noun_Type for LING learners in Context 4

The significant interaction of testing time and noun type in Model 2-A was confirmed by a Tukey post-hoc analysis, which found that LING learners were significantly more accurate with imitations of object-uncountable nouns than substance-uncountable nouns at T2 ($p < 0.01$). These results suggest that while instruction may have been beneficial at T1 (an increase in scores from T0 to T1), these effects did not extend into the delayed post-test for substance-uncountable nouns (a decrease in scores from T1 to T2).

The final context under investigation for LING learners are nouns presented in zero-singular context. The grammatical conditions in this context are substance- and object-uncountable nouns. Countable nouns are ungrammatical when presented in a zero-singular context, and therefore require the learners to imitate them differently than they heard them. Mean imitation scores and standard deviations are displayed in Figure 7.15. In this figure, we can see that imitation scores generally improve for all noun types from T0 to T1 and T2.

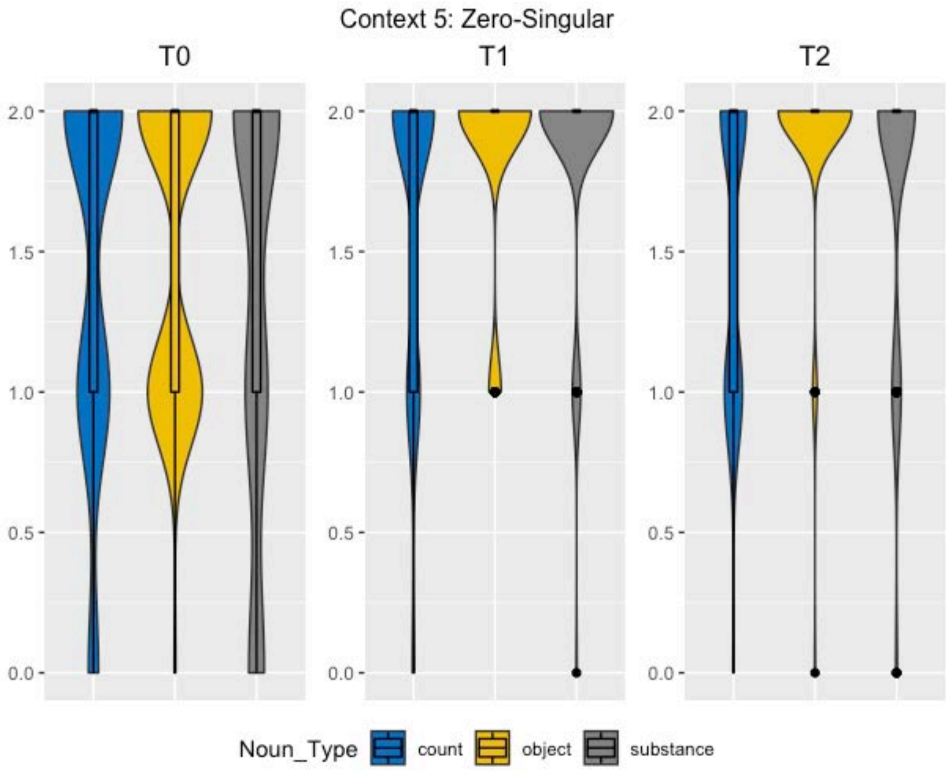

Figure 7.15. Violin plots of mean elicited-sentence imitation scores for LING learners in Context5

The results of the regression model are summarized in (11).

(11) Context 5: zero-singular

a. Model 2-A:

i. Main effect of Testing_Time:T2 ($p < 0.05$)

ii. No significant interaction predictors

b. Model 2-B: No significant predictors

Model 2-A did find a significant main effect of Testing_Time:T2 ($\beta = 0.37$, $t(15.55) = 2.36$, $p < 0.05$), indicating that imitation scores for object-uncountable nouns significantly increased from T0 to T2. Neither of the models found any significant interaction predictors. The effects of these models are presented in Figure 7.16.

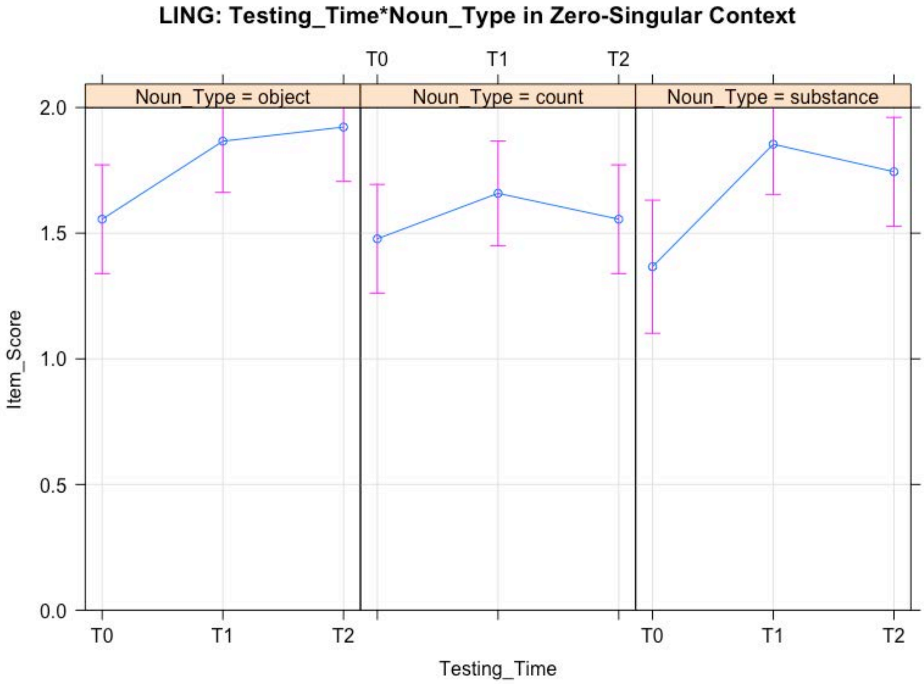

Figure 7.16. Effect plot for elicited-sentence imitation scores of Testing_Time by Noun_Type for LING learners in Context 5

While there is a general trend of increased imitation scores from T0 to T1, object-uncountable nouns are the only scores that continue to increase into T2. In addition, even though non-significant, it can be seen in the effect plot that LING learners did increase their mean imitation scores for countable nouns in a zero-plural context, meaning these learners were able to correct the ungrammaticality of the stimuli. A Tukey post-hoc pairwise comparison did not find any significant differences between the noun types across testing times.

To summarize the results of RQ2 for LING learners, we see that instruction was generally effective and imitation scores tend to increase over time. These changes are not always significant, and they are not always maintained into the delayed post-test. Even though there is a lack of significant interactions between noun types and testing times, the descriptive data does trend in the predicted direction. This will be discussed in more detail in Chapter 8.

7.1.2.2 | Traditional Instruction

The means and standard deviations across testing times for TRAD learners (*n* = 18) can be found in Table 7.3. This table shows the means by noun type in each context that is analyzed. The table shows the means by noun type in each context analyzed, as well as the total grammatical and ungrammatical article and noun type combinations.

Table 7.3. Means and standard deviations for elicited-sentence imitation scores for TRAD learners (n = 18) at T0, T1, and T2

		T0		**T1**		**T2**	
Context	**Noun_Type**	**M**	**SD**	**M**	**SD**	**M**	**SD**
definite-plural	count	1.78	0.63	1.44	0.88	1.40	0.88
	* object	1.41	0.77	1.59	0.66	1.21	0.78
	* substance	1.44	0.63	1.52	0.72	1.25	0.63
definite-singular	count	1.76	0.61	1.65	0.65	1.62	0.74
	object	1.63	0.71	1.76	0.58	1.70	0.62
	substance	1.83	0.50	1.80	0.56	1.63	0.74
indefinite-singular	count	1.61	0.63	1.80	0.53	1.82	0.53
	* object	1.35	0.55	1.35	0.59	1.46	0.57
	* substance	1.28	0.53	1.39	0.71	1.31	0.72
zero-plural	count	1.72	0.60	1.67	0.64	1.70	0.64
	* object	1.31	0.67	1.39	0.63	1.55	0.64
	* substance	1.40	0.71	1.44	0.63	0.98	0.53
zero-singular	* count	1.63	0.56	1.50	0.50	1.37	0.52
	object	1.61	0.56	1.83	0.42	1.68	0.66
	substance	1.47	0.81	1.89	0.42	1.60	0.65
	grammatical	1.63	0.70	1.78	0.58	1.65	0.70
	ungrammatical	1.42	0.64	1.46	0.64	1.31	0.65

** ungrammatical context and noun type combination*

At first glance, the standard deviations show much more variation in the data. For nouns presented in a definite-plural context, there was an increase in imitation scores from T0 to T1 for uncountable nouns but a decrease for countable nouns. From T0 and T1 to T2, there was a decrease in imitation scores for all noun types in this context. With regard to nouns presented in a definite-singular context, scores increased from T0 to T1 and T2 for uncountable-object nouns but decreased for both countable and uncountable-substance nouns. In an indefinite-singular context, imitation scores increased from T0 to T1 and T2 for all noun types. Some of the most surprising results are with nouns presented in a zero-plural context. For countable nouns, imitation scores decreased from T0 to T1 and T2, while variation in the data increased. For uncountable-object nouns, there was a decrease in variation of the data, paired with an increase in imitation scores from T0 to T1 and T2. Lastly, while imitation scores for uncountable-substance nouns in a zero-plural context increase from T0 to T1, there is a sharp decrease from T1 to T2. The final context under analysis is zero-singular. In this context, the learners' imitation scores increased from T0 to T1 and T2 for uncountable-object and uncountable-substance nouns but decreased for countable nouns. Overall, the descriptive statistics suggest that traditional instruction may have led to further confusion in providing acceptable imitations with these nouns and contexts, which is supported by the unpredictable increase and decrease of scores across time, as well as the increase in variation of the scores across time.

The first context under investigation is definite-plural. In this context, countable nouns are grammatical, while substance- and object-uncountable nouns are ungrammatical. The violin plots that show the distribution of ratings across time are displayed in Figure 7.17.

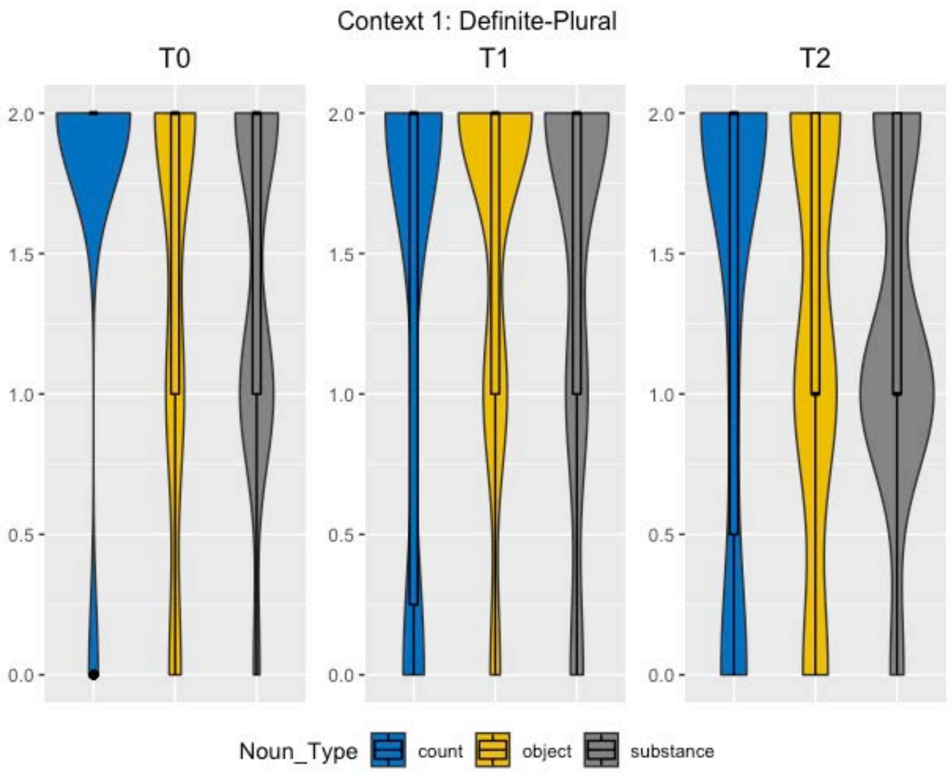

Figure 7.17. Violin plots of mean elicited-sentence imitation scores for TRAD learners in ContexT1

The results of the regression model are summarized in (12).

(12) Context 1: definite-plural

a. Model 2-A:

i. Main effect of Noun_Type:Count ($p < 0.05$)

ii. Interaction of Testing_Time:T1*Noun_Type:Count ($p < 0.05$)

b. Model 2-B:

i. No significant main effect predictors
ii. Interaction of Testing_Time:T0*Noun_Type:Count ($p < 0.05$)

Model 2-A revealed a significant main effect of Noun_Type:Count ($\beta = 0.37$, $t(16.83) = 2.16$, $p < 0.05$), which indicates that TRAD learners are significantly more successful with their imitations of countable nouns than object-uncountable nouns at T0. This main effect was qualified by an interaction of Testing_Time:T1 by Noun_Type:Count ($\beta = -0.52$, $t(16.82) = -2.14$, $p < 0.05$), which was also found in Model 2-B. This interaction reveals that imitation scores between countable and object-uncountable are significantly greater at T0 than T1. In other words, there is a significant difference in how TRAD learners treat countable nouns in comparison to object-uncountable nouns when moving from T0 to T1. These effects are plotted in Figure 7.18.

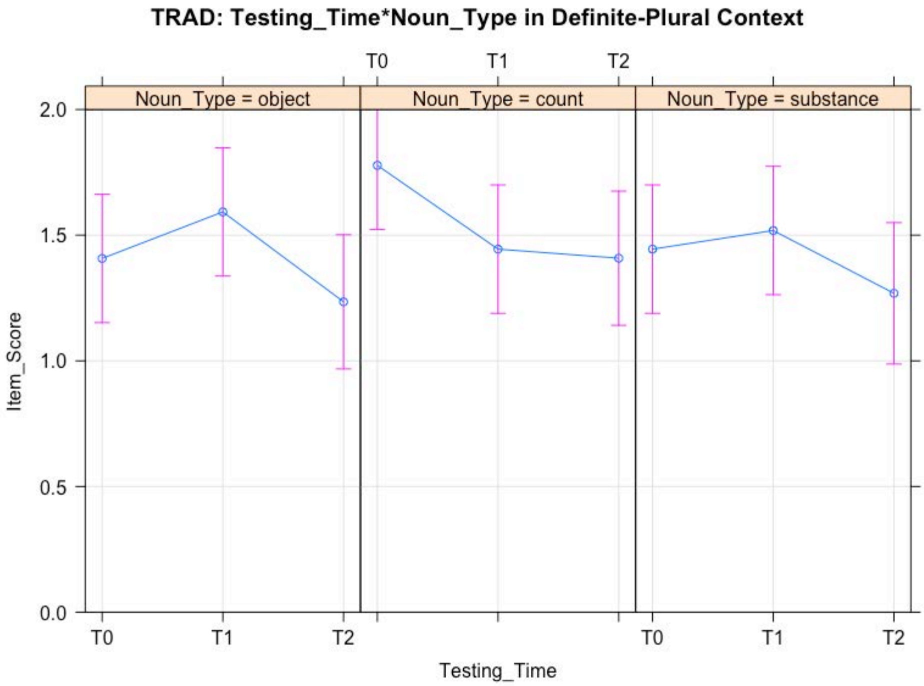

Figure 7.18. Effect plot for elicited-sentence imitation scores of Testing_Time by Noun_Type for TRAD learners in Context 1

In this figure, we see that imitation scores for substance- and object-uncountable nouns increase from T0 to T1, but decrease from T1 to T2, while scores decrease for countable nouns from T0 to T1 and T2. A Tukey post-hoc pairwise comparison did not find any additional significant differences.

The second context under investigation is definite-singular. In a definite-singular context, all noun types are grammatical. Therefore, we predict that there are no significant differences between noun types and testing times. The violin plots showing the mean distribution and standard deviations of imitation scores are found in Figure 7.19.

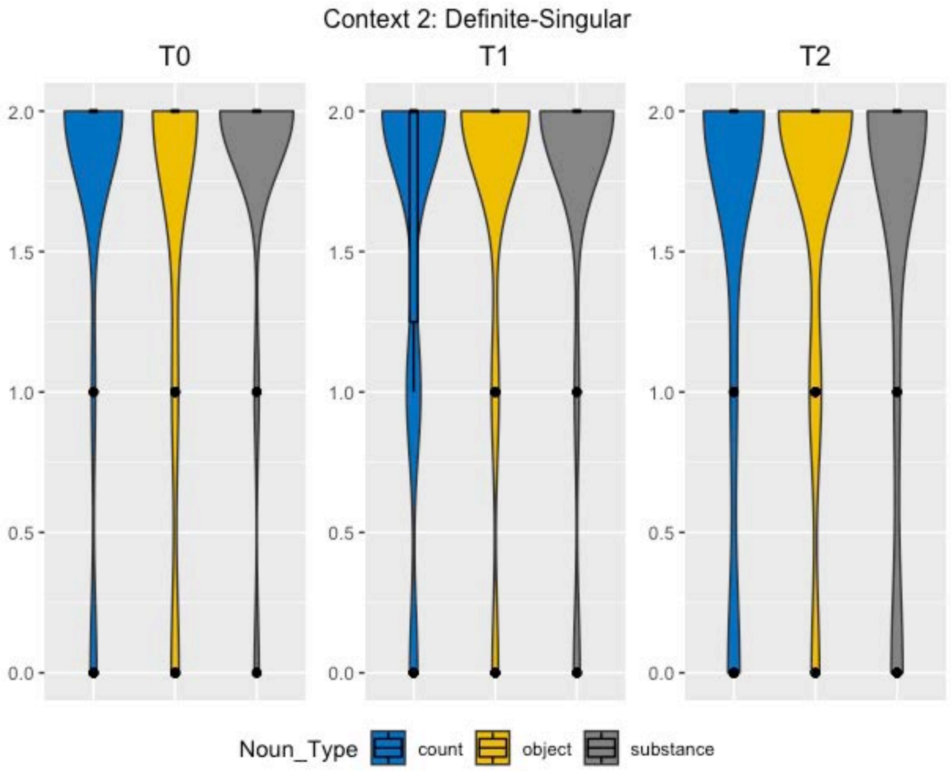

Figure 7.19. Violin plots of mean elicited-sentence imitation scores for TRAD learners in ContexT2

The results of the regression model are summarized in (13).

(13) Context 2: definite-singular

a. Model 2-A: No significant predictors

b. Model 2-B: No significant predictors

Unexpectedly, the model failed to produce any significant predictors. While all noun types are grammatical in a definite-singular context, we do not see any change in mean imitation scores from T0 to T1 or T2 for TRAD learners. As can be seen in the descriptive violin plots in Figure 7.19 and the effect plot in Figure 7.20, TRAD learners perform nearly at ceiling levels across all testing time.

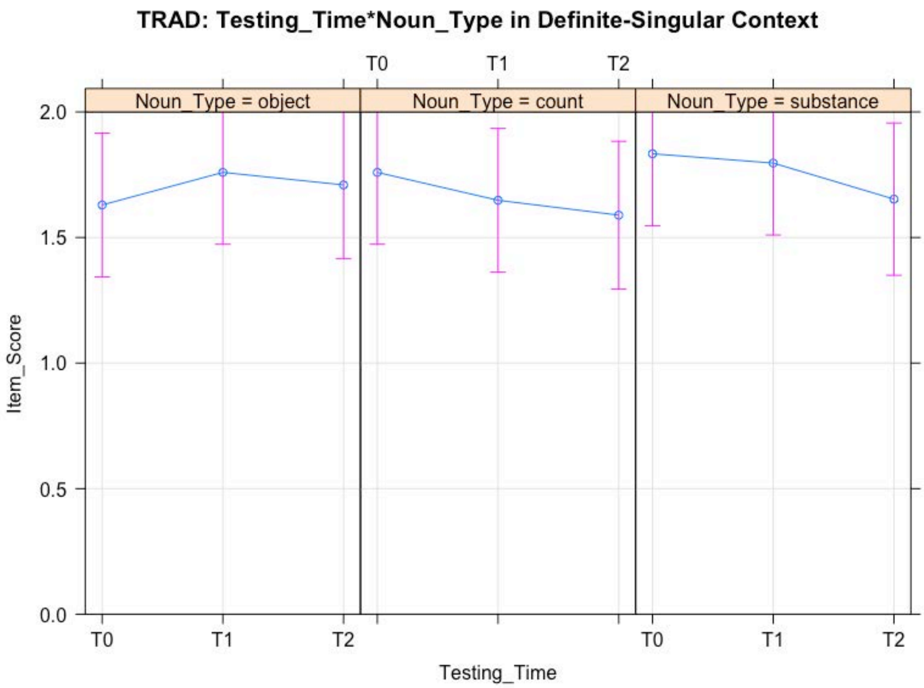

Figure 7.20. Effect plot for elicited-sentence imitation scores of Testing_Time by Noun_Type for TRAD learners in Context 2

It is important to note that there is a downward trend of imitation scores from T0 to T1 and T2 for countable and substance-uncountable nouns and from T1 to T2 for object-uncountable nouns. There is no prediction for this negative trend in the data. Being as there were not significant predictors of the regression model, the Tukey post-hoc pairwise comparisons also failed to yield any significant differences. These results suggest that traditional instruction did not have any significant effect on improvements of imitation scores across the course of the study for noun types presented in a definite-singular context.

The third context under investigation is indefinite-singular. In an indefinite-singular context, countable nouns are grammatical and uncountable nouns are ungrammatical. The descriptive statistics are plotted in Figure 7.21.

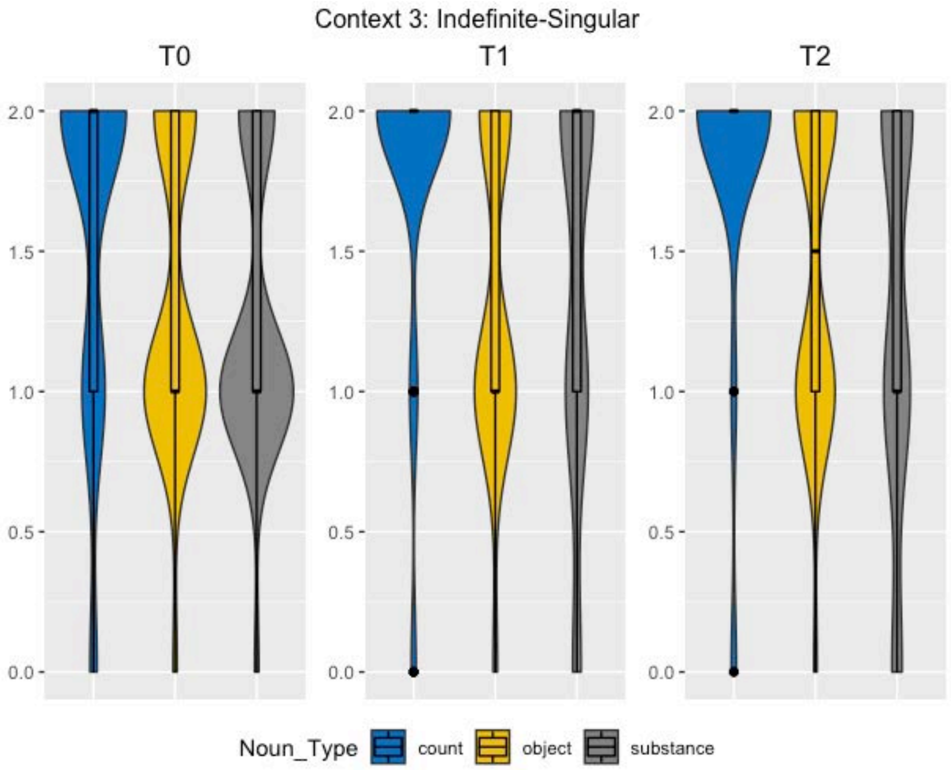

Figure 7.21. Violin plots of mean elicited-sentence imitation scores for TRAD learners in Context3

The results of the regression model are summarized in (14).

(14) Context 3: indefinite-singular

a. Model 2-A: No significant predictors

b. Model 2-B:

i. Main effect of Noun_Type:Count ($p < 0.05$)

ii. No significant interaction predictors

Model 2-A, with T0 and object-uncountable nouns as the baseline, did not reveal any significant main effect or interaction predictors. When the model was releveled for T1 as the baseline testing time, Model 2-B did reveal a significant main effect of Noun_Type:Count at T1 ($\beta = 0.44$, $t(17.88) = 2.31$, $p < 0.05$). This main effect shows that, at immediate post-test, there is a significant difference between imitation scores for countable nouns and object-uncountable nouns. In other words, TRAD learners are significantly more accurate with countable nouns than object-uncountable nouns at T1. As with Model 2-A, this model did not reveal any significant interaction predictors. These main effects are plotted in Figure 7.22.

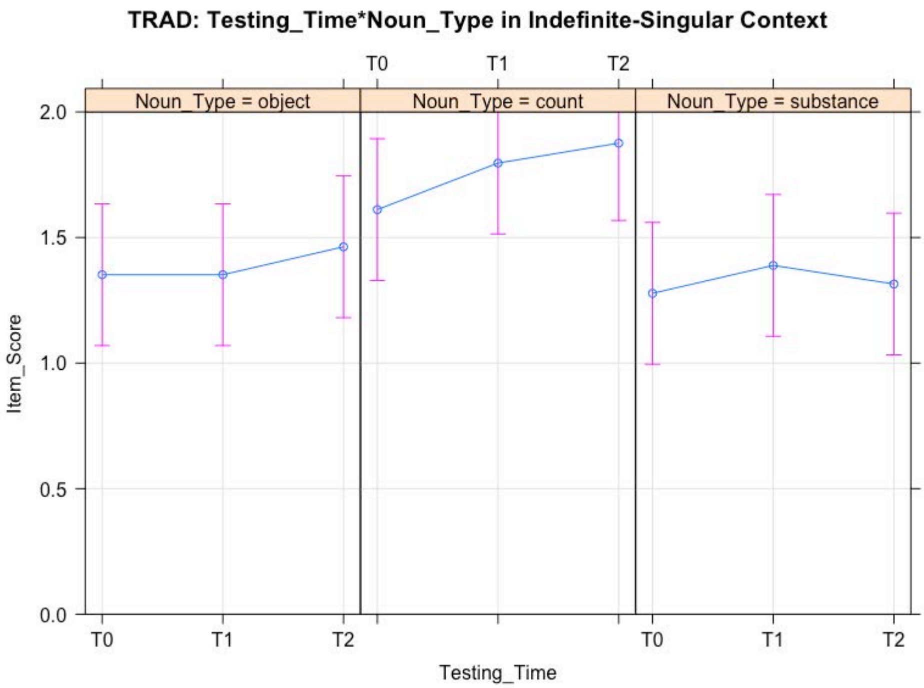

Figure 7.22. Effect plot for elicited-sentence imitation scores of Testing_Time by Noun_Type for TRAD learners in Context 3

As can be seen in the effect plot, there is a slight trend upward for imitation scores of countable nouns, but these changes were not significant. Being as there were significant main effects found at T1, a planned post-hoc analysis using the Tukey HSD was conducted. The post-hoc analysis also failed to produce any significant pairwise comparisons. While we did find an increase in the imitation scores of countable nouns from T0 to T1, the overall results suggest that traditional instruction may not have been as effective for uncountable noun types presented in an indefinite-singular context.

The fourth context under analysis is zero-plural. In this context, countable nouns are grammatical and uncountable nouns are ungrammatical, requiring a correction. The means and standard deviations for imitation scores of nouns presented in a zero-plural context are displayed in the violin plots in Figure 7.23.

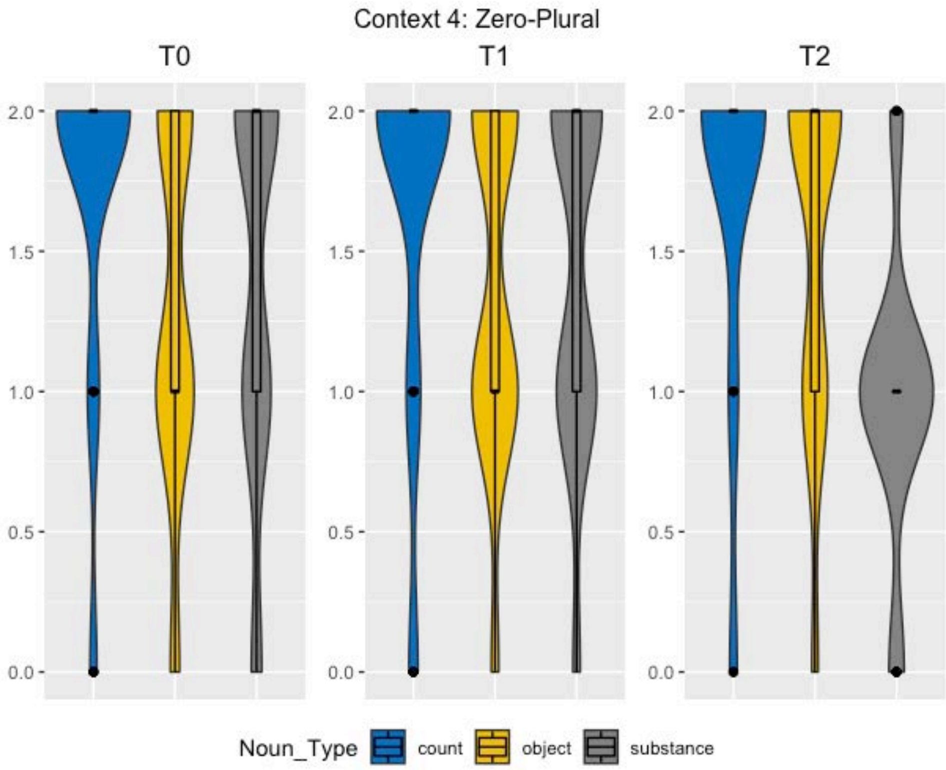

Figure 7.23. Violin plots of mean elicited-sentence imitation scores for TRAD learners in Context4

The regression models, summarized in (15), found no significant predictors for nouns in this context.

(15) Context 4: zero-plural

a. Model 2-A: No significant predictors

b. Model 2-B: No significant predictors

While these models did not produce any significant interactions, there are some interesting results presented in the violin plots in Figure 7.23, as well as the effect plot in Figure 7.24. We do see a change, although non-significant, in the imitation scores of object- and substance-uncountable nouns when moving from T1 to T2. For object-uncountable nouns, we see the mean scores shift upward, while substance-uncountable noun imitation scores shift downward sharply.

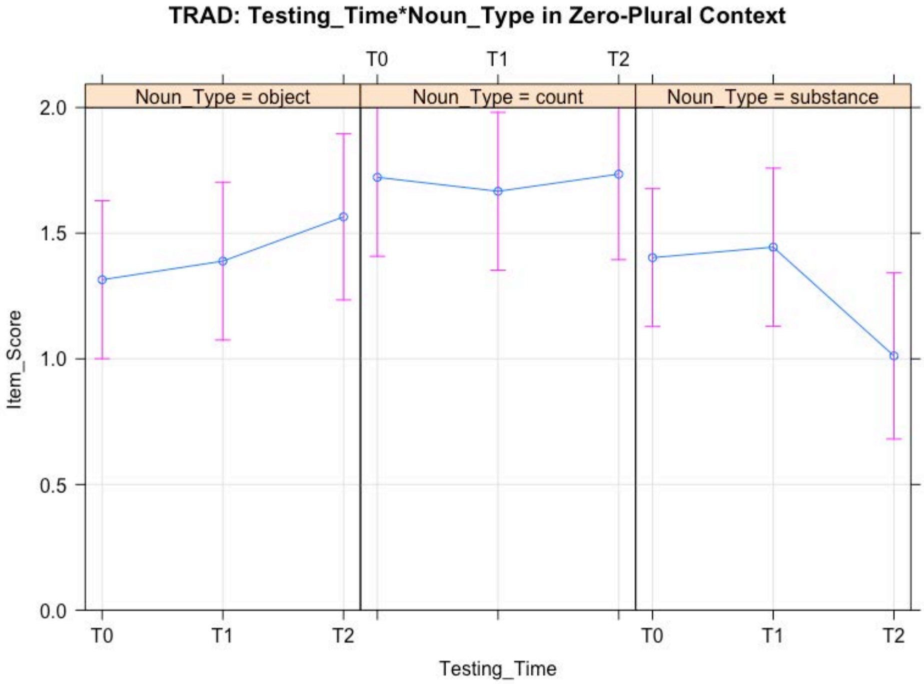

Figure 7.24. Effect plot for elicited-sentence imitation scores of Testing_Time by Noun_Type for TRAD learners in Context 4

Being as there were no significant main effect or interaction predictors from the regression models, the post-hoc analysis also failed to find any significant pairwise comparisons. These results are in-line with the prediction that traditional instruction may not be very beneficial for reassembly of L1 features for L2-English articles and noun types.

The final context under investigation is zero-singular. In this context, countable nouns require a correction with either the addition of an article or plural *-s,* whereas count and substance…etc . The means and standard deviations of imitation scores for TRAD learners are presented in Figure 7.25.

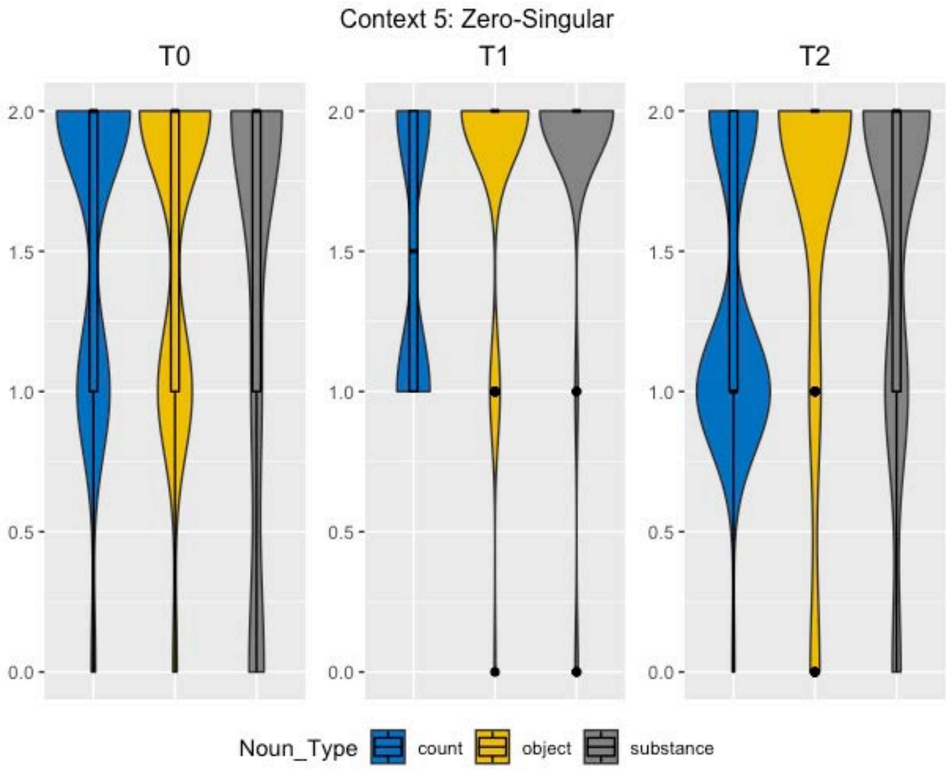

Figure 7.25. Violin plots of mean elicited-sentence imitation scores for TRAD learners in Context5

The results of the regression model are summarized in (16).

(16) Context 5: zero-singular

a. Model 2-A: No significant predictors

b. Model 2-B:

i. Main effect of Noun_Type:Count ($p < 0.05$)

ii. No significant interaction predictors

Model 2-A, with T0 and object-uncountable nouns as the baseline, did not reveal any significant main effect or interaction predictors. When the model was releveled for T1 as the baseline, Model 2-B found a main effect of Noun_Type:Count (β = -0.33, $t(15.67)$ = -2.54, p < 0.05). This interaction reveals that TRAD learners were significantly more successful in their imitations of object-uncountable nouns at T1 than in the correction of countable nouns. Model 2-B did fail to reveal any significant interaction predictors. The effects are plotted in Figure 7.26.

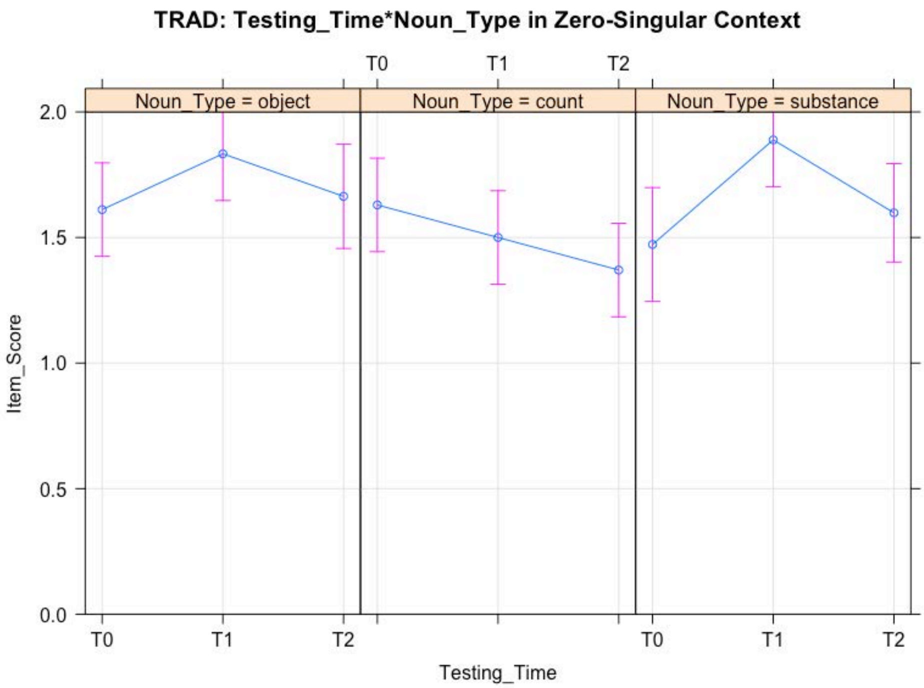

Figure 7.26. Effect plot for elicited-sentence imitation scores of Testing_Time by Noun_Type for TRAD learners in Context 5

In these effect plots, we see that there is an increase in imitation scores from T0 to T1 for uncountable nouns, but a decrease for countable nouns. The scores decrease from T1 to T2 for uncountable nouns, nearly returning to their T0 values, as seen in the descriptive statistics in Table 7.3. The Tukey post-hoc pairwise comparisons did not find any significant differences.

To summarize the results for TRAD learners, we found that in a definite-plural context, imitation scores were significantly higher for countable nouns than object-uncountable nouns at T0. We also found that moving from T0 to T1, imitation scores for uncountable nouns remained about the same, while scores for countable nouns decreased. In a definite singular context, we did not find any significant main effect or interaction predictors, which was predicted because all noun types are grammatical in this context. For stimuli that presented nouns in an indefinite-singular context, it was revealed that imitation scores for countable nouns increased while scores for uncountable nouns remained about the same. The results for noun presented in a zero-plural context did not yield any significant main effect or interaction predictors, and the results for the zero-singular context only found differences between countable nouns and object-uncountable nouns at T1. In culmination, these results suggest that traditional instruction—using the textbook assigned to the students in the study—may not have been very beneficial in facilitating the reassembly of L1 features for the L2. Now we turn our attention to learners who did not receive any instruction throughout the course of the study.

7.1.2.3 | No Extra Instruction

Finally, the NOEX learners (*n* = 17) received no additional instruction on L2-English articles and noun types. As a reminder, all participants of the study were recruited from a credit-based ESL program in the midwestern united states in which all learners had to be enrolled in at least one ESL course, grammar, but may have been enrolled in up to four courses. Therefore, while enrolled in the study, these learners may have received it in their regularly schedule course, which the researcher did not have control over. The descriptive statistics for NOEX learners can be found in Table 7.4.

Table 7.4. Means and standard deviations for elicited-sentence imitation scores for NOEX learners (n = 17) at T0, T1, and T2

		T0		T1		T2	
Context	**Noun_Type**	**M**	**SD**	**M**	**SD**	**M**	**SD**
definite-plural	count	1.82	0.56	1.82	0.52	1.43	0.88
	* object	1.49	0.64	1.57	0.64	1.29	0.76
	* substance	1.51	0.50	1.57	0.73	1.06	0.54
definite-singular	count	1.86	0.49	1.76	0.59	1.63	0.75
	object	1.88	0.38	1.90	0.41	1.69	0.68
	substance	1.63	0.60	1.94	0.24	1.53	0.83
indefinite-singular	count	1.76	0.43	1.90	0.36	1.69	0.62
	* object	1.29	0.50	1.35	0.56	1.24	0.65
	* substance	1.25	0.59	1.61	0.57	1.35	0.72
zero-plural	count	1.84	0.37	1.84	0.42	1.76	0.59
	* object	1.45	0.54	1.41	0.61	1.45	0.61
	* substance	1.44	0.58	1.43	0.67	1.04	0.49
zero-singular	* count	1.76	0.47	1.49	0.50	1.31	0.68
	object	1.51	0.54	1.80	0.45	1.59	0.73
	substance	1.71	0.52	1.73	0.57	1.47	0.81
	grammatical	1.76	0.53	1.87	0.44	1.65	0.71
	ungrammatical	1.46	0.57	1.49	0.62	1.25	0.65

** ungrammatical context and noun type combination*

For nouns presented in a definite-plural context, there was no change from T0 to T1 for countable nouns but an increase in ratings for uncountable-object and uncountable-substance nouns. In this context, imitation scores decreased for all noun types from T0 and T1 to T2. In a definite-singular context, imitation scores for countable nouns decrease from T0 to T1 and T2, while scores increased from T0 to T1 for uncountable-object and uncountable-substance nouns, they decreased from T0 and T1 to T2. With regard to nouns presented in an indefinite-singular context, there was an increase in scores for all noun types from T0 to T1, but these gains were not maintained into T2 for countable and uncountable-object nouns. Imitation scores for nouns presented in a zero-plural context either decreased or did not change at all from T0 to T1 and T2 for all noun types under investigation. Lastly, there was a decrease in scores for countable nouns presented in a zero-singular context from T0 to T1 and T2. In this same context, there was an increase of scores from T0 to T1 and T2 for uncountable-object nouns, but only an increase from T0 to T1 for uncountable-substance nouns. As the null hypothesis would predict, learners do not appear to make any linguistic gains without instruction.

The first context under analysis is definite-plural. In this context, countable nouns are grammatical, while substance- and object-uncountable nouns are not and require some kind of correction. The means and standard deviations for imitation scores are presented in the violin plots in Figure 7.27.

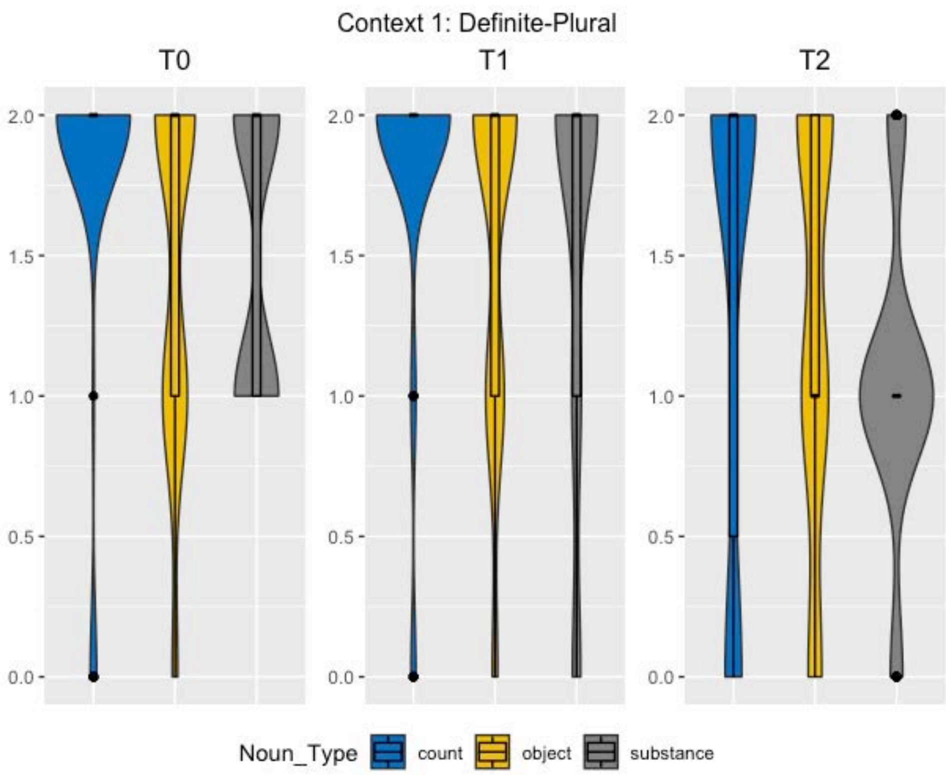

Figure 7.27. Violin plots of mean elicited-sentence imitation scores for NOEX in Context 1

The results of the regression model are summarized in (17).

(17) Context 1: definite-plural

a. Model 2-A: No significant predictors

b. Model 2-B: No significant predictors

As can be seen, this model did not produce any significant predictors for these learners with noun types in this context. The Effect plot for Model 2 for this context can be found in Figure 7.28.

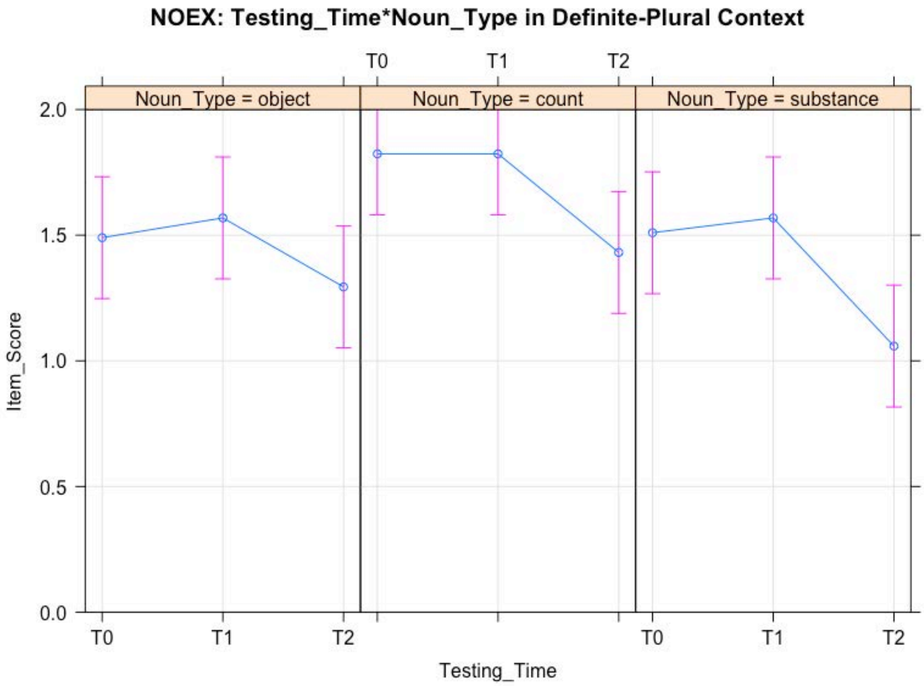

Figure 7.28. Effect plot for elicited-sentence imitation scores of Testing_Time by Noun_Type for NOEX learners in Context 1

This effect plot does show a decrease in imitation scores for all noun types from T1 to T2 but being as there were no significant main effect or interaction predictors, the post-hoc analysis failed to find any significant pairwise comparisons.

The next context under investigation is definite-singular. Recall that in this context, all noun types are grammatical and, therefore, do not warrant any kind of correction in their imitation. The means and standard deviations for nouns presented in a definite-singular context can be found in the violin plots in Figure 7.29

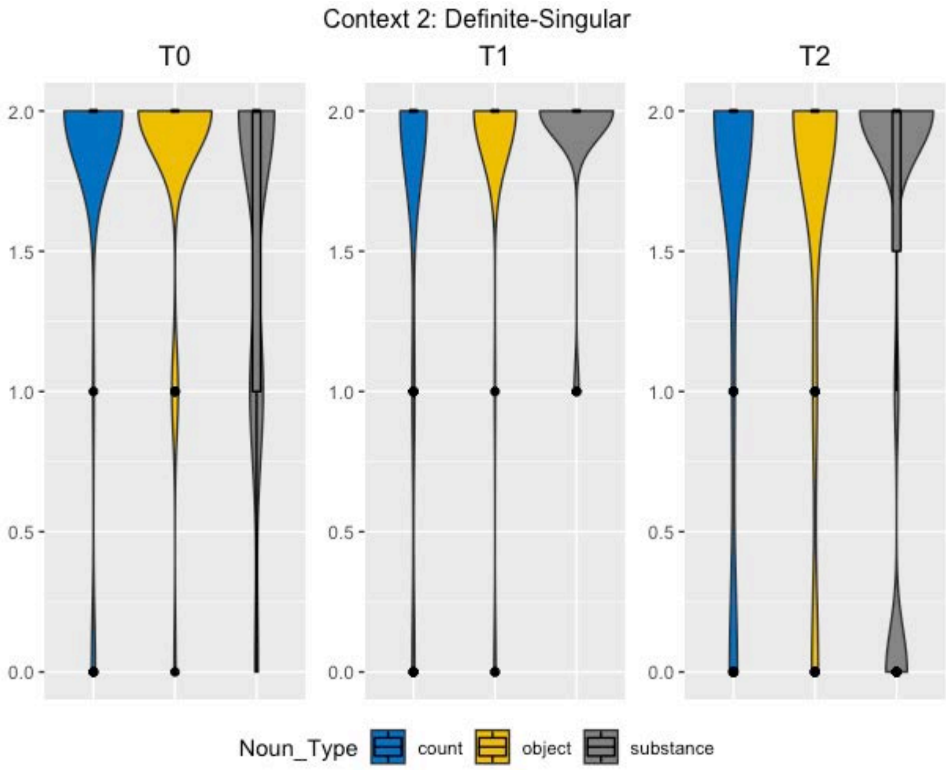

Figure 7.29. Violin plots of mean elicited-sentence imitation scores for NOEX in Context 2

As predicted, the regression model did not find any significant predictors and is summarized in (18).

(18) Context 2: definite-singular

a. Model 2-A: No significant predictors

b. Model 2-B: No significant predictors

In Figure 7.30, we have the effect plot for Model 2.

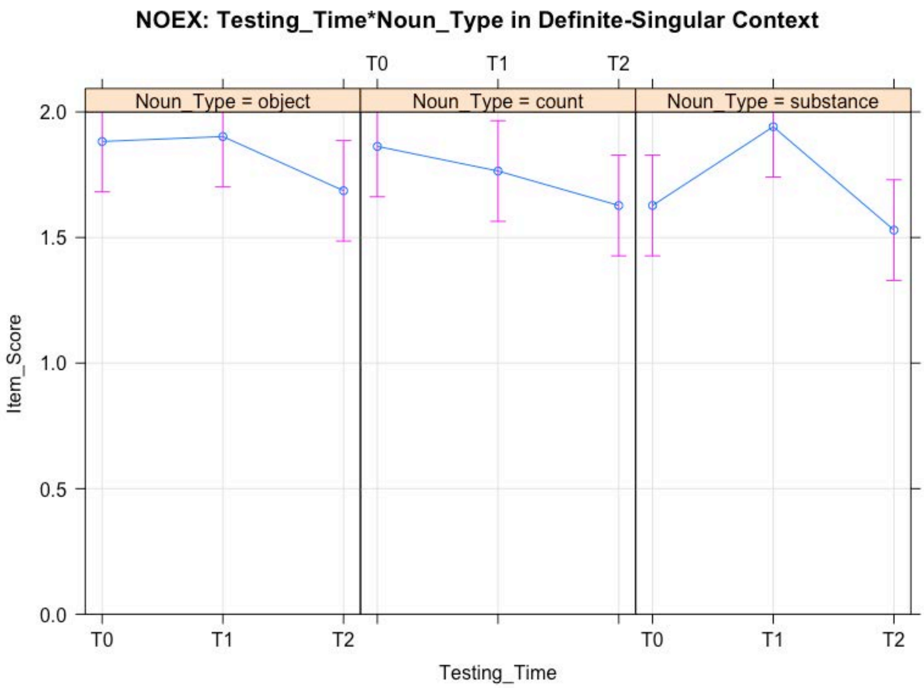

Figure 7.30. Effect plot for elicited-sentence imitation scores of Testing_Time by Noun_Type for NOEX learners in Context 2

While there were no significant main effect or interaction predictors, we can see that imitation scores for substance-uncountable and countable nouns decreased across the course of the study. For object-uncountable nouns, we see a slight increase in imitation scores from T0 to T1, but that decreases again from T1 to T2, resulting in virtually no change over the course of the study. Tukey post-hoc comparisons did not find any significant differences.

The third context under investigation is indefinite-plural. In an indefinite-singular context, countable nouns are grammatical and uncountable nouns require a correction in their imitation. The violin plots in Figure 7.31 show the means and standard deviations for imitation scores of nouns presented in an indefinite-singular context.

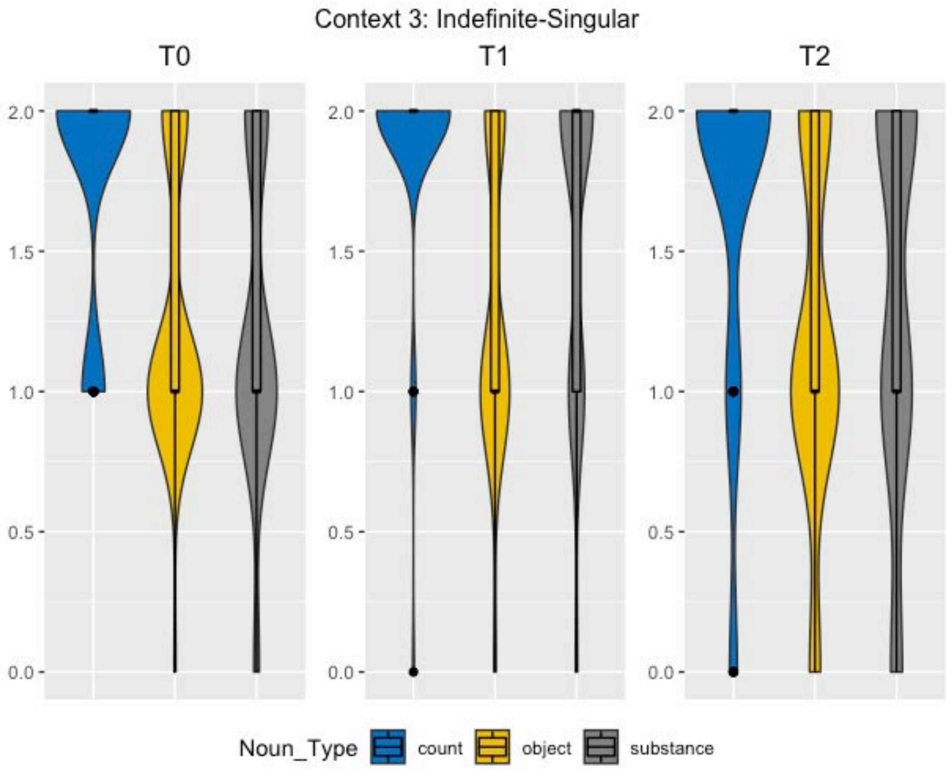

Figure 7.31. Violin plots of mean elicited-sentence imitation scores for NOEX in Context 3

The results of the regression model for this context are summarized in (19)

(19) Context 3: indefinite-singular

a. Model 2-A:

i. Main effect of Noun_Type:Count ($p < 0.01$)

ii. No significant interaction predictors

b. Model 2-B:

i. Main effect of Noun_Type:Count ($p < 0.01$)

ii. No significant interaction predictors

Model 2-A found a significant main effect of Noun_Type:Count ($\beta = 0.47$, $t(18) = 3.34$, $p < 0.01$), indicating that NOEX learners performed significantly better with countable nouns than object-uncountable nouns at T0. A similar main effect was found in Model 2-B. Model3-B revealed a significant main effect of Noun_Type:Count at T1 ($\beta = 0.55$, $t(18) = 3.90$, $p < 0.01$), indicating that NOEX learners were significantly better in their imitation scores for countable nouns than object-uncountable nouns. These effects are plotted in Figure 7.32.

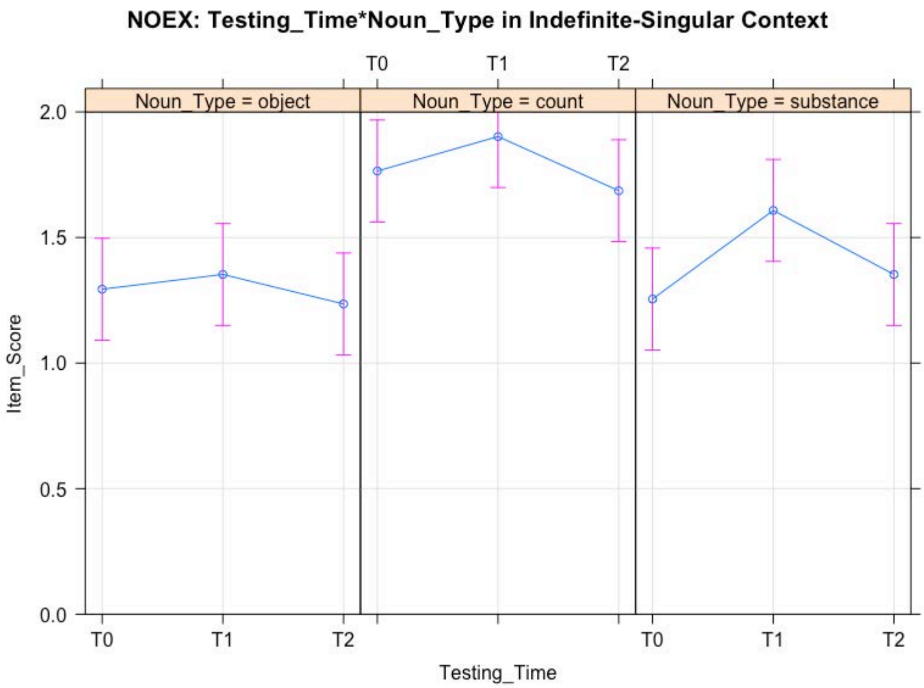

Figure 7.32. Effect plot for elicited-sentence imitation scores of Testing_Time by Noun_Type for NOEX learners in Context 3

A Tukey post-hoc pairwise comparison also found that, at T0, this group was significantly more accurate with countable nouns than substance-uncountable nouns ($p < 0.05$). The post-hoc comparisons also confirmed that imitation scores for countable nouns were significantly higher than object-uncountable nouns at T1 ($p < 0.05$). In the effect plots presented here, we see that the lowest scores are actually observed with object-uncountable nouns, with no real improvement made over the course of the study. In addition, the imitation scores for all noun types decrease from T1 to T2 in an indefinite-singular context.

The fourth context under analysis is zero-plural. As with the other plural context, only countable nouns are acceptable here, while uncountable nouns require a correction in their imitation. The means and standard deviations for imitation scores of nouns presented in this context are found in Figure 7.33.

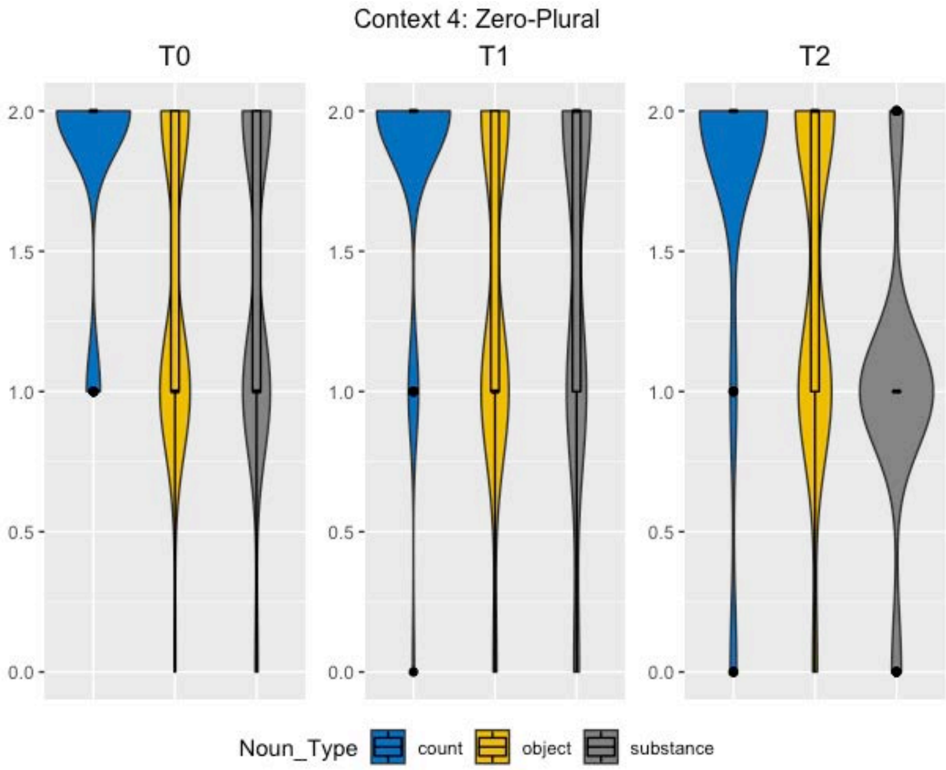

Figure 7.33. Violin plots of mean elicited-sentence imitation scores for NOEX in Context 4

The results of the regression model are summarized in (20).

(20) Context 4: zero-plural

a. Model 2-A: No significant predictors

b. Model 2-B: No significant predictors

As we can see, the model found no significant predictors. The regression model is plotted in Figure 7.34

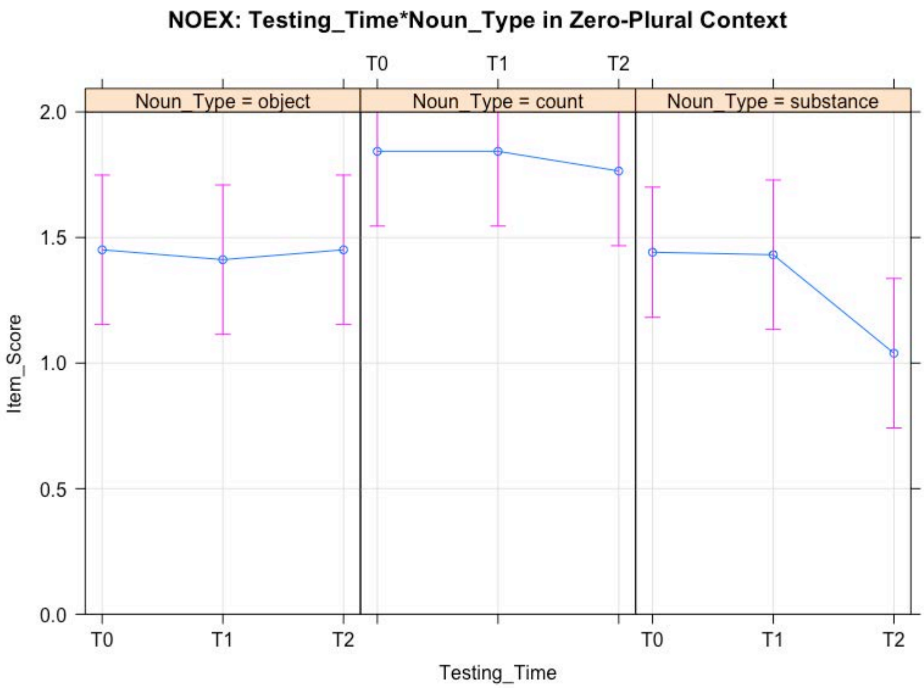

Figure 7.34. Effect plot for elicited-sentence imitation scores of Testing_Time by Noun_Type for NOEX learners in Context 4

In this effect plot, we see that there is a slight increase in object-uncountable imitation scores from T0 to T1 and T2. In addition, we also see that imitation scores for substance-uncountable nouns decrease from T1 to T2. Neither of these changes in scores yielded significant comparisons in the post-hoc analysis. Imitations scores for countable nouns presented in this context remained virtually the same throughout the course of the study.

The final context under investigation is zero-singular. In this context, uncountable nouns—both substance and object—are grammatical, while countable nouns are not. Therefore, countable nouns presented in zero-singular stimuli do require some kind of correction in their imitation of the statement. The means and standard deviations are plotted in Figure 7.35.

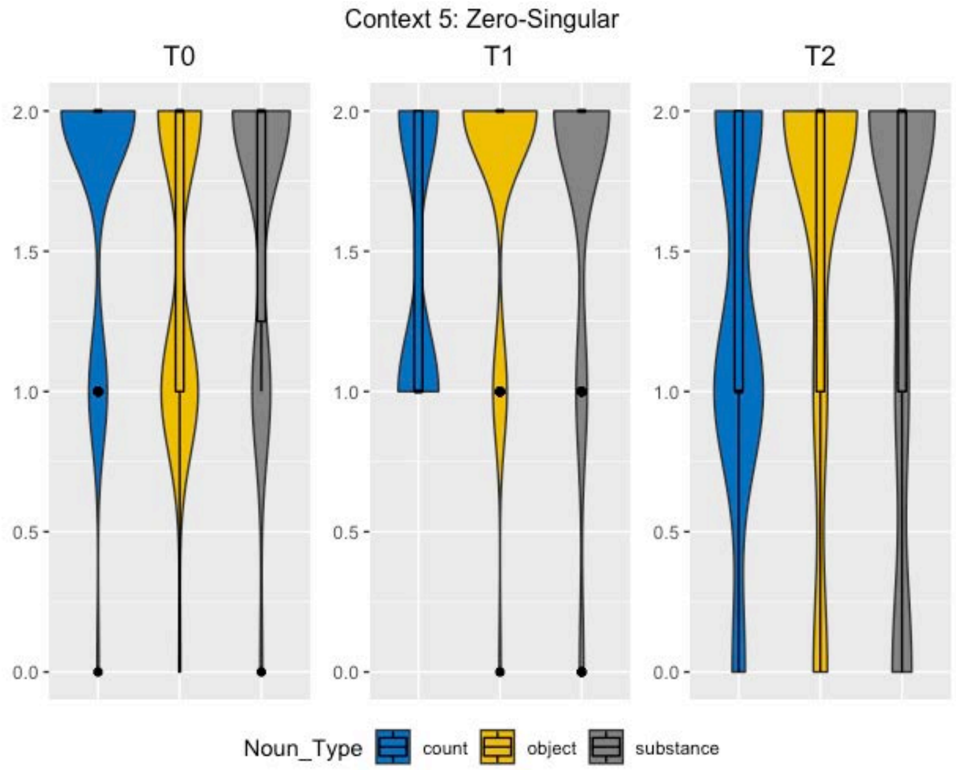

Figure 7.35. Violin plots of mean elicited-sentence imitation scores for NOEX in Context 5

The results of the regression model are summarized in (21).

(21) Context 5: zero-singular

a. Model 2-A:

i. No significant main effect predictors

ii. Interaction of Testing_Time:T1*Noun_Type:Count ($p < 0.05$)

iii. Interaction of Testing_Time:T2*Noun_Type:Count ($p < 0.05$)

b. Model 2-B:

i. No significant main effect predictors

ii. Interaction of Testing_Time:T0*Noun_Type:Count ($p < 0.05$)

Neither Model 2-A nor Model 2-B revealed any significant main effect predictors. The models did produce three significant interaction predictors. The first significant interaction predictor is of Testing_Time:T1 by Noun_Type:Count ($\beta = -0.57$, $t(17) = -2.43$, $p < 0.05$). This same significant interaction is found in Model 2-B. This interaction reveals that there is a significant difference in how NOEX learners treat object-uncountable nouns in relation to countable nouns when moving from T0 to T1. In other words, at T0, countable nouns receive higher imitation scores when compared to object-uncountable nouns, but that is reversed at T1. There was a similar interaction revealed in Model 2-A of Testing_Time:T2 by Noun_Type:Count (β = -0.53, $t(17)$ = -2.27, $p <$ 0.05). This interaction found that while imitations of countable nouns at T0 are higher than object-uncountable nouns, those scores drop and at T2, the imitation scores for both of these noun types are quite similar. The effects are plotted in Figure 7.36.

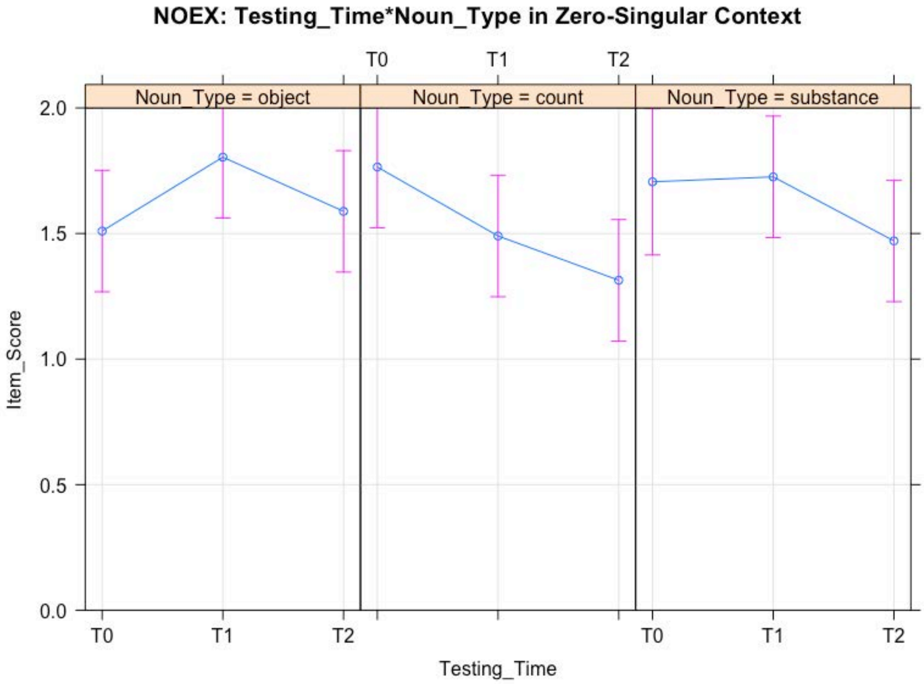

Figure 7.36. Effect plot for elicited-sentence imitation scores of Testing_Time by Noun_Type for NOEX learners in Context 5

As can be seen in the effect plots. The difference in imitation scores for countable and object-uncountable nouns at T0 is completely reversed at T2. In other words, at T0, learners are more accurate with grammatical corrections of countable nouns, but at T2 they are more accurate with object-uncountable noun imitations. The Tukey post-hoc pairwise comparison did not find any significant differences.

To summarize the results for NOEX learners in RQ2, the model did not produce any significant main effects or interactions for noun types in definite-plural, definite-singular, and zero-plural contexts. When nouns were presented in an indefinite-definite-singular context, countable nouns received significantly higher imitation scores than object-uncountable nouns at T0 and T1. For nouns presented in a zero=singular context, the model did not reveal any significant main effects, but it did reveal two noun type by testing time significant interactions. Moving from T0 to T1 and T0 to T2, the model found that there was a significant difference between imitation scores for object-uncountable nouns when compared to countable nouns. This is seen by countable nouns receiving higher imitation scores at T0, object-uncountable receiving the higher scores at T1, and then both noun types receiving virtually the same imitation scores at T2. These results are likely due to the fact that these learners did not receive any instruction on L2-English articles and noun types, and therefore tended to perform as predicted—making no significant improvements over time. We now turn out attention to RQ3, which investigates the linguistic gains made between groups across the course of the study.

7.1.3 | Research Question 3: Between Group Analysis of L2 Linguistic Gains

The third research question compares the linguistic gains of each group to determine if one method of instruction is more effective than another. To do this, we compared gains in ESIT imitation scores for noun types in each of the different contexts between groups across the course of the study. The mean gain scores can be found in Table 7.5.

In Table 7.5, a positive gain score indicates that accurate imitation scores increased from one testing time to the, next and a negative gain score indicates that mean correct imitation scores decreased. Ideally, gain scores will be positive, demonstrating an increase in acceptable correction and imitation across the course of the study.

In order to investigate the effects of instruction on linguistic gains and feature reassembly over the course of the study, we compared the ESIT gain scores for noun types in each of the different contexts between groups across testing times. As with the other research questions, a linear mixed-effects model[18] was run to investigate statistical differences. In this model, Model 3, the baseline (intercept) levels were Learner_Type:LING, Testing_Time:T0, and Noun_Type:Object for Model 3-A; Learner_Type:LING, Testing_Time:T1, and Noun_Type:Object for Model 3-B; Learner_Type:TRAD, Testing_Time:T0, and Noun_Type:Object for Model 3-C; and Learner_Type:TRAD, Testing_Time:T1, and Noun_Type:Object for Model 3-D. This model had to be releveled for Testing_Time and Learner_Type in order to investigate any statistical differences between immediate and delayed post-test, as well as TRAD and NOEX learners.

[18] The level of significance will be $\alpha = 0.05$ throughout all the analyses.

Table 7.5. Mean gain scores of elicited-sentence imitation scores for all learners

		T0 – T1			T0 – T2			T1 – T2		
Context	**Noun_Type**	**LING**	**TRAD**	**NOEX**	**LING**	**TRAD**	**NOEX**	**LING**	**TRAD**	**NOEX**
definite-plural	count	0.02	-0.33	0.00	-0.07	-0.37	-0.39	-0.09	-0.04	-0.39
	* object	0.38	0.19	0.08	0.26	-0.19	-0.20	-0.12	-0.38	-0.27
	* substance	0.28	0.07	0.06	-0.12	-0.19	-0.45	-0.40	-0.27	-0.51
definite-singular	count	0.07	-0.11	-0.10	0.01	-0.14	-0.24	-0.06	-0.03	-0.14
	object	0.06	0.13	0.02	0.17	0.07	-0.20	0.11	-0.06	-0.22
	substance	0.10	-0.04	0.31	0.07	-0.21	-0.10	-0.03	-0.17	-0.41
indefinite-singular	count	0.20	0.19	0.14	0.16	0.21	-0.08	-0.04	0.02	-0.22
	* object	0.24	0.00	0.06	0.42	0.11	-0.06	0.18	0.11	-0.12
	* substance	0.37	0.11	0.36	0.31	0.04	0.10	-0.06	-0.07	-0.26
zero-plural	count	0.13	-0.06	0.00	0.10	-0.03	-0.08	-0.03	0.03	-0.08
	* object	0.24	0.07	-0.04	0.27	0.24	0.00	0.02	0.16	0.04
	* substance	0.02	0.04	-0.01	-0.22	-0.43	-0.40	-0.24	-0.47	-0.39
zero-singular	* count	0.22	-0.13	-0.27	0.08	-0.26	-0.45	-0.14	-0.13	-0.18
	object	0.30	0.22	0.29	0.37	0.06	0.08	0.07	-0.16	-0.22
	substance	0.51	0.42	0.02	0.38	0.12	-0.24	-0.13	-0.29	-0.25
	grammatical	0.12	0.14	0.10	0.13	0.02	-0.11	0.00	-0.13	-0.21
	ungrammatical	0.25	0.04	0.03	0.14	-0.10	-0.21	-0.11	-0.14	-0.24

** ungrammatical context and noun type combination*

In this LMM, any main effects of Testing_Time will be comparing object-uncountable nouns from the baseline Testing_Time to the main effect testing time. Any main effects of Noun_Type will be comparing object-uncountable nouns at the baseline Testing_Time to the main effect noun type at the baseline Testing_Time. Therefore, there will be no explicit presentation of the main effects of Testing_Time and Noun_Type, as they were discussed earlier in Section 7.1.2. Any main effects of Learner_Type will be comparing object-uncountable nouns at the baseline Testing_Time between the baseline Learner_Type and the main effect Learner_Type. Finally, two-way interaction predictors of Testing_Time and Noun_Type were also presented in research question 2, so they will not be presented here. Since we already established that learner groups are different, we will only be investigating the interaction predictors of this model. The interaction predictors that we are interested in are any two-way interactions that include Learener_Type and Testing_Time and any three-way interactions that include Learner_Type, Testing_Time, and Noun_Type.

The first context under analysis is definite-plural. In a definite-plural context, countable nouns are grammatical while uncountable nouns are ungrammatical. While overall gain scores were presented earlier, the gain scores for each learner group, noun type, and testing time, are displayed in Figure 7.37.

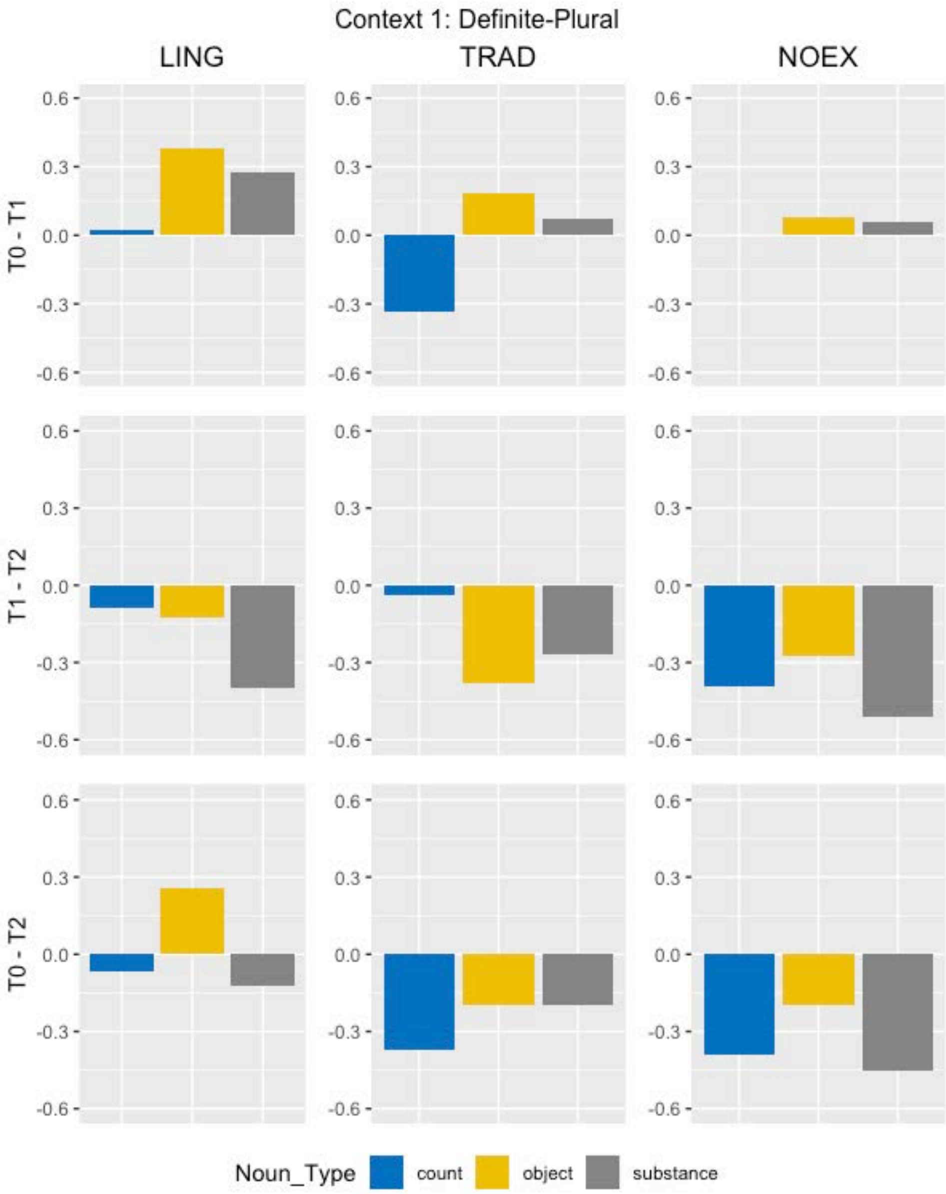

Figure 7.37. Bar plot of mean elicited-sentence imitation gain scores for all learner groups in Context 1

The results of the regression model are summarized in (22).

(22) Context 1: definite-plural

a. Model 3-A:

i. Interaction of Learner_Type:NOEX*Testing_Time:T1 ($p < 0.05$)

ii. Interaction of Learner_Type:NOEX*Testing_Time:T2 ($p < 0.01$)

iii. Interaction of Learner_Type:TRAD*Testing_Time:T2 ($p < 0.01$)

b. Model 3-B:
    i. Interaction of Learner_Type:NOEX*Testing_Time:T0 ($p < 0.05$)
c. Model 3-C:
    i. Interaction of Learner_Type:LING*Testing_Time:T2 ($p < 0.01$)
~~d.~~ Model 3-D: No significant interaction predictors

Model 3-A revealed a significant interaction of Learner_Type:NOEX by Testing_Time:T1 ($\beta = -0.30$, $t(1622) = -2.00$, $p < 0.05$) and by Testing_Type:T2 ($\beta = -0.45$, $t(1619.66) = -3.02$, $p < 0.01$). These significant interactions found that LING learners made significantly greater gains than NOEX learners with regard to their imitation (and correction) scores of object-uncountable nouns from T0 to T1 and T2. A similar significant interaction of Learner_Type:TRAD by Testintg_Time:T2 was also found ($\beta = -0.43$, $t(1624.17) = -2.83$, $p < 0.01$), indicating that LING learners made significantly greater gains with regard to their imitation (and correction) scores of object-uncountable nouns from T0 to T2 than TRAD learners. In other words, LING learners are displaying more evidence for successful feature reassembly than both TRAD and NOEX learners in a definite-plural context. Model 3-B revealed a significant interaction of Learner_Type:NOEX by Testing_Time:T0 ($\beta = 0.30$, $t(1622) = 2.00$, $p < 0.05$), which has already been discussed with regard to Model 3-A.

Model 3-C, with TRAD and T0 as baseline levels, did reveal a significant interaction of Learner_Type:LING by Testing_Time:T2 ($\beta = 0.43$, $t(1624) = 2.83$, $p < 0.01$), but this has already been accounted for in the analysis of Model 3-A. Model 3-D, with TRAD and T1 as the base level, failed to find any significant interactions that indicate significant differences in linguistic gains. The effects and interactions are plotted in Figure 7.38.

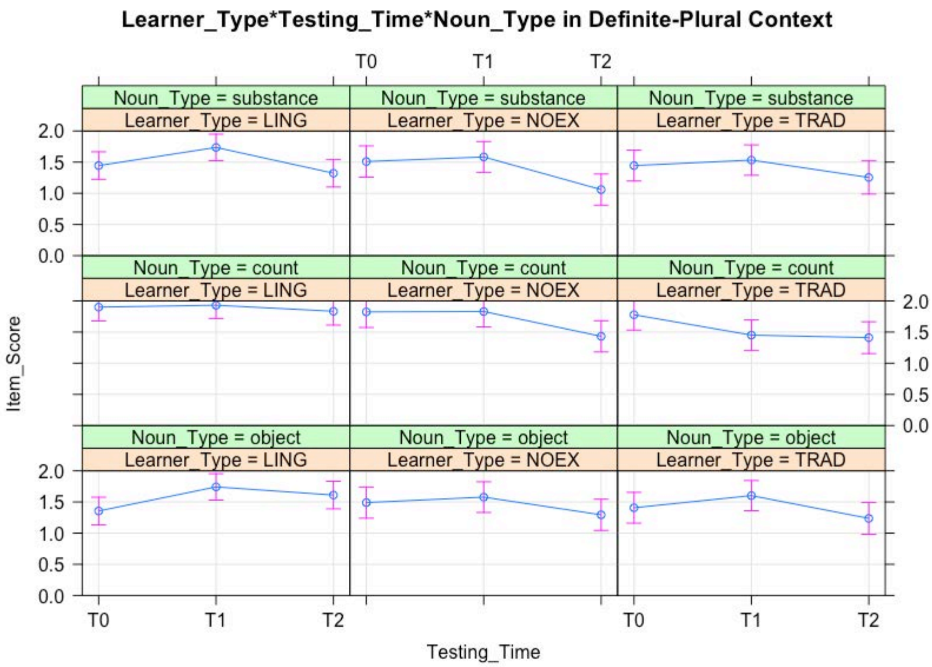

Figure 7.38. Effect plot for elicited-sentence imitation scores of Learner_Type by Testing_Time by Noun_Type in Context 1

As can be seen in the Effect plot in Figure 7.38, there is a significant difference in how TRAD learners treat countable and object-uncountable nouns at T1 when compared to NOEX learners. Similar to what we saw when compared to LING learners, TRAD learners were significantly less successful with countable noun imitation than uncountable-noun imitations at T1. This led to a significant interaction when compared to NOEX learners.

The second context under analysis is definite-singular. All noun types are grammatical in a definite-singular context and do not warrant any changes in their elicited imitation. The gain scores were presented earlier, but here we visually present them for each group, noun type, and testing time in Figure 7.40.

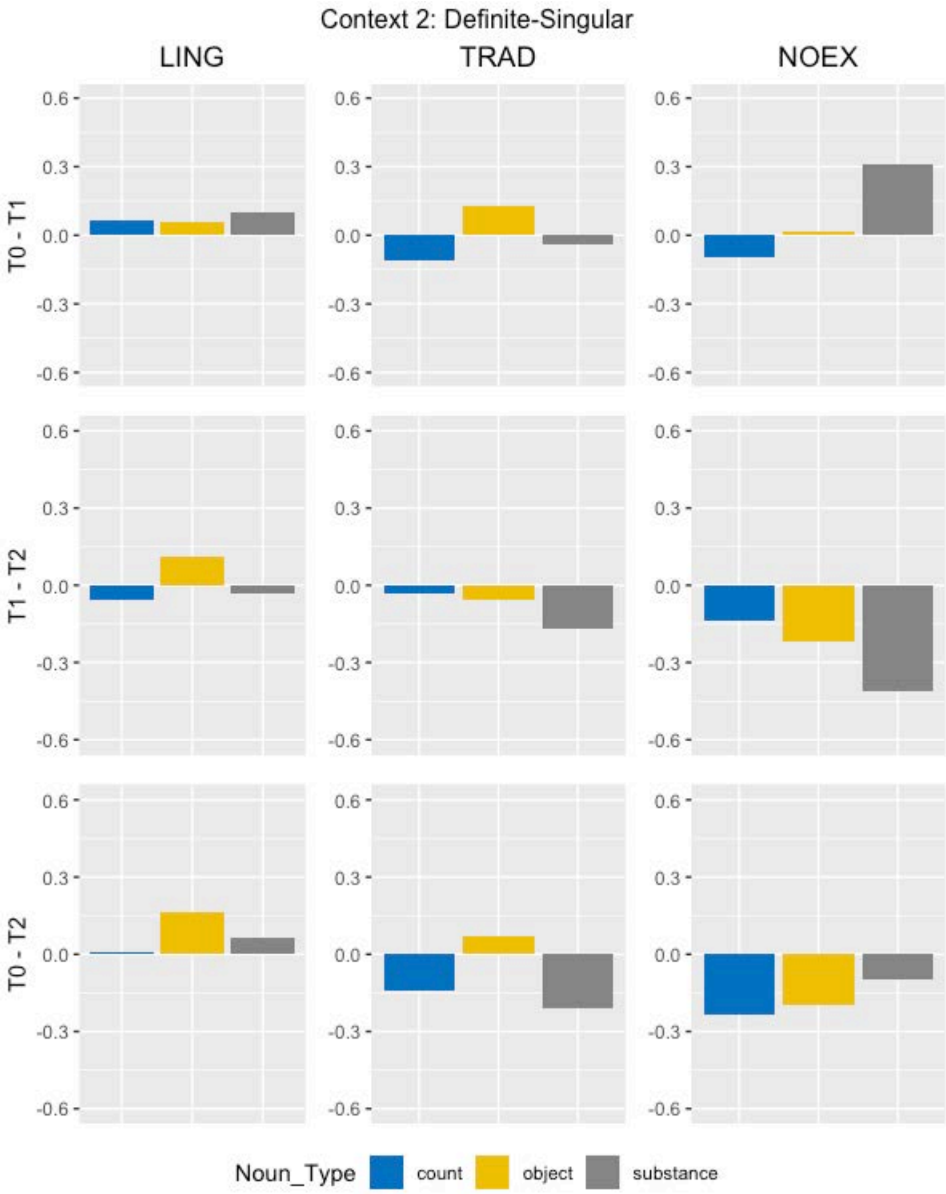

Figure 7.39. Bar plot of mean elicited-sentence imitation gain scores for all learner groups in Context 2

The results of the regression model are summarized in (23).

(23) Context 2: definite-singular

a. Model 3-A:

i. Interaction of Learner_Type:NOEX*Testing_Time:T2 ($p < 0.01$)

b. Model 3-B:

i. Interaction of Learner_Type:NOEX*Testing_Time:T2 ($p < 0.01$)

c. Model 3-C:

i. Interaction of Learner_Type:NOEX*Testing_Time:T2 ($p < 0.05$)

        ii. Interaction of Learner_Type:NOEX*Testing_Time:T1*Noun_Type: Substance ($p < 0.05$)

    d. Model 3-D:

        i. Interaction of Learner_Type:NOEX*Testing_Time:T0* Noun_Type: Substance ($p < 0.05$)

Model 3-A revealed a significant interaction of Learner_Type:NOEX by Testing_Time:T2 ($\beta = -0.36$, $t(1617) = -2.96$, $p < 0.01$), indicating that LING learners made significantly greater improvement in their imitation scores of object-uncountable nouns when moving from T0 to T1 when compared to NOEX learners. Furthermore, Model 3-B, with LING and T1 as the baseline, found a significant interaction of Learner_Type:NOEX by Testing_Time:T2 ($\beta = -0.32$, $t(1620) = -2.64$, $p < 0.01$), revealing that LING learners made significantly greater gains in their imitation scores of object-uncountable nouns from T1 to T2 when compared to NOEX learners.

Model 3-C revealed a significant interaction of Learner_Type:NOEX by Testing_Time:T2 ($\beta = -0.28$, $t(1620.08) = -2.00$, $p < 0.05$), indicating NOEX learners made a significant decrease in their imitation scores for object-uncountable nouns from T0 to T2 when compared to TRAD learners. This model also produced one three-way interaction of Learner_Type:NOEX by Testing_Time:T1 by Noun_Type:Substance ($\beta = 0.46$, $t(1616.82) = 2.39$, $p < 0.05$). This significant interaction shows that the difference between substance-uncountable nouns and object-uncountable nouns changes from T0 to T1 significantly for NOEX learners when compared to TRAD learners. These effects are plotted in Figure 7.40.

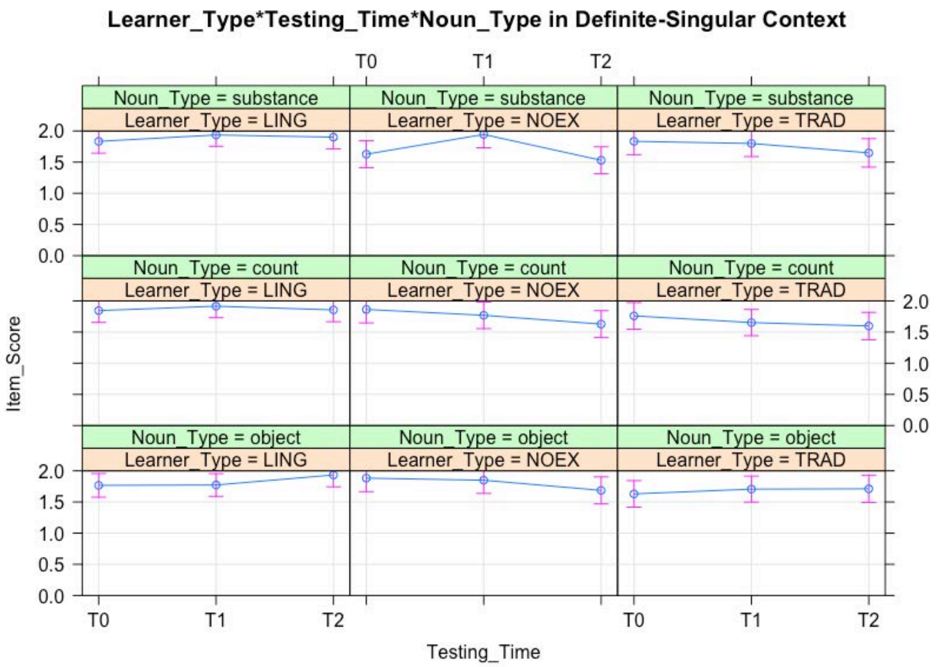

Figure 7.40. Effect plot for elicited-sentence imitation scores of Learner_Type by Testing_Time by Noun_Type in Context 2

The third context under analysis is indefinite-singular. In an indefinite-singular context, countable nouns are grammatical and uncountable nouns are ungrammatical. Therefore, uncountable nouns require some kind of correction in their imitation. The gain scores are presented in Figure 7.41.

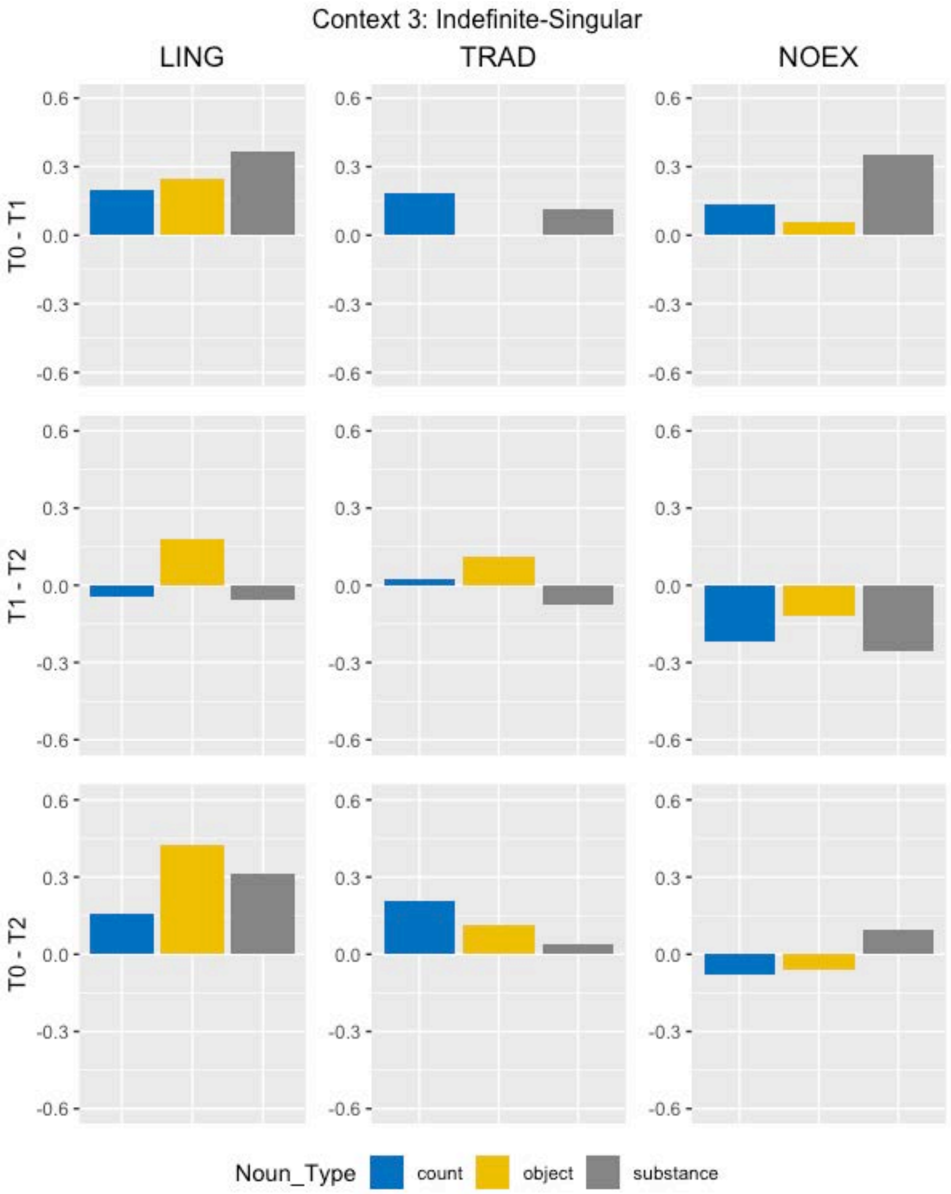

Figure 7.41. Bar plot of mean elicited-sentence imitation gain scores for all learner groups in Context 3

The results of the regression model are summarized in (24).

(24) Context 3: indefinite-singular

a. Model 3-A:

i. Interaction of Learner_Type:TRAD*Testing_Time:T1 ($p < 0.05$)

ii. Interaction of Learner_Type:NOEX*Testing_Time:T2 ($p < 0.001$)

iii. Interaction of Learner_Type:TRAD*Testing_Time:T2 ($p < 0.05$)

iv. Interaction of Learner_Type:TRAD*Testing_Time:T2* Noun_Type: Count ($p < 0.05$)

b. Model 3-B:

i. Interaction of Learner_Type:TRAD*Testing_Time:T0 ($p < 0.05$)
ii. Interaction of Learner_Type:NOEX*Testing_Time:T2 ($p < 0.05$)

c. Model 3-C:
   i. Interaction of Learner_Type:LING*Testing_Time:T1 ($p < 0.05$)
   ii. Interaction of Learner_Type:LING*Testing_Time:T2 ($p < 0.05$)
   iii. Interaction of Learner_Type:LING*Testing_Time:T2* Noun_Type: Count ($p < 0.05$)

d. Model 3-D:
   i. Interaction of Learner_Type:LING*Testing_Time:T0 ($p < 0.05$)

Model 3-A revealed a number of significant interactions of learner type and testing time. The first set of interactions are Learner_Type:TRAD by Testing_Time:T1 ($\beta = -0.24$, $t(1625.04) = -1.97$, $p < 0.05$) and Learner_Type:TRAD by Testing_Time:T2 ($\beta = -0.31$, $t(1621.18) = -2.51$, $p < 0.05$). These two interactions found that LING made greater linguistic gains in their imitation scores for object-uncountable nouns from T0 to T1 and T0 to T2 than TRAD learners. In addition, this model found a significant interaction of Learner_Type:NOEX by Testing_Time:T2 ($\beta = -0.48$, $t(1621.18) = -3.80$, $p < 0.001$), indicating that LING learners also made greater linguistic gains in their imitation scores for object-uncountable nouns from T0 to T2 than NOEX learners.

Model 3-A also revealed one significant three-way interaction of Learner_Type:TRAD by Testing_Time:T2 by Noun_Type:Count ($\beta = 0.41$, $t(1634.65) = 2.21$, $p < 0.05$). This three-way interaction finds that LING learners made greater gains with object-uncountable nouns from T0 to T2 than substance-uncountable nouns when compared to TRAD learners. Model 3-B revealed one additional significant interaction of Learner_Type:NOEX by Testing_Time:T2 ($\beta = -0.30$, $t(1624.91) = -2.34$, $p < 0.05$). This interaction states that LING learners made significantly greater gains from T1 to T2 for object-uncountable nouns when compared to NOEX learners. Models 4-C and 4-D did not produce any significant interactions that have not already been discussed. The effects and interactions are plotted in Figure 7.42.

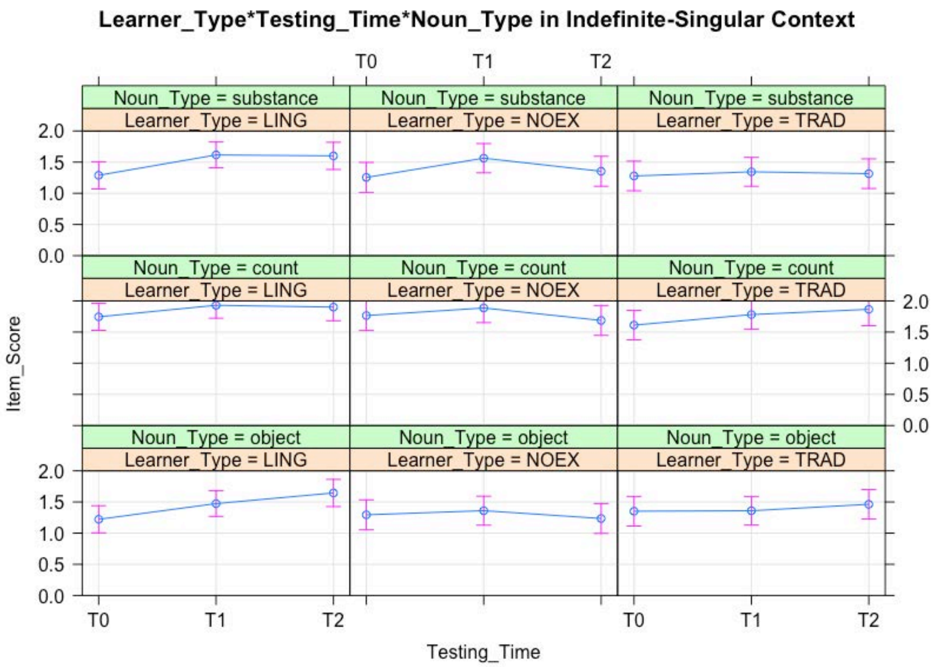

Figure 7.42. Effect plot for elicited-sentence imitation scores of Learner_Type by Testing_Time by Noun_Type in Context 3

The fourth context under analysis is zero-plural. In a zero-plural context, countable nouns do not require a correction and are grammatical. Uncountable nouns, on the other hand, require some kind of correction in their imitation in order to make the imitation grammatical. The gain scores are presented in Figure 7.43.

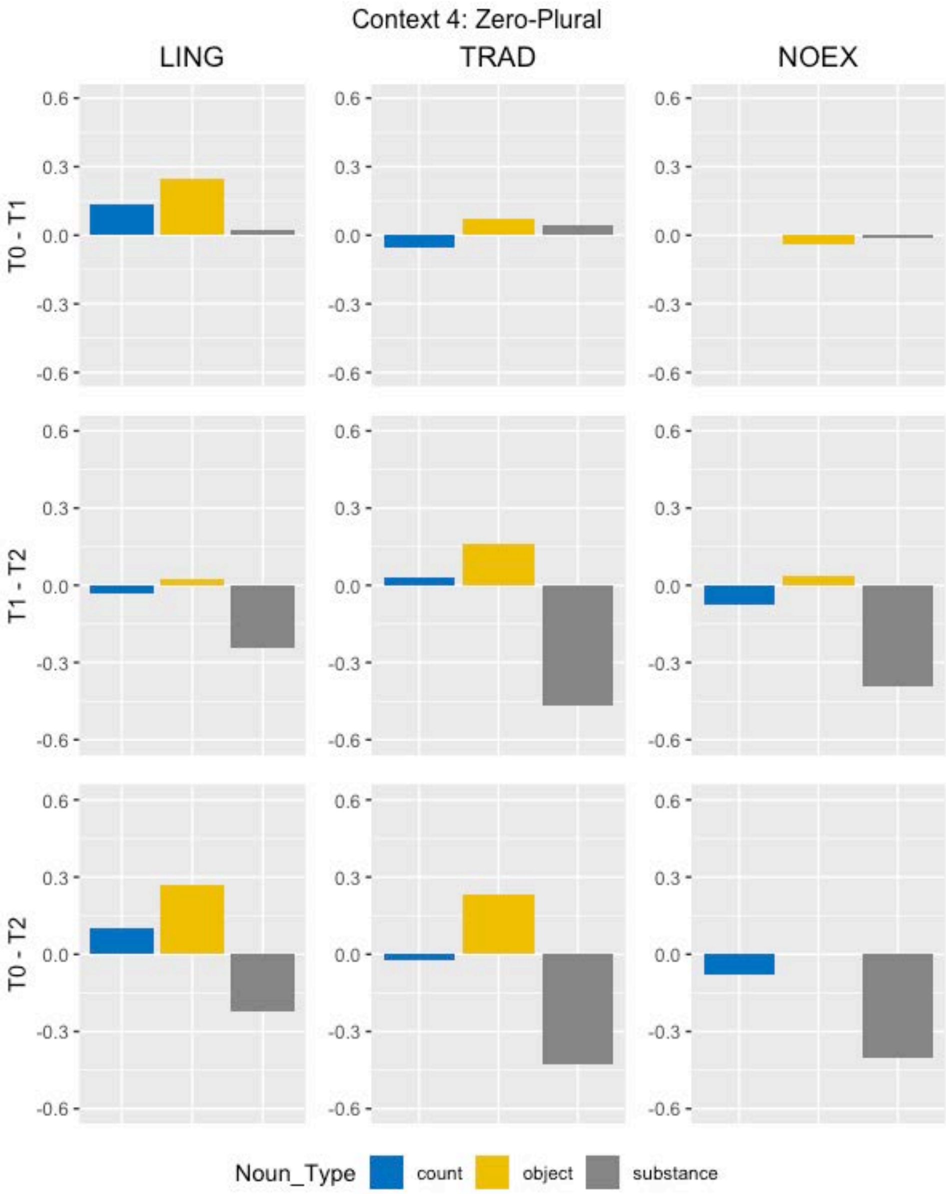

Figure 7.43. Bar plot of mean elicited-sentence imitation gain scores for all learner groups in Context 4

The results of the regression model are summarized in (25).

(25) Context 4: zero-plural

a. Model 3-A:

i. Interaction of Learner_Type:NOEX*Testing_Time:T1 ($p < 0.05$)

ii. Interaction of Learner_Type:NOEX*Testing_Time:T2 ($p < 0.05$)

b. Model 3-B:

i. Interaction of Learner_Type:NOEX*Testing_Time:T0 ($p < 0.05$)

c. Model 3-C:

i. Interaction of Testing_Time:T2*Noun_Type:Substance ($p < 0.01$)

d. Model 3-D:

i. Interaction of Testing_Time:T2*Noun_Type:Substance ($p < 0.05$)

The model analysis for this context did not produce many significant interactions that have not been previously discussed in RQ2. There are two significant interactions of Learner_Type:NOEX, one by Testing_Time:T1 ($\beta = -0.28$, $t(1665) = -2.14$, $p < 0.05$) and one by Testing_Time:T2 ($\beta = -0.27$, $t(1661) = -2.03$, $p < 0.05$). These interactions state that LING learners made significantly greater gains than NOEX learners from T0 to T1 and T2 with regard to their imitations of object-uncountable nouns in a zero-plural context. All other significant interaction predictors were previously discussed in RQ2. These effects are plotted in Figure 7.44.

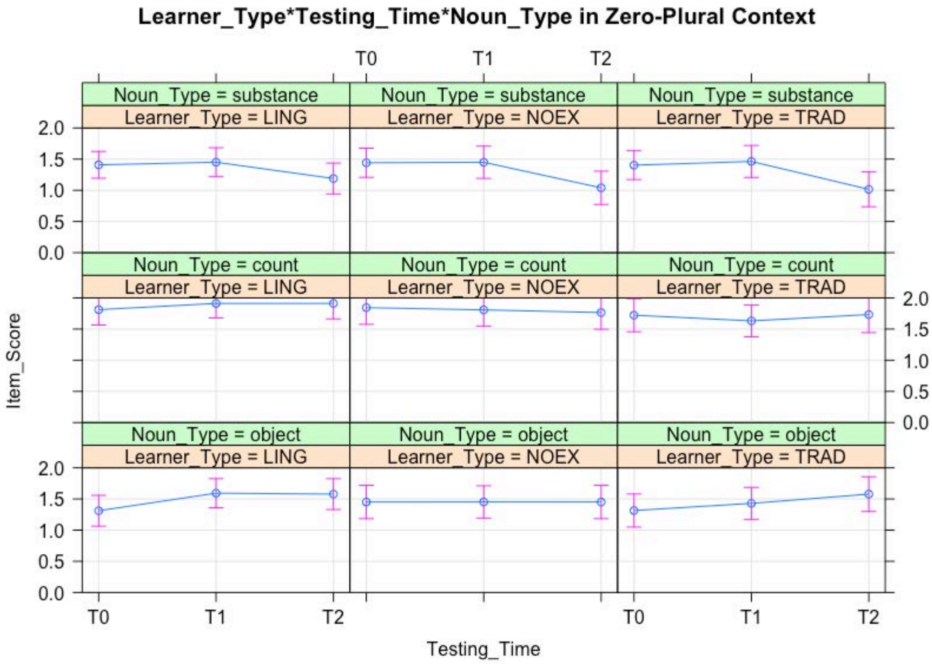

Figure 7.44. Effect plot for elicited-sentence imitation scores of Learner_Type by Testing_Time by Noun_Type in Context 4

The Turkey post-hoc pairwise comparisons did not find any additional significant differences.

The final context under analysis is zero-singular. In a zero-singular context, stimuli that present countable nouns are ungrammatical and require a correction in their imitation, while uncountable nouns are grammatical and do not require a correction in their imitation. The gain scores are presented in Figure 7.45.

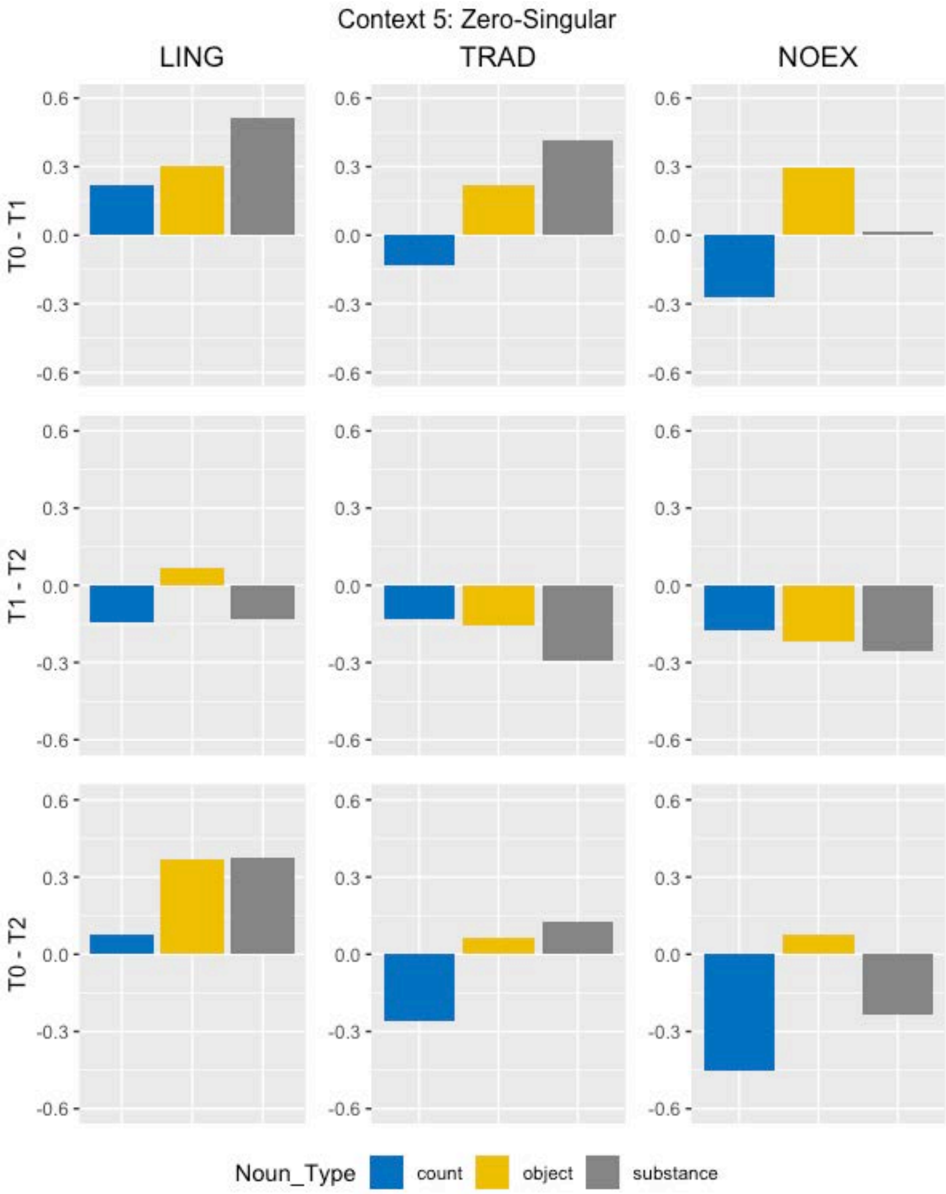

Figure 7.45. Bar plot of mean elicited-sentence imitation gain scores for all learner groups in Context 5

The results of the regression model are summarized in (26).

(26) Context 5: zero-singular

a. Model 3-A:

i. Interaction of Learner_Type:NOEX*Testing_Time:T2 ($p < 0.05$)

ii. Interaction of Learner_Type:TRAD*Testing_Time:T2 ($p < 0.05$)

iii. Interaction of Learner_Type:NOEX*Testing_Time:T1*Noun_Type: Count ($p < 0.01$)

iv. Interaction of Learner_Type:NOEX*Testing_Time:T1*Noun_Type: Substance ($p < 0.05$)

b. Model 3-B:
    i. Interaction of Learner_Type:NOEX*Testing_Time:T2 ($p < 0.05$)
    ii. Interaction of Learner_Type:NOEX*Testing_Time:T0*Noun_Type: Count ($p < 0.01$)
    iii. Interaction of Learner_Type:NOEX*Testing_Time:T0* Noun_Type: Substance ($p < 0.05$)
c. Model 3-C:
    i. No significant main effect predictors
    ii. Interaction of Learner_Type:LING*Testing_Time:T2 ($p < 0.05$)
    iii. Interaction of Learner_Type:NOEX*Testing_Time:T1* Noun_Type: Substance ($p < 0.05$)
d. Model 3-D:
    i. Interaction of Learner_Type:NOEX*Testing_Time:T0* Noun_Type: Substance ($p < 0.05$)

Model 3-A found two significant interactions of Learner_Type by Testing_Time:T2—one for NOEX ($\beta = -0.29$, $t(1562) = -2.18$, $p < 0.05$) and one for TRAD ($\beta = -0.32$, $t(1577) = -2.31$, $p < 0.05$). These interactions both revealed that LING learners made greater linguistic gains from T0 to T1 with their imitation scores of object-uncountable nouns than the other two learner groups. Model 3-A also found two significant three-way interactions. The first three-way interaction is of Learner_Type:NOEX by Testing_Time:T1 by Noun_Type:Count ($\beta = -0.49$, $t(1563) = -2.63$, $p < 0.01$). This three-way interaction found that over time (from T0 to T1), NOEX learners had lower imitation scores for countable nouns than object-uncountable nouns when compared to LING learners. The second three-way interaction is of Learner_Type:NOEX by Testing_Time:T1 by Noun_Type:Substance ($\beta = 0.49$, $t(1564) = -2.46$, $p < 0.05$). This three-way interaction found that over time (from T0 to T1), NOEX learners had lower imitation scores for substance-uncountable nouns than object-uncountable nouns when compared to LING learners. In both of these interactions, LING showed an opposite effect where imitation scores for substance-uncountable and countable nouns trended upward with the scores of object-uncountable nouns, and, therefore, not creating any distance between imitation scores of individual noun types.

Model 3-B revealed a significant interaction of Learner_Type:NOEX by Testing_Time:T2 ($\beta = -0.28$, $t(1564) = -2.14$, $p < 0.05$), which found that while LING learners increase their imitation scores of object-uncountable nouns from T1 to T2, NOEX learners make a significant decrease in their scores. Model 3-C found a significant three-way interaction of Learner_Type:NOEX by

Testing_Time:T1 by Noun_Type:Substance (β = -0.47, $t(1561.6)$ = -2.12, $p < 0.05$). This interaction reveals that TRAD learners made significant improvements with object- and substance-uncountable nouns from T0 to T1, while NOEX learners do not make any significant differences between these noun types from T0 to T1. Model 3-D did not reveal any significant main effects or interactions that have not already been discussed. The effects plotted in Figure 7.46.

Figure 7.46. Effect plot for elicited-sentence imitation scores of Learner_Type by Testing_Time by Noun_Type in Context 5

The Tukey post-hoc analysis did not find any additional significant differences.

To summarize the ESIT results of the third research question—the linguistic gains of groups throughout the course of the study—we ran a LMM investigating the main effects and interactions of learner type, testing time, and noun type. In the definite-plural context, we found that LING learners made the greatest gains, when compared to both NOEX and TRAD learners, from T0 to both T1 and T2. This is some of the first evidence of the effects of linguistically-informed instruction extending into the delayed post-test. For the definite-singular context, we only found significant gains in comparison to the NOEX learners, but that was to be expected as all noun types are grammatical in this context. Both LING and TRAD learners demonstrated their ability to provide grammatical imitations of noun types in a definite-singular context, and both performed at near-ceiling levels.

We found more significant effects of instruction on linguistic gains for LING learners in the indefinite-singular context. As with the definite-plural context, LING learners outperformed TRAD learners from T0 to T1 and both TRAD and NOEX learners when moving from T0 to T2. The analysis of nouns presented in a definite-plural context only found that LING learners made more significant gains that NOEX learners, although they did make non-significant gains in comparison to TRAD from T0 to T1 and T2. Finally, in a zero-singular context, LING displayed greater gains than both NOEX and TRAD learners from T0 to T1, although non-significant. They also displayed significantly greater gains than NOEX and TRAD learners from T0 to T2. Again, these results support the hypothesis that linguistically-informed instruction would lead to more successful reassembly of L1 features for the L2 than traditional instruction. In many of the contexts, we saw that LING learners made significantly greater gains, regardless of noun type, in their ability to provide imitations of grammatical combinations and correction of ungrammatical ones after instruction, when compared to the other groups, suggesting that linguistically-informed instruction may have been the most beneficial in producing significant linguistic gains.

7.2 | Acceptability Judgment Task

The same statistical analysis was run on the AJT data as the other tasks. In the untimed AJT, the participants were asked to rate English statements from 1 (not natural at all) to 7 (very natural). The sentences varied not only in the content, but the critical context was manipulated with different article and noun type combinations reflecting the features under analysis: definiteness, countability, atomicity, and plurality. The AJT data was coded for acceptability scores from 1 to 7 and subjected to statistical analysis. In this coding, higher means of acceptability are interpreted as acceptance of a given structure, while lower means represent rejection. Linear mixed-effects models (LMMs) were fit to nominal response data, and each model included fixed effects (specified in Section 1) and participant and item random effects. In the case of significant interactions, pairwise comparisons investigated the effects within the same context using the *lsmeans* package (Lenth, 2016).

7.2.1 | Research Question 1: Presence of L1-Mandarin Features in L2 English

In order to address the first research question, which investigates the presence of L1 features in the L2, we compared the L2 acceptability ratings given for noun types in each of the different contexts to the ratings given by native speakers. For noun types, the semantic features of [±count] and [±atomic] are combined to create three noun types: countable [+count, +atomic], object-uncountable [–count, +atomic], and substance-uncountable [–count, –atomic]. For context, the semantic features of [±definite] and [±plural] are combined to create five contexts: definite-plural, definite-singular, indefinite-singular, zero-plural, and zero-singular. This allows for investigation of the presence of L1 features in the L2 prior to instruction. First, descriptive statistics are presented and followed by inferential statistics. As specified in the Methodology chapter, the NS baseline group (n = 25) completed the task at one point in time and the L2 learner groups (LING, TRAD, and NOEX) completed the tasks at three different testing times (T0, T1, and T2). The means for NSs in Table 7.6 and the violin plots in Figure 7.47 are compared with the T0 data for the L2 learners.

Table 7.6. Means and standard deviations for acceptability ratings for NSs and L2 learners at T0

		English NSs (n = 25)		**L2 Learners (n = 65)**	
Context	**Noun_Type**	**M**	**SD**	**M**	**SD**
definite-plural	count	6.12	1.27	4.52	2.06
	* object	2.43	1.50	5.30	1.66
	* substance	2.32	1.54	5.38	1.69
definite-singular	count	6.32	1.32	4.55	2.00
	object	6.08	1.49	4.86	2.04
	substance	6.28	1.21	5.30	1.78
indefinite-singular	count	6.27	1.13	4.89	1.93
	* object	2.84	1.86	5.11	1.91
	* substance	2.73	1.65	4.52	2.10
zero-plural	count	6.21	1.59	5.31	1.76
	* object	2.32	1.49	4.64	1.94
	* substance	2.03	1.30	4.87	1.91
zero-singular	* count	3.65	2.41	4.16	2.08
	object	6.41	1.16	4.78	2.08
	substance	6.57	0.99	5.65	1.56
	grammatical	6.07	1.49	5.11	1.89
	ungrammatical	2.62	1.79	4.85	1.94

** ungrammatical context and noun type combination*

The NSs demonstrated acceptability patterns as predicted. This data was collected as a baseline in order to shed light on feature assembly in L1 English and how those features are assembled in L2 English. There will be no detailed discussion of NSs beyond RQ1. As expected, just by looking at the grammatical versus ungrammatical mean scores, the NSs demonstrated predicted patterns by rating ungrammatical statements low and grammatical statements high. It is important to note that the only ungrammatical context in which the mean acceptability score exceeded 3 was with countable nouns in a zero-plural context. This is likely due to the ability to shift readings, especially of countable nouns in this context, from countable to substance-uncountable (e.g., *a chicken* refers to an animal while *∅ chicken* refers to the edible substance). Overall, the standard deviations show that the acceptability ratings were quite similar among English native speakers.

When these ratings are compared to the NNSs, we can see that NNSs have much greater variation in their mean ratings of noun types in different contexts. With regard to the violin plots in Figure 7.47, we can see that all of the ratings tend to be higher and have a lot more variation. These plots also show how different each of the learner groups are at pre-test. For this reason, learner groups are only compared to one another in research question 3, which investigates the linguistic gains made by each group.

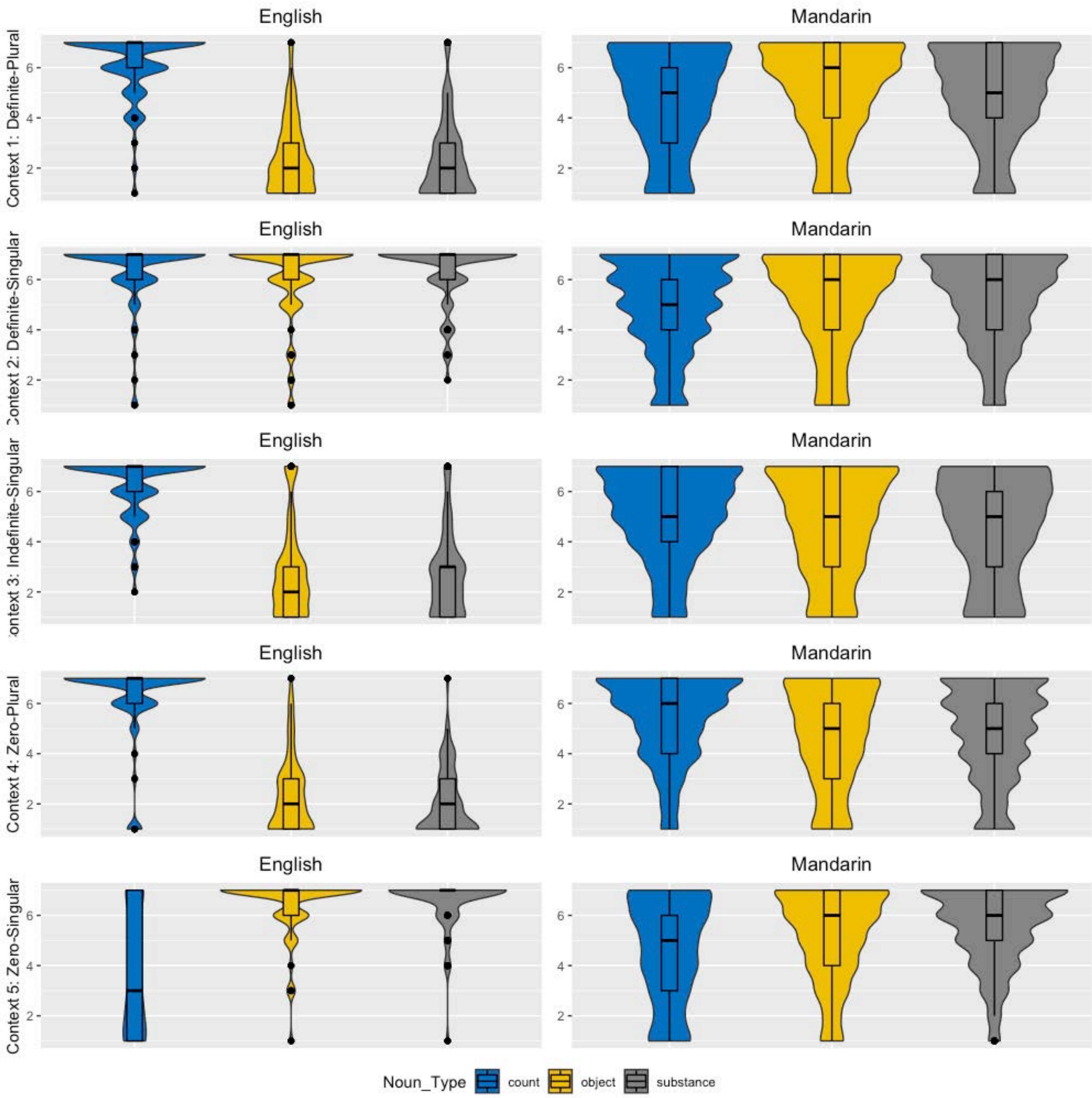

Figure 7.47. Violin plots of mean acceptability ratings for English NSs and L2 learners at T0

In order to investigate any statistical differences between the ENGL and L2 learner groups, two separate linear mixed-effects models[19] were run. Model 1 investigates NSs and NNSs. In this model, the baseline (intercept) levels were L1:Mandarin and Noun_Type:Object. In this LMM, any main effects of L1 will be comparing English NSs to Mandarin NSs, and any main effects of

[19] The level of significance will be $\alpha = 0.05$ throughout all the analyses.

Noun_Type will be comparing that noun type (countable or substance-uncountable) to the baseline, object-uncountable, for the baseline L1 group, Mandarin. The interactions of these variables will investigate how similar or different the Mandarin and English groups treat countable and substance-uncountable nouns to object-uncountable nouns when compared to one another. The model also included by-participant and by-item random intercepts. Here, we will summarize the significant effects and interactions the model for each context. The full model output tables can be found in Appendix I.

The first context under investigation is definite-plural. In this context, countable nouns are grammatical, while uncountable nouns (substance and object) are ungrammatical. The results of Model 1 are summarized in (27).

(27) Context 1: definite-plural

a. Model 1:

i. Main effect of L1:English ($p < 0.001$)

ii. Main effect of Noun_Type:Count ($p < 0.01$)

iii. Interaction of L1:English*Noun_Type:Count ($p < 0.001$)

As expected, Model 1 (NNSs vs NSs) revealed a significant main effect of L1:English ($\beta = -2.89$, $t(157.42) = -10.28$, $p < 0.001$), which means that L2-English learners rated object-uncountable nouns significantly higher than NSs. In addition, the model found a significant main effect of Noun_Type:Count ($\beta = -0.74$, $t(12.37) = -3.16$ $p < 0.01$), which means that L2-English speakers rated object-uncountable nouns significantly higher than countable nouns at T0. Importantly, these main effects were qualified by a significant L1:English by Noun_Type:Count interaction ($\beta = 4.44$, $t(144.31) = 13.44$, $p < 0.001$), which), indicating that L1-English speakers rated object-uncountable nouns significantly lower than countable nouns when compared to L2-English learners. The effects are plotted in Figure 7.48.

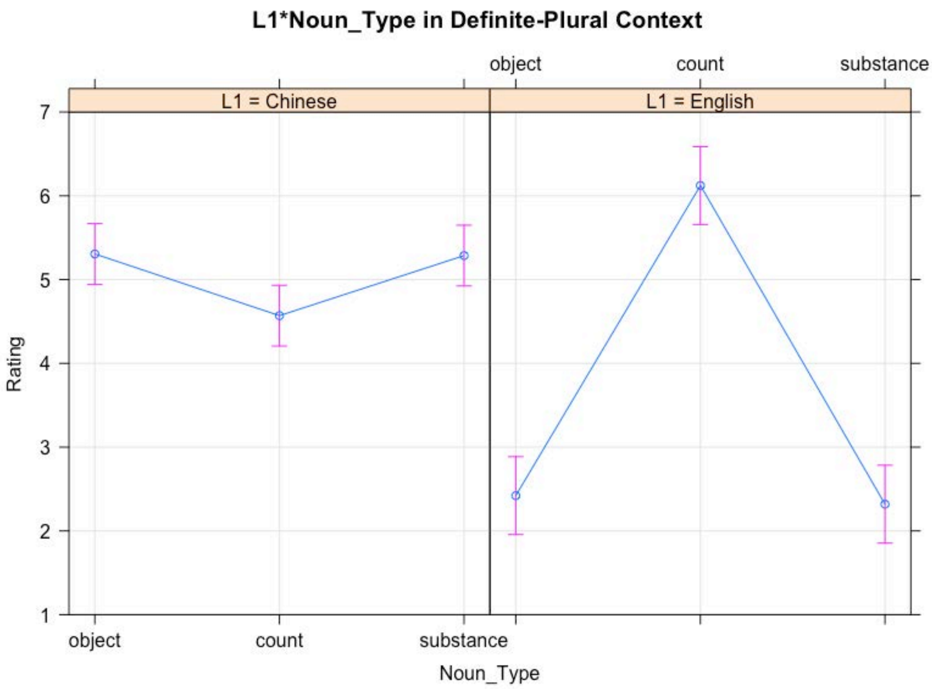

Figure 7.48. Effect plot for acceptability ratings for L1 by Noun_Type at T0 in Context 1

Post-hoc comparisons using the Tukey HSD test confirmed these significant results. The post-hoc analysis indicated that the mean score for countable nouns was significantly higher for English speakers than for Mandarin speakers ($p < 0.001$). They also revealed that Mandarin speakers rated substance- and object-uncountable nouns significantly higher than English NSs ($p < 0.001$ for both comparisons). Therefore, we see that in a definite-plural context, nearly all noun types are treated differently by L2 learners than NSs.

The second context under investigation is definite-singular. In this context, all noun types are grammatical. The results of Model 1 are summarized in (28).

(28) Context 2: definite-singular

a. Model 1:

i. Main effect of L1:English (p < 0.001)

ii. No significant interaction predictors

As expected, Model 1 revealed a main effect of L1:English ($\beta = 1.12$, $t(166.56) = 3.71$, $p < 0.001$) indicating that L1-English speakers rated object-uncountable nouns much higher than L2 speakers. The model did not found any interaction effects. The effect plots can be found in Figure 7.49.

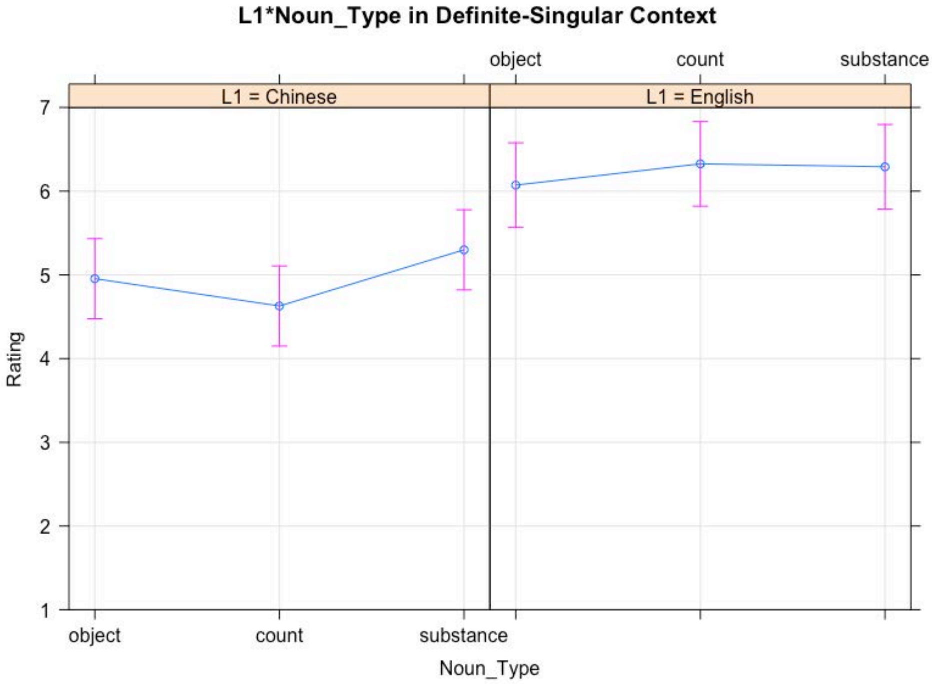

Figure 7.49. Effect plot for acceptability ratings for L1 by Noun_Type at T0 in Context 2

Tukey HSD post-hoc comparisons indicated that the mean score for countable nouns was significantly higher for English speakers than for Mandarin speakers ($p < 0.001$). These comparisons also revealed that Mandarin speakers rated substance- and object-uncountable nouns significantly lower than English NSs ($p < 0.05$ for substance and $p < 0.01$ for object).

The third context under investigation is indefinite-singular. In this context, countable nouns are grammatical and uncountable nouns are ungrammatical. The model is summarized in (29).

(29) Context 3: indefinite-singular

a. Model 1:

i. Main effect of L1:English ($p < 0.001$)

ii. Interaction of L1:English*Noun_Type:Count ($p < 0.001$)

Model 1 found a significant main effect of L1:English ($\beta = -1.98$, $t(200) = -5.99$, $p < 0.001$), indicating that English NSs rated object-uncountable nouns significantly lower than NNSs. This main effect was qualified by a significant L1:English by Noun_Type:Count interaction ($\beta = 3.25$, $t(247.11) = 7.73$, $p < 0.001$), indicating that L1-English speakers rated object-uncountable nouns significantly lower than countable nouns when compared to L2-English learners. These effects are plotted in Figure 7.50.

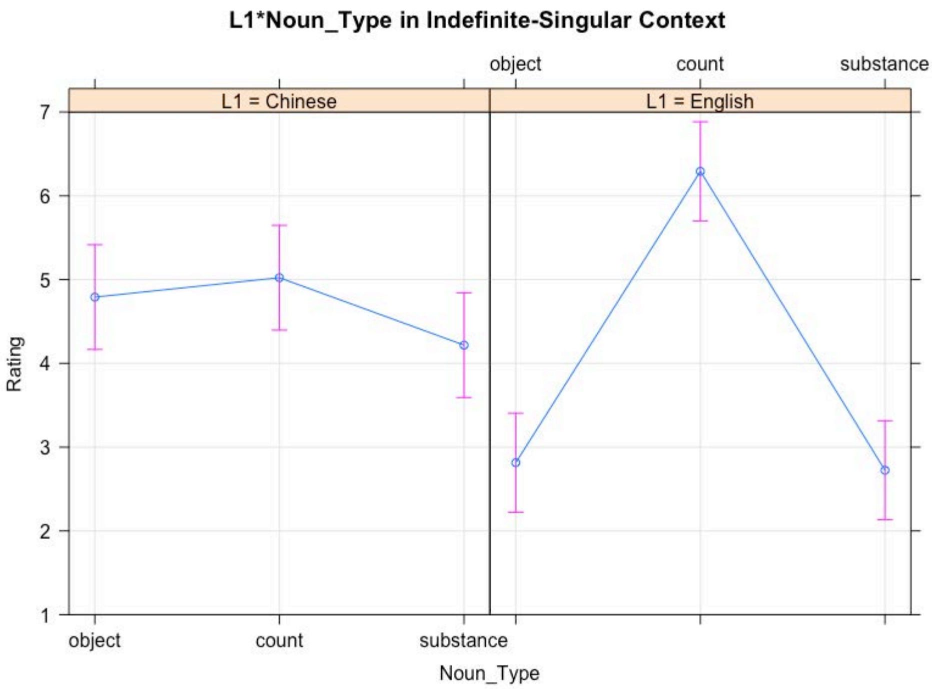

Figure 7.50. Effect plot for acceptability ratings for L1 by Noun_Type at T0 in Context 3

Post-hoc comparisons using the Tukey HSD test confirmed these significant effects. The post-hoc analysis indicated that the mean score for countable nouns was significantly higher for English speakers than for Mandarin speakers ($p < 0.01$). In addition, these comparisons also revealed that Mandarin speakers rated substance- and object-uncountable nouns significantly higher than English NSs ($p < 0.001$ for both comparisons).

The fourth context under investigation is zero-plural. In this context, countable nouns are grammatical and uncountable nouns are ungrammatical. The model is summarized in (30).

(30) Context 4: zero-plural

a. Model 1:

i. Main effect of L1:English ($p < 0.001$)

ii. Interaction of L1:English*Noun_Type:Count ($p < 0.001$)

Model 1 also found a significant main effect of L1:English in this context ($\beta = -2.34$, $t(84.62) = -7.68$, $p < 0.001$), similar to the main effects observed in Model 1 for definite-plural and indefinite-singular. Furthermore, this effect was qualified by a significant interaction of L1:English by Noun_Type:Count ($\beta = 3.24$, $t(79.74) = 8.59$, $p < 0.001$), indicating that NSs treat uncountable-object much different than countable nouns, while NNSs treat them similarly. These effects are plotted in Figure 7.50.

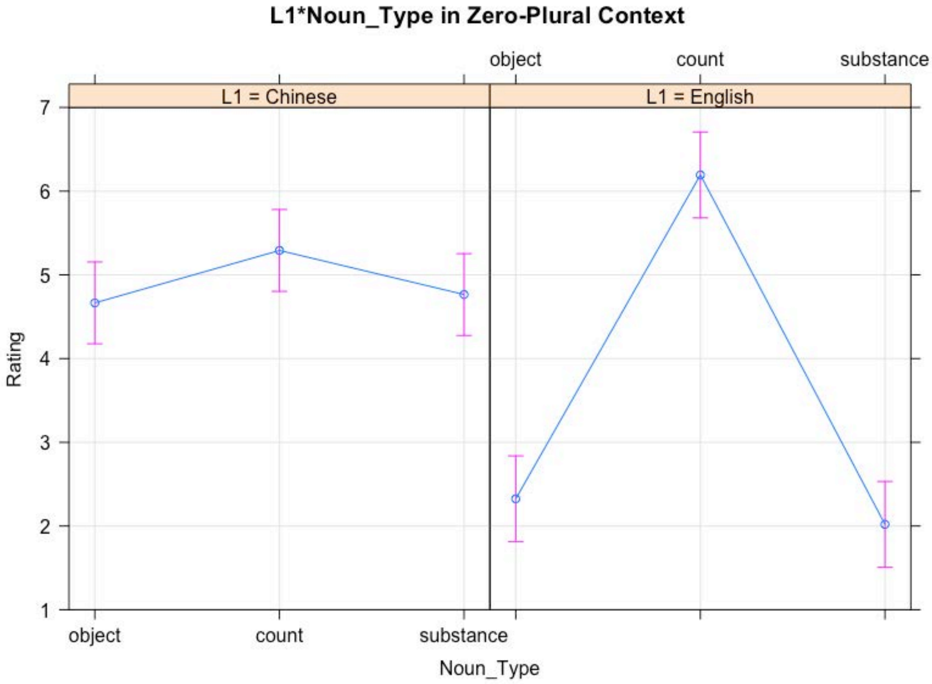

Figure 7.51. Effect plot for acceptability ratings for L1 by Noun_Type at T0 in Context 4

Post-hoc comparisons using the Tukey HSD test indicated that the mean score for countable nouns was significantly higher for English speakers than for Mandarin speakers ($p < 0.05$). These comparisons also revealed that Mandarin speakers rated substance- and object-uncountable nouns significantly higher than English NSs ($p < 0.001$ for both comparisons).

The final context under investigation is zero-singular. In this context, countable nouns are ungrammatical and uncountable nouns are grammatical. The model is summarized in (31).

(31) Context 5: zero-singular
  a. Model 1:
    i. Main effect of L1:English ($p < 0.001$)
    ii. Interaction of L1:English*Noun_Type:Count ($p < 0.001$)

The first model found a significant main effect of L1:English ($\beta = 1.55$, $t(22.83) = 4.34$, $p < 0.001$), meaning that NSs, on average, rated object-uncountable nouns significantly higher than NNSs. This was corroborated by a significant interaction of L1:English by Noun_Type:Count ($\beta = -2.37$, $t(389.78) = -5.48$, $p < 0.001$), which revealed that NSs rated countable nouns significantly lower than object-uncountable nouns, buy 2.37 points, when compared to NNSs. These effects are plotted in Figure 7.51.

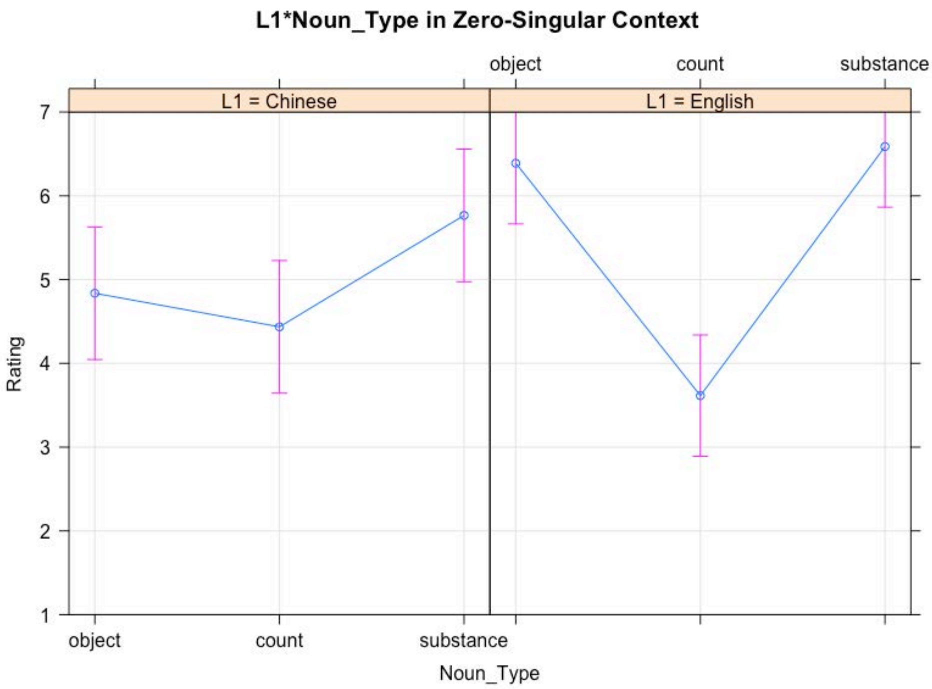

Figure 7.52. Effect plot for acceptability ratings for L1 by Noun_Type at T0 in Context 5

Post-hoc comparisons using the Tukey HSD test confirmed these significant results. The post-hoc analysis indicated that mean ratings for object-uncountable nouns were significantly lower for Mandarin speakers than English NSs ($p < 0.001$).

The null hypothesis for the LMMs is that the means obtained for each group and noun type are the same. As can be seen in (27)–(31) above, there is a main effect of L1 and Learner_Type in all contexts, meaning that NNSs consistently performed significantly different from NSs with regard to noun types in the contexts under investigation. The estimates for this effect of Learner_Type show that L2 learners rate object-uncountable nouns significantly higher than countable nouns in definite-plural, indefinite-singular, and zero-plural contexts, which is expected and supports the hypothesis that L1 features are present in the L2 prior to instruction. The estimates also show that, in the same contexts, they tend to also rate object-uncountable nouns higher than substance-uncountable nouns, but this interaction was non-significant. On the other hand, in definite-singular and zero-singular contexts, the ratings for object-uncountable nouns are significantly lower than countable nouns for L2 learners when compared to English NSs, which is also expected due to L1 influence. These results suggest that L2 learners may be interpreting [+atomic] as a grammatical distinction in English, rather than the [+count] feature due to relying on their L1-Mandarin linguistic knowledge and feature assembly.

7.2.2 | Research Question 2: Within Group Analysis of L2 Feature Reassembly

The second research question investigates the effect of instruction on L2 feature reassembly. To do this, we compared AJT acceptability ratings for noun types in each of the different contexts within group across time. The data will be presented for each learner group separately. We will first present the descriptive statistics, followed by the inferential statistics for each context under analysis. In order to investigate any statistical differences between noun types within each group, a linear mixed-effects model[20] was run. In this model, the baseline (intercept) levels were Testing_Time:T0 and Noun_Type:Object for Model 2-A and Testing_Time:T1 and Noun_Type:Object for Model 2-B. This model had to be releveled for Testing_Time in order to investigate any statistical differences between the immediate and delayed post-intervention data collection times. In this LMM, any main effects of Testing_Time will be comparing object-uncountable nouns from the baseline Testing_Time to the main effect testing time. Any main effects of Noun_Type will be comparing object-uncoutnable nouns at the baseline Testing_Time to the main effect noun type at the baseline Testing_Time. The interactions of these variables will investigate how similar or different countable and substance-uncountable nouns are treated in comparison to object-uncountable nouns across time. This will allow for investigation of feature reassembly by noun types either drifting apart or closer together over the course of the study. This model also included both by-participant and by-item random intercepts. Here, we will summarize the significant effects and interactions of each model. The full model output tables can be found in Appendix J.

7.2.2.1 | Linguistically-Informed Instruction

The means and standard deviations across testing times for the participants in the LING group (n = 30) can be seen in Table 7.7. The LING group received one hour of linguistically-informed instruction that used the semantic universals [±definite], [±count], [±atomic], and [±plural] to teach articles and noun types. Table 7.7 shows the means by noun type in each context that is analyzed, as well as the total grammatical and ungrammatical article and noun type combinations.

[20] The level of significance will be $\alpha = 0.05$ throughout all the analyses.

Table 7.7. Means and standard deviations for acceptability ratings for LING learners (n = 30) at T0, T1, and T2

		T0		T1		T2	
Context	**Noun_Type**	**M**	**SD**	**M**	**SD**	**M**	**SD**
definite-plural	count	4.23	2.08	5.48	1.61	4.59	2.11
	* object	4.98	1.82	4.71	2.31	4.81	1.96
	* substance	5.38	1.69	4.18	2.31	4.68	1.90
definite-singular	count	4.42	1.97	5.41	1.71	5.36	1.64
	object	4.91	2.11	5.22	1.91	5.44	1.54
	substance	5.26	1.83	5.56	1.57	4.98	1.73
indefinite-singular	count	4.79	2.05	5.16	2.00	5.27	1.56
	* object	4.82	2.00	4.41	2.14	4.18	2.16
	* substance	4.49	2.13	4.26	2.30	4.63	1.89
zero-plural	count	5.28	1.66	5.76	1.57	5.51	1.65
	* object	4.52	1.87	4.58	2.24	4.68	2.02
	* substance	5.06	1.78	4.37	2.16	4.73	1.88
zero-singular	* count	4.10	1.99	4.78	2.10	4.82	1.96
	object	4.80	2.16	5.73	1.40	5.30	1.71
	substance	5.57	1.60	6.03	1.14	5.50	1.52
	grammatical	5.07	1.91	5.42	1.71	5.28	1.71
	ungrammatical	4.79	1.92	4.55	2.17	4.79	1.92

** ungrammatical context and noun type combination*

For nouns presented in a definite-plural context, there is an increase in mean acceptability ratings of countable nouns, but a decrease in ratings for uncountable nouns (both object and substance), as predicted. With regard to nouns in a definite-singular context, countable and object-uncountable nouns show and increase form T0 to T1 and T2, but uncountable-subject nouns only show an increase in acceptability ratings from T0 to T1. The mean ratings for substance-uncountable nouns in a definite-singular context is actually lower at T2 than T1. Countable nouns in an indefinite-context showed increased ratings over the course of the study, while object-uncountable nouns showed a decrease. Surprisingly, though, there was not much change in the ratings of substance-uncountable nouns in an indefinite-singular context. In a zero-plural context, mean ratings of countable nouns and object-uncountable nouns increased over time, while substance-uncountable nouns decreased. Finally, when presented in a zero-singular context, there was improvement across time for all noun times. General improvement across time demonstrates patterns similar to those predicted (most notably from T0 to T1), but those linguistic gains do not always appear to extend into the delayed post-test. Overall, mean acceptability of article and noun type combinations that are ungrammatical are still quite higher than those observed by the NS baseline data, but the mean acceptability ratings for grammatical items do increase across the course of the study.

The first context under analysis is definite-plural. In this context, countable nouns are grammatical, while substance- and object-uncountable nouns are ungrammatical. The descriptive statistics are plotted in Figure 7.53. These violin plots show the distribution of ratings for each noun type at T0, T1, and T2. We can see there is a lot of variation in the acceptability ratings of countable nouns at T0, but that shifts to higher at T1, immediately following instruction. For object-uncountable and substance-uncountable nouns, we see a portion of these data shift to lower acceptability ratings at T2.

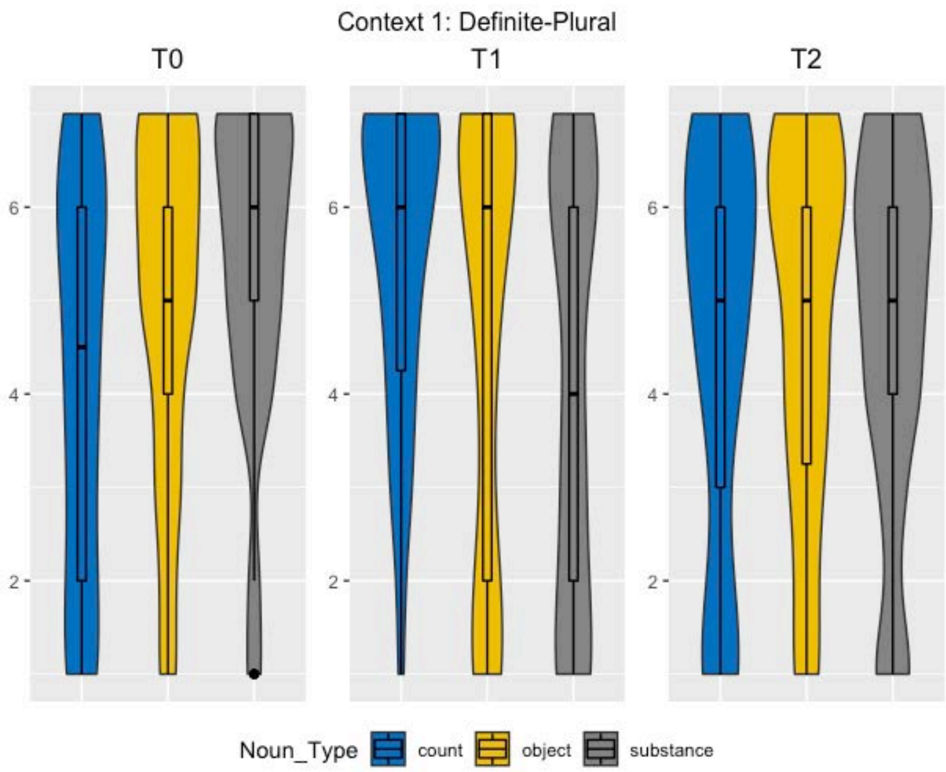

Figure 7.53. Violin plots of mean acceptability ratings for LING learners in ContexT1

The results of the regression model are summarized in (32).

(32) Context 1: definite-plural

a. Model 2-A:

i. Main effect of Noun_Type:Count ($p < 0.05$)

ii. Interaction of Testing_Time:T1*Noun_Type:Count ($p < 0.01$)

b. Model 2-B:

i. Main effect of Noun_Type:Count ($p < 0.05$)

ii. Interaction of Testing_Time:T0*Noun_Type:Count ($p < 0.01$)

iii. Interaction of Testing_Time:T2*Noun_Type:Count ($p < 0.05$)

Model 2-A revealed a significant main effect of Noun_Type:Count ($\beta = -0.74$, $t(18) = -2.27$, $p < 0.05$), indicating that LING learners rated countable nouns significantly lower than object-uncountable nouns at T0. This effect was qualified by a significant interaction of Testing_Time:T1 by Noun_Type:Count ($\beta = 1.51$, $t(18) = 3.26$, $p < 0.01$), indicating that this learner group made significant gains in their recognition of countable nouns as acceptable in this context and object-uncountable nouns as unacceptable when moving from T0 to T1. While not significant, this model also found an interaction of Testing_Time:T1 by Noun_Type:Substance ($\beta = -0.93$, $t(18) = -2.02$, $p = 0.0596$), showing that LING learners were more accurate at rejecting substance-uncountable nouns at T1 than T0. This suggests that instruction may have facilitated their reassembly of [–count, –atomic] features but not [–count, +atomic] features.

In Model 2-B, we find a significant main effect of Noun_Type:Count ($\beta = 0.77$, $t(18) = 2.34$, $p < 0.05$), revealing that, immediately following instruction, LING learners rated countable nouns significantly higher than object-uncountable nouns. This model also found a significant interaction of Testing_Time:T2 by Noun_Type:Count ($\beta = -0.99$, $t(18) = -2.13$, $p < 0.05$), which indicates that object-uncountable nouns and countable nouns are rated significantly more different at T1 than T2, suggesting that any effects of instruction have regressed. Unfortunately, the ratings of uncountable nouns—both object and substance—increase at T2, suggesting that any effects of instruction were not long-lasting with regard to the definite-plural context. While this may suggest that they are interpreting [+atomic] as [+count], we see a similar pattern with substance, uncountable nouns, so we cannot draw that conclusion definitively. In Figure 7.54, we see the effect plot for noun types presented in a definite-plural context.

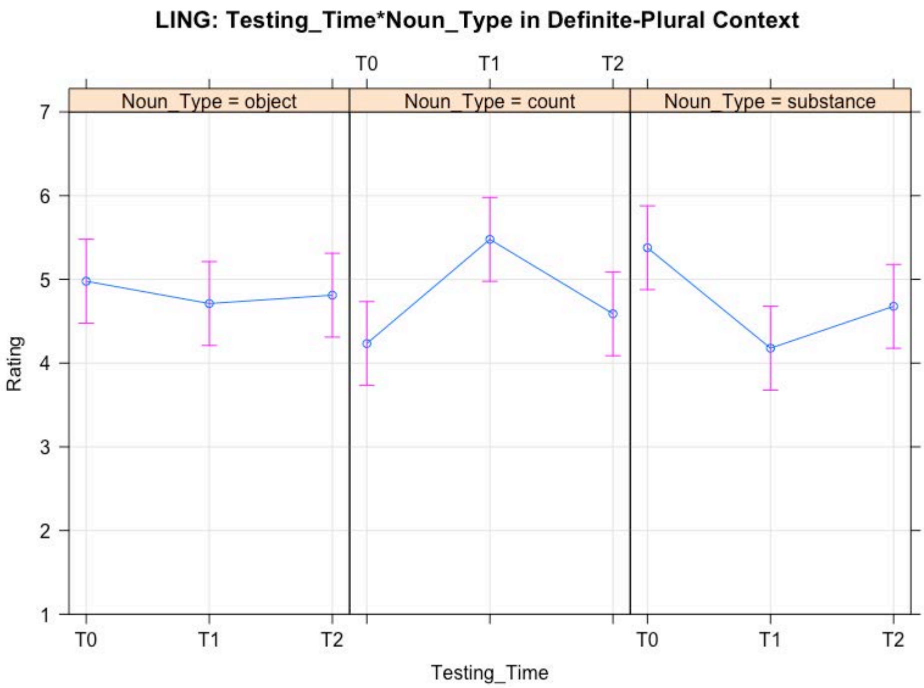

Figure 7.54. Effect plot for acceptability ratings of Testing_Time by Noun_Type for LING learners in Context 1

Being as the model produced significant predictors, planned TukeyHSD pairwise comparisons were calculated to determine any other significant gains for noun types across time. The mean ratings for substance-uncountable nouns dip from T0 to T1 ($p < 0.05$), and are mostly maintained into T2 ($p = 0.48$), but there is little change in acceptability ratings for object-uncountable nouns from T0 to T1 ($MD = 0.27, p = 0.99$) and T2 ($MD = -0.17, p = 0.99$). Furthermore, the acceptability ratings for countable nouns significantly increase from T0 to T1 ($p < 0.05$), but dip from T1 to T2 ($p = 0.21$). The post-hoc analysis also revealed that the difference between countable and substance-uncountable nouns at T1 was significant ($p < 0.05$). Observing similar improvement patterns in mean acceptability ratings of substance-uncountable and countable nouns at T1 and T2 may provide evidence that instruction may have facilitated in more impactful feature reassembly at T1 for nouns that differ in their [atomicity] feature than those which do not.

The next context under investigation is definite-singular. Regardless of noun type, when presented in a definite-singular context, these statements have an acceptable and grammatical reading (see Table 7.6 for NS ratings). The descriptive statistics are plotted in Figure 7.55, and the inferential statistics are summarized in (33).

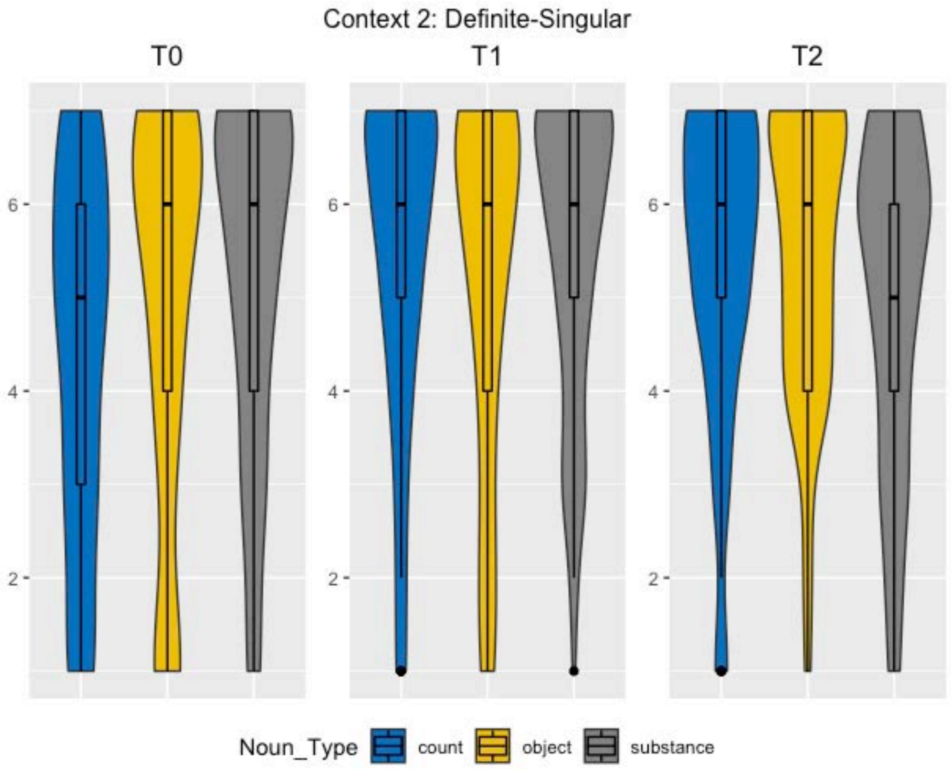

Figure 7.55. Violin plots of mean acceptability ratings for LING learners in ContexT2

(33) Context 2: definite-singular

a. Model 2-A: No significant predictors

b. Model 2-B: No significant predictors

There were no significant predictors of the regression model. In the descriptive statistics, it can be observed that from T0 to T1, and to some extent T2, mean ratings for all noun types in a definite-plural context shift higher after instruction, but none of the models or pairwise comparisons yielded significant differences. The results of the model are presented in Figure 7.56, and the full model outputs can be found in Appendix J.

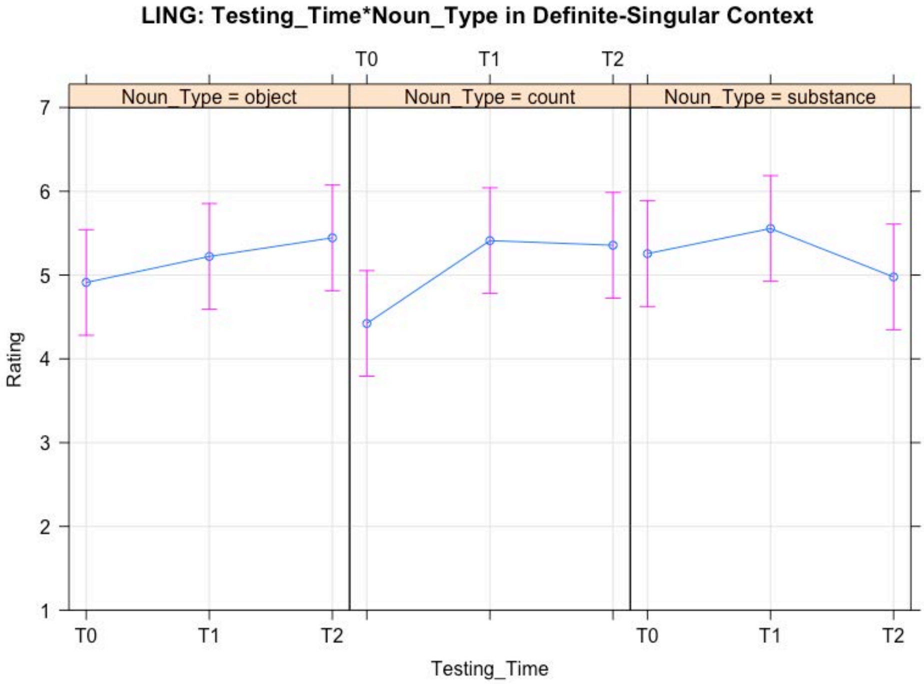

Figure 7.56. Effect plot for acceptability ratings of Testing_Time by Noun_Type for LING learners in Context 2

The third context under investigation is indefinite-singular. In an indefinite-singular context, countable nouns are grammatical and uncountable nouns are ungrammatical. The descriptive statistics are presented in Figure 7.57, and the predictions of the regression model are summarized in (34).

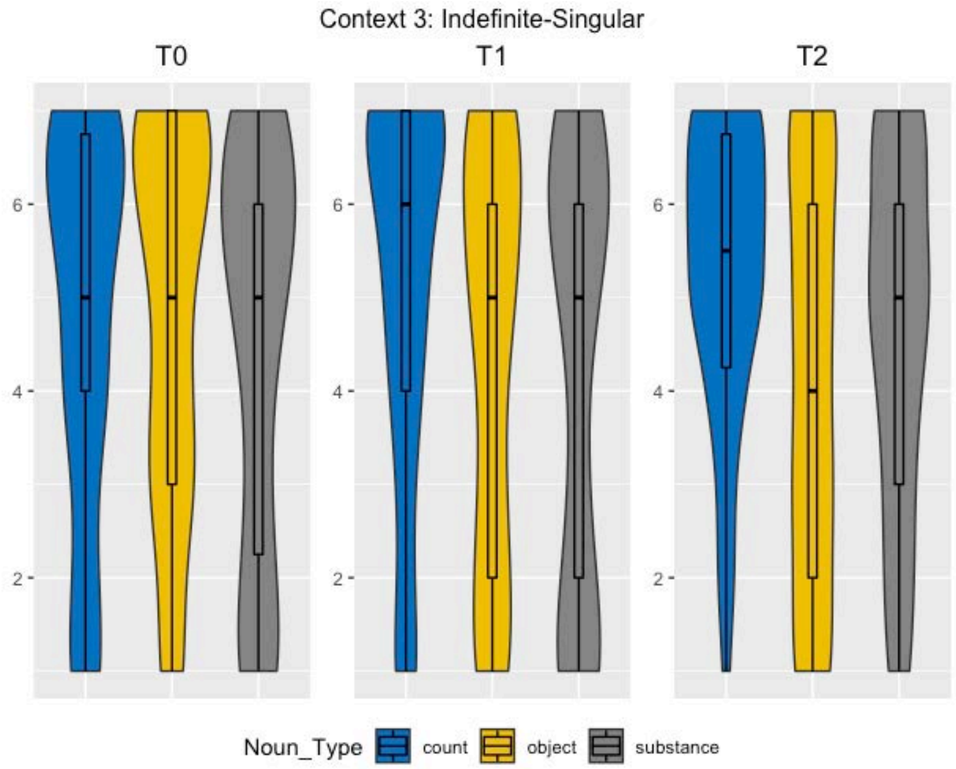

Figure 7.57. Violin plots of mean acceptability ratings for LING learners in Context3

(34) Context 3: indefinite-singular

a. Model 2-A: No significant predictors

b. Model 2-B: No significant predictors

The only changes in mean acceptability ratings from T0 to T1 and T2 are the ratings of countable nouns, but none of the predictors or pairwise comparisons yielded significant differences.

These results suggest that while instruction may have been beneficial (i.e., data tends to trend in the predicted direction), these gains were not significant across testing times regardless of noun type. The models are plotted in Figure 7.58, and the full model outputs can be found in Appendix J.

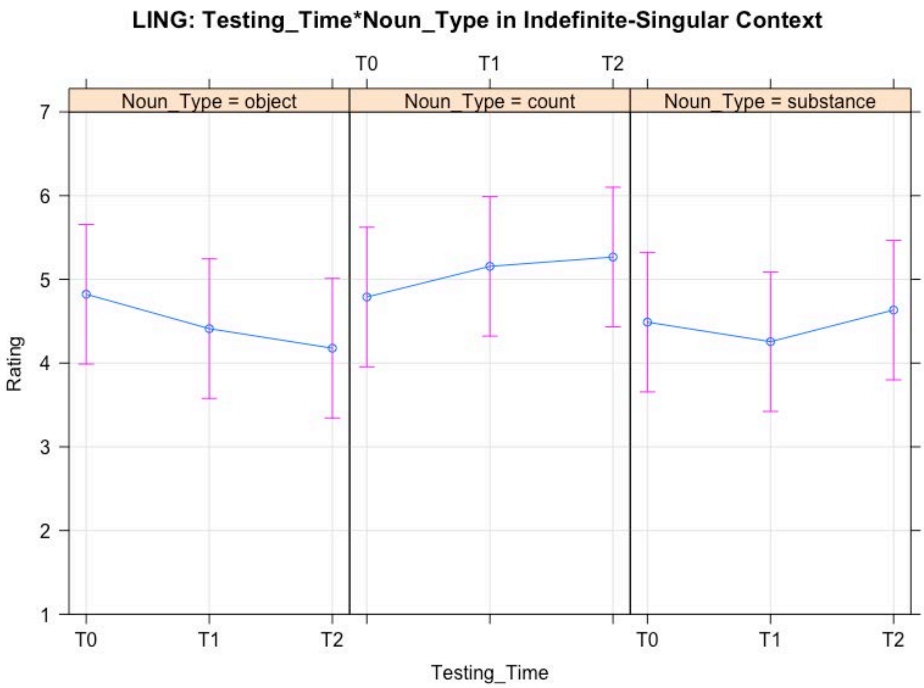

Figure 7.58. Effect plot for acceptability ratings of Testing_Time by Noun_Type for LING learners in Context 3

The next context of investigation is nouns presented in a zero-plural context. In this context, countable nouns are grammatical and uncountable nouns are ungrammatical. The distribution of the data can be found in Figure 7.59. These violin plots show a shift in acceptability ratings from T0 to T1 and T2 for all noun types. For countable nouns, the ratings shift higher from T0 to T1, but spread out from T1 to T2. For both substance- and object-uncountable nouns, we see mean ratings decrease from T0 to T1, but not as much from T1 to T2.

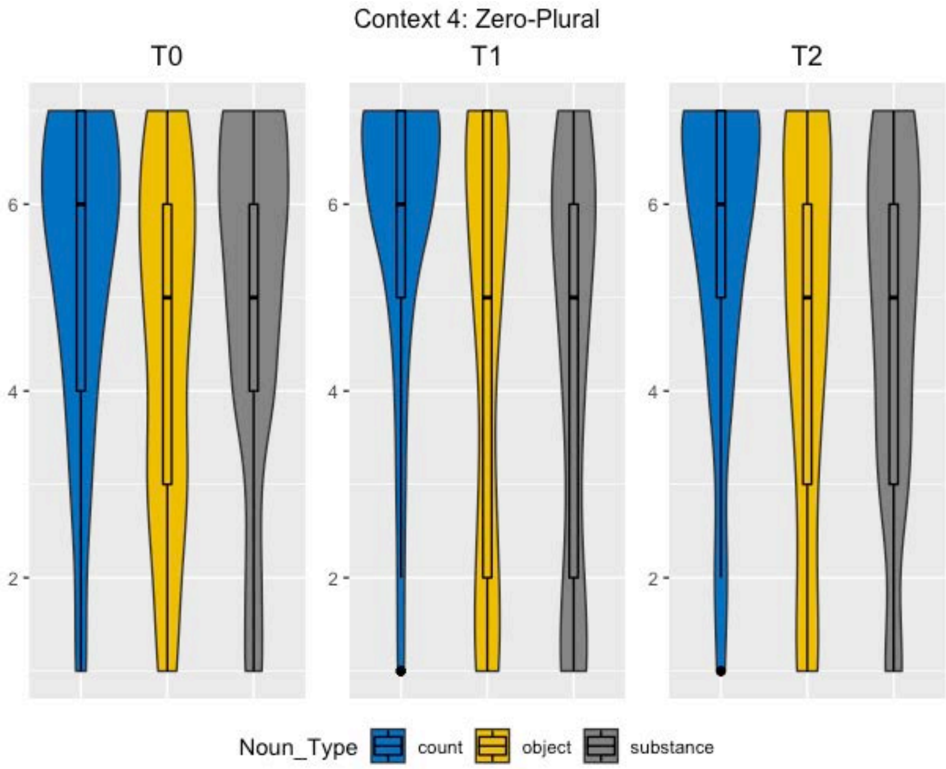

Figure 7.59. Violin plots of mean acceptability ratings for LING learners in Context4

The results of the regression model are summarized in (35).

(35) Context 4: zero-plural

a. Model 2-A:

i. Main effect of Noun_Type:Count ($p < 0.05$)

ii. No significant interaction predictors

b. Model 2-B:

i. Main effect of Noun_Type:Count ($p < 0.01$)

ii. No significant interaction predictors

In this context, zero-plural, the model revealed a significant main effect of Noun_Type:Count ($\beta = 0.76$, $t(18) = 2.14$, $p < 0.05$), suggesting that LING learners rate countable nouns significantly higher than uncountable-object nouns in this context prior to instruction. While there are no significant interactions in Model 2-A, we find a similar significant main effect in Model 2-B. At T1, the model revealed a significant main effect of Noun_Type:Count ($\beta = 1.18$, $t(18) = 3.33$, $p < 0.01$). The coefficients of these models both show the mean difference in acceptability ratings between object-uncountable nouns and countable nouns was significantly greater at T0 than T0. These effects can be seen in Figure 7.60.

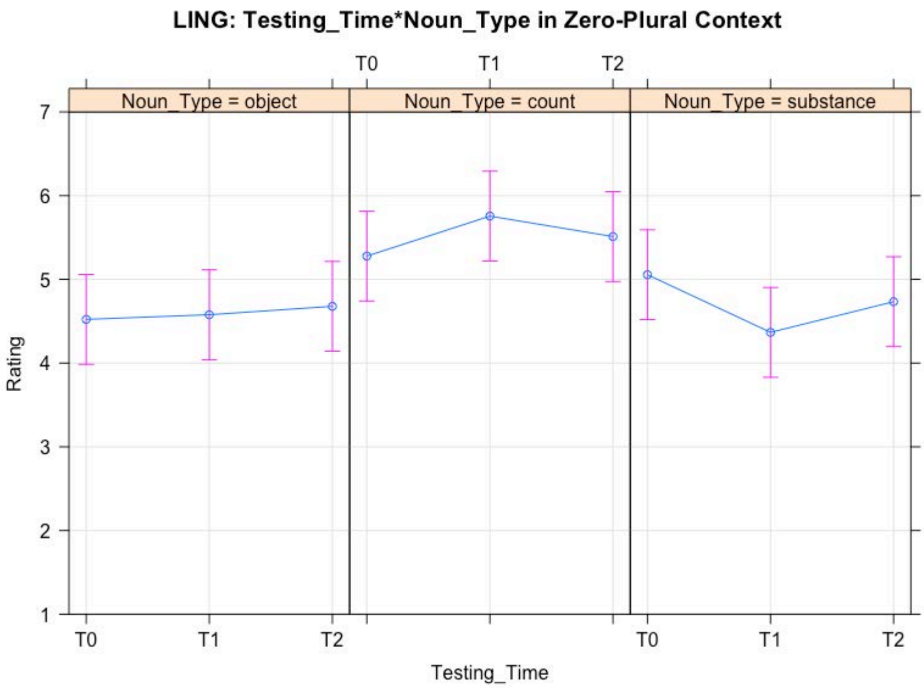

Figure 7.60. Effect plot for acceptability ratings of Testing_Time by Noun_Type for LING learners in Context 4

These effect plots show that after instruction, mean acceptability ratings of both substance- and object-uncountable nouns decrease from T0 to T1, while the acceptability ratings for countable nouns increase. A planned Tukey post-hoc comparison found that at immediate post-test, T1, countable nouns were rated significantly higher than substance-uncountable nouns ($p < 0.05$). These trends in the data do show that there was an immediate effect of instruction for noun types in a zero-plural context, with some of these effects extending into the delayed post-test.

The final context under investigation is zero-singular context. In this context, substance- and object-uncountable nouns are grammatical and countable nouns are ungrammatical. Mean acceptability ratings and standard deviations are displayed in Figure 7.61. In this figure, we can see that from T0 to T1, mean ratings of uncountable nouns shifted to higher acceptability, but these changes were not significant. Furthermore, moving from T1 to T2 shows more variation in the data than T0.

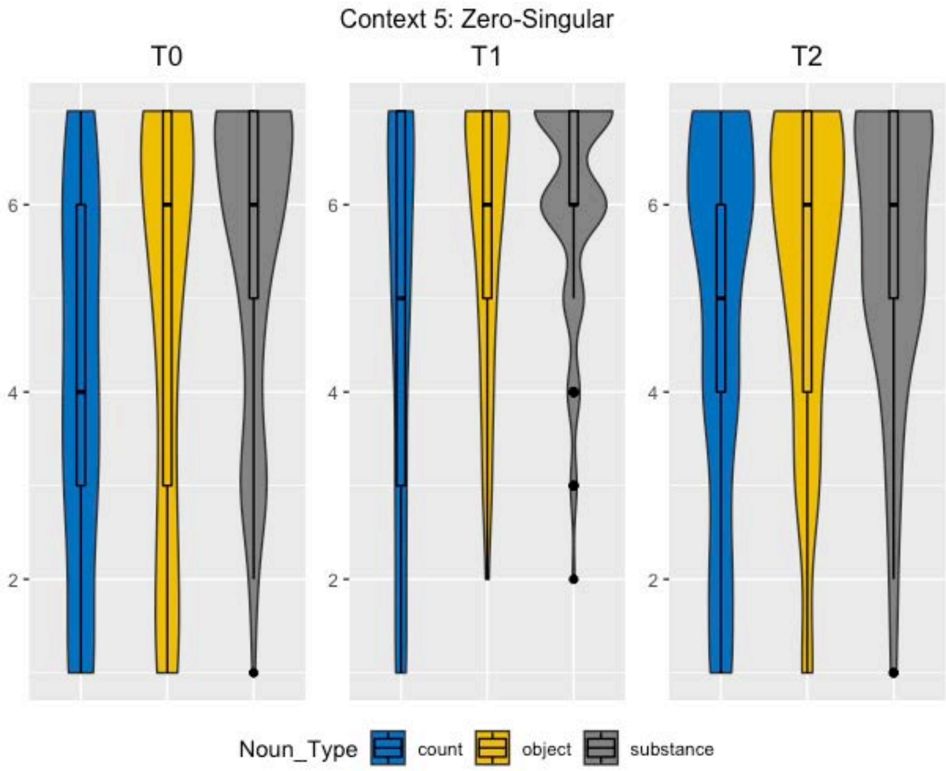

Figure 7.61. Violin plots of mean acceptability ratings for LING learners in Context5

The results of the regression model are summarized in (36).

(36) Context 5: zero-singular

a. Model 2-A: No significant predictors

b. Model 2-B: No significant predictors

The models did not find any significant main effect or interaction predictors. These results suggest that while instruction may have been beneficial (i.e., data tends to trend in the predicted direction for uncountable nouns), these gains were not significant across testing times regardless of noun type. The effect plots can be found in Figure 7.62, and the full model outputs can be found in Appendix J.

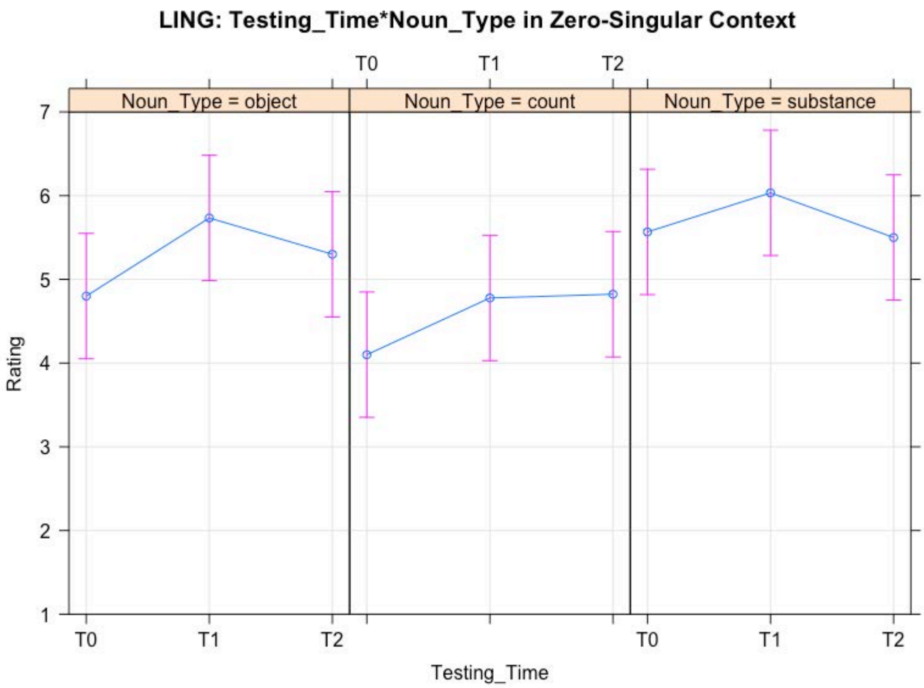

Figure 7.62. Effect plot for acceptability ratings of Testing_Time by Noun_Type for LING learners in Context 5

To summarize the results of research question 2 for LING learners, we see that instruction was most effective for nouns presented in a definite-plural and zero-plural context. Overall, mean ratings in a definite-singular context were high, which is line with predictions due to all combinations being grammatical. Furthermore, even though there is a lack of significant differences in indefinite-singular and zero-singular contexts, the descriptive data does trend in the predicted direction. While instruction was not beneficial in all contexts, we do have to consider to what extent we can realistically predict learners to make linguistic gains with only one hour of instruction. This will be discussed in further detail in Chapter 8.

7.2.2.2 | Traditional Instruction

The means and standard deviations by noun type in each context across testing times for TRAD learners (n = 18) can be found in Table 7.8. The table shows the means by noun type in each context that is analyzed, as well as the total grammatical and ungrammatical article and noun type combinations.

Table 7.8. Means and standard deviations for acceptability ratings for TRAD learners (n = 18) at T0, T1, and T2

		T0		T1		T2	
Context	**Noun_Type**	**M**	**SD**	**M**	**SD**	**M**	**SD**
definite-plural	count	4.94	1.85	4.57	1.60	4.59	1.85
	* object	5.33	1.43	5.35	1.63	4.35	1.63
	* substance	5.04	1.70	4.85	1.63	4.44	1.59
definite-singular	count	4.81	1.84	4.96	1.66	5.22	1.37
	object	4.65	1.94	5.11	1.89	5.17	1.53
	substance	5.30	1.70	5.35	1.57	4.81	1.58
indefinite-singular	count	5.11	1.60	4.85	1.70	5.19	1.43
	* object	5.20	1.77	4.76	2.00	4.20	1.64
	* substance	4.15	2.12	4.91	1.72	4.57	1.60
zero-plural	count	5.46	1.66	5.59	1.43	5.22	1.53
	* object	4.59	2.11	4.80	1.88	4.61	1.75
	* substance	4.67	1.93	4.72	1.57	4.96	1.48
zero-singular	* count	3.94	2.07	4.76	1.85	4.94	1.66
	object	4.69	1.94	5.28	1.52	5.02	1.49
	substance	5.43	1.63	4.93	1.77	5.15	1.35
	grammatical	5.06	1.83	5.04	1.81	5.08	1.72
	ungrammatical	4.61	1.99	4.87	1.85	4.48	1.91

** ungrammatical context and noun type combination*

With regard to nouns presented in a definite-plural context, acceptability ratings of all noun types decrease over the course of the study. In a definite-singular context, ratings for both countable and object-uncountable nouns increased but decreased for substance-uncountable nouns. There are some surprising results with noun types in an indefinite-singular context. For countable nouns, there is a sharp decrease from T0 to T1, but an overall increase from T0 to T2. For object-uncountable nouns, there is a decrease from T0 to T1 and T2. For substance-uncountable nouns, there is an increase in mean acceptability ratings from T0 to T1 and T2. In the zero-plural context, there was an increase in ratings of countable nouns from T0 to T1 but a decrease from T0 to T2. Object-uncountable nouns decrease in mean acceptability ratings in this context, but substance-uncountable nouns increase. As for the zero-singular context, countable nouns are rated very low at T0, but those ratings increase over time. The mean ratings for object-uncountable nouns increase, while the ratings for substance-uncountable nouns decrease, which is unexpected.

Overall, acceptability ratings of grammatical items stayed about the same across testing times. With regard to ungrammatical items, the acceptability scores actually increased from T0 to T1 but decreased from T0 to T2.

The first context under analysis is definite-plural. In this context, countable nouns are grammatical, while substance- and object-uncountable nouns are ungrammatical. The violin plots that show the distribution of ratings across time can be found in Figure 7.63.

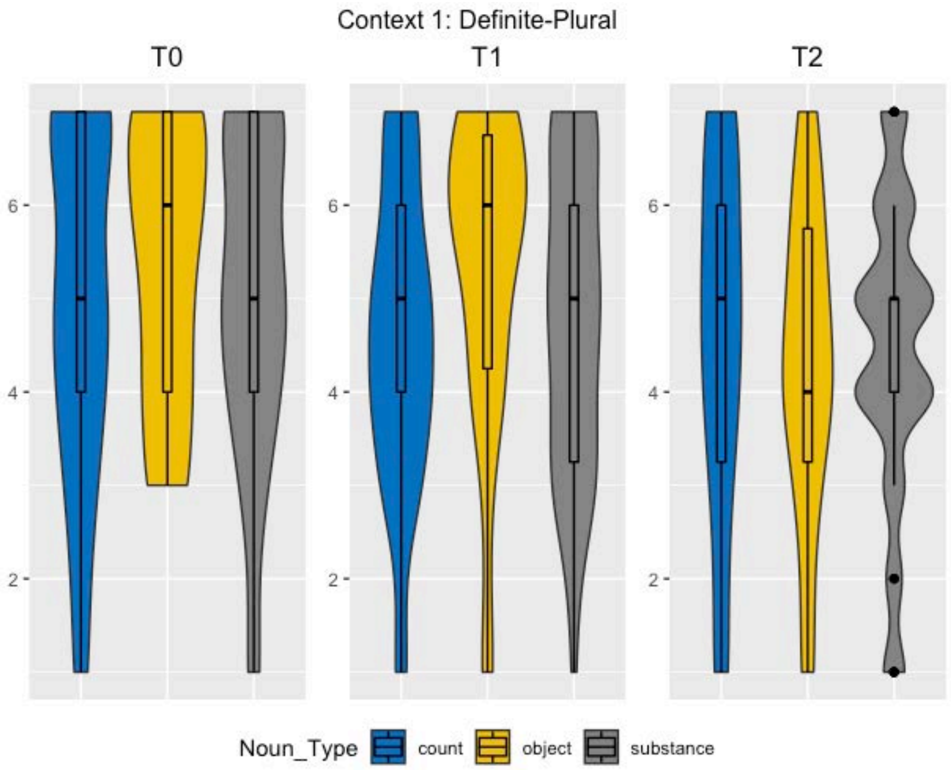

Figure 7.63. Violin plots of mean acceptability ratings for TRAD learners in ContexT1

The results of the regression model are summarized in (37)

(37) Context 1: definite-plural

a. Model 2-A:

   i. Main effect of Testing_Time:T2 ($p < 0.05$)

   ii. No significant interaction predictors

b. Model 2-B:

   i. Main effect of Testing_Time:T2 ($p < 0.05$)

   ii. No significant interaction predictors

Model 2-A revealed a significant main effect of Testing_Time:T2 (β = -0.98, $t(18)$ = -2.30, p < 0.05), suggesting that TRAD learners rated object-uncountable nouns significantly different from T0 to T2. Model 2-B also found a main effect of Testing_Time:T2 (β = -1.00, $t(18)$ = -2.35, p < 0.05). This effect again shows that TRAD learners rated object-uncountable nouns significantly different but this time from T1 to T2. These effects can be seen in Figure 7.64.

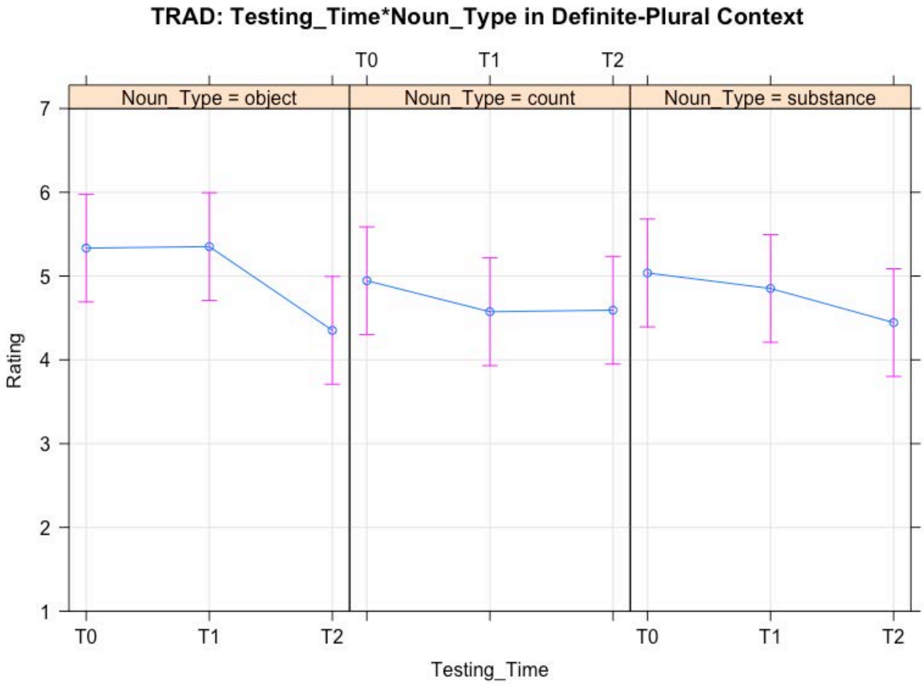

Figure 7.64. Effect plot for acceptability ratings of Testing_Time by Noun_Type for TRAD learners in Context 1

These effect plots show that immediately following instruction (T1) there was no significant change in the ratings of noun types in a definite-plural context. The post-hoc pairwise comparisons found no significant differences in how TRAD learners rated noun types in a definite-plural context over time.

The next context under investigation is definite-singular. As mentioned before, all noun types are grammatical in a definite-singular context. The descriptive statistics are plotted in Figure 7.65.

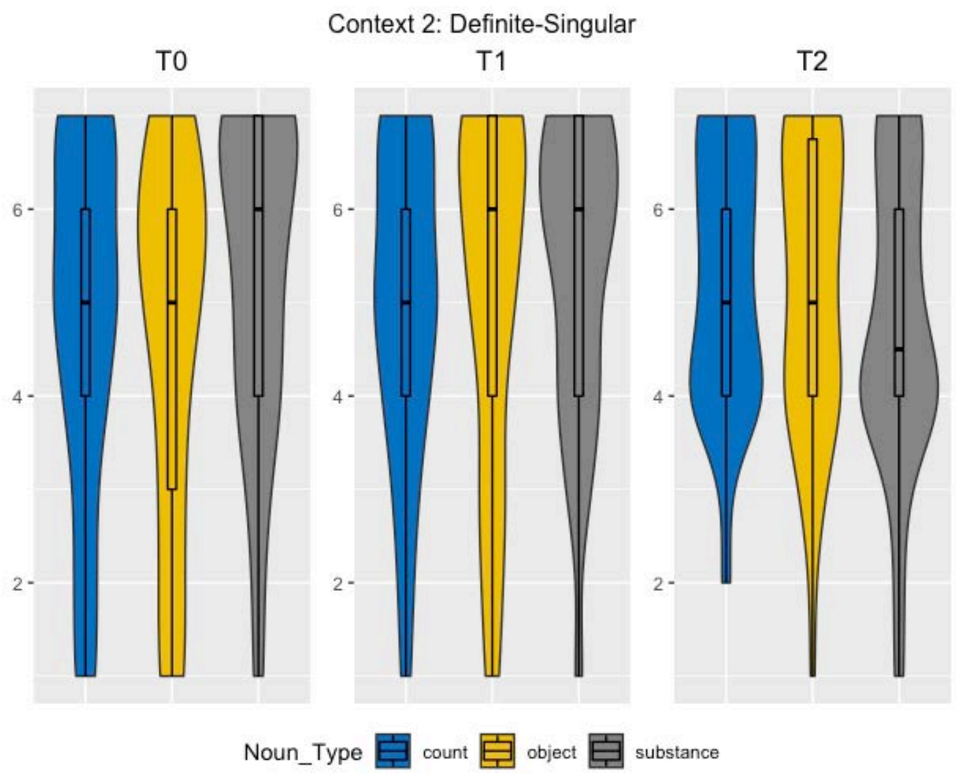

Figure 7.65. Violin plots of mean acceptability ratings for TRAD learners in ContexT2

For the definite-singular context, there the regression model did not return any significant predictors as summarized in (38) and plotted in Figure 7.66.

(38) Context 2: definite-singular

a. Model 2-A: No significant predictors

b. Model 2-B: No significant predictors

In Figure 7.66, it can be observed that from T0 to T1, there is a trend for the ratings to be slightly higher immediately following instruction, but this was not significant. The mean ratings for object-uncountable and countable nouns appear to continue increasing from T1 to T2, but, once again, these were not significant increases.

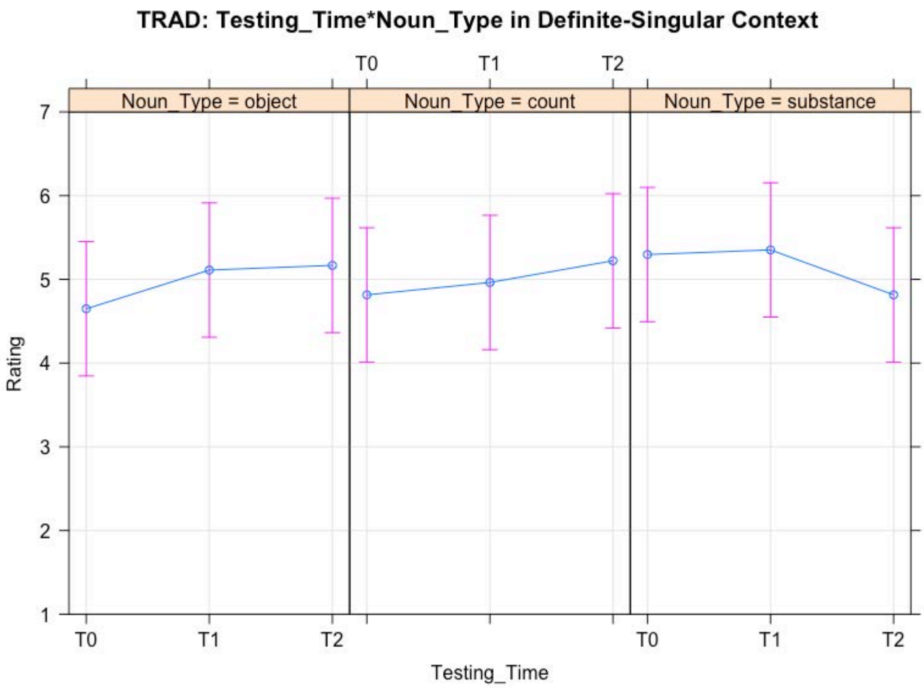

Figure 7.66. Effect plot for acceptability ratings of Testing_Time by Noun_Type for TRAD learners in Context 2

The third context under investigation is indefinite-singular. In an indefinite-singular context, only countable nouns are grammatical. The descriptive statistics are plotted in Figure 7.67.

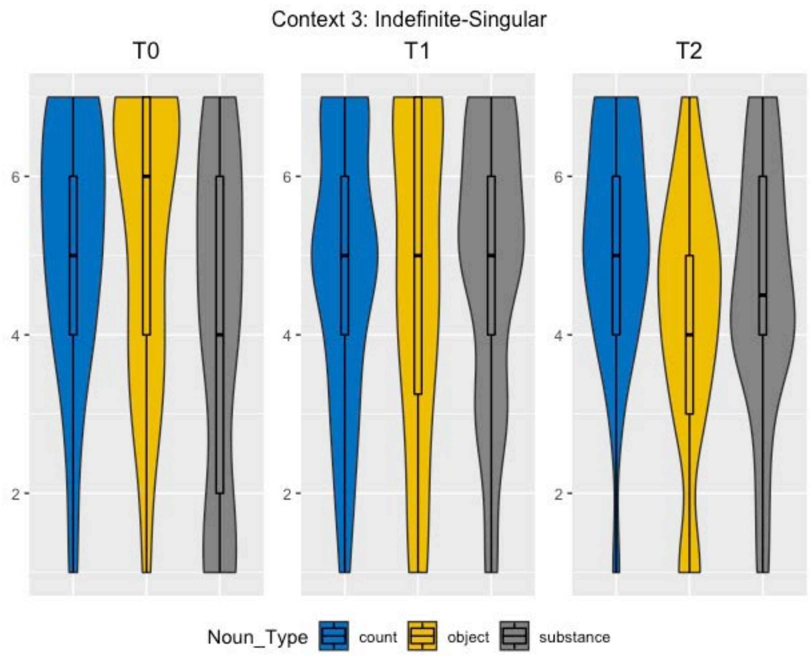

Figure 7.67. Violin plots of mean acceptability ratings for TRAD learners in Context3

The results of the linear model for nouns presented in an indefinite-singular context are summarized in (39).

(39) Context 3: indefinite-singular

a. Model 2-A:

i. Main effect of Testing_Time:T2 ($p < 0.05$)

ii. Main effect of Noun_Type:Substance ($p < 0.05$)

iii. Interaction of Testing_Time:T2*Noun_Type:Substance ($p < 0.05$)

b. Model 2-B: No significant predictors

Model 2-A found a significant main effect of Testing_Time:T2 ($\beta = -1.00$, $t(18) = -2.11$, $p < 0.05$) which shows that TRAD learners rated uncountable-object nouns significantly lower at T2 than T0. This model also found a significant main effect of Noun_Type:Substance ($\beta = -1.60$, $t(18) = -2.23$, $p < 0.05$), indicating that substance-uncountable nouns are rated significantly lower than object-uncountable nouns at T0. One significant interaction was also revealed for Testing_Time:T2 by Noun_Type:Substance ($\beta = 1.43$, $t(18) = 2.13$, $p < 0.05$), which states that object-uncountable nouns and substance-uncountable nouns are treated significantly more different at T2 than T0. Model 2-B did not reveal any significant main effects or interaction predictors. The effects are plotted in Figure 7.68.

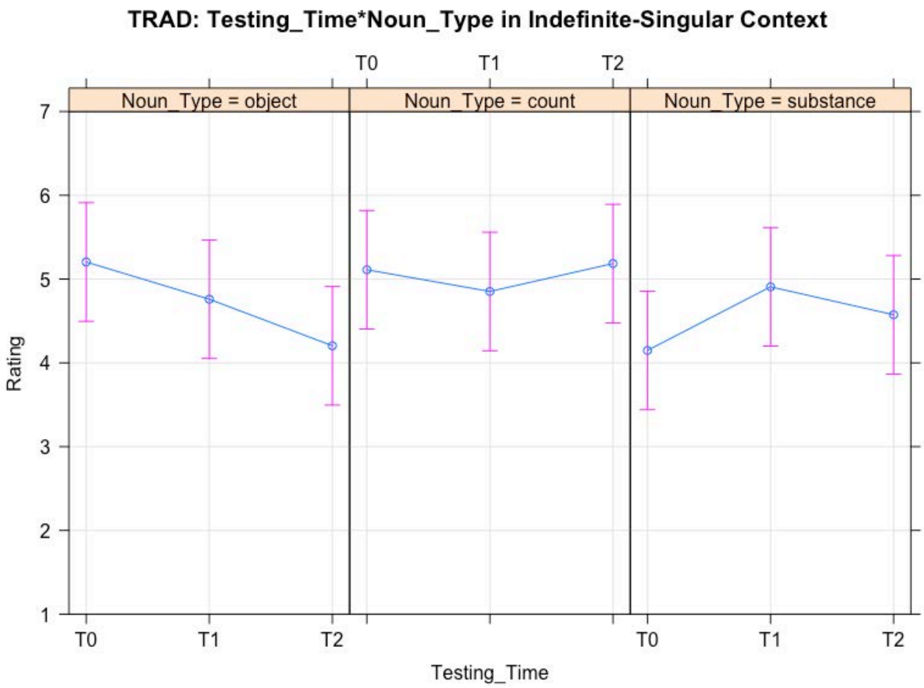

Figure 7.68. Effect plot for acceptability ratings of Testing_Time by Noun_Type for TRAD learners in Context 3

As can be seen in the effect plot, ratings for object-uncountable in this context decrease from T0 to T1, while they increase for substance uncountable nouns. This suggests that this form of instruction may have been beneficial for object-uncountable nouns, but not substance uncountable nouns since they trend in the opposite direction. There is a slight decrease in ratings of countable nouns from T0 to T1. There were not significant findings in the post-hoc pairwise comparisons.

The fourth context under investigation is zero-plural. In this context, only countable nouns are grammatical as uncountable nouns do not have a plural form. The descriptive statistics are plotted in Figure 7.69.

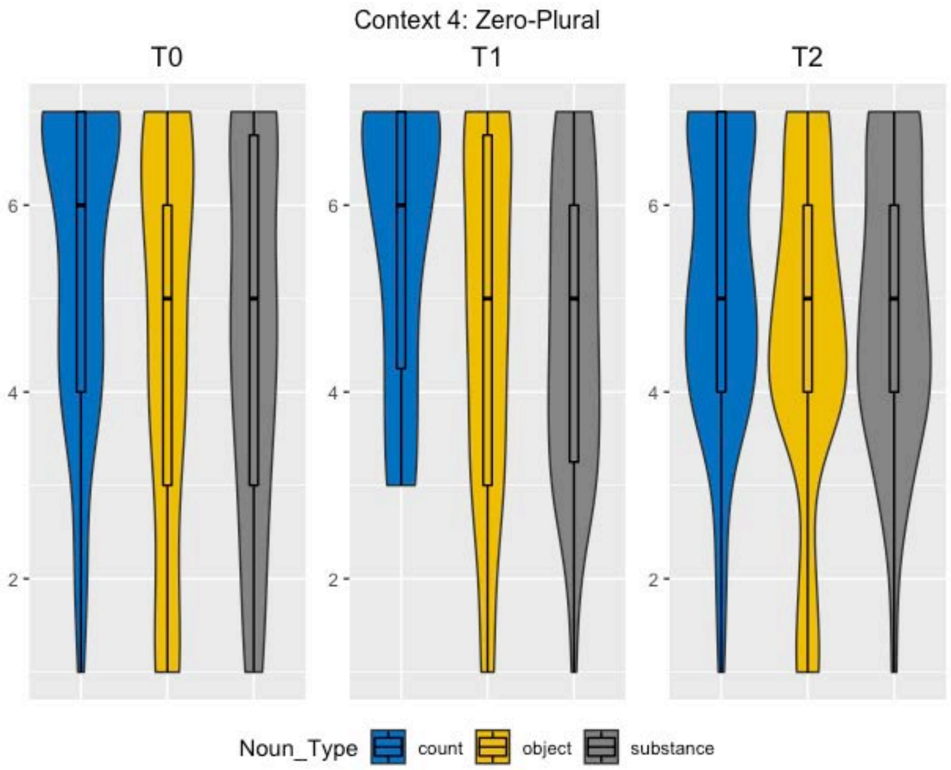

Figure 7.69. Violin plots of mean acceptability ratings for TRAD learners in Context4

The results of the regression model are summarized in (40).

(40) Context 4: zero-plural

a. Model 2-A:

i. Main effect of Noun_Type:Count ($p < 0.05$)

ii. No significant interaction predictors

b. Model 2-B:

i. Main effect of Noun_Type:Count ($p < 0.05$)

ii. No significant interaction predictors

Model 2-A revealed a main effect of Noun_Type:Count at T0 (β = 0.87, $t(18)$ = 2.56, $p < 0.05$), and Model 2-B revealed a main effect of Noun_Type:Count at T1 (β = 0.80, $t(18)$ = 2.34, $p < 0.05$). Both of these main effects suggest that object-uncountable nouns are rated significantly lower than countable nouns at both of these testing times. While the T0 effect was not predicted, the T1 effect suggests that instruction may have been beneficial in assisting learners in recognizing that countable nouns are grammatical in a zero-plural context. These results can be visualized in Figure 7.70.

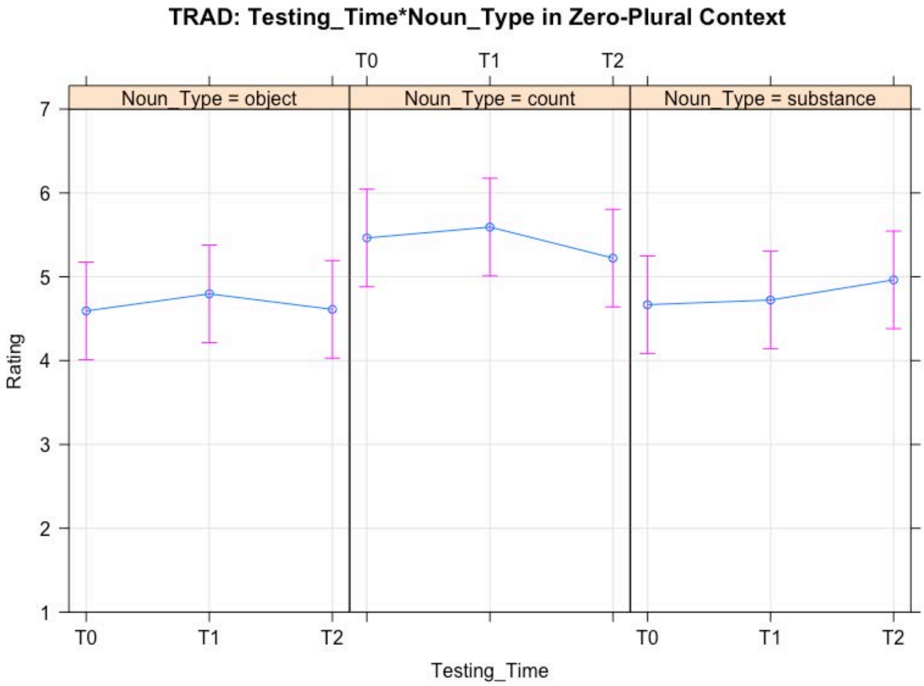

Figure 7.70. Effect plot for acceptability ratings of Testing_Time by Noun_Type for TRAD learners in Context 4

A Tukey post-hoc pairwise comparisons did not yield any additional significant differences. Being as there is no main effect of testing time or interaction with testing time, these results suggest that instruction may not have been beneficial for noun types in this context.

The final context under investigation is zero-singular. In this context, only uncountable noun types (both substance and object) are grammatically acceptable. The descriptive statistics are plotted in Figure 7.71.

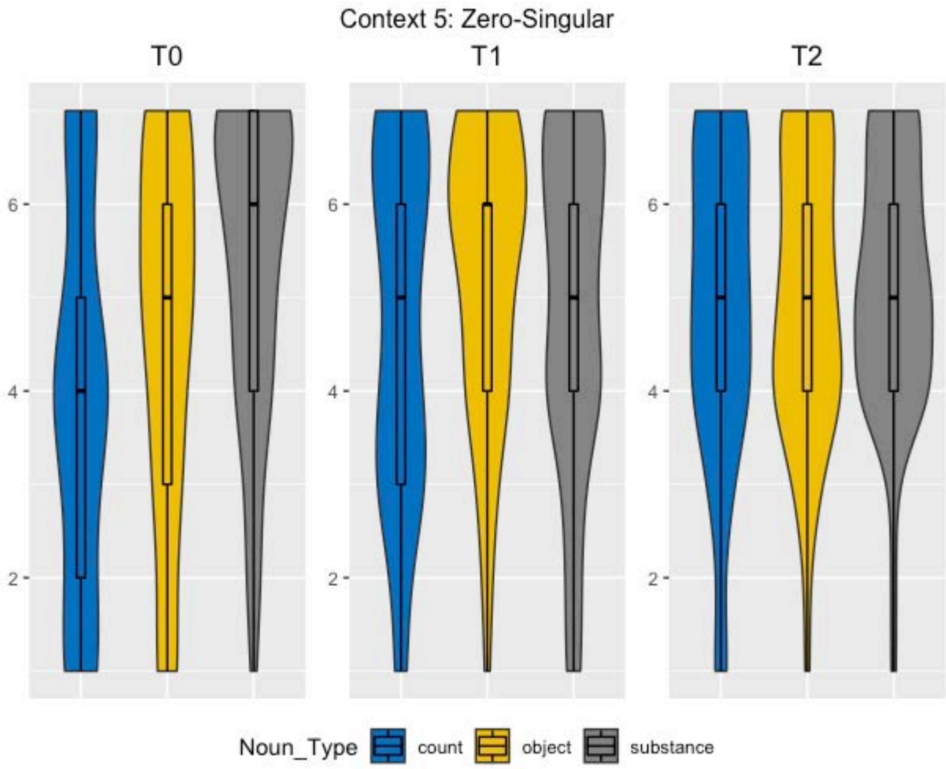

Figure 7.71. Violin plots of mean acceptability ratings for TRAD learners in Context5

The results of the linear regression are summarized in (41).

(41) Context 5: zero-singular

a. Model 2-A: No significant predictors

b. Model 2-B: No significant predictors

This model did not find any significant predictors, and, therefore, the post-hoc pairwise comparisons were non-significant as well.

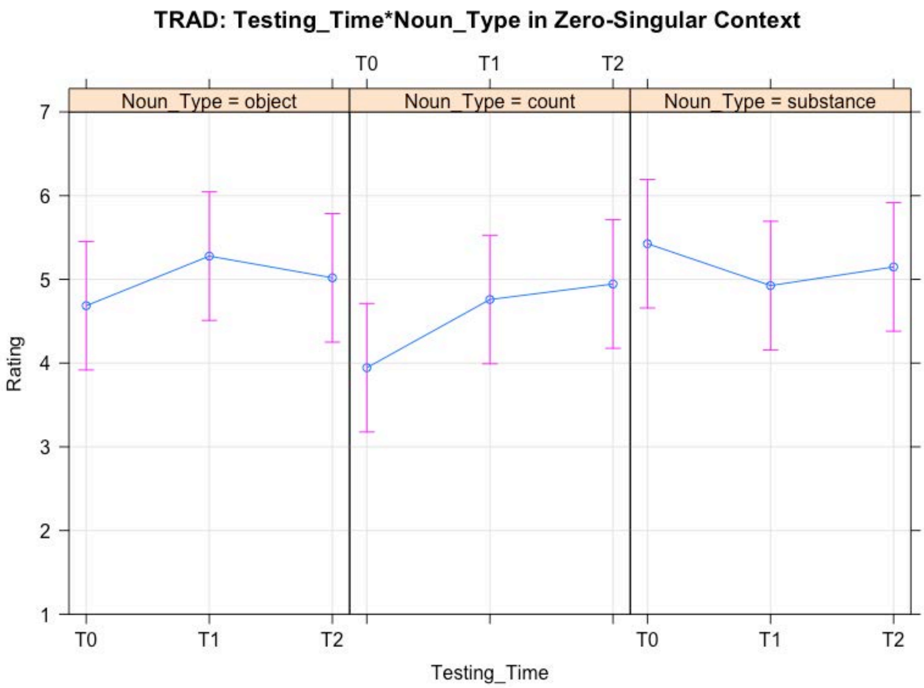

Figure 7.72. Effect plot for acceptability ratings of Testing_Time by Noun_Type for TRAD learners in Context 5

In summary, we found that object-uncountable nouns were rated significantly lower at T2, than T0 and T1 in a definite-plural context. While this is to be expected because uncountable nouns are ungrammatical in this context, we did not observe a similar effect immediately following instruction, suggesting that the explicit instruction administered in the study may not have contributed to this linguistic change. Furthermore, when nouns were presented in an indefinite-singular context, we found that ratings for object-uncountable were significantly lower at T2 than T0. We also found that TRAD learners rated substance-uncountable nouns much higher than object-uncountable nouns in this context at T0, and the comparisons between these two noun types were significantly different from T0 to T2. In a zero-plural context, we found that TRAD learners rated object-uncountable nouns significantly lower than countable nouns, but there was no interaction of time in this model. There were two contexts, definite-singular and zero-singular, were no significant predictors were found whatsoever. In the next section, we explore noun types in these contexts for learners who did not receive any extra instruction on L2-English articles and noun types.

7.2.2.3 | No Extra Instruction

Finally, the NOEX learners (n = 17) received no additional instruction on L2-English articles and noun types. The means and standard deviations can be seen in Table 7.9.

Table 7.9. Means and standard deviations for acceptability ratings for NOEX learners (n = 17) at T0, T1, and T2

		T0		**T1**		**T2**	
Context	**Noun_Type**	**M**	**SD**	**M**	**SD**	**M**	**SD**
definite-plural	count	4.59	2.21	5.24	1.82	4.55	2.00
	* object	5.82	1.48	5.76	1.35	5.02	1.88
	* substance	5.75	1.64	5.53	1.32	4.96	1.73
definite-singular	count	4.49	2.20	5.12	1.74	4.88	1.73
	object	5.00	2.05	5.20	1.92	5.10	1.66
	substance	5.39	1.82	5.33	1.70	4.55	1.87
indefinite-singular	count	4.84	2.04	4.90	1.73	5.12	1.69
	* object	5.51	1.83	5.14	1.64	5.00	1.92
	* substance	4.98	1.97	4.65	1.97	4.75	1.83
zero-plural	count	5.22	2.06	5.43	1.70	4.73	1.63
	* object	4.90	1.88	5.27	1.80	4.90	1.87
	* substance	4.76	2.11	5.49	1.51	4.88	1.85
zero-singular	* count	4.51	2.24	4.92	2.05	4.82	2.06
	object	4.84	2.12	5.18	1.84	5.49	1.49
	substance	6.02	1.36	5.31	1.67	5.18	1.71
	grammatical	5.28	1.89	5.30	1.67	5.06	1.69
	ungrammatical	5.17	1.90	5.29	1.64	4.94	1.84

** ungrammatical context and noun type combination*

In the definite-plural context, there is a sharp increase in acceptability ratings for countable nouns from T0 to T1, but that reverts to nearly the original value at T2. For object-uncountable and substance-uncountable nouns, there is a sudden decrease in ratings from T1 to T2. For nouns presented in a definite-singular context, there is an increase for countable nouns and object-uncountable nouns, but a decrease for substance-uncountable nouns. Countable nouns presented in an indefinite-singular context increase from T0 to T1 and T2, while object-uncountable and substance-uncountable nouns decrease. In a zero-plural context, countable nouns increase in mean ratings from T0 to T1 but decrease from T0 to T2. Object-uncountable nouns show an increase in ratings from T0 to T1, but no change from T0 to T2, but substance-uncountable nouns decrease from T0 to T1 and T2. For nouns presented in a zero-singular context, countable and object-uncountable nouns both increase from T0 to T1 and T2, but substance nouns decrease in those same periods. In looking at the overall grammatical versus ungrammatical trends, we see that the trend from T0 to T1 for both grammatical and ungrammatical was an increase in mean acceptability ratings, while from T0 to T2 the mean acceptability ratings decreased. At all three testing times, there does not appear to be much difference between the ratings of grammatical and ungrammatical items.

The first context under analysis is definite-plural. In this context, countable nouns are grammatical, while substance- and object-uncountable nouns are ungrammatical. These data are summarized in the violin plots in Figure 7.73. As can be seen here, the mean acceptability ratings for object- and substance-uncountable nouns increase from T0 to T1, which means they are becoming *more accepting* of these noun types in a definite-plural context at the immediate post-test.

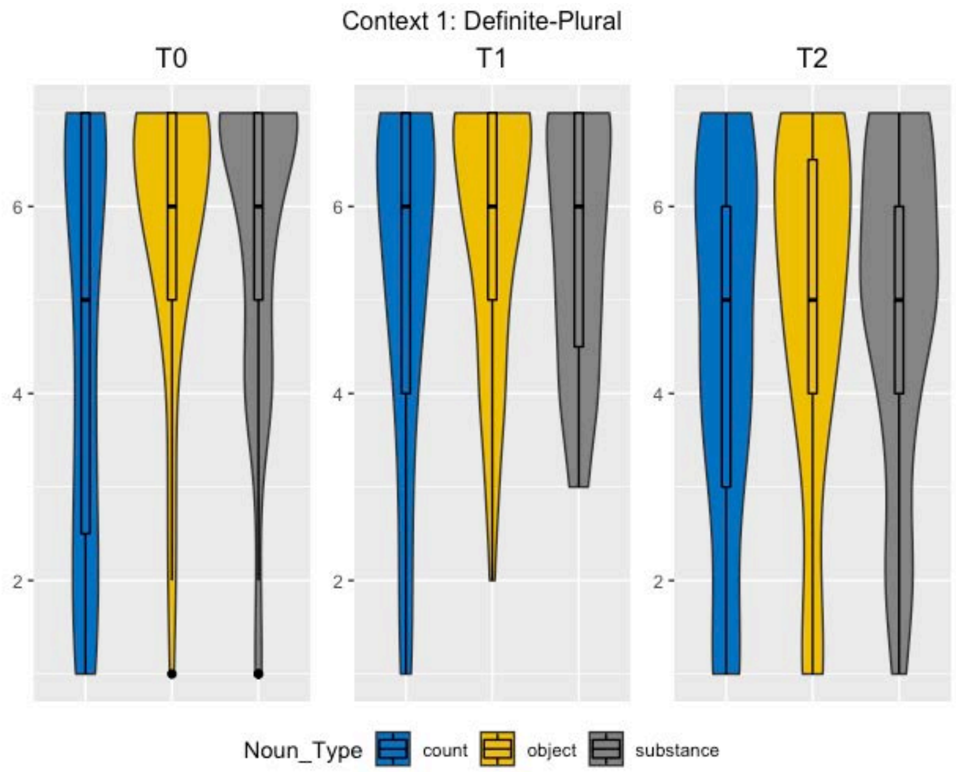

Figure 7.73. Violin plots of mean acceptability ratings for NOEX in Context 1

The results of the regression model are summarized in (42).

(42) Context 1: definite-plural

a. Model 2-A:

i. Main effect of Testing_Time:T2 ($p < 0.05$)

ii. Main effect Noun_Type:Count ($p < 0.01$)

iii. No significant interaction predictors

b. Model 2-B:
   i. Main effect of Testing_Time:T2 ($p < 0.05$)
   ii. No significant interaction predictors

Model 2-A found a significant main effect of Testing_Time:T2 ($\beta = -0.80$, $t(18) = -2.36$, $p < 0.05$), suggesting that object-uncountable nouns are rated significantly higher at T0 than T2. This model also found a significant main effect of Noun_Type:Count ($\beta = -1.24$, $t(18) = -3.63$, $p < 0.01$), indicating that countable nouns were rated significantly lower than object-uncountable nouns at T0, which suggests the presence of L1 features in the L2. Model 2-B also revealed a significant main effect of Testing_Time:T2 ($\beta = -0.75$, $t(18) = -2.19$, $p < 0.05$), suggesting that object-uncountable nouns are rated significantly higher at T1 than T2. While this group did not receive any instruction, the shift of object-uncountable noun ratings to lower scores across time suggests that the learners are recognizing that these nouns are less acceptable in a definite-plural context.

These effects and interactions are plotted in Figure 7.74.

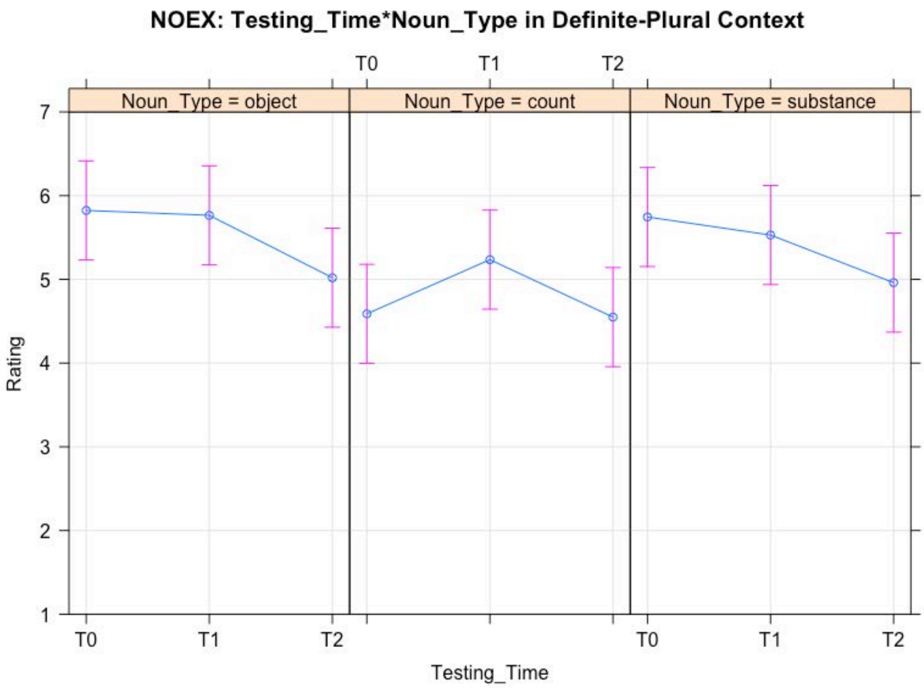

Figure 7.74. Effect plot for acceptability ratings of Testing_Time by Noun_Type for NOEX learners in Context 1

At T0, the model found that NOEX learners rate object-uncountable nouns significantly higher than countable nouns. The post-hoc pairwise confirmed this but failed to yield a significant difference in ratings for substance-uncountable nouns and countable nouns at T0 ($p = 0.0615$).

While ratings for countable nouns increase from T0 to T1, this was non-significant, and these ratings nearly revert to their original values at T2. Both substance- and object-uncountable nouns trend downward from T0 to T1 and T2, but these changes are not always significant.

The next context under investigation is definite-singular. In this context, all noun types are grammatical, so we do not expect to find any significant differences in acceptability ratings. The descriptive statics are plotted in Figure 7.75.

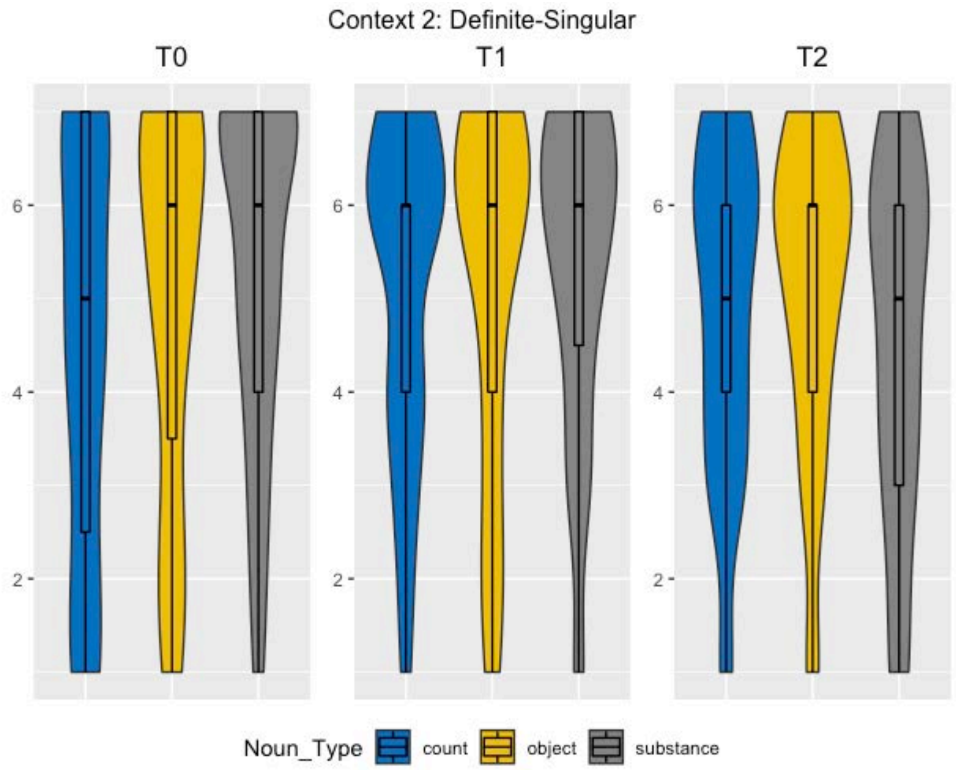

Figure 7.75. Violin plots of mean acceptability ratings for NOEX in Context 2

The regression models are summarized in (43).

(43) Context 2: definite-singular

a. Model 2-A: No significant predictors

b. Model 2-B: No significant predictors

As can be seen here, these models did not produce any significant main effect or significant interaction predictors. The effect plots can be found in Figure 7.76.

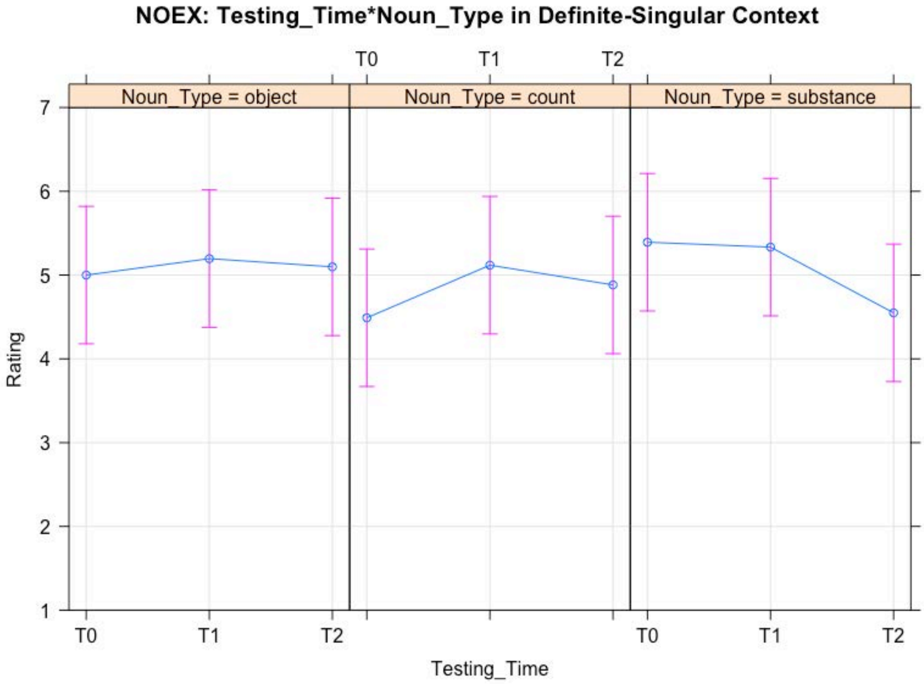

Figure 7.76. Effect plot for acceptability ratings of Testing_Time by Noun_Type for NOEX learners in Context 2

The third context under investigation is indefinite-singular. In this context, countable nouns are grammatical, while uncountable nouns are ungrammatical. The distribution of acceptability ratings and descriptive statistics can be found in Figure 7.77.

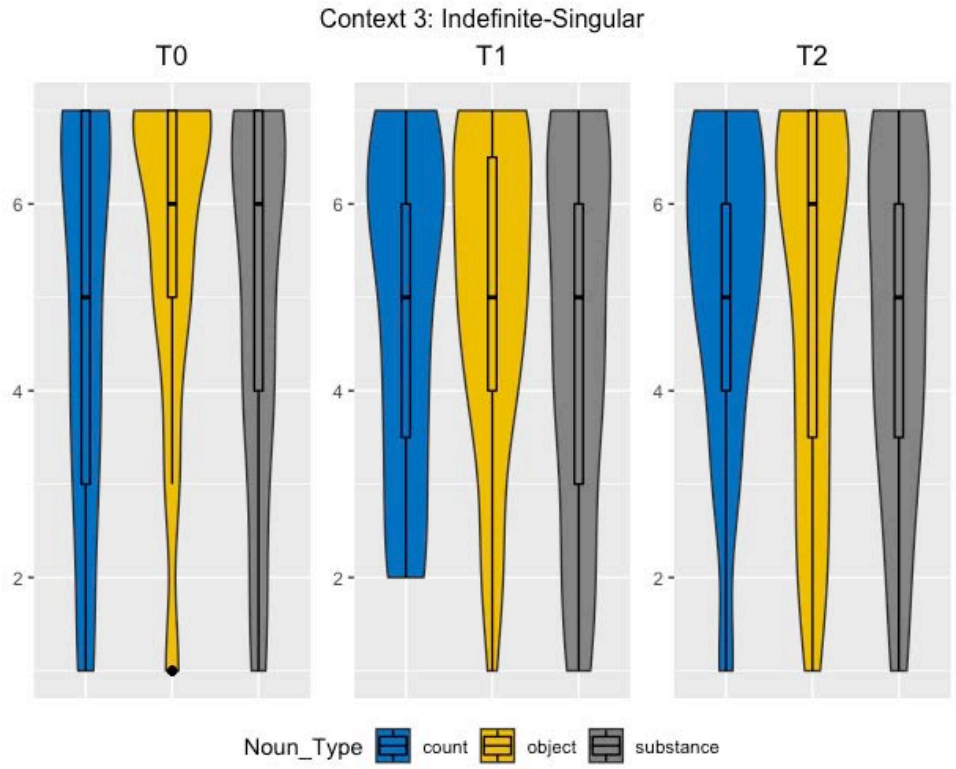

Figure 7.77. Violin plots of mean acceptability ratings for NOEX in Context

The results of the linear regression models are summarized in (44)

(44) Context 3: indefinite-singular

a. Model 2-A: No significant predictors

b. Model 2-B: No significant predictors

As can be seen here, these models did not produce any significant main effect or significant interaction predictors. The effect plots can be found in Figure 7.78.

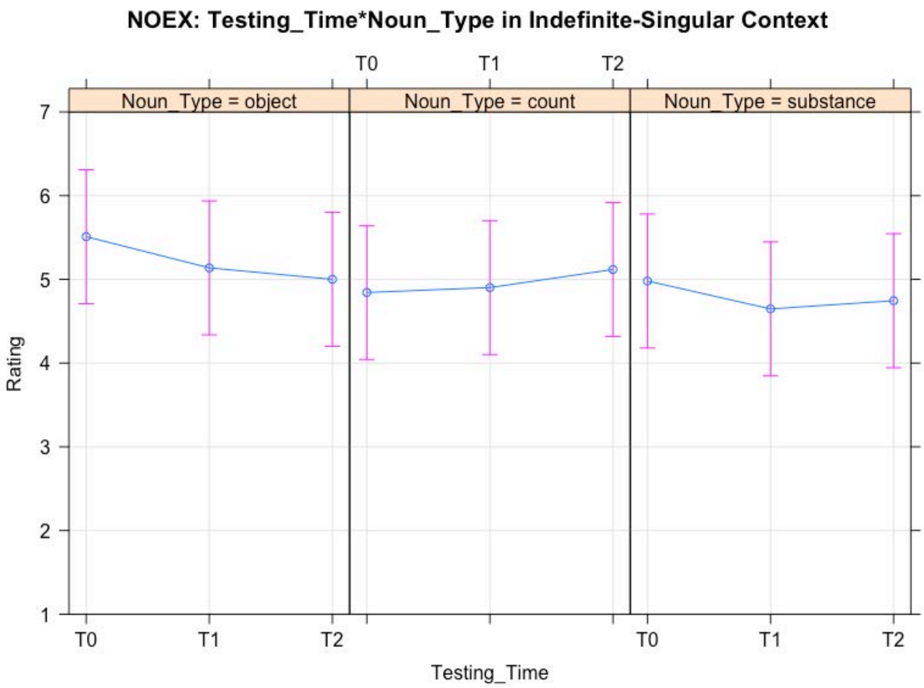

Figure 7.78. Effect plot for acceptability ratings of Testing_Time by Noun_Type for NOEX learners in Context 3

The fourth context under investigation is zero-plural context. In this context, countable nouns are grammatical and uncountable nouns are ungrammatical. The distribution of mean acceptability ratings can be found in the violin plots in Figure 7.79.

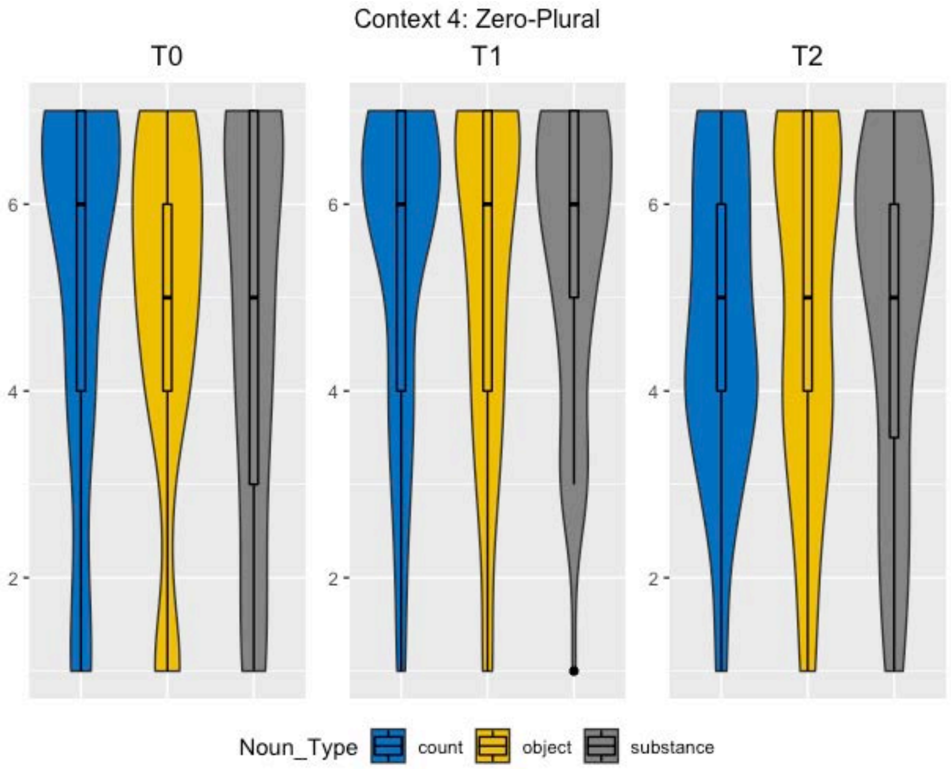

Figure 7.79. Violin plots of mean acceptability ratings for NOEX in Context 4

The model did not find any significant predictors, as summarized in (45) below.

(45) Context 4: zero-plural

a. Model 2-A: No significant predictors

b. Model 2-B: No significant predictors

The effects of these models are presented in Figure 7.80.

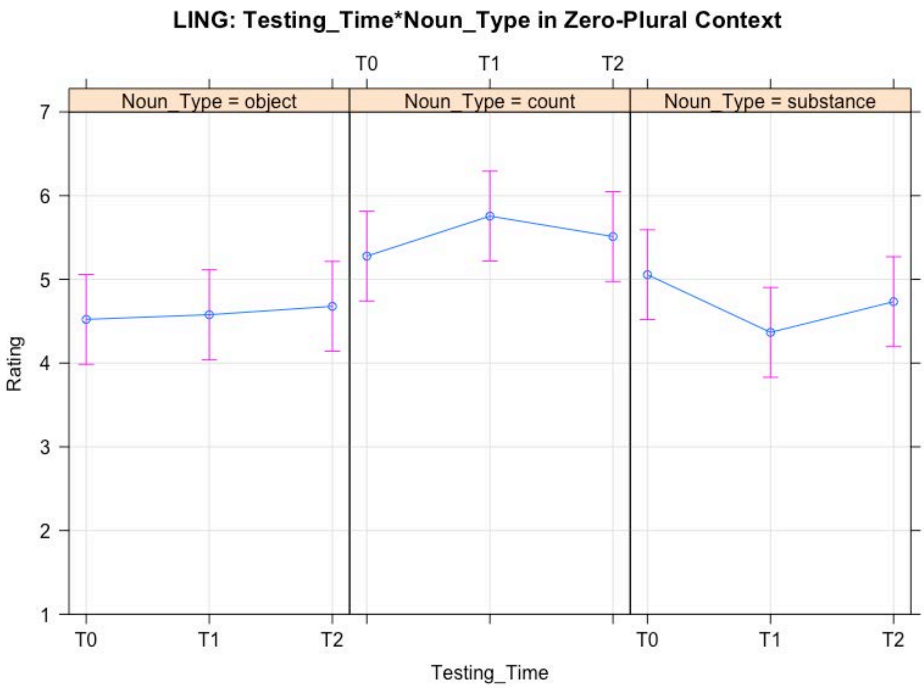

Figure 7.80. Effect plot for acceptability ratings of Testing_Time by Noun_Type for NOEX learners in Context 4

Neither the models nor pairwise comparisons yielded any significant differences for nouns presented in definite-singular, indefinite-singular, or zero-plural contexts.

The final context under investigation is zero-singular. In this context, countable nouns are ungrammatical, while substance- and object-uncountable nouns are grammatical. The results of the model are summarized in (46).

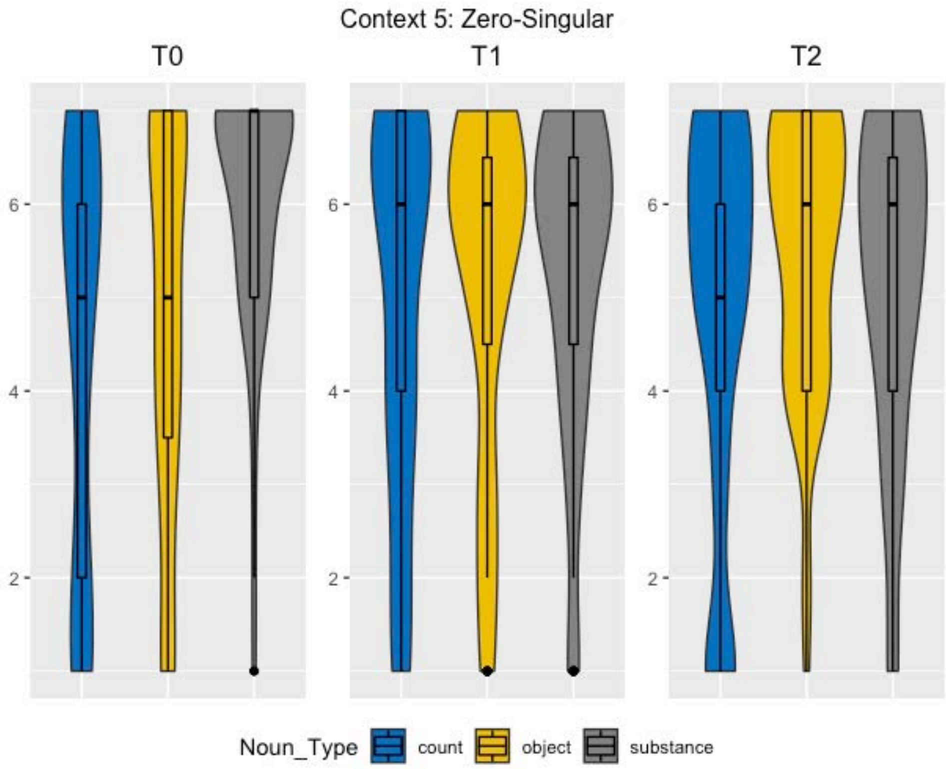

Figure 7.81. Violin plots of mean acceptability ratings for NOEX in Context 5

(46) Context 5: zero-singular

a. Model 2-A:

i. Main effect of Noun_Type:Substance ($p < 0.05$)

ii. No significant interaction predictors

b. Model 2-B: No significant predictors

This model found a main effect of substance-uncountable nouns at T0, but no other significant predictors at T0, T1 or T2. These effects are plotted in Figure 7.82.

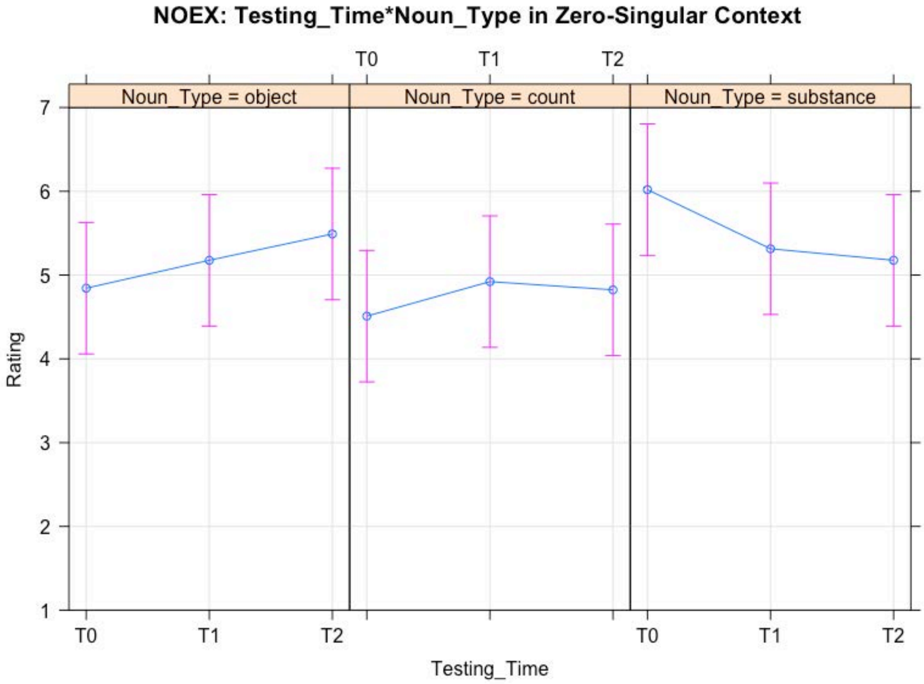

Figure 7.82. Effect plot for acceptability ratings of Testing_Time by Noun_Type for NOEX learners in Context 5

This model found that NOEX learners rated substance-uncountable nouns in a zero-singular context significantly higher than object-uncountable nouns at T0 ($p < 0.05$). A post-hoc Tukey pairwise comparison did not find any significant interactions between noun types and testing time. In looking at the plots, we see that ratings for substance-uncountable nouns decrease across time but increase for object-uncountable nouns.

To summarize the results, we found significant main time effects for nouns in definite-plural and zero-singular contexts for NOEX learners, but the model failed to produce any significant interactions for any noun types and testing times in all contexts. We now turn our attention to RQ3, which investigates the comparison between linguistic gains of each group across the course of the study.

7.2.3 | Research Question 3: Between Group Analysis of L2 Linguistic Gains

The third research question compares the linguistic gains of each group to determine if one method of instruction is more effective than another. To do this, we compared gains in AJT acceptability ratings for noun types in each of the different contexts between groups across the course of the study. The mean gain scores and standard deviations can be found in Table 7.10.

Table 7.10. Mean gain scores of acceptability ratings for all learners

		T0 – T1			T0 – T2			T1 – T2		
Context	**Noun_Type**	**LING**	**TRAD**	**NOEX**	**LING**	**TRAD**	**NOEX**	**LING**	**TRAD**	**NOEX**
definite-plural	count	1.24	-0.37	0.65	0.36	-0.35	-0.04	-0.89	0.02	-0.69
	* object	-0.27	0.02	-0.06	-0.17	-0.98	-0.80	0.10	-1.00	-0.75
	* substance	-1.20	-0.19	-0.22	-0.70	-0.59	-0.78	0.50	-0.41	-0.57
definite-singular	count	0.99	0.15	0.63	0.93	0.41	0.39	-0.06	0.26	-0.24
	object	0.31	0.46	0.20	0.53	0.52	0.10	0.22	0.06	-0.10
	substance	0.30	0.06	-0.06	-0.28	-0.48	-0.84	-0.58	-0.54	-0.78
indefinite-singular	count	0.37	-0.26	0.06	0.48	0.07	0.27	0.11	0.33	0.22
	* object	-0.41	-0.44	-0.37	-0.64	-1.00	-0.51	-0.23	-0.56	-0.14
	* substance	-0.23	0.76	-0.33	0.14	0.43	-0.24	0.38	-0.33	0.10
zero-plural	count	0.48	0.13	0.22	0.23	-0.24	-0.49	-0.24	-0.37	-0.71
	* object	0.06	0.20	0.37	0.16	0.02	0.00	0.10	-0.19	-0.37
	* substance	-0.69	0.06	0.73	-0.32	0.30	0.12	0.37	0.24	-0.61
zero-singular	* count	0.68	0.81	0.41	0.72	1.00	0.31	0.04	0.19	-0.10
	object	0.93	0.59	0.33	0.50	0.33	0.65	-0.43	-0.26	0.31
	substance	0.47	-0.50	-0.71	-0.07	-0.28	-0.84	-0.53	0.22	-0.14
	grammatical	0.35	-0.02	0.02	0.21	0.02	-0.22	-0.14	0.04	-0.24
	ungrammatical	-0.24	0.26	0.12	0.00	-0.13	-0.23	0.24	-0.39	-0.35

** ungrammatical context and noun type combination*

In Table 7.10, a positive gain score indicates that acceptability ratings increased from one testing time to the next, and a negative gain score indicates that mean acceptability ratings. Ideally, gain scores for grammatical items would be positive and gain scores for ungrammatical items would be negative.

In order to investigate the effects of instruction on linguistic gains and feature reassembly over the course of the study, we compared the AJT gain scores for noun types in each of the different contexts between groups across testing times. As with the other research questions, a linear mixed-effects model[21] was run to investigate statistical differences. In this model, Model 3, the baseline (intercept) levels were Learner_Type:LING, Testing_Time:T0, and Noun_Type:Object for Model 3-A; Learner_Type:LING, Testing_Time:T1, and Noun_Type:Object for Model 3-B; Learner_Type:TRAD, Testing_Time:T0, and Noun_Type:Object for Model 3-C; and Learner_Type:TRAD, Testing_Time:T1, and Noun_Type:Object for Model 3-D. This model had to be releveled for Testing_Time and Learner_Type in order to investigate any statistical differences between immediate and delayed post-test, as well as TRAD and NOEX learners.

In this LMM, any main effects of Testing_Time will be comparing object-uncountable nouns from the baseline Testing_Time to the main effect testing time. Any main effects of Noun_Type will be comparing object-uncountable nouns at the baseline Testing_Time to the main effect noun type at the baseline Testing_Time. Therefore, there will be no explicit presentation of the main effects of Testing_Time and Noun_Type, as they were discussed earlier in Section 7.2.2. Any main effects of Learner_Type will be comparing object-uncountable nouns at the baseline Testing_Time between the baseline Learner_Type and the main effect Learner_Type. Finally, two-way interaction predictors of Testing_Time and Noun_Type were also presented in research question 2, so they will not be presented here. Since we already established that learner groups are different, we will only be investigating the interaction predictors of this model. The interaction predictors that we are interested in are any two-way interactions that include Learener_Type and Testing_Time and any three-way interactions that include Learner_Type, Testing_Time, and Noun_Type.

The first context under investigation is definite-plural. In this context, countable nouns are grammatical and uncountable nouns are ungrammatical. The mean gain scores for each learner group, noun type, and testing time are plotted in Figure 7.83.

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[21] The level of significance will be $\alpha = 0.05$ throughout all the analyses.

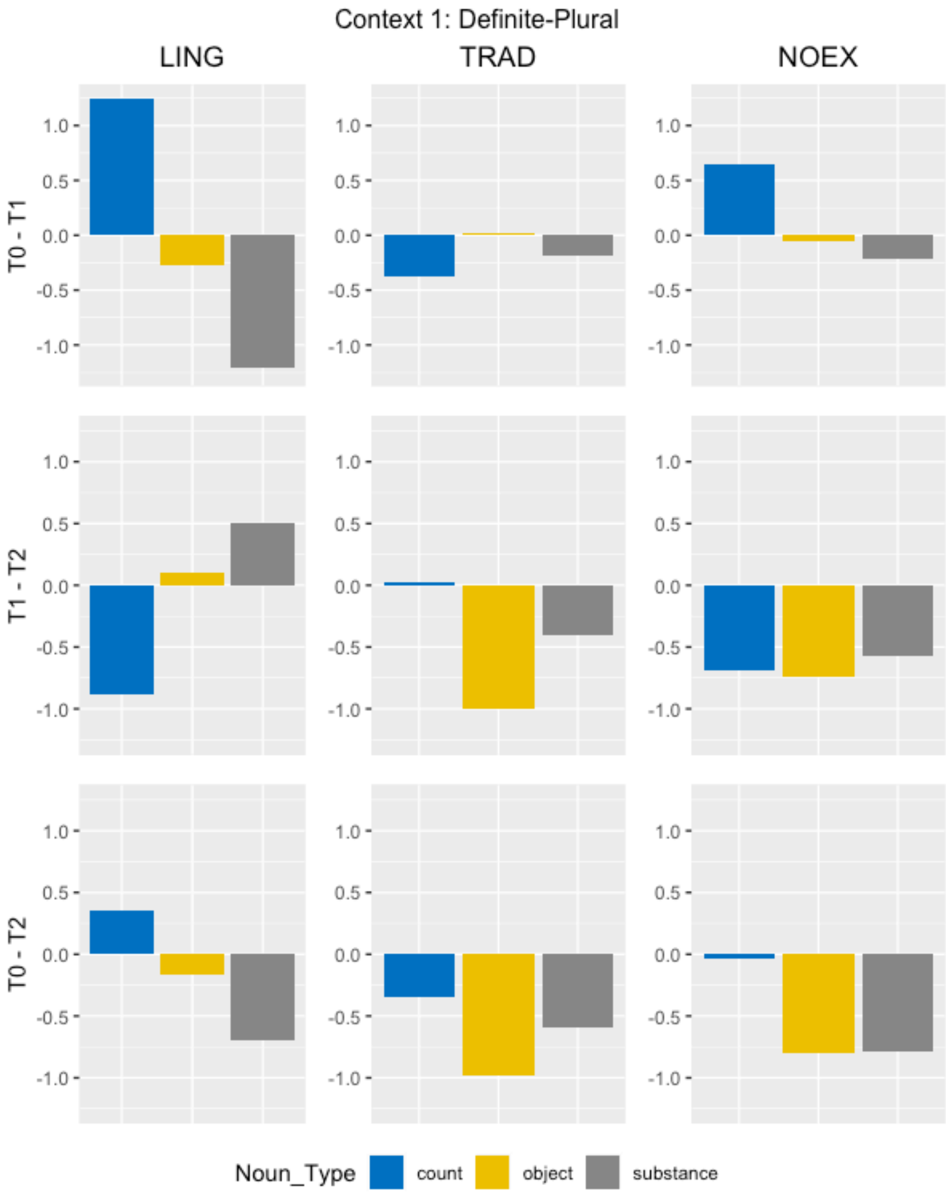

Figure 7.83. Bar plots of mean acceptability rating gain scores for all learner groups in Context 1

The results of the linear mixed-effects model are summarized in (47)

(47) Context 1: definite-plural

a. Model 3-A:

  i. Interaction of Learner_Type:TRAD*Testing_Time:T1* Noun_Type: Count ($p < 0.01$)

b. Model 3-B:

  i. Interaction of Learner_Type:NOEX*Testing_Time:T2 ($p < 0.05$)

  ii. Interaction of Learner_Type:TRAD*Testing_Time:T2 ($p < 0.01$)

  iii. Interaction of Testing_Time:T0*Noun_Type:Count ($p < 0.01$)

iv. Interaction of Learner_Type:TRAD*Testing_Time:T0*Noun_Type: Count ($p < 0.01$)

v. Interaction of Learner_Type:TRAD*Testing_Time:T2*Noun_Type: Count ($p < 0.001$)

c. Model 3-C:

i. Interaction of Learner_Type:LING*Testing_Time:T1* Noun_Type: Count ($p < 0.01$)

d. Model 3-D:

i. Interaction of Learner_Type:LING*Testing_Time:T2 ($p < 0.01$)

Model 3-A revealed a significant interaction of Learner_Type:TRAD by Testing_Time:T1 by Noun_Type:Count ($\beta = -1.90$, $t(1648) = -3.22$, $p < 0.01$). This three-way interaction found that LING learners made significantly greater gains in their ability to distinguish between the acceptability of object-uncountable and countable nouns in a definite plural context from T0 to T1 than TRAD learners. In other words, linguistically-informed instruction seems to have led to greater linguistic gains in the reassembly of the [±count] and [±atomic] features in a definite-plural context.

Model 3-B revealed a number of two-way significant interactions. First, there is a significant interaction of Learner_Type:NOEX by Testing_Time:T2 ($\beta = -0.85$, $t(1648) = -1.99$, $p < 0.05$) and a significant interaction of Interaction of Learner_Type:TRAD by Testing_Time:T2 ($\beta = -1.10$, $t(1648) = -2.63$, $p < 0.01$), both of these suggesting that TRAD and NOEX learners made more significant linguistic gains in their ability to rate object-uncountable nouns as ungrammatical from T1 to T2 than LING learners. Model 3-B also found one three-way interaction of Learner_Type:TRAD by Testing_Time:T2 by Noun_Type:Count ($\beta = 2.01$, $t(1648) = 3.40$, $p < 0.001$). This interaction reveals that TRAD learners made greater linguistic gains from T0 to T2 in their ability to rate object-uncountable nouns lower than countable nouns when compared to LING learners. The effects of this model are plotted in Figure 7.84.

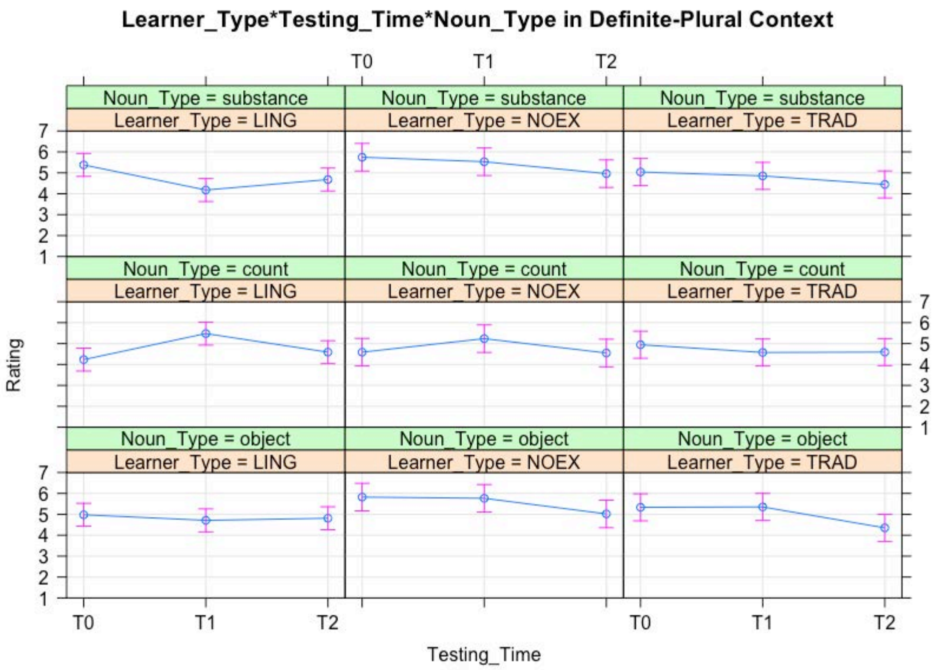

Figure 7.84. Effect plot for acceptability ratings of Learner_Type by Testing_Time by Noun_Type in Context 1

The second context under investigation is definite-singular. In this context, all noun types are grammatically acceptable. The mean gain scores for each group, noun type, and testing time in a nested violin plot in Figure 7.85.

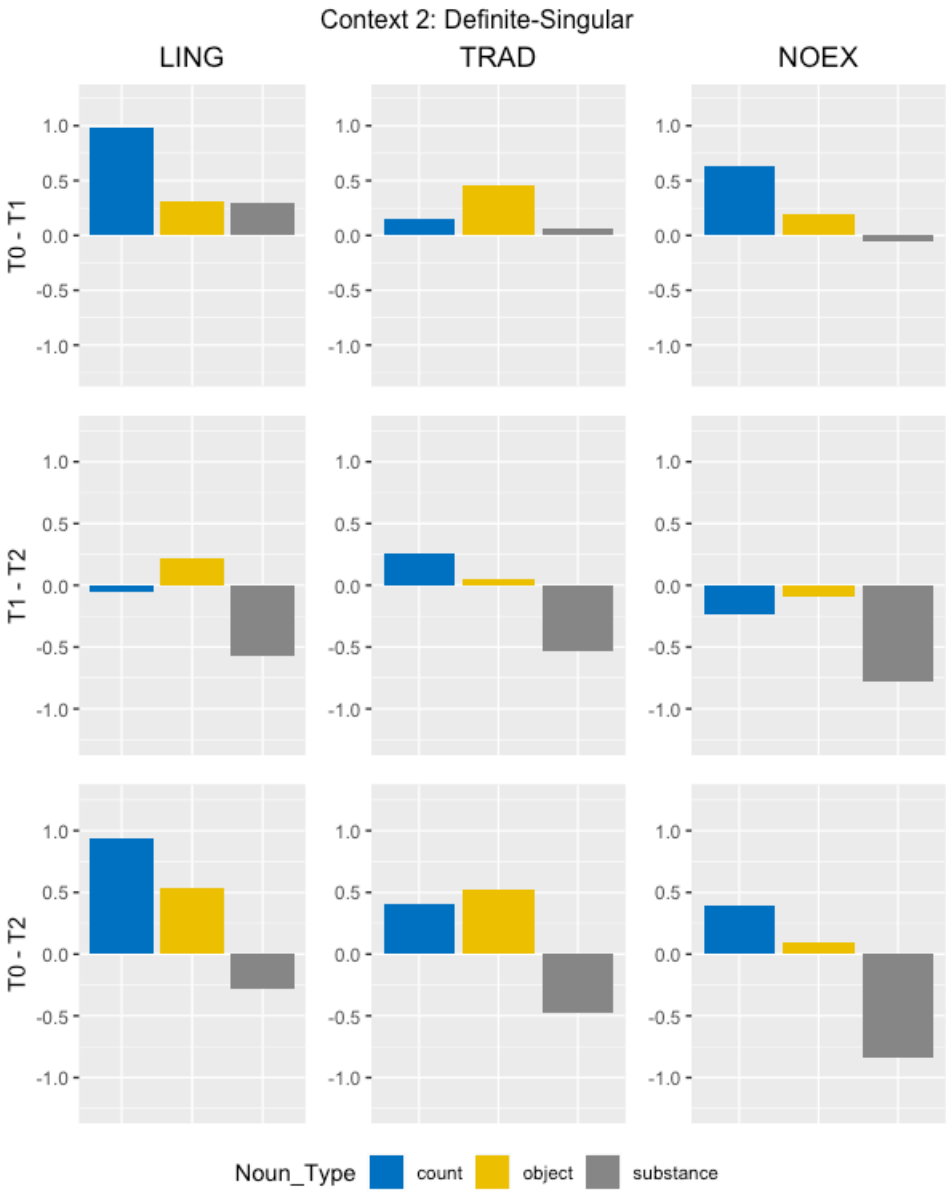

Figure 7.85 Bar plots of mean acceptability rating gain scores for all learner groups in Context 2

The results of the linear mixed-effects model are summarized in (48).

(48) Context 2: definite-singular

a. Model 3-A: No significant interaction predictors

b. Model 3-B: No significant interaction predictors

c. Model 3-C: No significant interaction predictors

d. Model 3-D: No significant interaction predictors

Unexpectedly, Model 3 did not produce any significant predictors for main effects or interactions. Furthermore, a Tukey post-hoc pairwise comparison also did not find any significant interactions. This is likely due to the fact that all NNS groups performed at near-ceiling levels prior to instruction, so all gains are quite small, resulting in non-significant changes. The effect plot can be found in Figure 7.86.

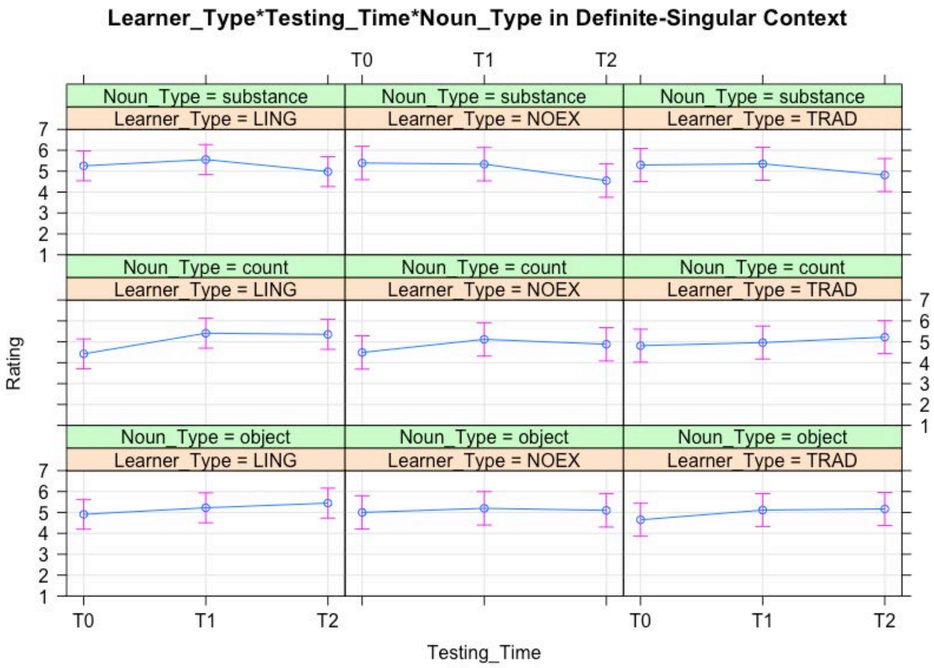

Figure 7.86. Effect plot for acceptability ratings of Learner_Type by Testing_Time by Noun_Type in Context 2

The third context under investigation is indefinite-singular. In this context, only countable nouns are grammatical while uncountable nouns are ungrammatical. The mean gain scores for each group, noun type, and testing time are plotted in Figure 7.87.

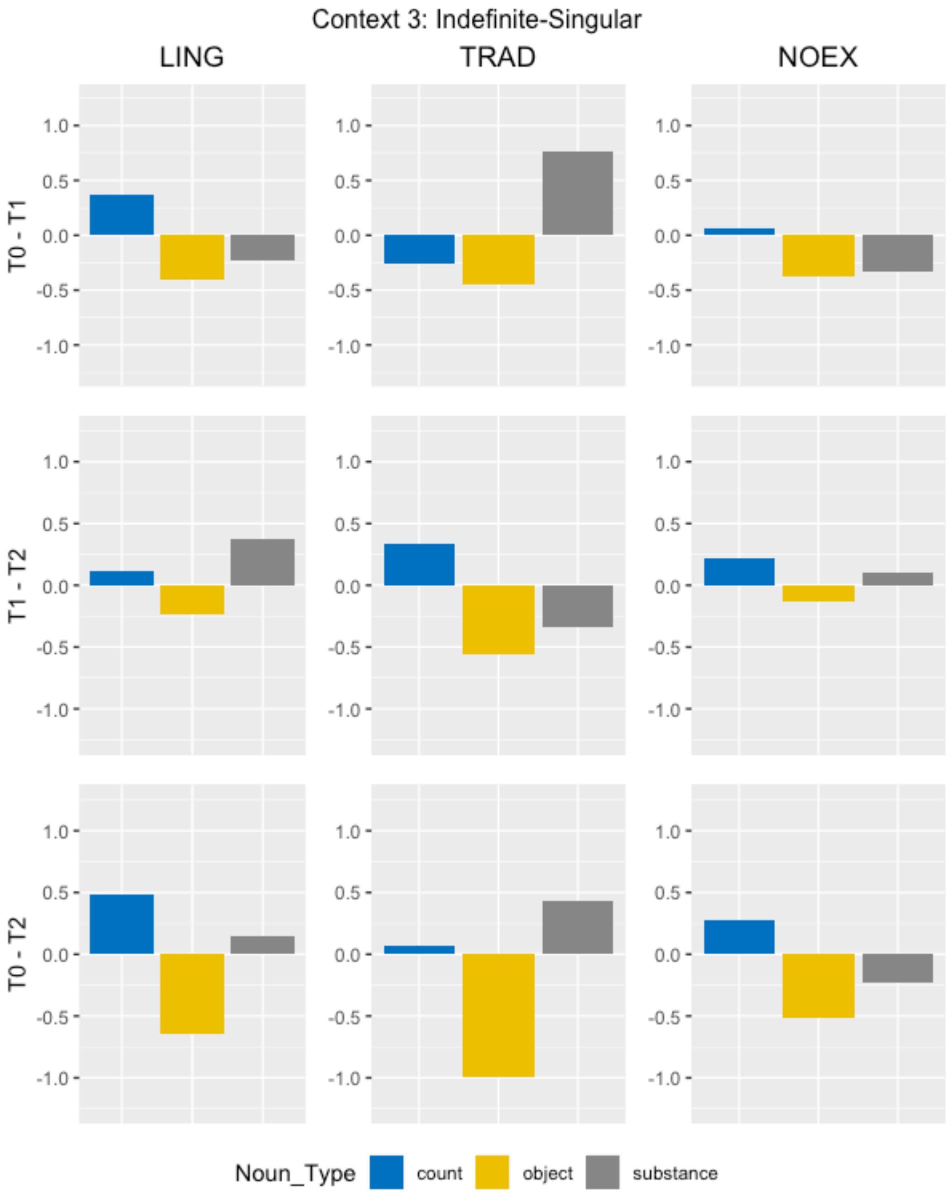

Figure 7.87. Bar plots of mean acceptability rating gain scores for all learner groups in Context 3

The results of the LMM are summarized in (49).

(49) Context 3: indefinite-singular

a. Model 3-A: No significant interaction predictors

b. Model 3-B: No significant interaction predictors

c. Model 3-C: No significant interaction predictors

d. Model 3-D: No significant interaction predictors

Model 3, in all of its iterations, failed to produce any significant interaction predictors that focused on linguistic gains. The interactions are plotted in Figure 7.88. A Tukey post-hoc pairwise comparison found no other significant differences.

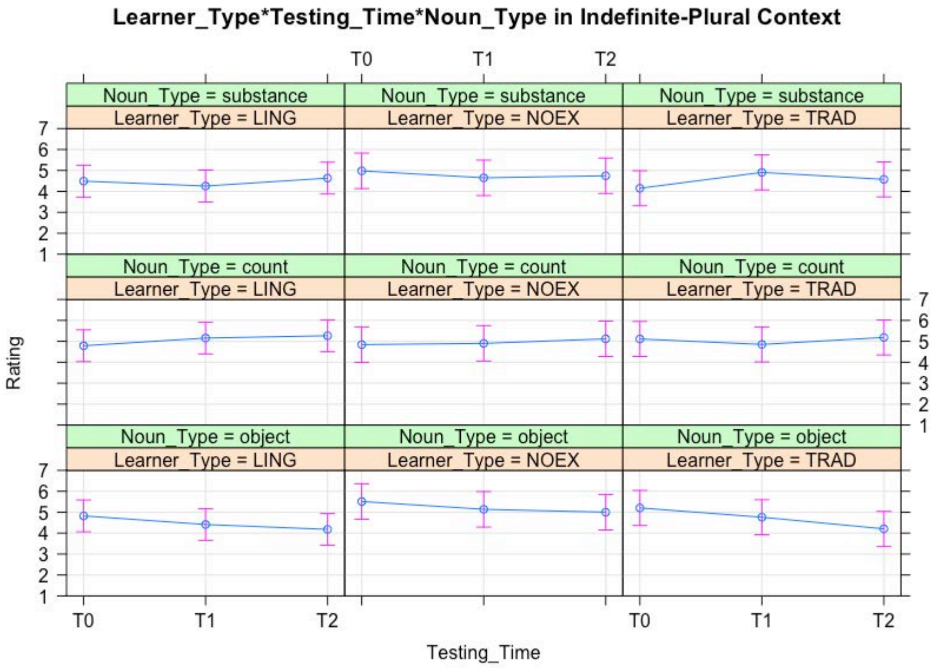

Figure 7.88. Effect plot for acceptability ratings of Learner_Type by Testing_Time by Noun_Type in Context 3

The fourth context under investigation is zero-plural. In this context, countable nouns are grammatical and uncountable nouns are ungrammatical. The violin plots in Figure 7.89 show the means and standard deviations for each group, noun type, and testing time.

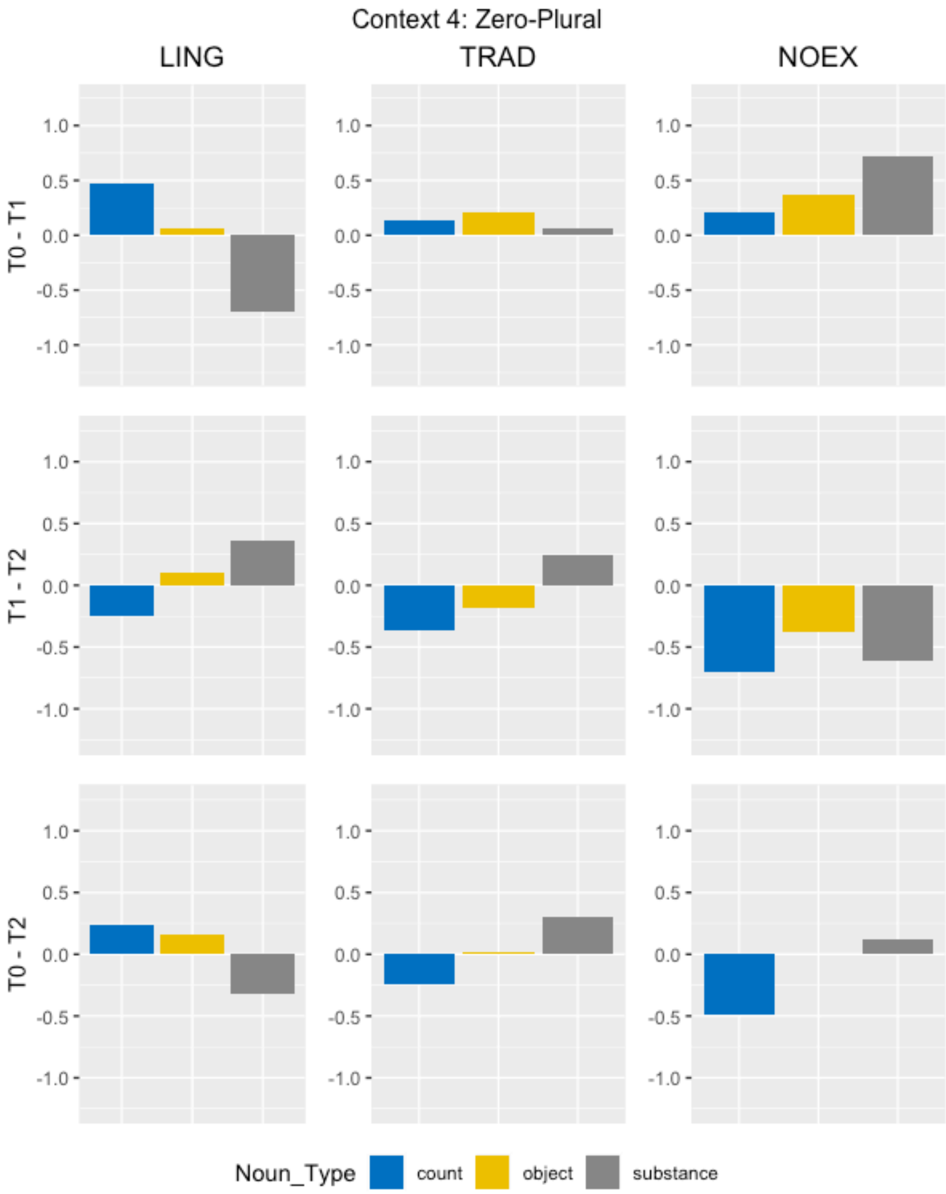

Figure 7.89. Bar plots of mean acceptability rating gain scores for all learner groups in Context 4

The results of the models are summarized in (50).

(50) Context 4: zero-plural

a. Model 3-A: No significant interaction predictors

b. Model 3-B: No significant interaction predictors

c. Model 3-C: No significant interaction predictors

d. Model 3-D: No significant interaction predictors

As with the previous context, Model 3 in a zero-plural context failed to produce any significant time and learner time interactions, indicating that there were no significant differences between groups across the course of the study. These effects are displayed in Figure 7.90. A Tukey post-hoc pairwise comparison also found that LING learners rated substance-uncountable nouns significantly lower than countable nouns at T1 ($p < 0.05$), which is in line with the predictions.

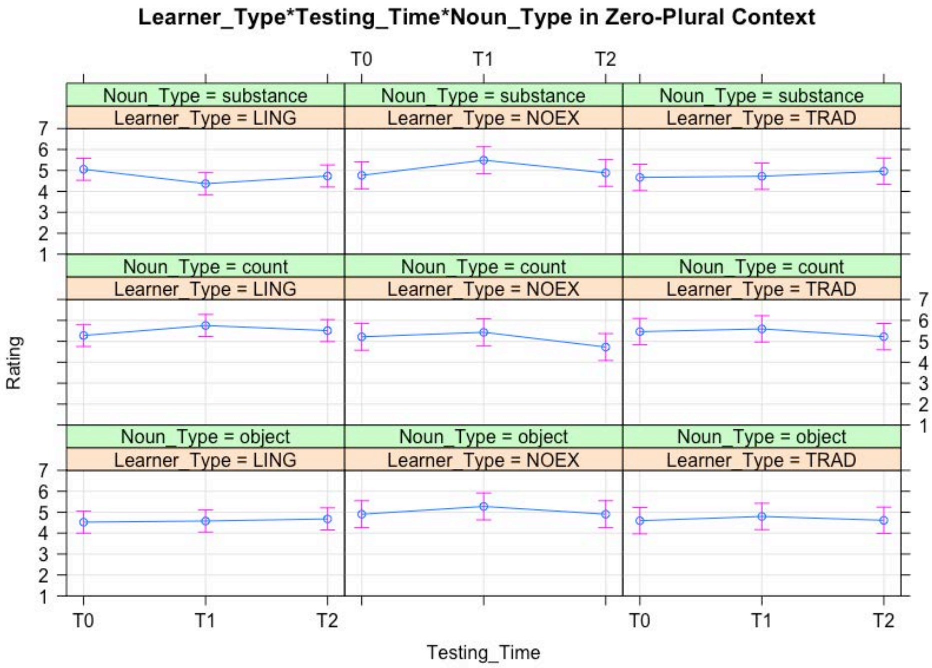

Figure 7.90. Effect plot for acceptability ratings of Learner_Type by Testing_Time by Noun_Type in Context 4

The final context under investigation is zero-singular. In this context, uncountable nouns are grammatical and countable nouns are ungrammatical. The gain scores were presented earlier, and the violin plots in Figure 7.91 show the means and standard deviations for each learner type, noun type, and testing time.

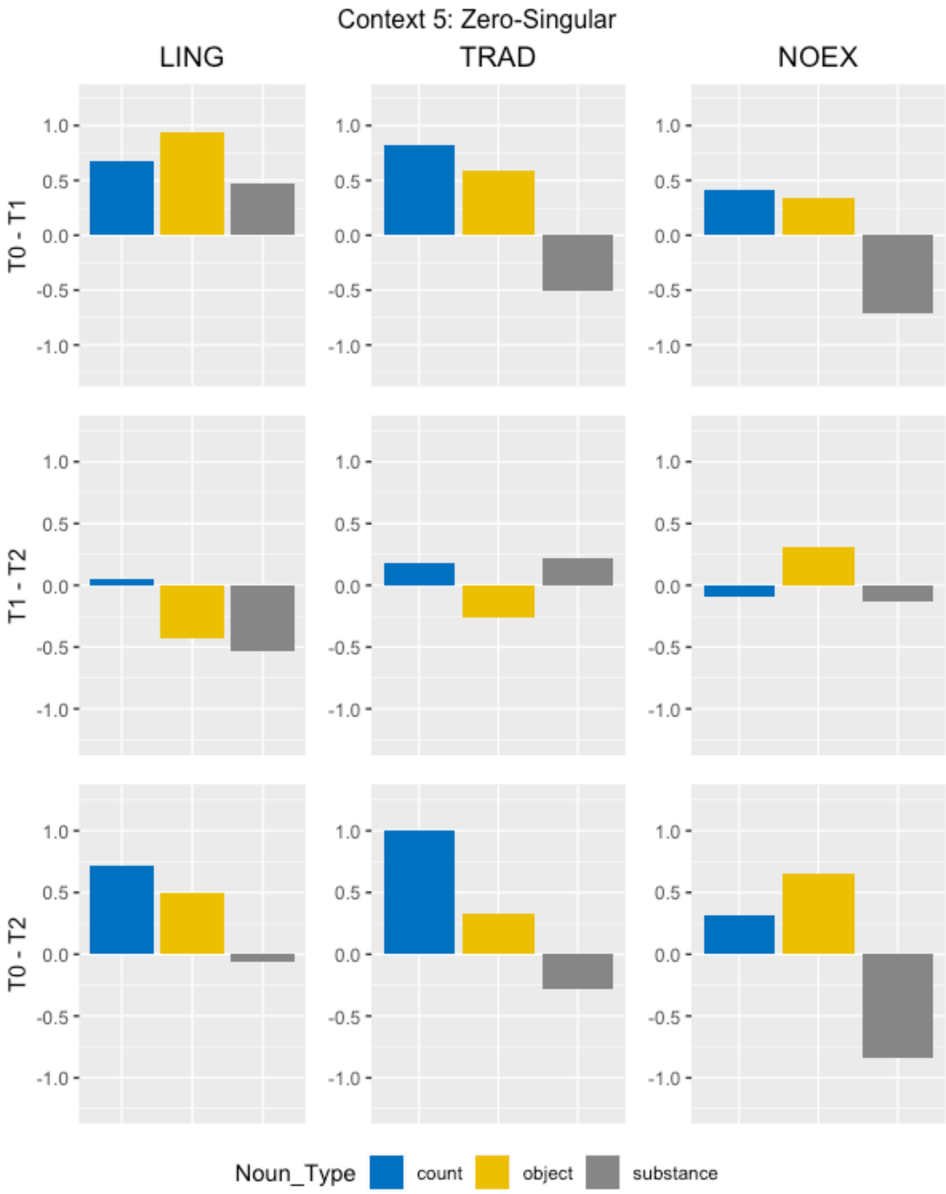

Figure 7.91. Bar plots of mean acceptability rating gain scores for all learner groups in Context 5

The results of the model are summarized in (51).

(51) Context 5: zero-singular

a. Model 3-A: No significant interaction predictors

b. Model 3-B: No significant interaction predictors

c. Model 3-C: No significant interaction predictors

d. Model 3-D: No significant interaction predictors

In this context, the LMM analysis did not reveal any significant main effect predictors or interaction predictors. All learners treated nouns similarly across time. Linguistic gains, if any, were non-significant. The effect plots can be found in Figure 7.92. Being as there were no significant predictors for the models, there were also no significant differences in post-hoc pairwise analysis.

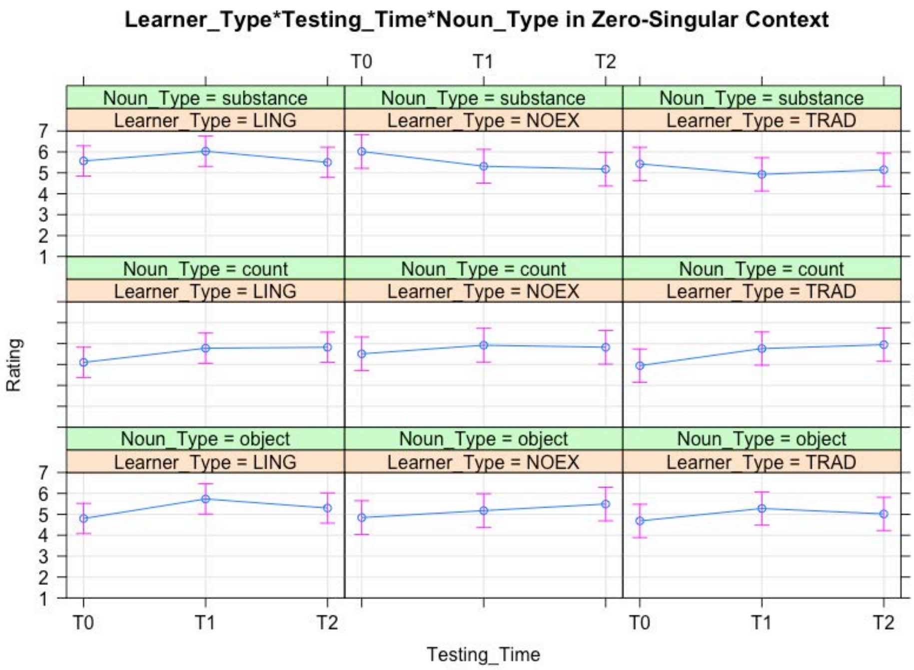

Figure 7.92. Effect plot for acceptability ratings of Learner_Type by Testing_Time by Noun_Type in Context 5

To summarize the results of the third research question—the linguistic gains of groups throughout the course of the study—we ran a LMM investigating the main effects and interactions of learner type, testing time, and noun type. In the definite-plural context, we found the LING learners made the greatest linguistic gains immediately after instruction by rating countable nouns higher and uncountable nouns lower. The other two learner groups, TRAD and NOEX, did make gains in their ability to rate object- and substance-uncountable nouns in this context lower from T1 to T2, but they showed similar downward trend with regard to countable nouns in the same context. There were no significant main effects or interactions in the definite-singular context, as all noun types are grammatical in this context. In both the indefinite-singular and zero-plural context, we did not find any interactions for linguistic gains, but we did find that at T1 (immediate post-test), LING learners treated object-uncountable nouns significantly different from countable nouns when compared to NOEX learners, which may indicate that the gains in the LING group was greater than the NOEX group. Finally, in the zero-singular context, the analysis did not reveal any significant main effects or interactions.

7.3 | Forced-Choice Elicitation Task

The FCET data was subjected to the statistical analysis presented in the introduction of this chapter. In the FCET, participants read a context sentence followed by a second sentence that had a blank for both the article and the noun type. The participants were asked to select an appropriate article and noun type for each statement based on the context provided. The critical region, that is the target article and noun combination, in each statement was rated for accuracy (1 for accurate and 0 for inaccurate) of the selection of both the article and the noun based on the context that had been provided. Therefore, a forced-choice score for each statement received one of three scores:

- 0 = no acceptable selection of article or noun type
- 1 = acceptable selection of either article or noun type
- 2 = acceptable selection of both article and noun type

The sentences varied not only in the content, but also the context sentence that was provided, eliciting article and noun selections according to the features under analysis: definiteness, countability, atomicity, and plurality. It is crucial to note that this task only tested grammatical combinations of articles and noun types. Linear mixed-effects models (LMMs) were fit to nominal response data, and each model included fixed effects (specified in this chapter's introduction) and participant and item random effects. In the case of significant interactions, pairwise comparisons investigated the effects within the same context using the *lsmeans* package (Lenth, 2016).

7.3.1 | Research Question 1: Presence of L1-Mandarin Features in L2 English

In order to explore the first research question, which investigates the presence of L1 features in the L2, we compared the L2 forced-choice scores given for noun types in each of the different contexts to those of native speakers. For noun types, the semantic features of [±count] and [±atomic] are combined to create three noun types: countable [+count, +atomic], object-uncountable [–count, +atomic], and substance-uncountable [–count, –atomic]. For context, the semantic features of [±definite] and [±plural] are combined to create five contexts: definite-plural, definite-singular, indefinite-singular, zero-plural, and zero-singular. This allows for investigation of the presence of L1 features in the L2 prior to instruction. The descriptive statistics are presented followed by inferential statistics. As specified in the Methodology chapter, the NS baseline group (n = 25) completed the task at one point in time and the L2 learner groups (LING, TRAD, and

NOEX) completed the tasks at three different testing times (T0, T1, and T2). These means and standard deviations for NSs can be found in for NSs in in Table 7.11 where they are presented alongside the T0 data for the L2 learners.

Table 7.11. Means and standard deviations for forced-choice scores for NSs and L2 learners at T0

		English NSs (n = 25)		**L2 Learners (n = 65)**	
Context	**Noun_Type**	**M**	**SD**	**M**	**SD**
definite-plural	count	1.72	0.53	1.33	0.60
definite-singular	count	1.71	0.46	1.55	0.60
	object	1.89	0.31	1.15	0.74
	substance	2.00	0.00	1.45	0.67
indefinite-singular	count	1.73	0.66	1.24	0.91
zero-plural	count	1.32	0.70	1.45	0.69
zero-singular	object	1.49	0.50	0.88	0.51
	substance	1.67	0.47	1.27	0.61

The NSs mostly demonstrated forced-choice scores that were mostly as predicted with a few exceptions This data was collected as a baseline in order to shed light on feature assembly in L1 English and how those features are assembled in L2 English. There will be no detailed discussion of NSs beyond RQ1. In definite-plural, definite-singular, and indefinite-singular contexts, the NSs show forced-choice rates that are close to ceiling levels. In these contexts, NSs demonstrated the ability to choose the correct article and noun type to complete each statement. When we look at forced-choice scores for zero-plural and zero-singular, we see a sharp decrease in scores when compared to the other contexts. It is important to note that the lowest scores are with regard to countable nouns in a zero-plural context. While there is no clear explanation for these scores, it is likely due to consistent incorrect article choice given that these contexts were asking participants to choose no article at all. Overall, the standard deviations show that forced choice scores were quite similar among English NSs.

When these forced-choice scores are compared to NNSs, we can see that NNSs tend to display much greater variation in their forced-choices of noun types in different contexts. With regard to the means in Table 7.11, we can see that in nearly all contexts NNSs display lower scores and higher standard deviations than NSs. There is one context, countable nouns in a zero-plural context, where NNSs actually outperform NSs. This is surprising since this is the same article and noun type combination that NSs scored the lowest in.

In order to investigate any statistical differences between the ENGL and L2 learner groups, two separate linear mixed-effects models[22] were run. Model 1 investigates NSs and NNSs. In this model, the baseline (intercept) levels were L1:Mandarin and Noun_Type:Object. In this LMM, any main effects of L1 will be comparing English NSs to Mandarin NSs, and any main effects of Noun_Type will be comparing that noun type (countable or substance-uncountable) to the baseline, object-uncountable, for the baseline L1 group, Mandarin. The interactions of these variables will investigate how similar or different the Mandarin and English groups treat countable and substance-uncountable nouns to object-uncountable nouns when compared to one another. The model also included by-participant and by-item random intercepts. Here, we will summarize the significant effects and interactions of the model. The full model output tables can be found in Appendix I. It is important to note that, since this task only deals with grammatical article and noun type combinations, not all model outputs will have interaction predictors.

The first context under investigation is definite-plural. In this context, countable nouns are grammatical, while substance- and object-uncountable nouns are ungrammatical. Therefore, in the FCET, only countable nouns were elicited. The means and standard deviations can be seen in Figure 7.93.

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[22] The level of significance will be $\alpha = 0.05$ throughout all the analyses.

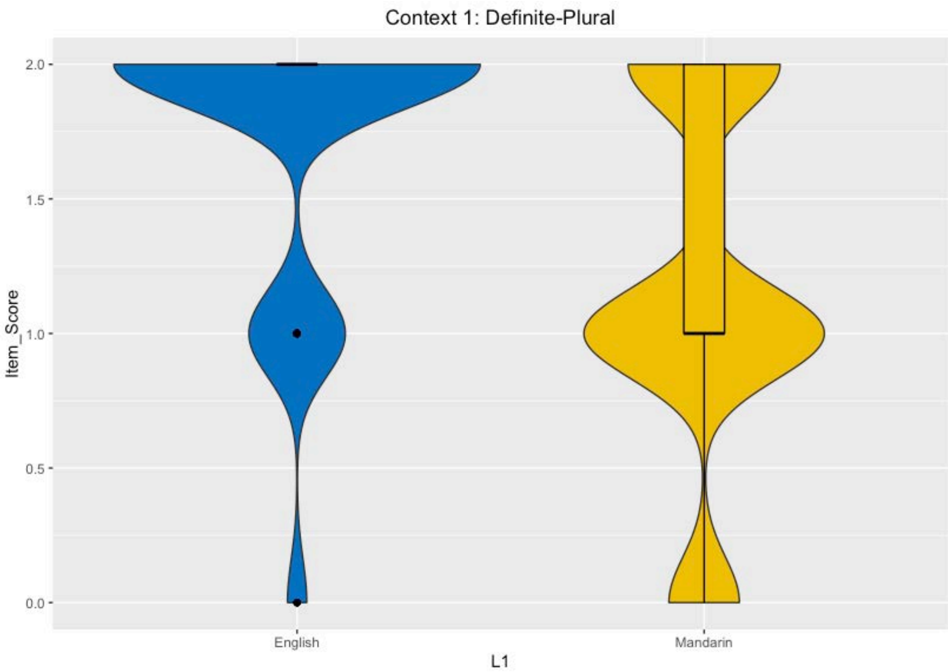

Figure 7.93. Violin plot of mean forced-choice scores for English NSs and L2 learners at T0 in Context 1

The results Model 1 are summarized in (52).

(52) Context 1: definite-plural

a. Model 1:

i. Main effect of L1:English ($p < 0.01$)

ii. No possible interaction predictors

Model 1 revealed a significant main effect of L1:English ($\beta = 0.36$, $t(45.33) = 2.82$, $p < 0.01$), indicating that L1-Mandarin learners of English performed significantly lower than NSs with regard to their forced-choice scores for countable nouns in a definite-plural context. These effects are plotted in Figure 7.94

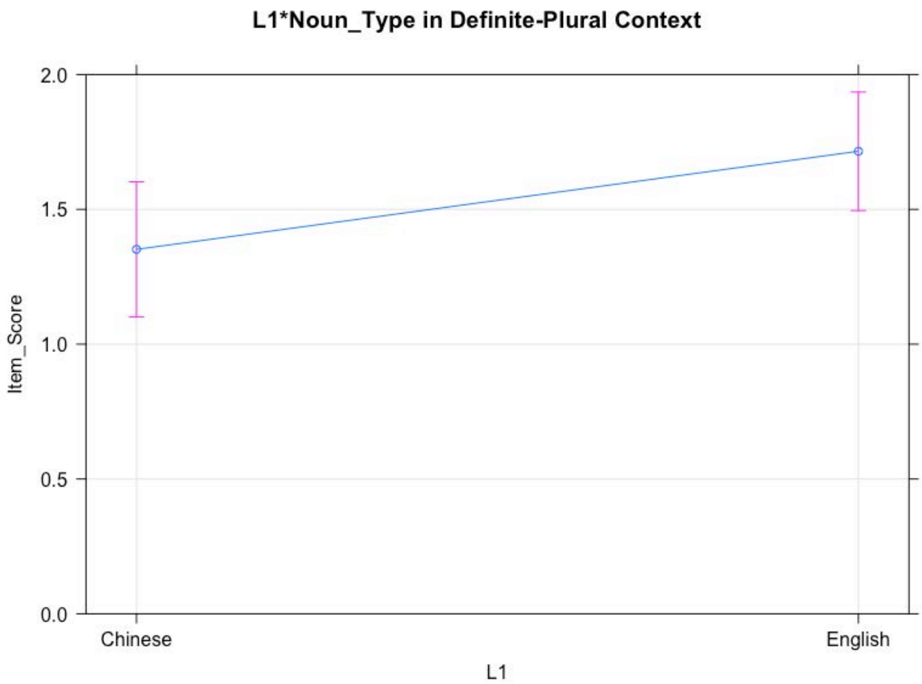

Figure 7.94. Effect plot for forced-choice scores for L1 by Noun_Type at T0 in Context 1

Being as there were significant effects, the models were subjected to post-hoc analysis using the Tukey HSD. For Model 1, the post-hoc analysis found that L1-Mandarin speakers were significantly lower than NSs with regard to their forced-choice scores for countable nouns ($p < 0.05$).

The second context under investigation is definite-singular. In this context, all noun types are grammatical. The means and standard deviations are plotted in the nested violin plots in Figure 7.95.

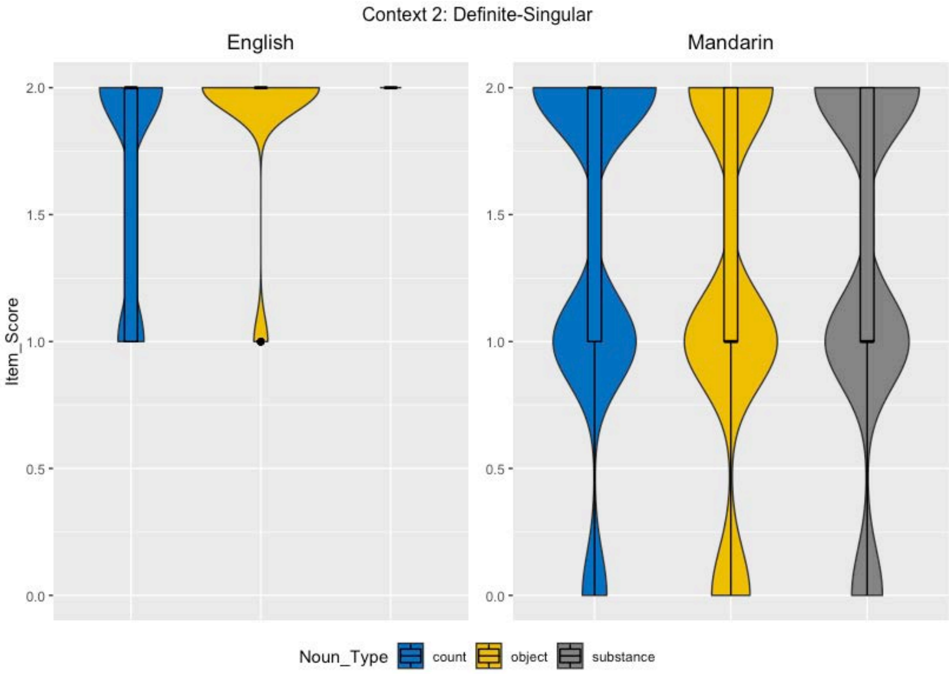

Figure 7.95. Violin plots of mean forced-choice scores for English NSs and L2 learners at T0 in Context 2

The results of the regression model are summarized in (53).

(53) Context 2: definite-singular

a. Model 1:

i. Main effect of L1:English ($p < 0.001$)

ii. Main effect of Noun_Type:Count ($p < 0.05$)

iii. Main effect of Noun_Type:Substance ($p < 0.05$)

iv. Interaction of L1:English*Noun_Type:Count ($p < 0.001$)

Model 1 revealed a significant main effect of L1:English ($\beta = 0.74$, $t(109.9) = 6.22$, $p < 0.001$), indicating that English NSs performed significantly higher than NNSs with regard to their forced-choice scores of object-uncountable nouns in a definite-singular context as predicted. The model also revealed main effects of Noun_Type:Count ($\beta = 0.37$, $t(29.25) = 2.67$, $p < 0.05$) and Noun_Type:Substance ($\beta = 0.31$, $t(29.25) = -3.61$, $p < 0.05$). These two main effects found that NNSs achieved higher forced-choice scores for countable and substance-uncountable nouns than object-uncountable nouns in a definite-singular context. This model also found a significant interaction of L1:English by Noun_Type:Count ($\beta = -0.54$, $t(114.88) = -1.35$, $p < 0.001$), which found that NNSs had a greater distance between their object-uncountable noun and countable noun scores than NSs. The effects of Model 1 are plotted in Figure 7.96.

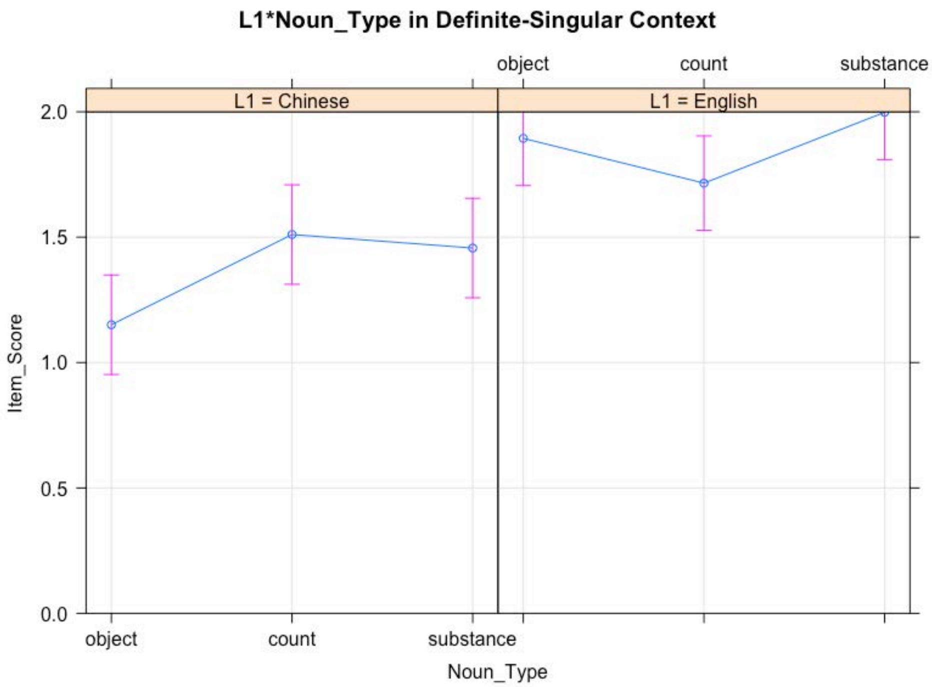

Figure 7.96. Effect plot for forced-choice scores for L1 by Noun_Type at T0 for Context 2

Since the models found significant main effects and interactions, both models were subjected to Tukey HSD post-hoc analysis. The post-hoc analysis found that Mandarin learners of English displayed significantly lower scores than NSs for object-uncountable nouns ($p < 0.001$). It also revealed that the forced-choice scores for substance-uncountable nouns were significantly lower for NNSs than NSs ($p < 0.001$). The post-hoc failed to find any significant differences between NSs and NNS with regard to countable nouns.

The third context under investigation is indefinite-singular. In this context, only countable nouns are grammatical, so therefore they are the only nouns included in the analysis. The means and standard deviations are plotted in Figure 7.97.

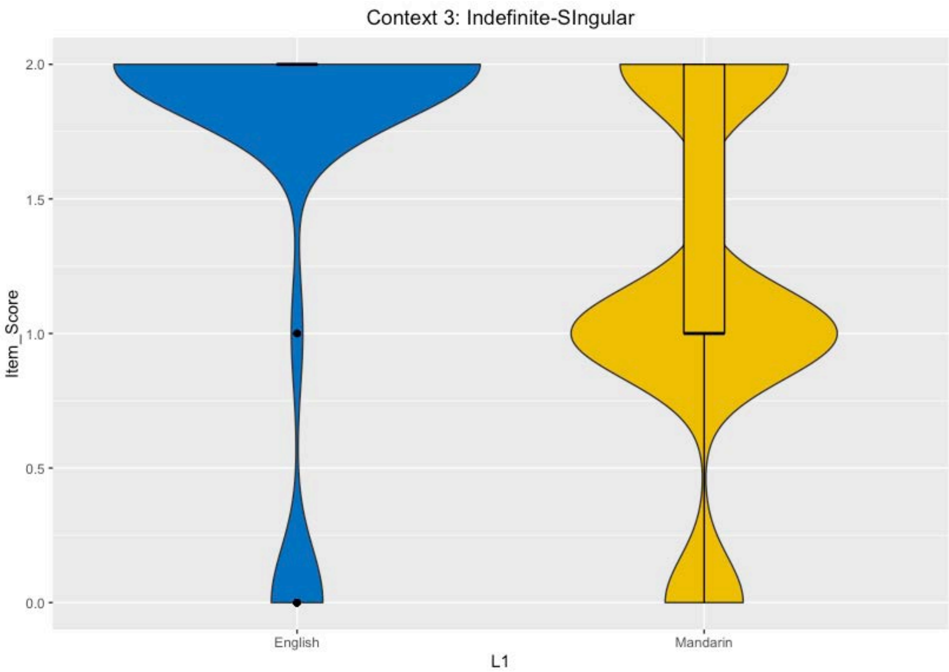

Figure 7.97. Violin plot of mean forced-choice scores for English NSs and L2 learners at T0 in Context 3

The results of the regression model are summarized in (54).

(54) Context 3: indefinite-singular

a. Model 1:

i. Main effect of L1:English ($p < 0.01$)

ii. No possible interaction predictors

As expected, Model 1 revealed a main effect of L1:English ($\beta = 0.54$, $t(32.34) = 3.07$, $p < 0.01$), finding that NSs performed significantly better than NNSs as a collective group. The effects are plotted in Figure 7.98

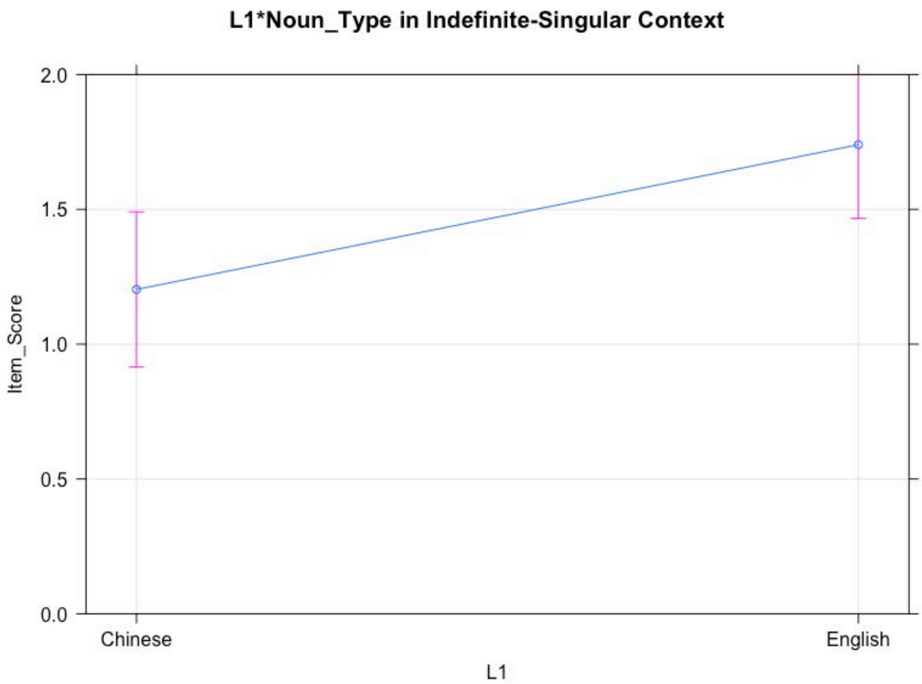

Figure 7.98. Effect plot for forced-choice scores for L1 by Noun_Type at T0 for Context 3

The Tukey post-hoc analysis confirmed that, in Model 1, English NSs performed significantly higher than NNSs as a group ($p < 0.01$). The post-hoc analysis found no other significant differences.

The fourth context under investigation is zero plural. In this context, only countable nouns are grammatical. The means and standard deviations are displayed in the violin plots in Figure 7.99.

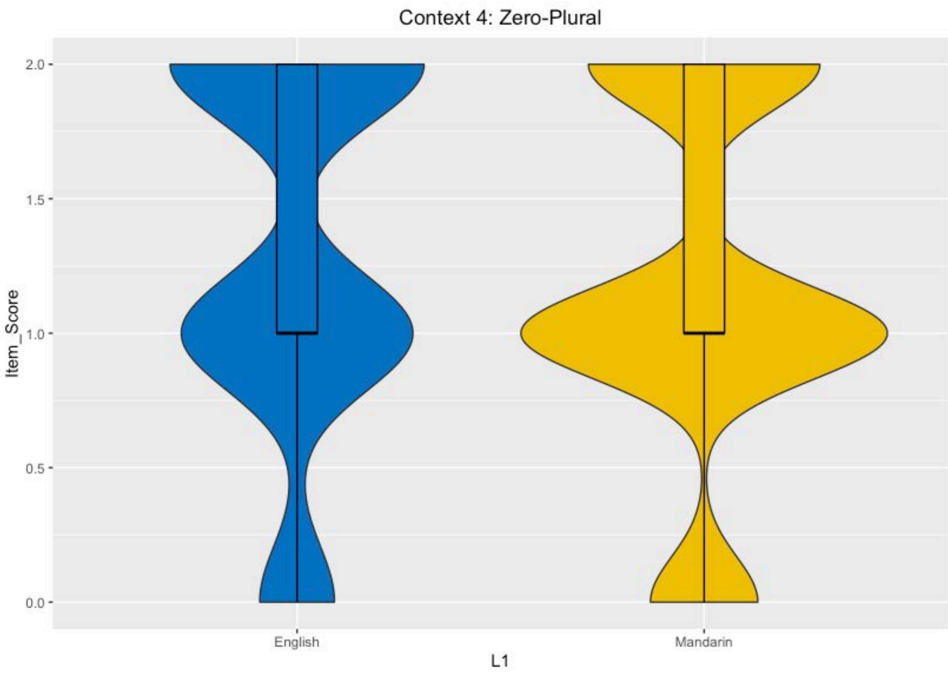

Figure 7.99. Violin plot of mean forced-choice scores for English NSs and L2 learners at T0 in Context 4

The results of the regression model are summarized in (55).

(55) Context 4: zero-plural

a. Model 1: No significant main effect or interaction predictors

Due to the large variation in the NS data, it comes as no surprise that the regression models failed to produce any significant predictors. As can be seen in the effect plots in Figure 7.100, the ENGL group actually performs slightly lower than the L2 learners with their forced-choice scores.

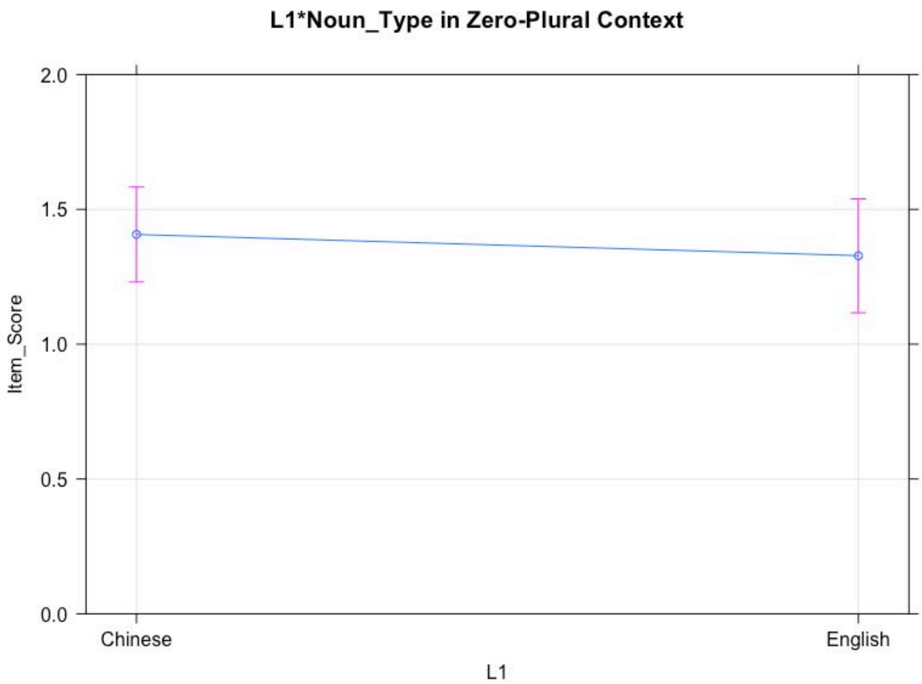

Figure 7.100. Effect plot for forced-choice scores for L1 by Noun_Type at T0 for Context 4

Being as there were no significant predictors, the post-hoc analysis also failed to find any significant differences.

The final context under investigation is zero-singular. In this context, substance- and object-uncountable nouns are grammatical. Therefore, those are the only two noun types under investigation in this context. The means and standard deviations are plotted in Figure 7.101.

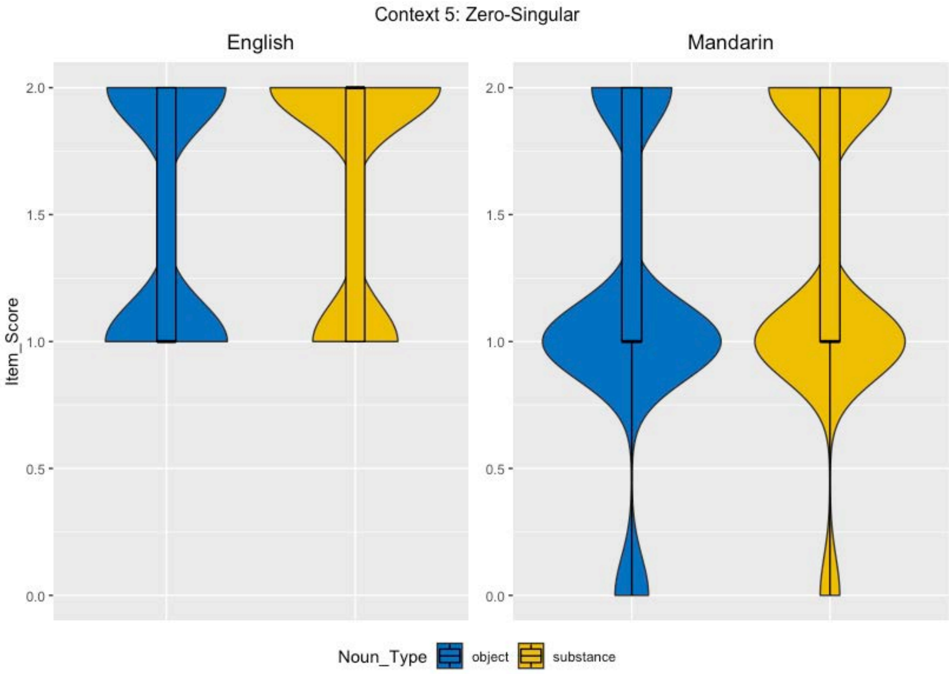

Figure 7.101. Violin plots of mean forced-choice scores for English NSs and L2 learners at T0 in Context 5

The results of the regression models are summarized in (56).

(56) Context 5: zero-singular

a. Model 1:

i. Main effect of L1:English ($p < 0.001$)

ii. Main effect of Noun_Type:Substance ($p < 0.05$)

iii. No significant interaction predictors

As predicted, Model 1 revealed a significant main effect of L1:English ($\beta = 0.58$, $t(51.61) = 5.10$, $p < 0.001$), which found that NSs scored significantly higher than NNSs with regard to object-uncountable nouns in a zero-singular context. The first model also found a significant main effect of Noun_Type:Substance ($\beta = 0.31$, $t(11.83) = 2.69$, $p < 0.05$), revealing that NNSs scored significantly higher with substance-uncountable nouns than object-uncountable nouns. The effects are plotted in Figure 7.102.

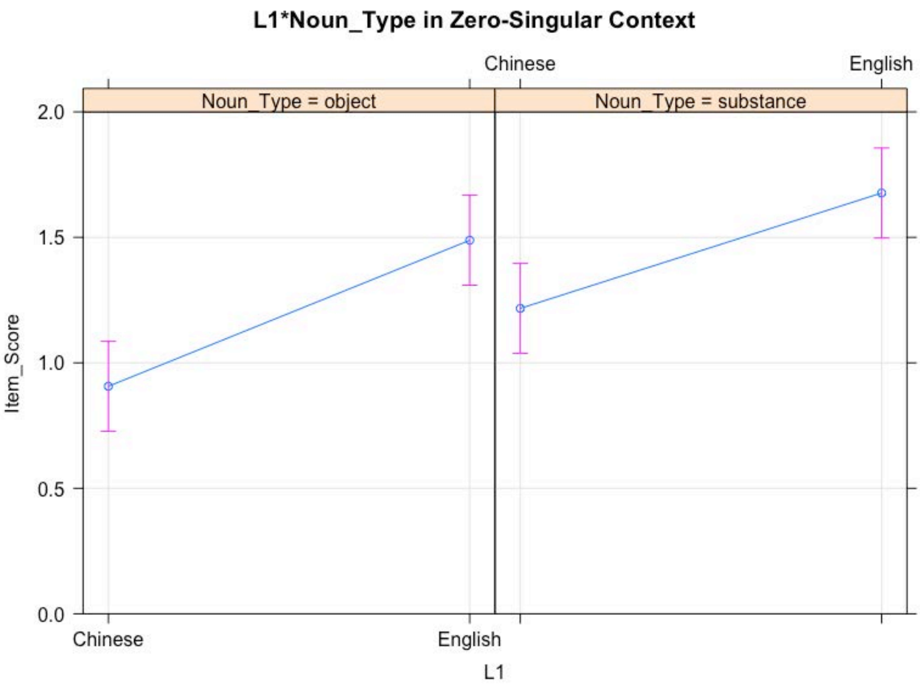

Figure 7.102. Effect plot for forced-choice scores for Learner_Type by Noun_Type at T0 for Context 5

Since the model found significant main effects, it was subjected to post-hoc analysis using Tukey HSD. The post-hoc analysis confirmed that NSs performed significantly higher than NNSs with regard to object-uncountable nouns in a zero-singular context ($p < 0.001$). The post-hoc analysis also found that NSs performed significantly higher with substance-uncountable nouns than NNSs ($p < 0.01$).

To summarize the results of RQ1, NSs performed, mostly as expected, when compared to NNSs and in the by-group breakdowns. We found unexpected results in the zero-plural context, when NSs appeared to performed lower than NNSs as a collective group, but this difference was not significant. In other words, NSs did not perform significantly different from NNSs. Otherwise, in definite-plural, definite-singular, indefinite-singular, and zero-singular contexts, NSs consistently outperformed the NNSs with regard to each noun type in those contexts. Now we turn out attention to RQ2 which will investigate the within group analysis of L2 features prior to, immediately following, and 3-weeks-after instruction.

7.3.2 | Research Question 2: Within Group Analysis of L2 Feature Reassembly

The second research question investigates the effect of instruction on L2 feature reassembly. To do this, we compared FCET selection for noun types in each of the different contexts within group across time. The data will be presented for each learner group separately. We will first present the descriptive statistics, followed by the inferential statistics for each context under analysis. In order to investigate any statistical differences between noun types within each group, a linear mixed-effects model[23] was run. In this model, the baseline (intercept) levels were Testing_Time:T0 and Noun_Type:Object for Model 2-A and Testing_Time:T1 and Noun_Type:Object for Model 2-B. This model had to be releveled for Testing_Time in order to investigate any statistical differences between the immediate and delayed post-intervention data collection times. In this LMM, any main effects of Testing_Time will be comparing object-uncountable nouns from the baseline Testing_Time to the main effect testing time. Any main effects of Noun_Type will be comparing object-uncountable nouns at the baseline Testing_Time to the main effect noun type at the baseline Testing_Time. The interactions of these variables will investigate how similar or different countable and substance-uncountable nouns are treated in comparison to object-uncountable nouns across time. This will allow for investigation of feature reassembly by noun types either drifting apart or closer together over the course of the study. This model also included both by-participant and by-item random intercepts. It is important to note that not every noun type is available for analysis of every context, so there will be some results that do not have interaction predictors. Here, we will summarize the significant effects and interactions of each model. The full model output tables can be found in Appendix J.

7.3.2.1 | Linguistically-Informed Instruction

The means and standard deviations across testing times for the participants in the LING group (*n* = 30) can be seen in Table 7.12. The LING group receive one hour of explicit instruction using linguistically-informed materials that used the semantic universals [±definite], [±count], [±atomic], and [±plural] to teach articles and noun types. Table 7.12 shows the means by each noun type in each context that is analyzed. Since this task only investigated grammatical article and noun type combinations, not every context has multiple noun types.

[23] The level of significance will be $\alpha = 0.05$ throughout all the analyses.

Table 7.12. Means and standard deviations for forced-choice elicitation scores for LING learners (n = 30) at T0, T1, and T2

		T0		T1		T2	
Context	**Noun_Type**	**M**	**SD**	**M**	**SD**	**M**	**SD**
definite-plural	count	1.36	0.61	1.20	0.62	1.01	0.74
definite-singular	count	1.56	0.56	1.39	0.74	1.44	0.64
	object	1.06	0.75	1.43	0.69	1.08	0.71
	substance	1.36	0.66	1.46	0.71	1.30	0.71
indefinite-singular	count	1.22	0.90	1.03	0.92	1.63	0.66
zero-plural	count	1.44	0.70	1.48	0.84	1.17	0.93
zero-singular	object	0.87	0.52	1.39	0.55	1.32	0.58
	substance	1.22	0.63	1.56	0.52	1.43	0.58

For the definite-plural context, countable nouns are the only grammatical nouns in this context. As we can see in the descriptive statistics above, mean forced-choice scores actually decrease from T0 to T1 and T1 to T2, in addition to standard deviations increasing. In a definite-singular context, all noun types are grammatical. At T0, we see that countable nouns receive the highest scores, followed by substance-uncountable and then object-uncountable. At T1, scores for countable nouns have decreased, while scores for uncountable nouns have increased. The standard deviations have remained mostly the same. From T1 to T2, we see that countable noun scores increase, but uncountable noun scores decrease. At T2, similar to T0, countable nouns have the highest scores, followed by substance-uncountable and then object-uncountable. Countable nouns are the only nouns acceptable in an indefinite-singular context. The descriptive statistics show a decrease in scores from T0 to T1, but an increase from T1 to T2 and overall increase from T0 to T2. As with an indefinite-singular context, only countable nouns are grammatical in a zero-plural context. In this context, it can be seen that scores increase from T0 to T1 but decrease from T1 to T2 and T0 to T2. The final context under investigation is zero-singular. Only uncountable nouns are grammatical in this context. At T0, substance-uncountable nouns are much higher than countable nouns, and that is continued at T1 and T2. In addition, both noun types increase from T0 to T1, but there is a slight decrease from T1 to T2. Overall, they increase from T0 to T2. Being as there is not a general trend of increases in scores across times, these patterns were mostly not predicted.

The first context under investigation is definite-plural. In this context, countable nouns are grammatical and are the only noun type under investigation. The distribution of data can be found in Figure 7.103. This violin plot shows the distribution and shift in forced-elicitation scores for each testing time.

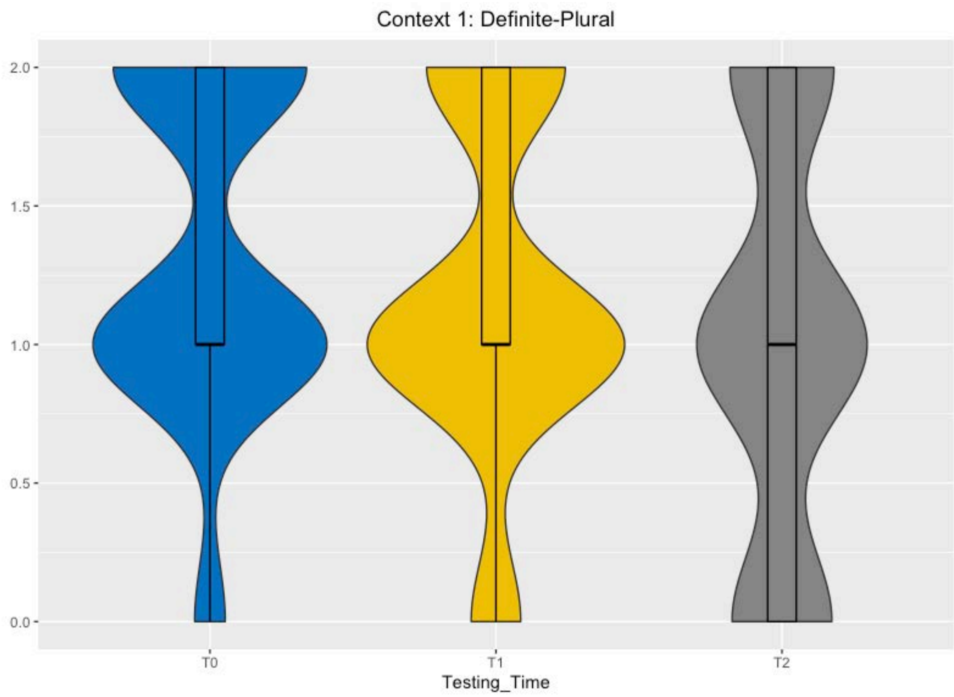

Figure 7.103. Violin plot of mean forced-choice scores for LING learners in ContexT1

The results of the regression models are summarized in (57).

(57) Context 1: definite-plural

a. Model 2-A: No significant main effect or interaction predictors

b. Model 2-B: No significant main effect or interaction predictors

The analyses for countable nouns in this context did not find any significant main effect predictors, and there are no possible interaction predictors for the model. The effects are plotted in Figure 7.104.

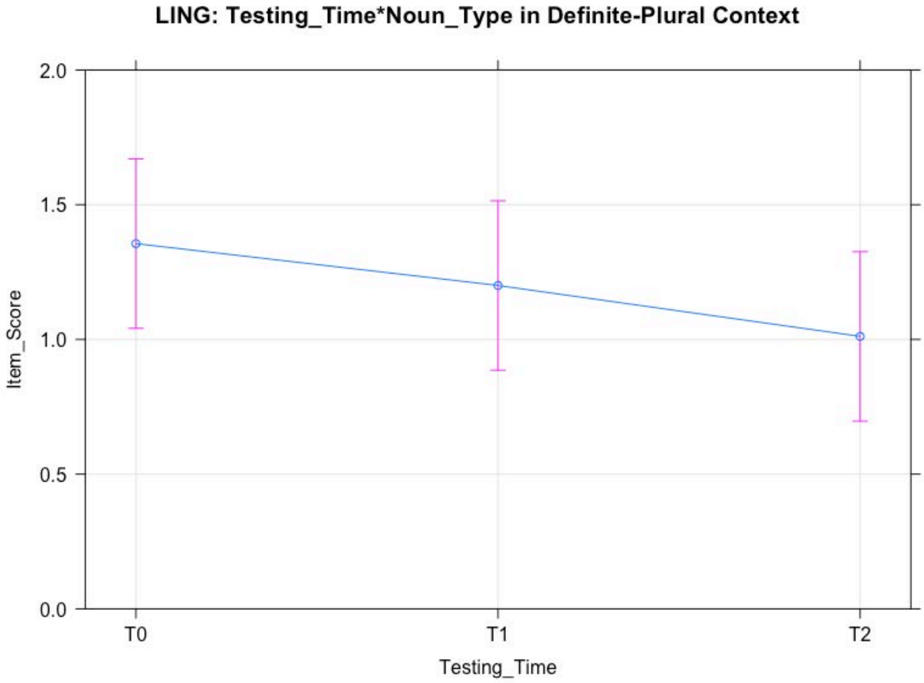

Figure 7.104. Effect plot for forced-choice scores of Testing_Time by Noun_Type for LING learners in Context 1

In this figure, we can see that the forced-choice scores decrease across the course of the study. Being as no significant effects were found, there was no need for a post-hoc analysis.

The next context under investigation is definite-singular. In this context, all noun types are grammatical. The descriptive statistics are presented in Figure 7.105.

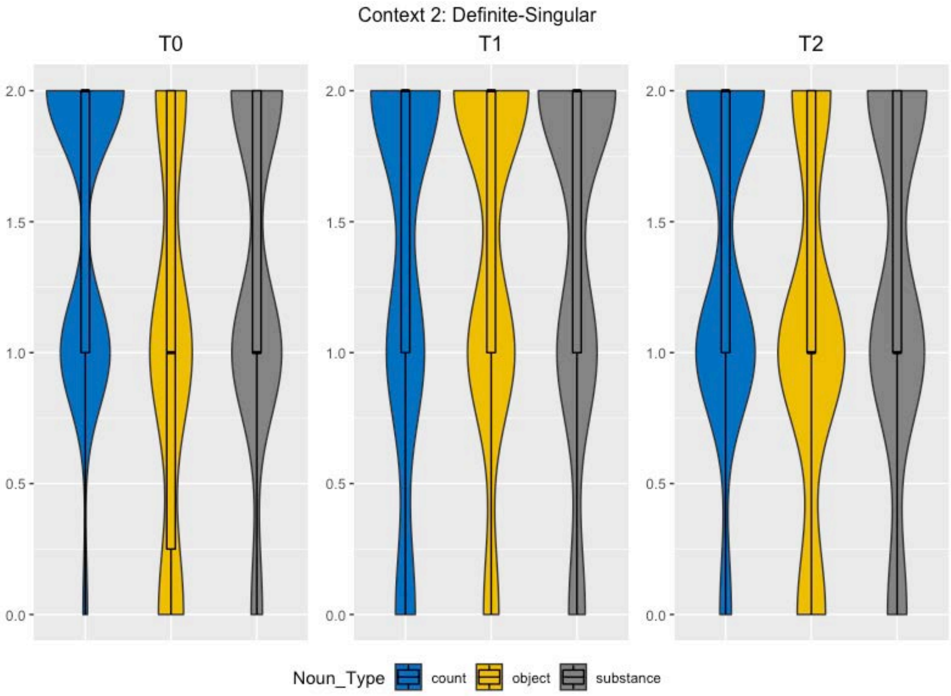

Figure 7.105. Violin plots of mean forced-choice scores for LING learners in ContexT2

The results of the regression models are summarized in (58).

(58) Context 2: definite-singular

a. Model 2-A:

i. Main effect of Noun_Type:Count ($p < 0.05$)

ii. No significant interaction predictors

b. Model 2-B: No significant main effect or interaction predictors

Model 2-A, with T0 as the baseline, did reveal a significant main effect of Noun_Type:Count (β = 0.50, $t(18) = 2.19$, $p < 0.05$), which found that LING learners performed significantly better with countable nouns than object-uncountable nouns at T0. This model did not find any other significant main effect or interaction predictors. In addition, when the model was releveled for Testing_Time:T1, the model failed to reveal any significant main effect or interaction predictors. The effects are plotted in Figure 7.106.

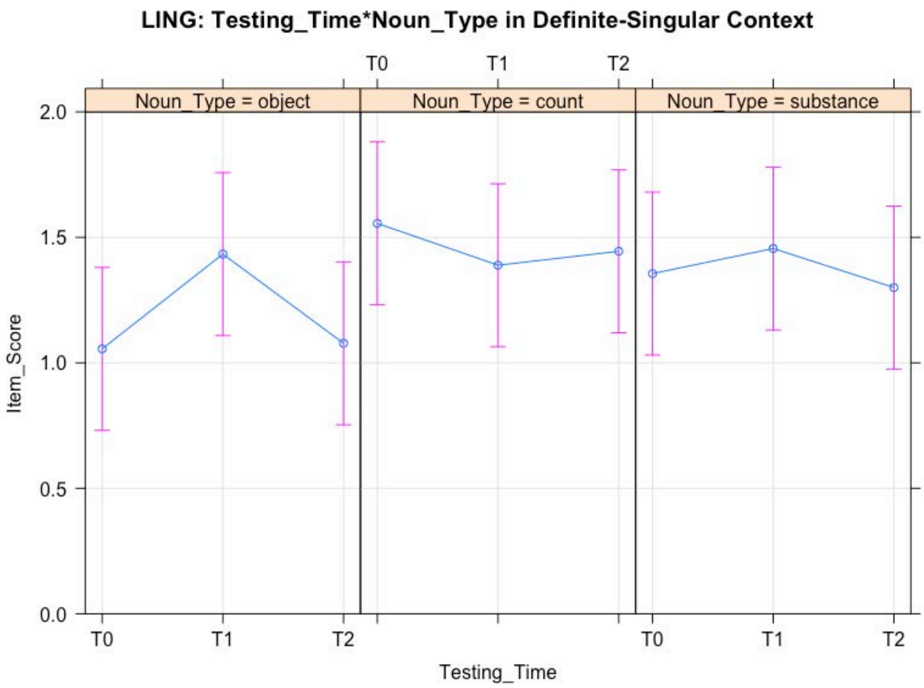

Figure 7.106. Effect plot for forced-choice scores of Testing_Time by Noun_Type for LING learners in Context 2

The Tukey post-hoc analysis failed to confirm the significant main effect in Model 2-A and also failed to reveal an addition significant differences.

The third context under investigation is indefinite-singular, which only takes countable nouns to make it grammatical. The descriptive statistics, means and standard deviations, are plotted in Figure 7.107. As can be seen in the violin plot, there is a slight downward shift from T0 to T1 but an increase from T0 and T1 to T2.

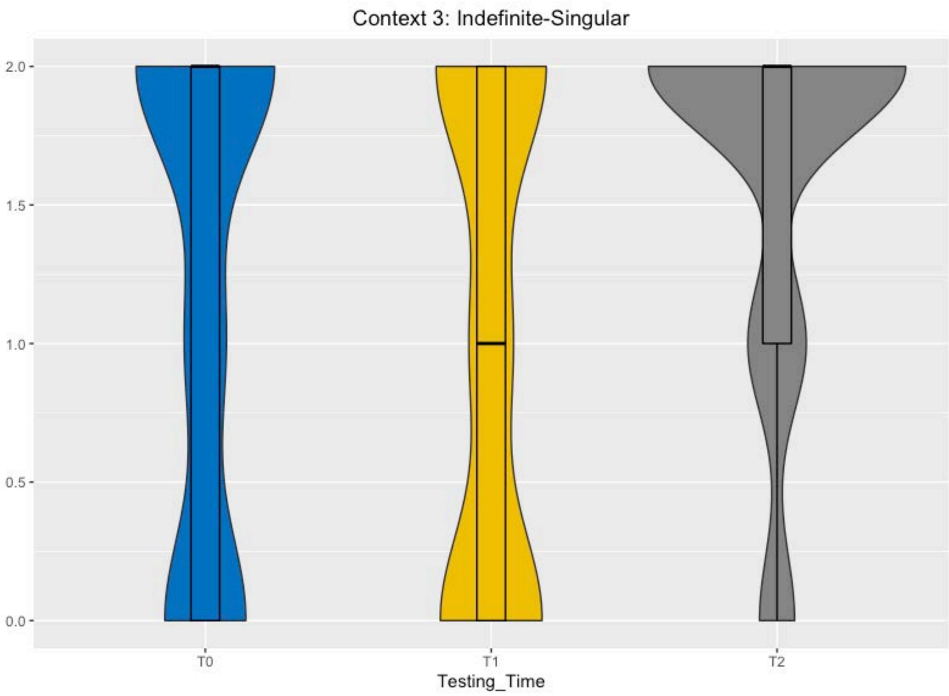

Figure 7.107. Violin plot of mean forced-choice scores for LING learners in Context3

The results of the regression models are summarized in (59).

(59) Context 3: indefinite-singular

a. Model 2-A: No significant main effect or interaction predictors

b. Model 2-B:

   i. Main effect of Testing_Time:T2 ($p < 0.05$)

   ii. No possible interaction predictors

Model 2-A, with T0 as the baseline, failed to reveal any significant main effect predictors. When the model was releveled, Model 2-B, with T1 as the baseline, it did reveal a significant main effect predictor of Testing_Time:T2 ($\beta = 0.19$, $t(6) = 2.75$, $p < 0.05$), finding that LING learners significantly increased in their forced-choice scores from T1 to T2. Model 2-B failed to reveal any other significant interactions. The effects are plotted in Figure 7.108

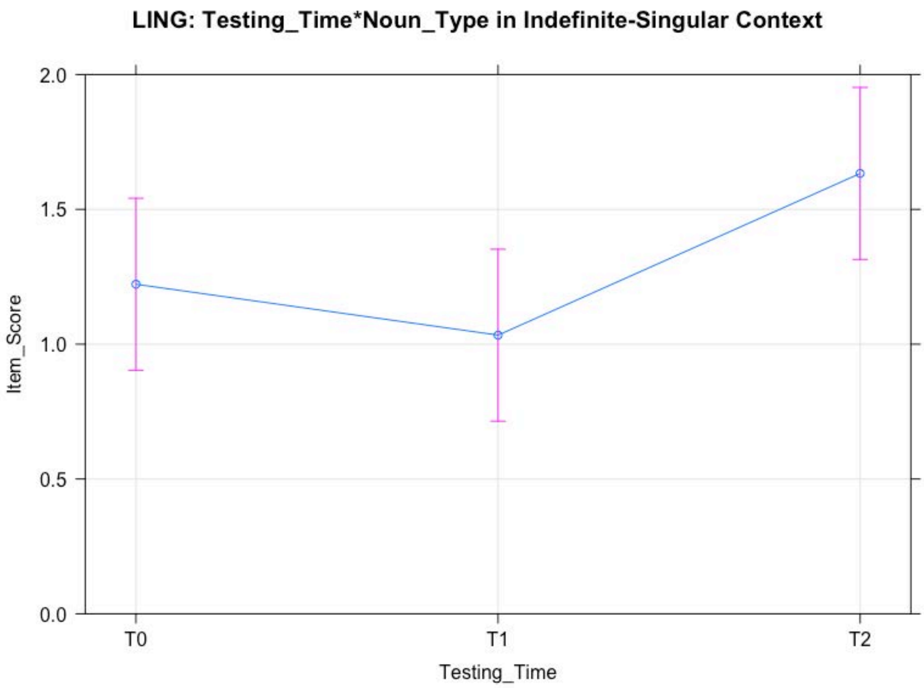

Figure 7.108. Effect plot for forced-choice scores of Testing_Time by Noun_Type for LING learners in Context 3

The post-hoc analysis failed to confirm the main effect of Model 2-B as well as reveal any other significant differences.

The fourth context under investigation is zero-plural. In this context, only countable nouns are grammatical. The means and standard deviations for forced-choice scores can be found in the violin plot in Figure 7.109.

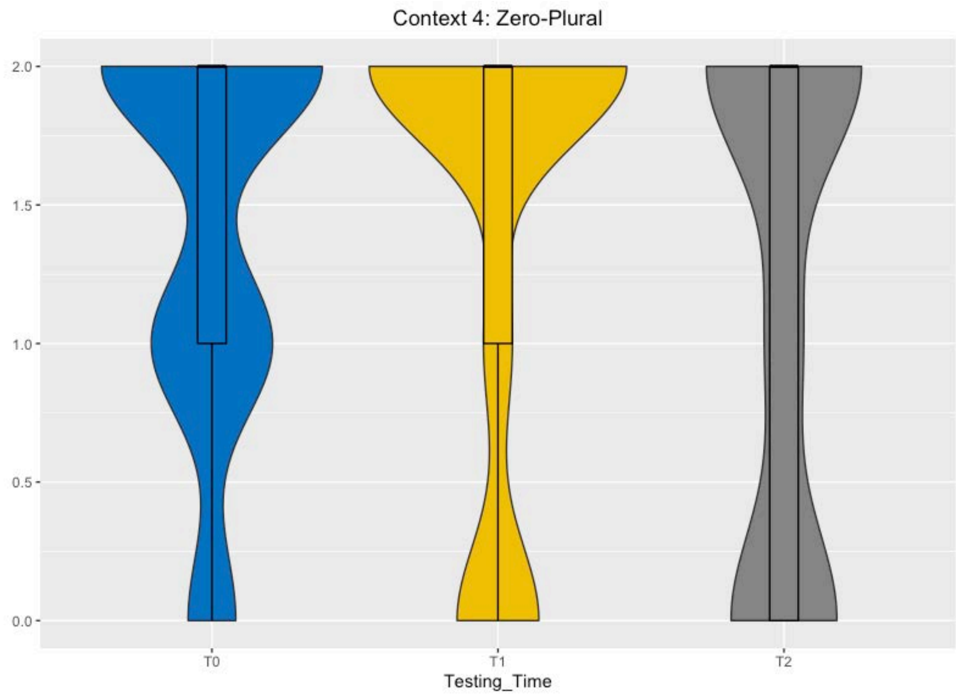

Figure 7.109. Violin plot of mean forced-choice scores for LING learners in Context4

The results of the regression models are summarized in (60).

(60) Context 4: zero-plural

a. Model 2-A: No significant main effect or interaction predictors

b. Model 2-B: No significant main effect or interaction predictors

The analyses for this context failed to reveal any significant main effect predictors, and there are no possible interaction predictors. These effects are plotted in Figure 7.110.

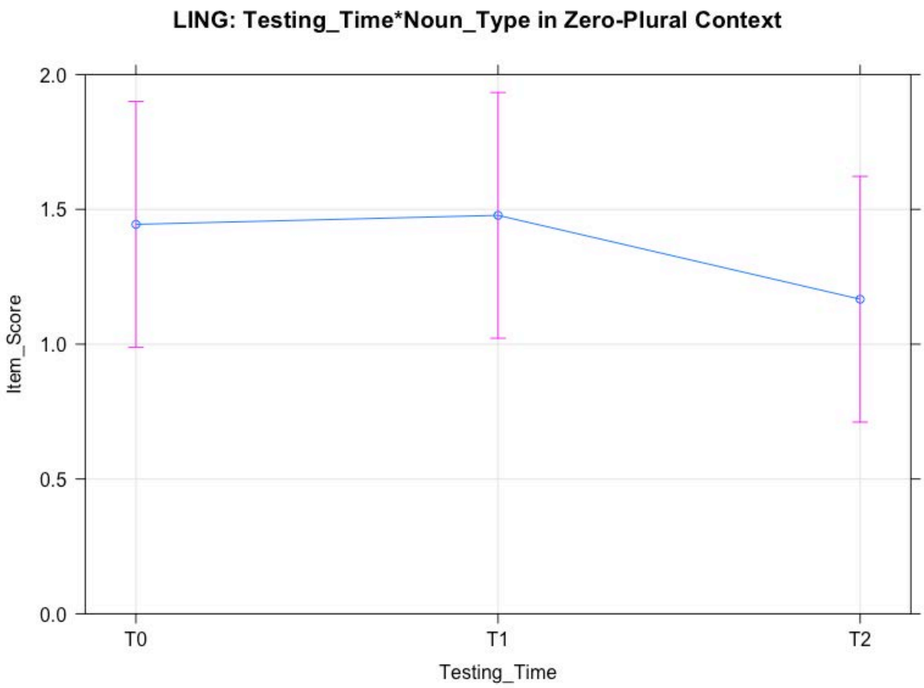

Figure 7.110. Effect plot for forced-choice scores of Testing_Time by Noun_Type for LING learners in Context 4

As can be seen in the effect plot, there is a non-significant negative trend from T1 to T2. While this trend is unexpected, the Tukey HSD post-hoc analysis failed to reveal any significant differences.

The final context under investigation for LING learners for RQ2 is zero-singular. In this context, countable nouns are ungrammatical, so the analyses only investigates object- and substance-uncountable nouns. The means and standard deviations of forced-choice scores are plotted in Figure 7.111.

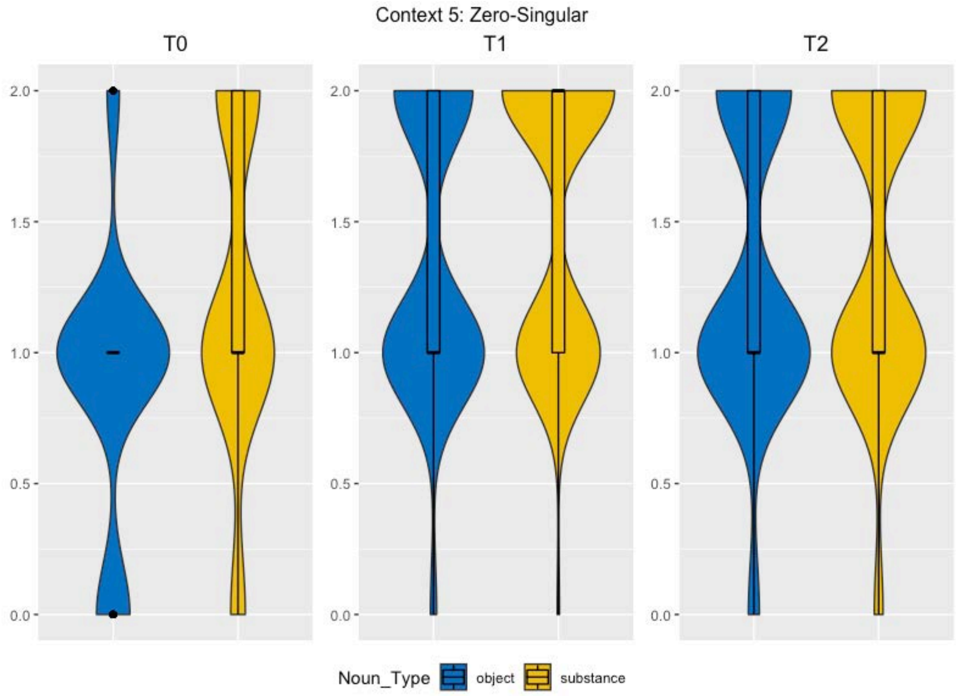

Figure 7.111. Violin plot of mean forced-choice scores for LING learners in Context5

The results of the regression models are summarized in (61).

(61) Context 5: zero-singular

a. Model 2-A:

i. Main effect of Testing_Time:T1 ($p < 0.01$)

ii. Main effect of Testing_Time:T2 ($p < 0.05$)

iii. Main effect of Noun_Type:Substance ($p < 0.05$)

iv. No significant interaction predictors

b. Model 2-B:

i. Main effect of Testing_Time:T0 ($p < 0.01$)

ii. No significant interaction predictors

Model 2-A revealed three significant main effects. Two main effects are for Testing_Time—one for T1 ($\beta = 0.52$, $t(12) = 3.28$, $p < 0.01$) and one for T2 ($\beta = 0.46$, $t(12) = 2.86$, $p < 0.05$). Both of these main effects found that there was a significant increase in forced-choice scores from T0 to T1 and T0 to T2 for object-uncountable nouns. This model also revealed a significant main effect of Noun_Type:Substance ($\beta = 0.36$, $t(12) = 2.23$, $p < 0.05$). This main effect found that LING learners, at T0, performed significantly better with substance-uncountable nouns than object-uncountable nouns. When the model was releveled for T1, the only significant main effect that was revealed was for Testing_Time:T0, which has been previously discussed. The effects are plotted in Figure 7.112

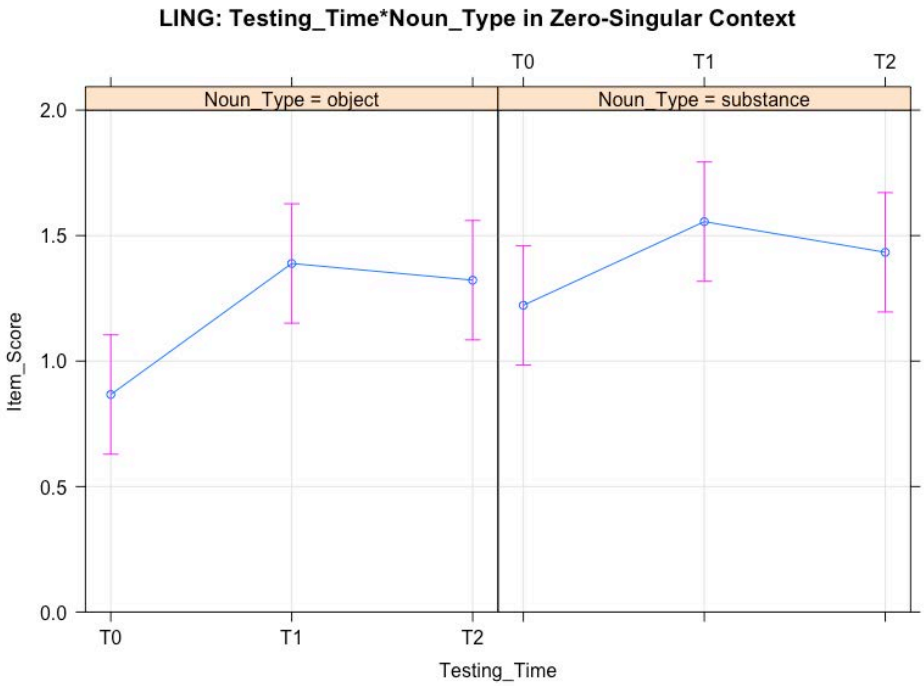

Figure 7.112. Effect plot for forced-choice scores of Testing_Time by Noun_Type for LING learners in Context 5

The Tukey post-hoc analysis failed to confirm any of the significant main effects and also failed to reveal any significant differences between noun types or testing times.

In summary, the LING learners did not perform as expected. In both a definite-singular context and a definite-plural context, the models failed to reveal any significant linguistic gains. For the countable nouns in an indefinite-singular context, a significant gain from T1 to T2 was observed for countable nouns. The model, once again, failed to produce any significant gains for countable nouns in a zero-plural context. It appears, though, that LING learners were most successful with the zero-singular context. In that context, we found significant linguistic gains from T0 to T1 and T2 for object-uncountable nouns. The results from this task, thus far, may suggest that LING instruction may not have been as beneficial as it was with the other tasks.

7.3.2.2 | Traditional Instruction

In RQ2, the next learner group under investigation are TRAD learners (n = 18). The means and standard deviations across testing times for these learners can be found in Table 7.13. This table shows the means by noun type in each context that is analyzed. Due to the nature of the task, not every noun type is presented in every context.

Table 7.13. Means and standard deviations for forced-choice elicitation scores for TRAD learners (n = 18) at T0, T1, and T2

		T0		**T1**		**T2**	
Context	**Noun_Type**	**M**	**SD**	**M**	**SD**	**M**	**SD**
definite-plural	count	1.30	0.57	1.13	0.65	1.06	0.76
definite-singular	count	1.70	0.57	1.35	0.78	1.43	0.72
	object	1.33	0.78	1.46	0.72	1.09	0.65
	substance	1.56	0.69	1.24	0.73	1.39	0.66
indefinite-singular	count	1.19	0.95	0.89	0.92	1.85	0.49
zero-plural	count	1.48	0.67	1.54	0.77	1.39	0.81
zero-singular	object	0.98	0.46	1.28	0.53	1.39	0.56
	substance	1.35	0.48	1.43	0.50	1.59	0.50

For countable nouns in a definite-plural context, we see a steady decrease in forced-elicitations cores when moving from T0 to T1 and T1 to T2, with a steady increase in standard deviation at the same time. For a definite-singular context, we see scores decrease for countable and substance-uncountable nouns from T0 to T1 but increase from T1 to T2. The opposite trend is observed for object-uncountable nouns which increase from T0 to T1 and decrease from T1 to T2. For countable nouns in an indefinite-singular context, we see a decrease from T0 to T1, but a sharp increase from T1 to T2 in forced-choice scores. For countable nouns in a zero-plural context, we see an increase from T0 to T1, but a decrease from T1 to T2 and T0 to T2. Some of the most promising results are observed with uncountable nouns in a zero-singular context. Both substance- and object-uncountable nouns increase from T0 to T1 and T1 to T2. We now turn to inferential statistics. We will present the results context-by-context.

The first context under investigation is definite-plural. In this context, the only noun type that is grammatical, and, thus, under investigation, is countable. The means and standard deviations for countable nouns and TRAD learners can be found in Figure 7.113.

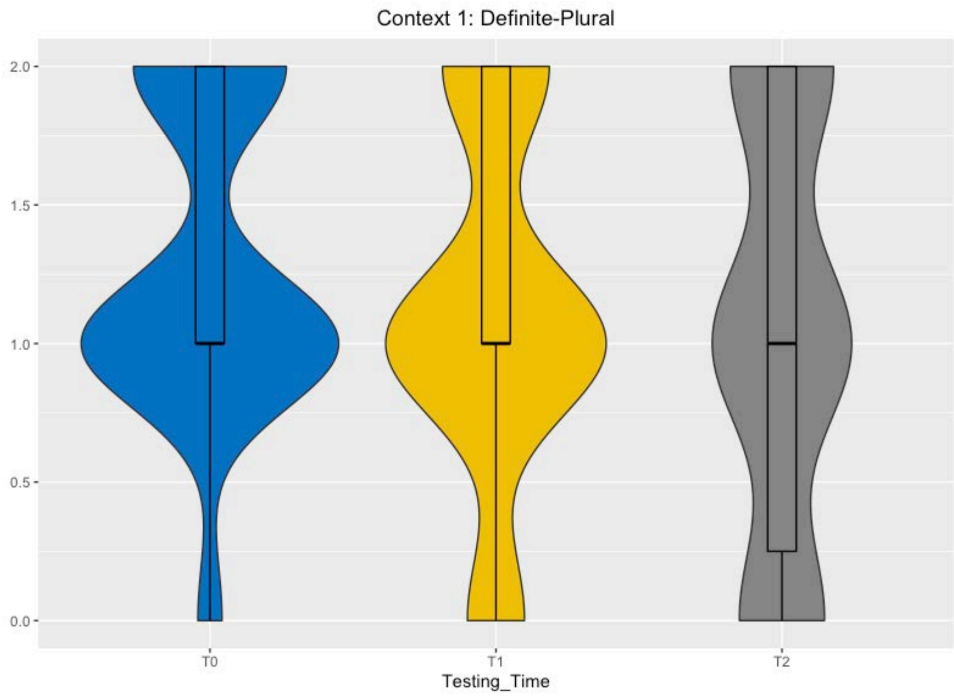

Figure 7.113. Violin plot of mean forced-choice scores for TRAD learners in ContexT1

The results of the regression models are summarized in (62).

(62) Context 1: definite-plural

a. Model 2-A: No significant main effect or interaction predictors

b. Model 2-B: No significant main effect or interaction predictors

The analyses for countable nouns in this context did not find any significant main effect predictors, and there are no possible interaction predictors for the model. The effects are plotted in Figure 7.114.

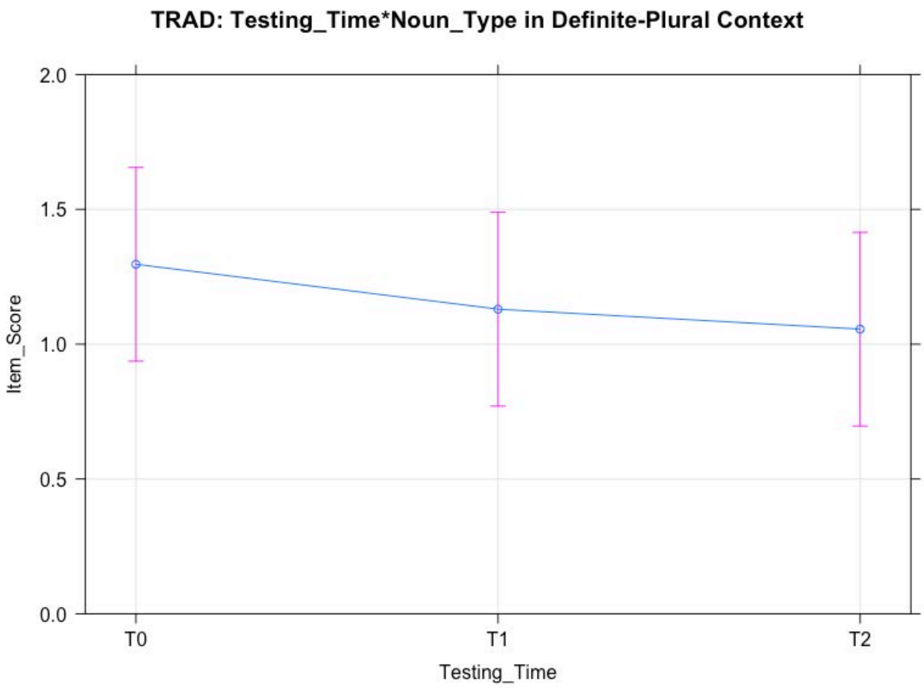

Figure 7.114. Effect plot for forced-choice scores of Testing_Time by Noun_Type for TRAD learners in Context 1

Being as the models found no significant main effects, there was no need to run Tukey post-hoc analysis on these models. The effect plot in Figure 7.114 shows a negative trend of imitation scores from T0 to T1 and T2. Although this trend is non-significant, it may indicate that TRAD instruction was not beneficial for countable in this context.

The next context under investigation definite-singular. In this context, all noun types are grammatical and, therefore, included in the analysis. The means and standard deviations are plotted in Figure 7.115.

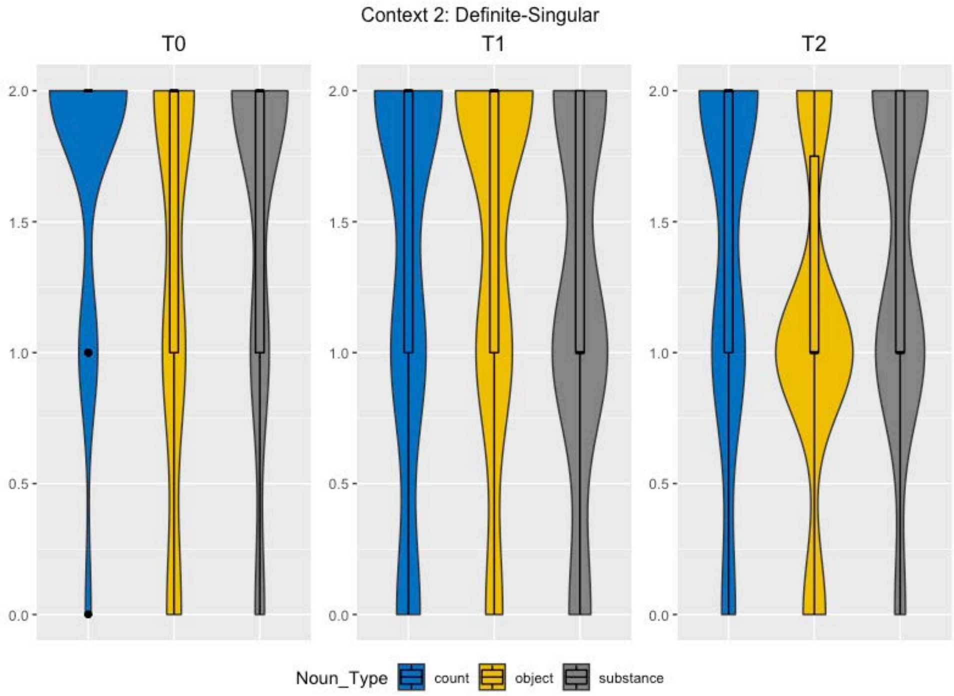

Figure 7.115. Violin plots of mean forced-choice scores for TRAD learners in ContexT2

The results of the regression models are summarized in (63).

(63) Context 2: definite-singular

a. Model 2-A: No significant main effect or interaction predictors

b. Model 2-B: No significant main effect or interaction predictors

The model analysis failed to reveal any significant main effect or interaction predictors. The effect plots can be found in Figure 7.116.

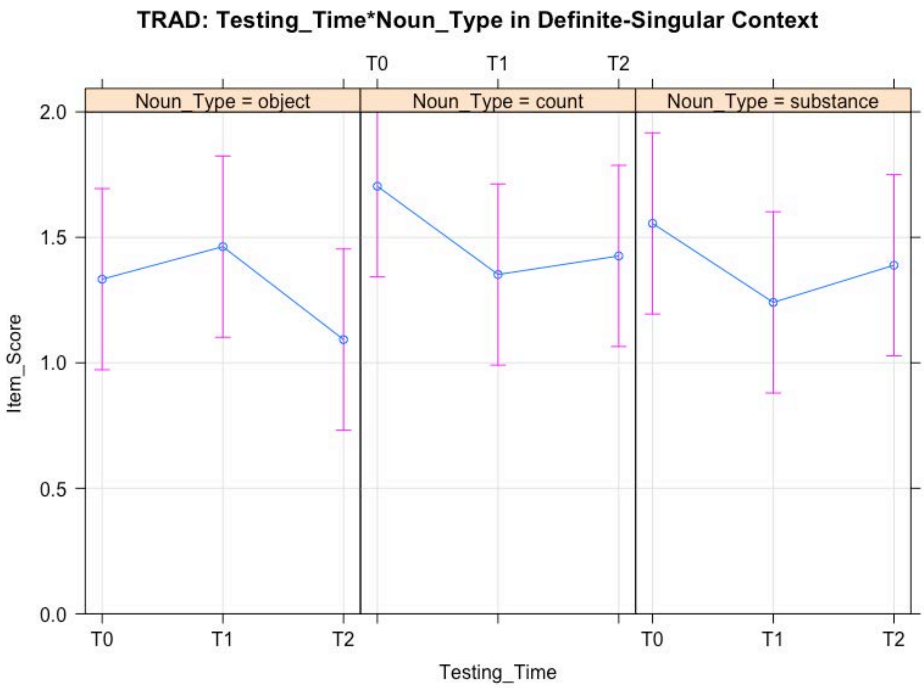

Figure 7.116. Effect plot for forced-choice scores of Testing_Time by Noun_Type for TRAD learners in Context 2

As can be seen in the effect plot in Figure 7.116, there is an overall negative trend from T0 to T2 for all noun types. Object-uncountable nouns, however, do make a small increase in imitation scores from T0 to T1, but this is ultimately overshadowed by T2 imitation scores that are lower than both T0 and T1. Furthermore, while countable and substance-uncountable nouns decrease from T0 to T1, there is a slight increase for both of these noun types from T1 to T2. Due to no significant main effect or interaction predictors, the post-hoc analysis was deemed unnecessary and not performed.

The third context under investigation is indefinite-singular. In the indefinite-singular context, only countable nouns are grammatical and, therefore, under investigation and analysis in the models. The descriptive statistics can be found in Figure 7.117 below.

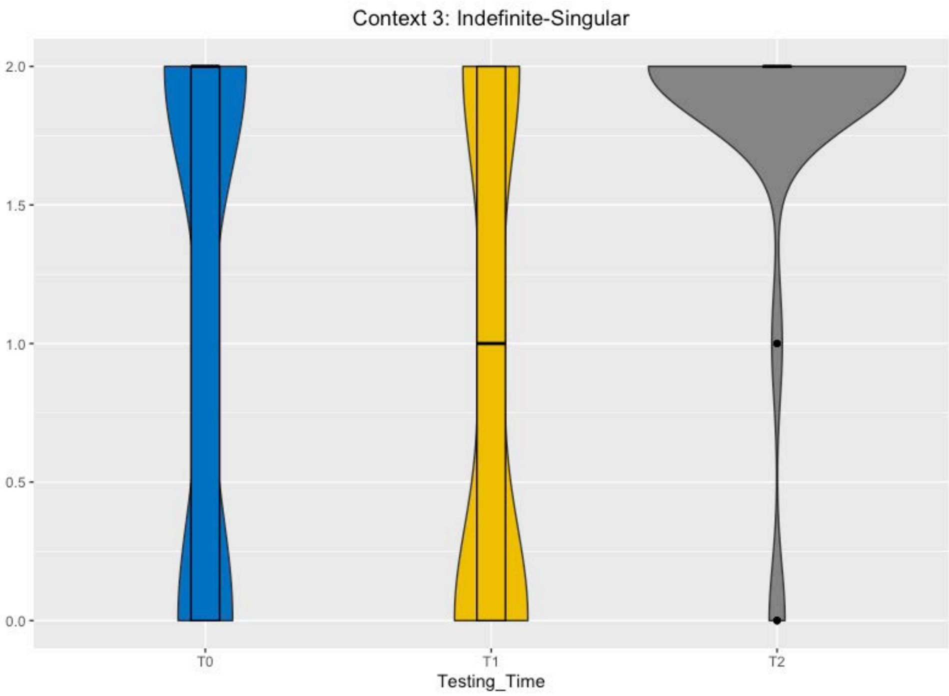

Figure 7.117. Violin plot of mean forced-choice scores for TRAD learners in Context3

The results of the regression models are summarized in (64).

(64) Context 3: indefinite-singular

a. Model 2-A: No significant main effect or interaction predictors

b. Model 2-B:

   i. Main effect of Testing_Time:T2 (p < 0.05)

   ii. No possible interaction predictors

Model 2-A, with T0 as the baseline, failed to reveal any significant main effect predictors and has no possible interaction predictors. When the model was releveled, Model 2-B with T1 as the baseline testing time, it revealed a significant main effect of Testing_Time:T2 ($\beta = 0.96$, $t(6) = 3.12$, $p < 0.05$). This main effect found that TRAD learners made significant linguistic gains from T1 to T2 with regard to their forced-choice scores of countable nouns. These effects are plotted in Figure 7.118.

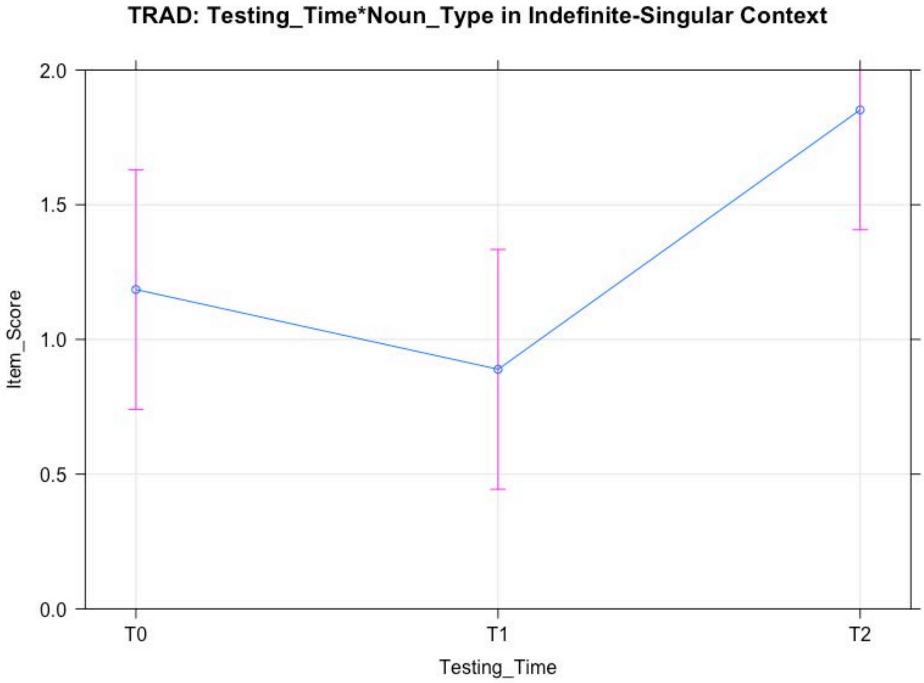

Figure 7.118. Effect plot for forced-choice scores of Testing_Time by Noun_Type for TRAD learners in Context 3

Being as Model 2-B found a significant interaction, the model was subjected to post-hoc analysis. The Tukey HSD post-hoc analysis confirmed the significant effect and found that TRAD learners made significant linguistic gains for countable nouns from T1 to T2 ($p < 0.05$). The post-hoc test did not reveal any additional significant differences.

The next context under investigation is zero-plural. As with definite-plural and indefinite-singular, countable nouns are the only grammatical noun type and under investigation. The descriptive statistics, which were presented in the table earlier, are displayed in the violin plot in Figure 7.119.

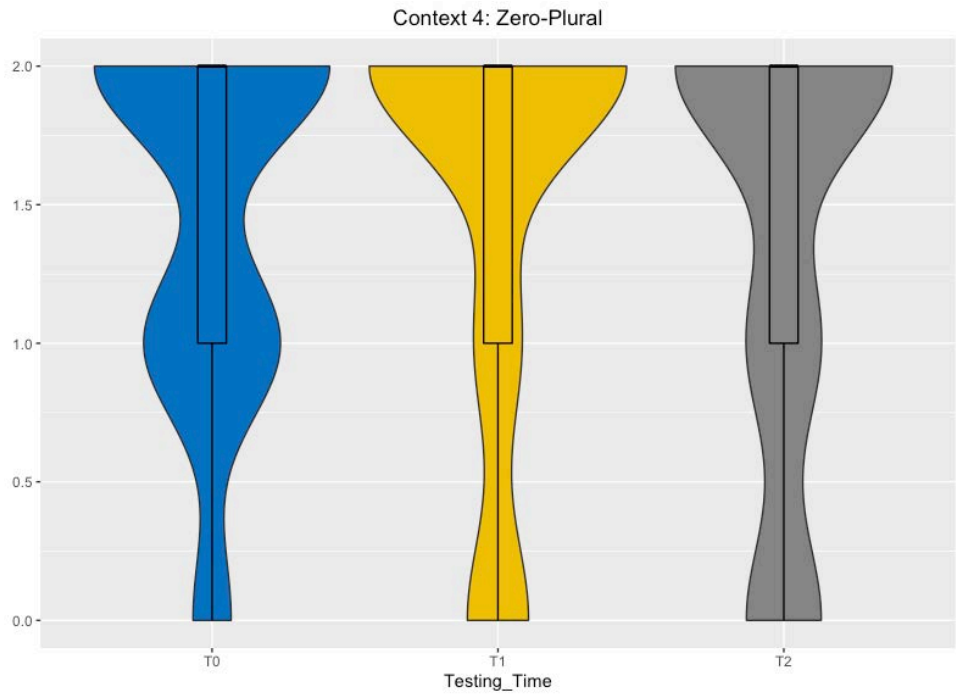

Figure 7.119. Violin plot of mean forced-choice scores for TRAD learners in Context4

The results of the regression models are summarized in (65).

(65) Context 4: zero-plural

a. Model 2-A: No significant main effect or interaction predictors

b. Model 2-B: No significant main effect or interaction predictors

The inferential analysis for this context failed to find any significant main effect predictors. This means that TRAD learners did not make any significant changes in their linguistic knowledge of the forced-choice production of countable nouns in a zero-plural context. Th effects are plotted in Figure 7.120.

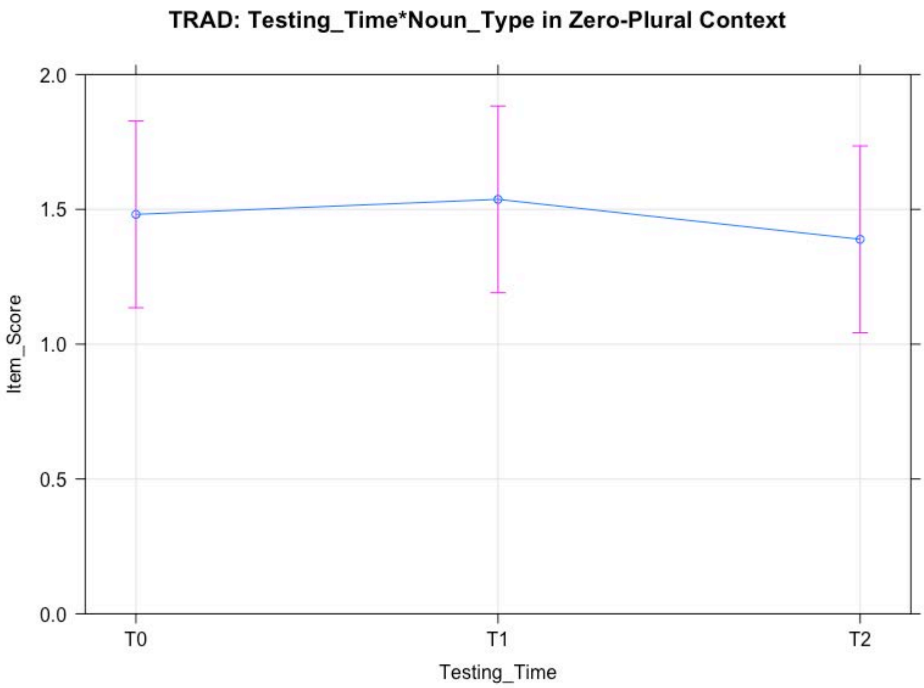

Figure 7.120. Effect plot for forced-choice scores of Testing_Time by Noun_Type for TRAD learners in Context 4

Since there were no significant main effect predictors, these models were not subjected to post-hoc analysis.

The final context under investigation for TRAD learners in RQ2 is zero-singular. In a zero-singular context, countable nouns are ungrammatical. Therefore, only substance- and object-uncountable nouns are under investigation and analysis in the FCET. The descriptive statistics are visually presented in Figure 7.121.

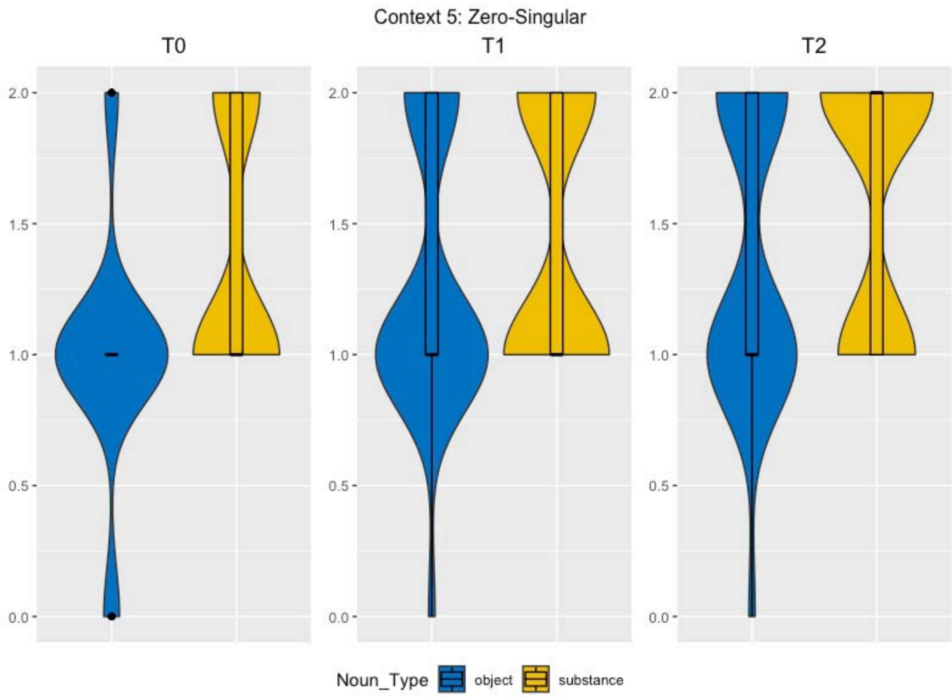

Figure 7.121. Violin plots of mean forced-choice scores for TRAD learners in Context5

The results of the regression models are summarized in (66).

(66) Context 5: zero-singular

a. Model 2-A:

i. Main effect of Testing_Time:T2 ($p < 0.05$)

ii. Main effect of Noun_Type:Substance ($p < 0.05$)

iii. No significant interaction predictors

b. Model 2-B: No significant main effect or interaction predictors

Model 2-A revealed a main effect of Testing_Time:T2 ($\beta = 0.41$, $t(12) = 2.72$, $p < 0.05$), indicating that TRAD learners perform significantly better at T2 than T0 with regard to their forced-choice scores of object-uncountable nouns. Furthermore, the model revealed a significant main effect of Noun_Type:Substance ($\beta = 0.37$, $t(12) = 2.47$, $p < 0.05$), which indicates that, at T0, TRAD learners are significantly more successful with their forced-choices of substance-uncountable nouns than object-uncountable nouns. When releveled for testing time T1, Model 2-B failed to reveal any significant main effect or interaction predictors. The effects are plotted in Figure 7.122.

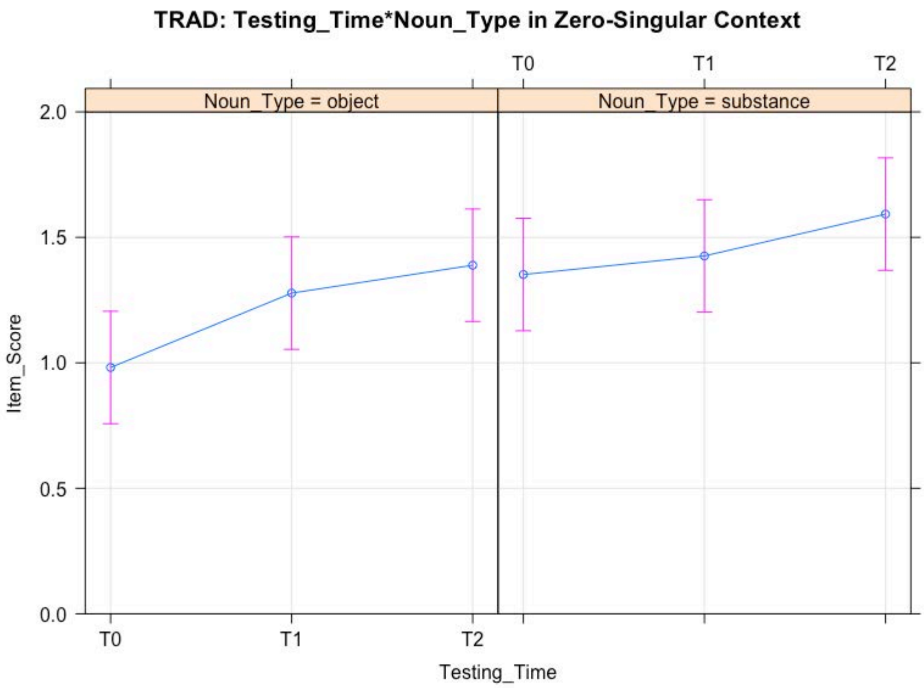

Figure 7.122. Effect plot for forced-choice scores of Testing_Time by Noun_Type for TRAD learners in Context 5

Due to significant findings, the model was subjected to post-hoc analysis. The Tukey HSD post-hoc analysis failed to confirm these significant gains and failed to find any significant differences overall.

For TRAD learners, we did not find any significant linguistic differences or gains for nouns in a definite-plural, definite singular, or zero-plural context. In an indefinite-singular context, we found that the learners did make significant linguistic gains from T1 to T2 with countable nouns. We also found a significant gain in linguistic knowledge from T0 to T2 in a zero-singular context. The lack of gains overall, indicates that TRAD instruction may not have been most beneficial, but we need to conduct an analysis of linguistic gains between groups, as in RQ3, to confirm this.

7.3.2.3 | No Extra Instruction

The last learner group under investigation for RQ2 is NOEX leaners (*n* = 17). The descriptive statistics can be found in Table 7.14.

Table 7.14. Means and standard deviations for forced-choice elicitation scores for NOEX learners (n = 17) at T0, T1, and T2

		T0		T1		T2	
Context	**Noun_Type**	**M**	**SD**	**M**	**SD**	**M**	**SD**
definite-plural	count	1.31	0.62	1.16	0.73	1.04	0.66
definite-singular	count	1.39	0.67	1.24	0.68	1.25	0.66
	object	1.14	0.66	1.33	0.77	1.02	0.62
	substance	1.49	0.64	1.06	0.70	1.10	0.81
indefinite-singular	count	1.31	0.91	0.78	0.92	1.45	0.78
zero-plural	count	1.41	0.70	1.25	0.84	1.37	0.77
zero-singular	object	0.80	0.53	0.98	0.62	1.33	0.71
	substance	1.25	0.69	1.02	0.62	1.18	0.68

For countable nouns in a definite-plural context, we find that there is a steady decrease from T0 to T1 and T1 to T2. Furthermore, there is greater variation in the data as we move from T0 to T1 and T2. In a definite-singular context, all noun types are grammatical. With regard to the means and standard deviations, we see a steady decrease in scores for countable nouns in a definite-singular context from T0 to T1 and T1 to T2. For object-uncountable nouns, we see an increase in scores from T0 to T1, but a decrease from T1 to T2 as well as an overall decrease from T0 to T2. The mean forced-choice scores for substance-uncountable nouns shows a sharp decrease from T0 to T1 and T0 to T2 but show a slight increase from T1 to T2. Countable nouns are the only noun type allowed in an indefinite-singular context. In the descriptive statistics, we see a sharp decrease of nearly 50% from T0 to T1, followed by the score doubling from T1 to T2. When moving from T0 to T2 there's an overall increase in forced-choice scores. For countable nouns in a zero-plural context, we see a decrease in scores from T0 to T1, but an increase from T1 to T2. Overall, the scores for countable nouns in a zero-plural context decrease from T0 to T2. The final context under investigation is zero-singular. This context allows both object- and substance-uncountable nouns. For object-uncountable nouns, scores start really low, but show a steady increase from T0 to T1 and T1 to T2. For substance-uncountable nouns, there is a decrease in scores from T0 to T1 and T1 to T2, but an increase from T1 to T2. These descriptive statistics appear to show no systematic patterns for the NOEX learner group. We now turn out attention to the inferential statistics.

The first contest under analysis is definite-plural. In a definite-plural context, only countable nouns are grammatical, and, therefore, the only noun type under investigation in this context. The means and standard deviations are displayed in the violin plots in Figure 7.123.

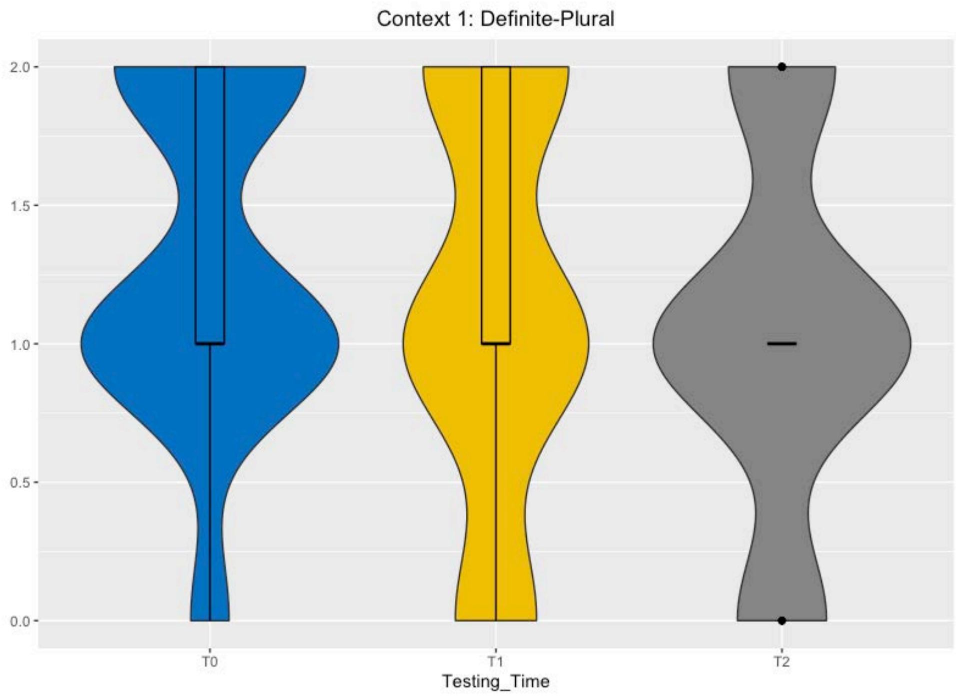

Figure 7.123. Violin plot of mean forced-choice scores for NOEX in Context 1

The results of the regression models are summarized in (67).

(67) Context 1: definite-plural

a. Model 2-A: No significant main effect or interaction predictors

b. Model 2-B: No significant main effect or interaction predictors

The analysis for countable nouns in this context did not find any significant main effect predictors, and there are no possible interaction predictors for the model. The effects are plotted in Figure 7.124.

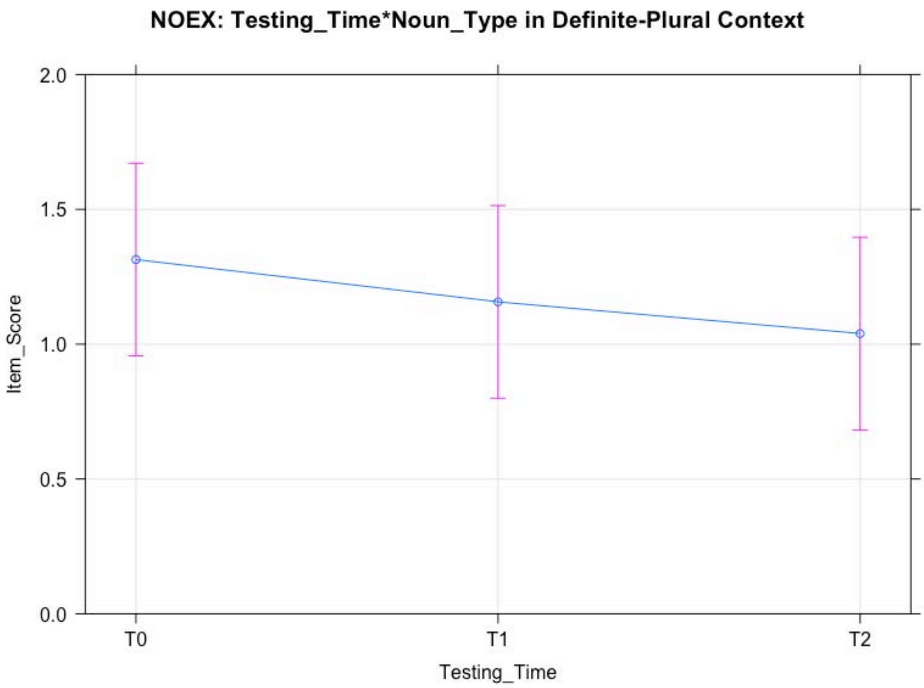

Figure 7.124. Effect plot for forced-choice scores of Testing_Time by Noun_Type for NOEX learners in Context 1

Being as the model found no significant main effects, there was no need to run any post-hoc analysis.

Definite-singular is the next context under investigation. In this context, all noun types are grammatical and, therefore, included in the analysis. The means and standard deviations are in Figure 7.125.

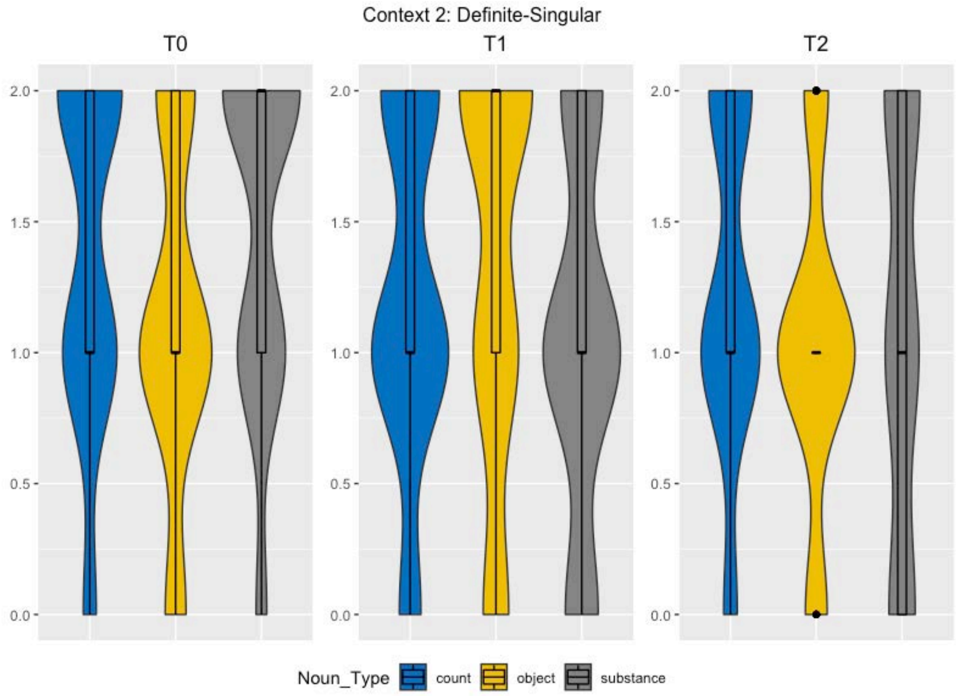

Figure 7.125. Violin plots of mean forced-choice scores for NOEX in Context 2

The results of the regression models are summarized in (68).

(68) Context 2: definite-singular

a. Model 2-A: No significant main effect or interaction predictors

b. Model 2-B: No significant main effect or interaction predictors

The regression model analysis failed to reveal any significant main effect or interaction predictors. The results of the model are plotted in Figure 7.126.

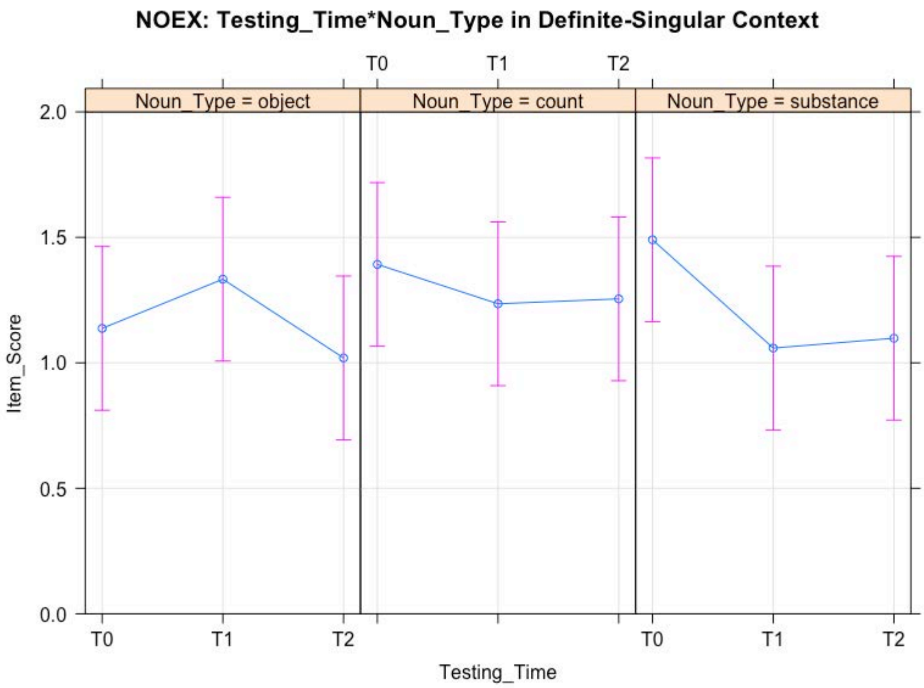

Figure 7.126. Effect plot for forced-choice scores of Testing_Time by Noun_Type for NOEX learners in Context 2

Since there were no significant main effect or interaction predictors, the post=-hoc analysis was deemed unnecessary and not performed.

Countable nouns in an indefinite-singular context are the next ones under analysis. The descriptive statistics are plotted in the violin plots in Figure 7.127.

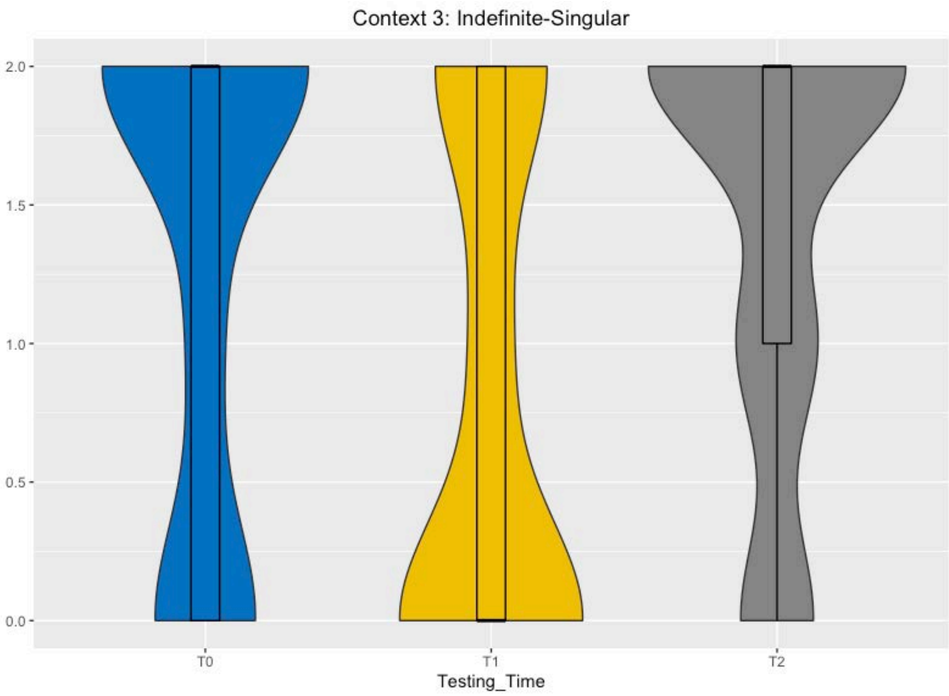

Figure 7.127. Violin plot of mean forced-choice scores for NOEX in Context 3

The results of the regression models are summarized in (69).

(69) Context 3: indefinite-singular

a. Model 2-A: No significant main effect or interaction predictors

b. Model 2-B:

i. Main effect of Testing_Time:T2 ($p < 0.05$)

ii. No possible interaction predictors

Model 2-A, with T0 as the baseline, failed to reveal any significant main effect predictors and does not have any possible interaction predictors. Model 2-B, releveled with T1 as the baseline, revealed a main effect of Testing_Time:T2 ($\beta = 0.67$, $t(6) = 2.92$, $p < 0.05$), finding that NOEX learners made significant improvements in their forced-choice scores from T1 to T2. The effect plot can be found in Figure 7.128.

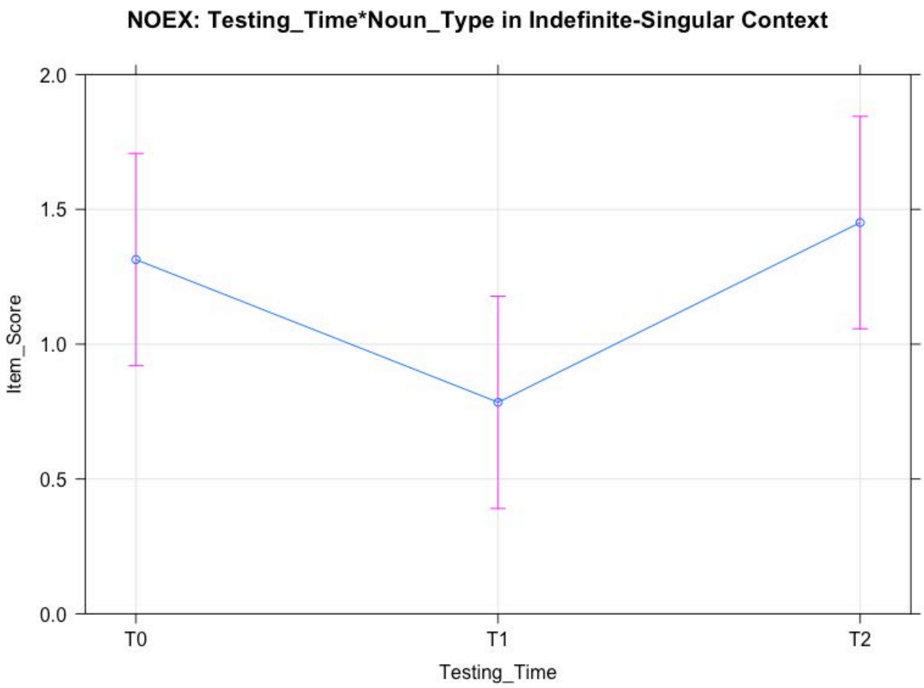

Figure 7.128. Effect plot for forced-choice scores of Testing_Time by Noun_Type for NOEX learners in Context 3

Since Model 2-B found a significant main effect, the model was subjected to post-hoc analysis. The Tukey HSD post-hoc analysis did not confirm the significant effect and found no significant differences.

The next context under investigation is zero-plural. In this context, only countable nouns are grammatical and under analysis. The descriptive statistics were presented earlier in a table but are displayed in violin plots here in Figure 7.129.

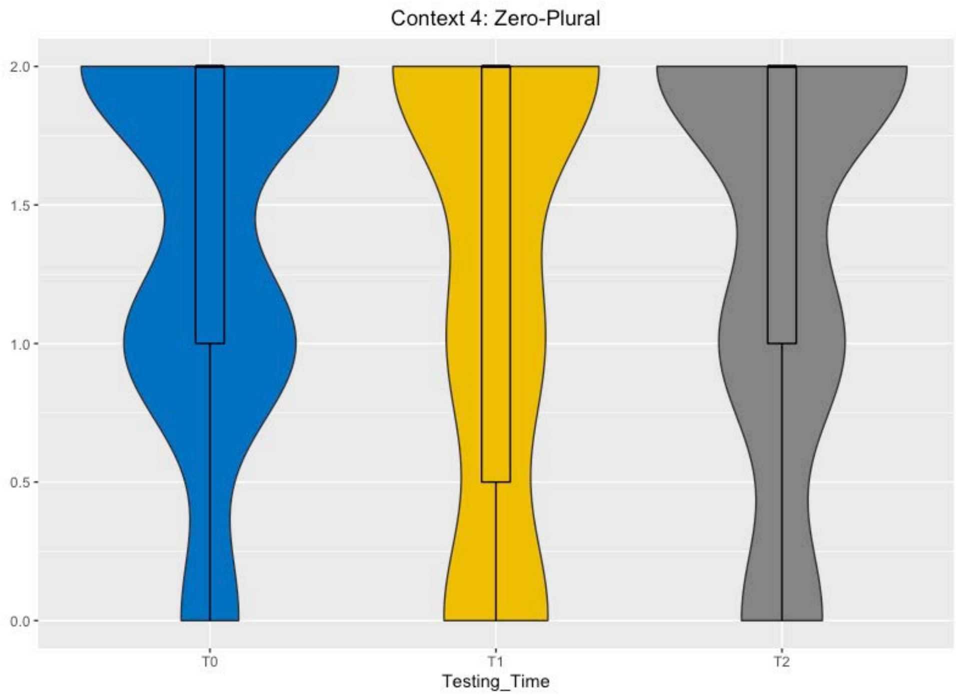

Figure 7.129. Violin plot of mean forced-choice scores for NOEX in Context 4

The results of the regression models are summarized in (70).

(70) Context 4: zero-plural

a. Model 2-A: No significant main effect or interaction predictors

b. Model 2-B: No significant main effect or interaction predictors

The linear regression analysis failed to find any significant main effect predictors, and there are no possible interaction predictors. This means that NOEX learners did not make any significant changes in their linguistic knowledge of forced-choice selection of countable nouns in a zero-plural context. The model is plotted in Figure 7.130.

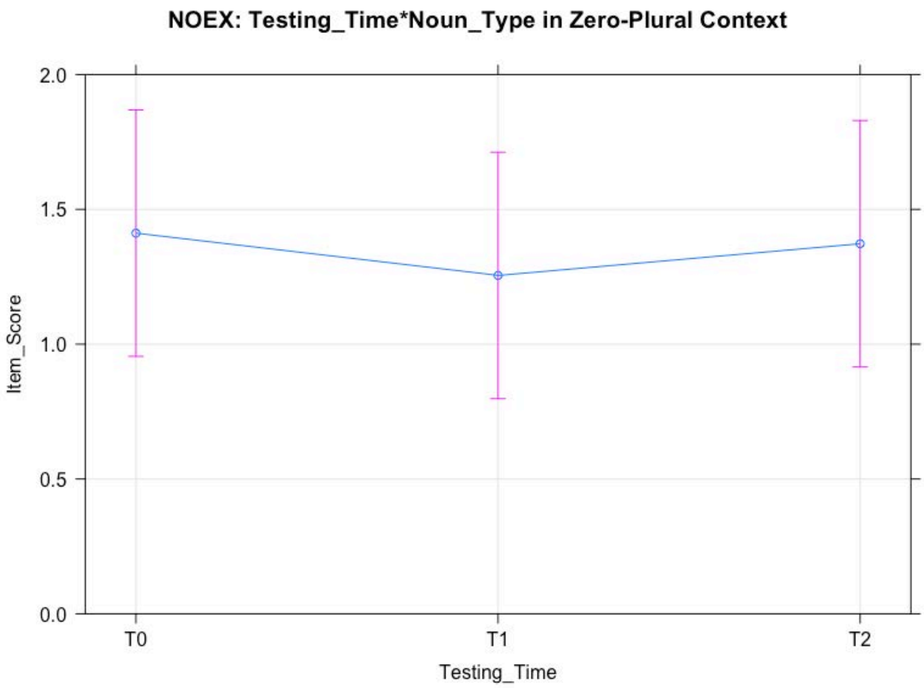

Figure 7.130. Effect plot for forced-choice scores of Testing_Time by Noun_Type for NOEX learners in Context 4

Being as there were no significant main effect predictors, the model was not subjected to any post-hoc analysis.

The final context under investigation is zero-singular. In a zero-singular context, uncountable nouns (substance and object) are grammatical, while uncountable nouns are not. The descriptive statistics are visualized in Figure 7.131.

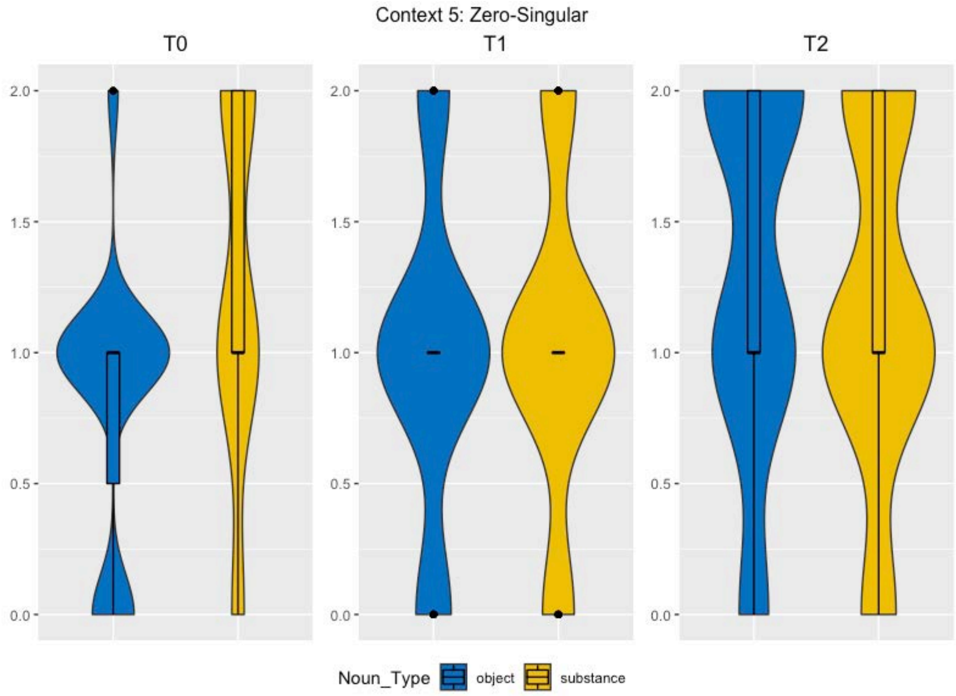

Figure 7.131. Violin plots of mean forced-choice scores for NOEX in Context 5

The results of the regression models are summarized in (71).

(71) Context 5: zero-singular

a. Model 2-A:

i. Main effect of Testing_Time:T2 ($p < 0.01$)

ii. Main effect of Noun_Type:Substance ($p < 0.01$)

iii. Interaction of Testing_Time:T2*Noun_Type:Substance ($p < 0.05$)

b. Model 2-B:

i. Main effect of Testing_Time:T2 ($p < 0.05$)

ii. No significant interaction predictors

Model 2-A revealed two significant main effect predictors and an interaction predictor. The first main effect is of Testing_Time:T2 ($\beta = 0.53$, $t(12) = 3.76$, $p < 0.01$). This main effect found that NOEX learners made significant improvement with their forced-choice scores of object-uncountable nouns in a zero-singular context. The other main effect is of Noun_Type:Substance ($\beta = 0.45$, $t(12) = 3.20$, $p < 0.01$), which found that NOEX learners were significantly better with substance-uncountable nouns than object-uncountable nouns at T0. Model 2-A also found a significant interaction of Testing_Time:T2 by Noun_Type:Substance ($\beta = -0.61$, $t(12) = -3.05$, $p < 0.05$). This interaction found that NOEX learners showed greater difference with their scores between substance-and object-uncountable nouns at T0 than T2, indicating that NOEX learners became more successful with object-uncountable nouns over time than substance-uncountable nouns. When the model was releveled for T1 as the baseline, Model 2-B revealed a significant main effect of Testing_Time:T2 ($\beta = 0.35$, $t(12) = 2.50$, $p < 0.05$), which found that NOEX learners made a significant increase in their forced-choice scores from T1 to T2. The effects are plotted in Figure 7.132

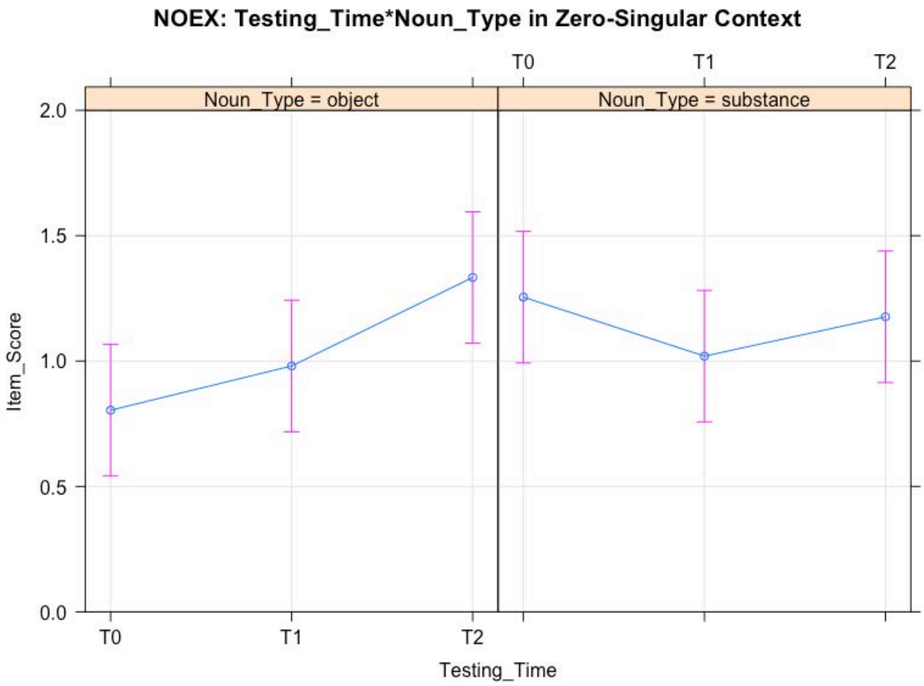

Figure 7.132. Effect plot for forced-choice scores of Testing_Time by Noun_Type for NOEX learners in Context 5

Due to significant minders, the model was subjected to post-hoc analysis used Tukey HSD. This post-hoc analysis confirmed significant gains from T0 to T0 for object-uncountable nouns ($p < 0.05$) but failed to find any other significant differences for noun types and testing times in this context.

For NOEX learners, there were not any significant differences or gains for nouns in a definite-plural, definite-singular, and zero-singular context. In the indefinite-singular context, the model revealed that NOEX learners improve significantly from T1 to T2, but that increase was not significant when we looked at T0 to T2. In the zero-singular context, the regression analysis revealed a number of significant gains and interactions, most notably finding significant increases in object-uncountable nouns from T0 to T2 and T1 to T2. These results are likely due to the fact that these learners did not receive any extra instruction on L2-English articles and noun types as part of the study. We now turn our attention to RQ3, which will investigate the comparison of linguistic gains made in each of the learner groups across the course of the study.

7.3.3 | Research Question 3: Between Group Analysis of L2 Linguistic Gains

The third research question compares the linguistic gains of each group to determine if one method of instruction proves to be more beneficial than another with regard to feature reassembly of articles and noun type features. To do this, we compare the gains in FCET scores for noun types in each of the contexts between groups across the course of the study. The mean gain scores and standard deviations can be found in Table 7.15.

Table 7.15. Mean gain scores and standard deviations of forced-choice scores for all learners

		T0 – T1			T0 – T2			T1 – T2		
Context	**Noun_Type**	**LING**	**TRAD**	**NOEX**	**LING**	**TRAD**	**NOEX**	**LING**	**TRAD**	**NOEX**
definite-plural	count	-0.16	-0.17	-0.16	-0.34	-0.24	-0.27	-0.19	-0.07	-0.12
definite-singular	count	-0.17	-0.35	-0.16	-0.11	-0.28	-0.14	0.06	0.07	0.02
	object	0.38	0.13	0.20	0.02	-0.24	-0.12	-0.36	-0.37	-0.31
	substance	0.10	-0.31	-0.43	-0.06	-0.17	-0.39	-0.16	0.15	0.04
indefinite-singular	count	-0.19	-0.30	-0.53	0.41	0.67	0.14	0.60	0.96	0.67
zero-plural	count	0.03	0.06	-0.16	-0.28	-0.09	-0.04	-0.31	-0.15	0.12
zero-singular	object	0.52	0.30	0.18	0.46	0.41	0.53	-0.07	0.11	0.35
	substance	0.33	0.07	-0.24	0.21	0.24	-0.08	-0.12	0.17	0.16

In Table 7.15, a positive gain score indicates that forced-choice scores increased from one testing time to the next, and a negative gain score indicates that mean scores decreased. Ideally, since this task only tested grammatical article and noun type combinations, the table would be filled with only positive gain scores.

In order to investigate the effects of instruction on linguistic gains and feature reassembly over the course of the study, we compared the FCET gain scores for noun types in each of the different contexts between groups across testing times. As with the other research questions, a linear mixed-effects model[24] was run to investigate statistical differences. In this model, Model 3, the baseline (intercept) levels were Learner_Type:LING, Testing_Time:T0, and Noun_Type:Object for Model 3-A; Learner_Type:LING, Testing_Time:T1, and Noun_Type:Object for Model 3-B; Learner_Type:TRAD, Testing_Time:T0, and Noun_Type:Object for Model 3-C; and Learner_Type:TRAD, Testing_Time:T1, and Noun_Type:Object for Model 3-D. This model had to be releveled for Testing_Time and Learner_Type in order to investigate any statistical differences between immediate and delayed post-test, as well as TRAD and NOEX learners.

In this LMM, any main effects of Testing_Time will be comparing object-uncountable nouns from the baseline Testing_Time to the main effect testing time. Any main effects of Noun_Type will be comparing object-uncountable nouns at the baseline Testing_Time to the main effect noun type at the baseline Testing_Time. Therefore, there will be no explicit presentation of the main effects of Testing_Time and Noun_Type, as they were discussed earlier in Section 7.3.2. Any main effects of Learner_Type will be comparing object-uncountable nouns at the baseline Testing_Time between the baseline Learner_Type and the main effect Learner_Type. Finally, two-way interaction predictors of Testing_Time and Noun_Type were also presented in research question 2, so they will not be presented here. Since we already established that learner groups are different, we will only be investigating the interaction predictors of this model. The interaction predictors that we are interested in are any two-way interactions that include Learener_Type and Testing_Time and any three-way interactions that include Learner_Type, Testing_Time, and Noun_Type.

The first context under analysis is definite-plural. Countable nouns are the only noun type that is grammatical in this context. Therefore, only countable nouns were in the task and, therefore, now under analysis. While overall gain scores were presented earlier, the gain scores for each learner group and testing time are plotted in Figure 7.133 for countable nouns in a definite-plural context.

[24] The level of significance will be $\alpha = 0.05$ throughout all the analyses.

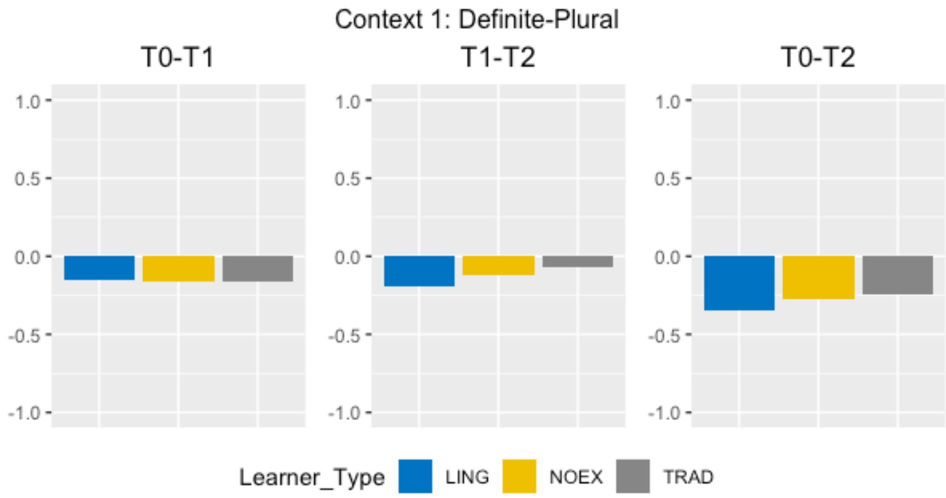

Figure 7.133. Bar plot of mean forced-choice gain scores for all learner groups in Context 1

The results of the regression models are summarized in (72).

(72) Context 1: definite-plural

a. Model 3-A: No significant interaction predictors

b. Model 3-B: No significant interaction predictors

c. Model 3-C: No significant interaction predictors

d. Model 3-D: No significant interaction predictors

Model 3, in all of its iterations, failed to reveal any significant main effect or interaction predictors. The effect plot can be found in Figure 7.134. As can be seen in the figure, all learner groups show similar negative trends moving from T0 to T1 and T1 to T2.

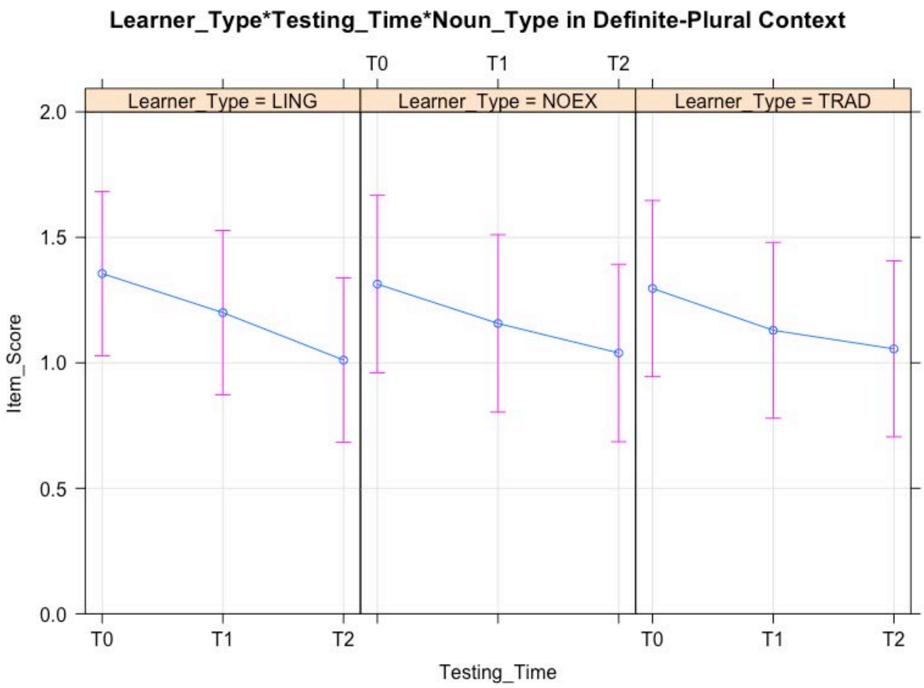

Figure 7.134. Effect plot for forced-choice scores of Learner_Type by Testing_Time by Noun_Type in Context 1

Since there were no significant main effect or interaction predictors, there was no need for post-hoc analysis.

The next context under investigation is definite-singular. In an indefinite-singular context, all noun types are grammatical. Therefore, all noun types are included in the FCET and subjected to analysis. The mean gain scores are plotted in Figure 7.135.

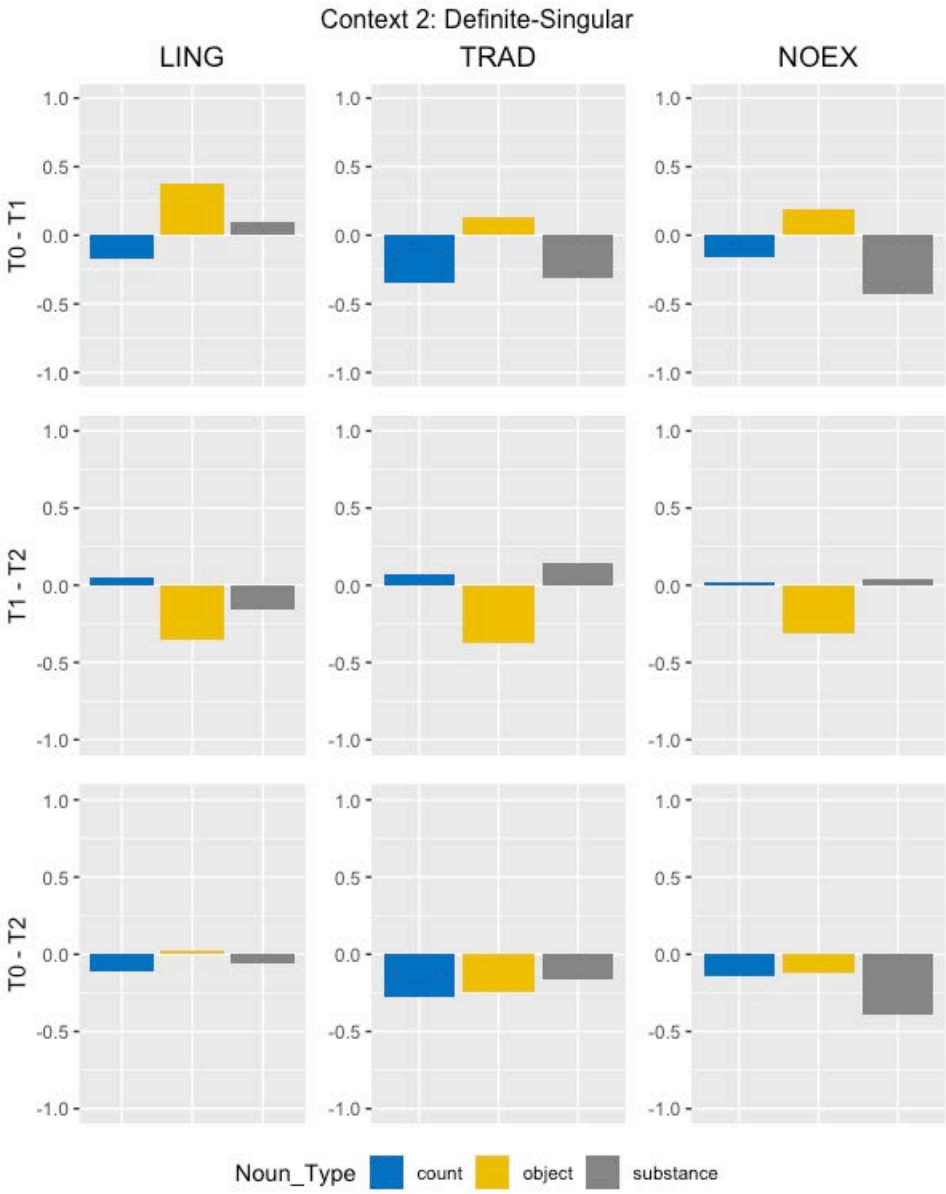

Figure 7.135. Bar plot of mean forced-choice gain scores for all learner groups in Context 2

The results of the regression models are summarized in (73).

(73) Context 2: definite-singular

a. Model 3-A: No significant interaction predictors

b. Model 3-B: No significant interaction predictors

c. Model 3-C: No significant interaction predictors

d. Model 3-D: No significant interaction predictors

While the various iterations of Model 3 did reveal some significant main effects, they are irrelevant to the analysis in the current research question. The model did fail to produce any significant interactions that answer the current research question. The effect plot in Figure 7.136 shows the predictors of the model. As can be seen in the figure, leaners groups displayed similar patterns of forced-choice scores throughout the course of the study.

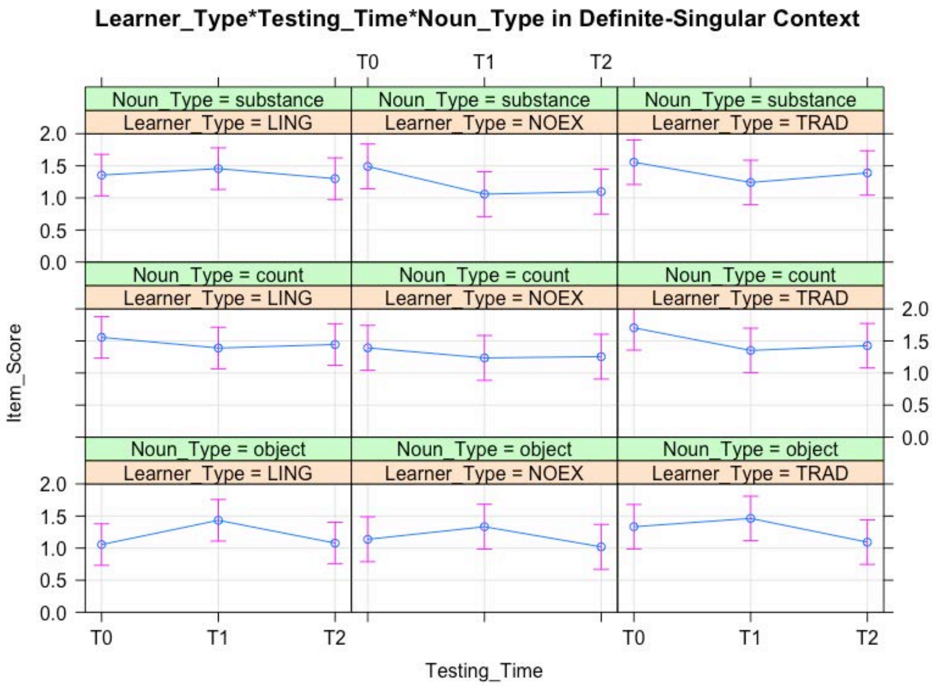

Figure 7.136. Effect plot for forced-choice scores of Learner_Type by Testing_Time by Noun_Type in Context 2

Being as there were no significant interaction predictors, the post-hoc analysis was deemed unnecessary.

The third context under analysis is indefinite-singular. In this context, only countable nouns are grammatical. The gain scores are plotted in Figure 7.137.

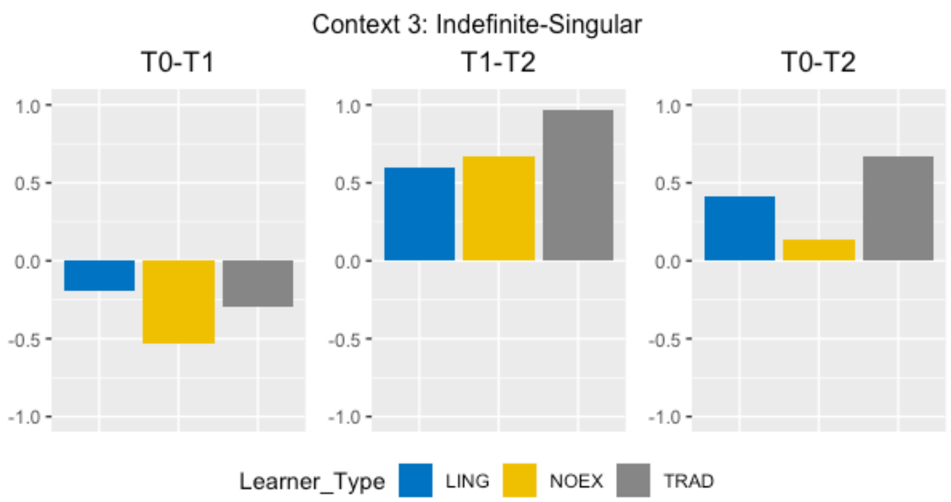

Figure 7.137. Bar plot of mean forced-choice gain scores for all learner groups in Context 3

The results of the regression models are summarized in (74).

(74) Context 3: indefinite-singular

a. Model 3-A: No significant interaction predictors

b. Model 3-B:

   i. Interaction of Learner_Type:TRAD*Testing_Time:T2 ($p < 0.05$)

c. Model 3-C:

   i. Interaction of Learner_Type:NOEX*Testing_Time:T2 ($p < 0.01$)

d. Model 3-D:

   i. Interaction of Learner_Type:LING*Testing_Time:T2 ($p < 0.05$)

Model 3-A failed to reveal any significant main effect or interaction predictors. When releveled for testing time T1 as the baseline, Model 3-B did reveal an interaction of Learner_Type:TRAD by Testing_Time:T2 ($\beta = 0.36$, $t(508) = 2.02$, $p < 0.05$). This interaction found that TRAD learners made significantly greater gains than LING learners from T1 to T2 with their forced-choice scores of countable nouns in an indefinite-singular context. Models 4-C and 4-D were releveled for TRAD learners as the baseline. In Model 3-C, with T0 as the baseline testing time, the model revealed a significant interaction of Learner_Type:NOEX by Testing_Time:T2 ($\beta = -0.53$, $t(508) = -2.59$, $p < 0.01$). This interaction found that TRAD learners made a significantly greater gain than NOEX in their forced-choice scores from T0 to T2 with regard to countable nouns in an indefinite-singular context. The effects are plotted in Figure 7.138.

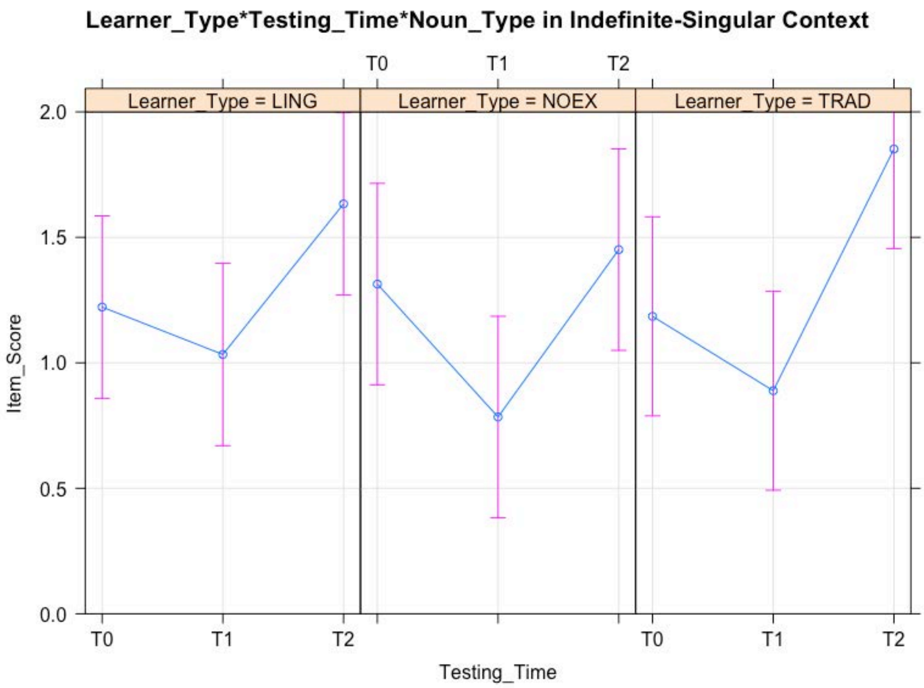

Figure 7.138. Effect plot for forced-choice scores of Learner_Type by Testing_Time by Noun_Type in Context 3

Being as the model found significant interactions, the model and data were subjected to post-hoc analysis. The Tukey HSD post-hoc analysis failed to find any significant comparisons.

The next context under analysis is zero-plural, as with the other plural context, only countable nouns are grammatical, and, therefore, under analysis in the FCET data. The means gain scores are plotted in Figure 7.139.

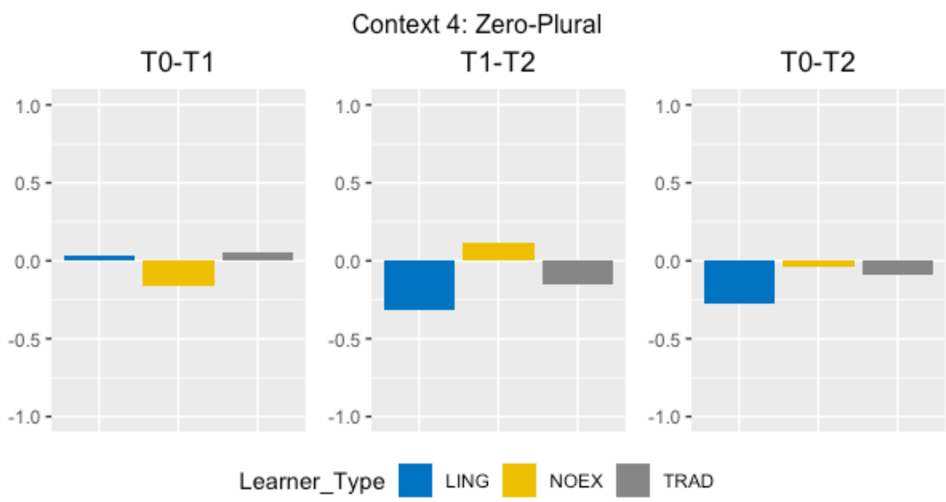

Figure 7.139. Bar plot of mean forced-choice gain scores for all learner groups in Context 4

The results of the regression models are summarized in (75).

(75) Context 4: zero-plural

a. Model 3-A: No significant interaction predictors

b. Model 3-B: No significant interaction predictors

c. Model 3-C: No significant interaction predictors

d. Model 3-D: No significant interaction predictors

The various interactions of Model 3 failed to produce any significant main effect or interaction predictors. This is likely due to very small changes in gain scores across the course of the study. The effects are plotted in Figure 7.140.

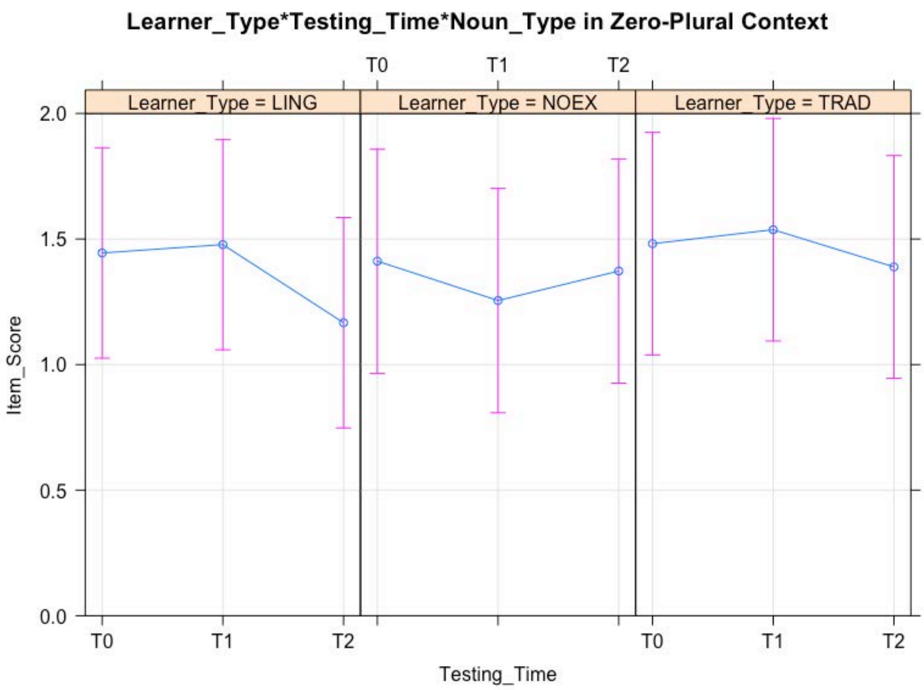

Figure 7.140. Effect plot for forced-choice scores of Learner_Type by Testing_Time by Noun_Type in Context 4

There are no post-hoc analysis results to present since the model failed to produce any significant main effect or interaction predictors.

The final context under investigation for RQ3 is zero-singular. In this context, only uncountable nouns—both substance and object—are grammatical and under analysis in the FCET. The means gain scores presented in Figure 7.141.

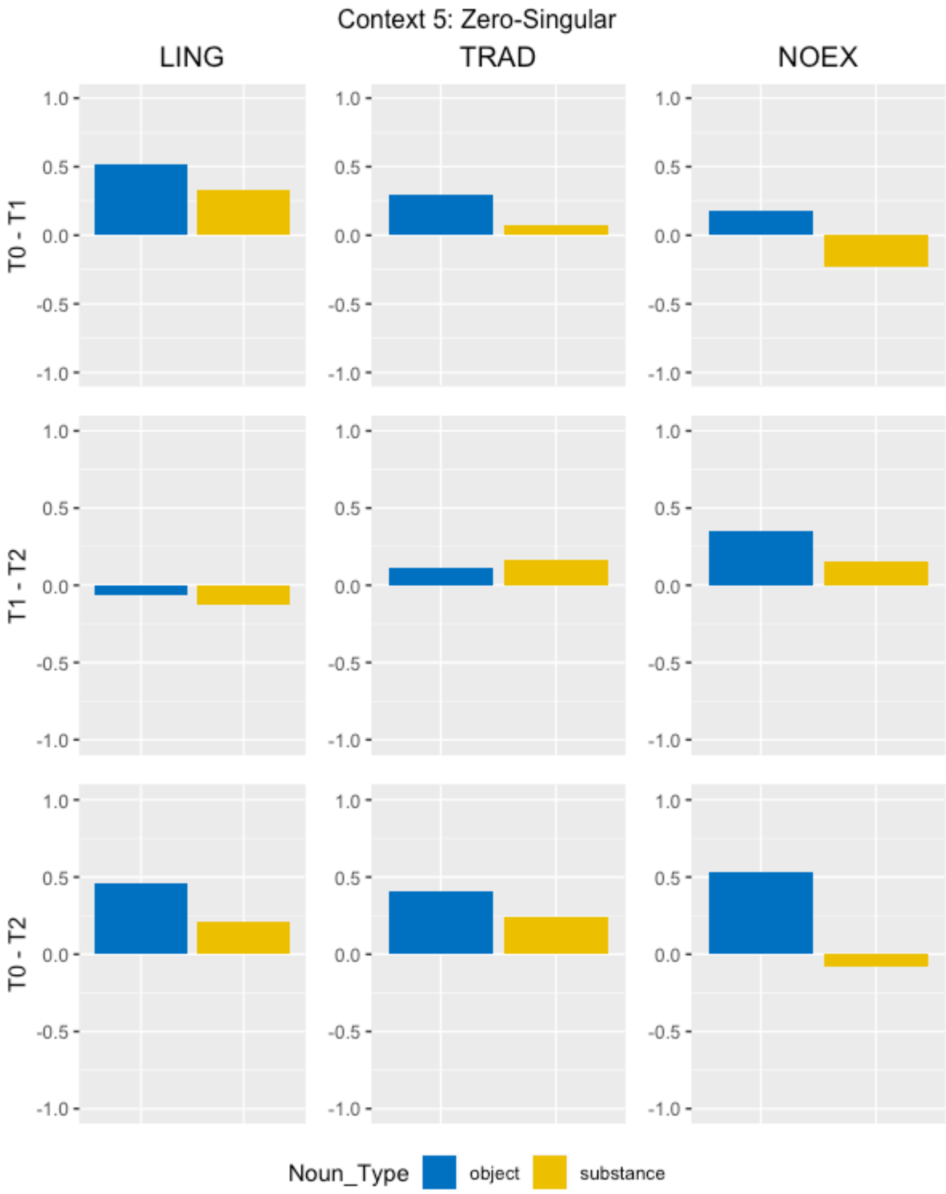

Figure 7.141. Bar plot of mean forced-choice gain scores for all learner groups in Context 5

The results of the regression models are summarized in (76).

(76) Context 5: zero-singular

a. Model 3-A:

i. Interaction of Learner_Type:NOEX*Testing_Time:T1 ($p < 0.01$)

ii. Interaction of Learner_Type:NOEX*Testing_Time:T2*Noun_Type: Substance ($p < 0.05$)

b. Model 3-B:

i. Interaction of Learner_Type:NOEX*Testing_Time:T0 ($p < 0.01$)

ii. Interaction of Learner_Type:NOEX*Testing_Time:T2 ($p < 0.001$)

c. Model 3-C:
    i. Interaction of Learner_Type:NOEX*Testing_Time:T2*Noun_Type: Substance ($p < 0.05$)
d. Model 3-D: No significant interaction predictors

Model 3-A had LING and T0 as the baseline and revealed a two-way significant interaction of Learner_Type:NOEX by Testing_Time:T1 ($\beta = -0.35$, $t(1078) = -2.85$, $p < 0.01$). This interaction found that LING learners made greater gains than NOEX learners with object-uncountable nouns from T0 to T1. This model also found a three-way interaction of Learner_Type:NOEX by Testing_Time:T2 by Noun_Type:Substance ($\beta = -0.36$, $t(1078) = -2.12$, $p < 0.05$. This three-way interaction found that over time (T0 to T2), LING learners show a greater change in their ratings of substance- and object-uncountable nouns than NOEX learners. In other words, scores for both substance- and object-uncountable nouns increase from T0 to T2 for LING learners but only increase for object-uncountable nouns for NOEX learners.

In Model 3-B, the baseline testing time is T1. This model revealed another two-way interaction of Learner_Type:NOEX by Testing_Time:T2 ($\beta = 0.42$, $t(1078) = 3.45$, $p < 0.001$), which finds that NOEX makes greater gains than LING learners in their forced-choice scores of uncountable-nouns when moving from T1 to T2. Model 3-C relevels learner type to TRAD and testing time to T0. This model revealed a three-way interaction of Learner_Type:NOEX by Testing_Time:T2 by Noun_Type:Substance ($\beta = -0.44$, $t(1078) = -2.31$, $p < 0.05$). This three-way interaction found that over time (from T0 to T2), NOEX learners had lower scores of substance-uncountable nouns than object-uncountable nouns when compared to TRAD learners. In other words, TRAD learners trend upward with their forced-choice scores of both substance- and object-uncountable nouns from pre-test to delayed post-test while NOEX learners only improve with object-uncountable nouns but not substance-uncountable nouns. The effects are plotted in Figure 7.142

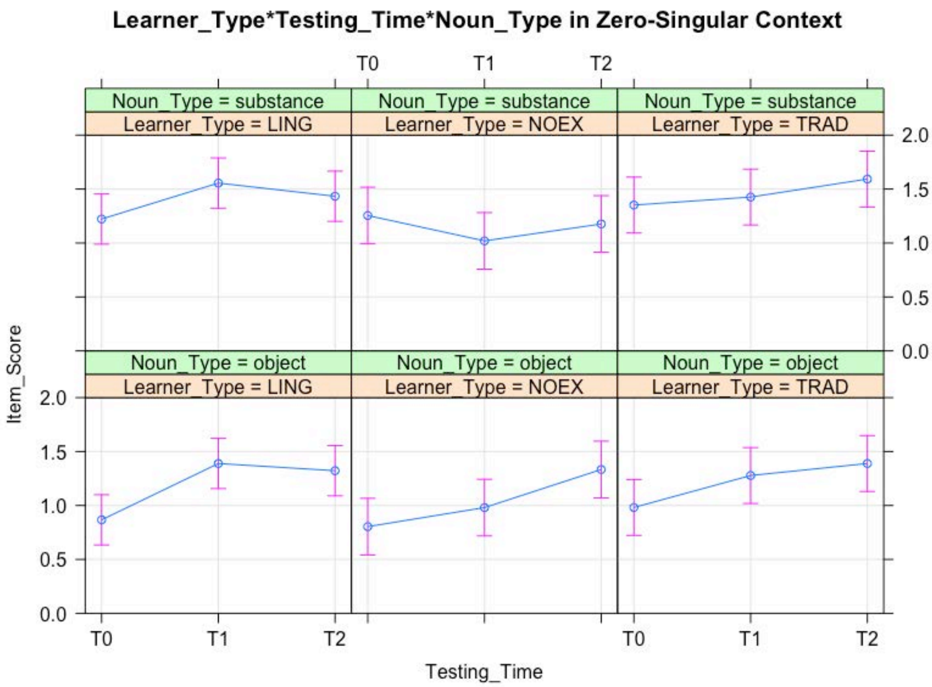

Figure 7.142. Effect plot for forced-choice scores of Learner_Type by Testing_Time by Noun_Type in Context 5

Being as Tukey post-hoc analysis just compares means and not gain scores, it was deemed unnecessary.

To summarize the FCET results of the third research question—the comparison of linguistic gains of groups across the course of the study—we ran a LMM that investigated the main effects and interactions of learner type, testing time, and noun type. We did not find any significant interaction for noun types in both a definite-plural and definite-singular context. For countable nouns in an indefinite-singular context, the regression analysis did find that both LING and TRAD learners outperformed NOEX learners, but these two groups (TRAD and LING) made similar linguistic gains when compared to one another. The analysis of countable nouns in a zero-plural context also failed to reveal any significant interactions of learner type or testing time, finding that no groups made gains that were significantly different than another. Finally, for uncountable nouns in a zero-plural context, we found a number of significant interactions with regard to linguistic gains. Over the course of the study, we found that LING and TRAD learners performed similarly with their forced-choice scores of object- and substance-uncountable nouns, but both of these groups did differ significantly from NOEX learners. Overall, the lack of significant results in RQ3 is likely due to the very small changes that each group made over time. Since mean linguistic gain scores were not very large to begin with, the between-group analysis failed to produce numerous significant differences.

7.4 | Research Question 4: Within & Between Group Analysis of Task Effect

The fourth, and final, research question compares the overall linguistic gains of each task within and between each instructional context to determine if there are task effects and if these are dependent on instruction. To do this, we converted the gain scores for each group, task, and time period into gain percentages. The mean gain percentages by task are presented in Table 7.16.

Table 7.16. Mean percentage gains by task and time period for all learners

	T0 – T1			**T0 – T2**			**T1 – T2**		
Task	**LING**	**TRAD**	**NOEX**	**LING**	**TRAD**	**NOEX**	**LING**	**TRAD**	**NOEX**
ESIT	10.49	2.58	3.04	7.23	-3.94	-8.99	-3.26	-5.29	-12.03
AJT	6.81	-0.92	0.75	3.33	-0.25	1.05	-3.48	0.67	0.30
FCET	5.35	-3.59	-8.09	1.94	1.85	-2.33	-3.40	5.44	5.76

In Table 7.16, the gains are represented in percentages—a positive score is an increase in task performance and a negative score is a decrease in task performance. As we can see in the table, from T0 to T1, LING made positive gains in each of the three tasks. TRAD learners, on the other hand, display improvement in the ESIT but not in the AJT or FCET. NOEX learners, from T0 to T1, display overall positive gains in the ESIT and AJT but negative gains in the FCET. For the period T0 to T2, we see that LING made positive gains in all three tasks once again. TRAD learners display a decrease in overall performance from T0 to T2 for both the ESIT and ESIT but show an overall increase for the FCET. NOEX learners display an overall decrease in performance from T0 to T2 in both the ESIT and FCET, but their performance in the AJT does increase. In the time period between the two post-tests, T1 to T2, we find that LING displays about the same percentage decrease in performance for all three tasks. For TRAD learners, we see a decrease in performance on the ESIT, but an increase for the AJT and FCET. Finally, the NOEX learners, from T0 to T1, show a large decrease in performance from T1 to T2 on the ESIT, but show improvement on both the AJT and FCET from T1 to T2.

In order to investigate the effects of task type on overall gains, we compared the gain percentages for task within and between groups across the course of the study. As with the other research questions, a linear mixed-effects model[25] was fit to the data and run to investigate statistical differences. In this model, Model 4, the baseline (intercept) levels were Learner_Type:LING and Task_Type:ESIT for Model 4-A; Learner_Type:LING and Task_Type:AJT for Model 4-B; Learner_Type:LING and Task_Type:FCET for Model 4-C; Learner_Type:TRAD and Task_Type:ESIT for Model 4-D; Learner_Type:TRAD and Task_Type:AJT for Model 4-E; Learner_Type:TRAD and Task_Type:FCET for Model 4-F; Learner_Type:NOEX and Task_Type:ESIT for Model 4-G; Learner_Type:NOEX and Task_Type:AJT for Model 4-H; Learner_Type:NOEX and Task_Type:FCET for Model 4-I. This model had to be releveled for Learner_Type and Task_Type in order to investigate statistical differences between each of the learner groups for each of the tasks included in the study.

In this LMM, any main effects of Task_Type will be comparing the task performance for the baseline learner group to the other tasks in the study. As a consequence of the model, the output also produces main effects of Learner_Type, but since RQ3 already established that learner groups performed differently on each of the tasks, we will not discuss these main effects. The interaction predictors compare how learner groups perform similarly or differently when comparing tasks. For RQ4, we are primarily interested in the main effects of Task_Type and the interactions of Task_Type and Learner_Type. The regression model also included by-context and by-participant random intercepts. In the following paragraphs, we present the results of the model by each time period in the study. Full tables and model outputs can be found in Appendix L.

The first time period under investigation in the study is T0 to T1, or pre-test to immediate post-test. While the descriptive statistics were presented earlier in a table, we present them in nested violin plots in Figure 7.143.

[25] The level of significance will be $\alpha = 0.05$ throughout all the analyses.

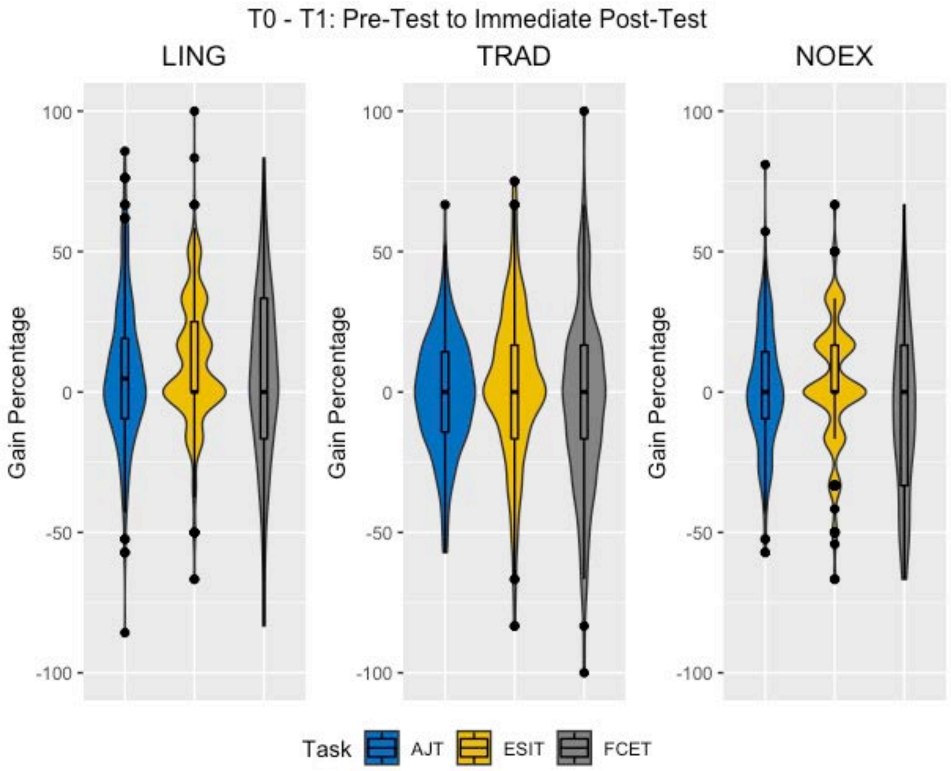

Figure 7.143. Violin plot of mean gain percentage by task for each learner type from T0 to T1

The model is summarized in (77).

(77) T0 – T1: Pre-Test to Immediate Post-Test

a. Model 4-A:

i. Main effect of Task_Type:AJT ($p < 0.05$)

ii. Main effect of Task_Type:FCET ($p < 0.01$)

iii. No interaction predictors

b. Model 4-B:

i. Main effect of Task_Type:ESIT ($p < 0.05$)

ii. Interaction of Learner_Type:NOEX*Task_Type:FCET ($p < 0.05$)

c. Model 4-C:

i. Main effect of Task_Type:ESIT ($p < 0.01$)

ii. Interaction of Learner_Type:NOEX*Task_Type:AJT ($p < 0.05$)

d. Model 4-D:

i. Main effect of Task_Type:FCET ($p < 0.01$)

ii. No interaction predictors

e. Model 4-E: No significant main effect or interaction predictors

f. Model 4-F:

i. Main effect of Task_Type:ESIT ($p < 0.01$)

g. Model 4-G:

i. Main effect of Task_Type:FCET ($p < 0.001$)

h. Model 4-H:

i. Main effect of Task_Type:FCET ($p < 0.001$)

ii. Interaction of Learner_Type:LING*Task_Type:FCET ($p < 0.05$)

i. Model 4-I:

i. Main effect of Task_Type:ESIT ($p < 0.001$)

ii. Main effect of Task_Type:AJT ($p <0.001$)

iii. No significant interaction predictors

Model 4-A revealed significant revealed significant main of effects of Task_Type:AJT ($\beta = -3.68$, $t(2385.32) = -2.29$, $p < 0.05$) and Task_Type:FCET ($\beta = -5.69$, $t(2389.19) = -2.87$, $p < 0.01$). These significant main effects found that LING learners made significantly greater gains from T0 to T1 on the ESIT than both the AJT and FCET. Model 4-A failed to reveal any significant interaction predictors. Model 4-B, with LING and AJT as the baseline levels, revealed a significant interaction of Learner_Type:NOEX by Task_Type:FCET ($\beta = -7.37$, $t(2385.32) = -2.30$, $p < 0.05$), which found that NOEX learners showed a significantly greater difference in their performance on the ESIT and FCET than LING learners. In other words, NOEX showed significant negative gains on the FCET, which resulted in this significant interaction. In Model 4-C, LING and FCET serve as the baseline levels. This model failed to reveal any new significant main effect or interaction predictors.

Models 5-D, 5-E, and 5-F were releveled to have TRAD as the baseline Learner_Type. The regression analysis in Model 4-D revealed a new significant main effect of Task_Type:FCET ($\beta = -6.71$, $t(2398.85) = -2.65$, $p < 0.01$), indicating that TRAD learners made greater significant gains from T0 to T1 on the ESIT than FCET, while LING learners made greater gains on the ESIT than the FCET. Models 5-E and 5-F did not reveal any new significant main effects.

Model 4-G, with NOEX and ESIT as baseline, revealed a significant main effect of Task_Type:FCET ($\beta = -11.67$, $t(2399.02) = -4.49$, $p < 0.001$), which found that NOEX learners made significantly greater gains from T0 to T1 on the ESIT than the FCET. Model 4-H, NOEX and AJT as baseline, revealed a significant main effect of Task_Type:FCET ($\beta = -9.38$, $t(2399.02) = -3.61$, $p < 0.001$), indicating that NOEX learners made significantly greater gains on the AJT than the FCET from T0 to T1. Model 4-I failed to reveal any additional main effects that have not already been presented. The effects of Model 4 for T0 to T1 are plotted in Figure 7.144.

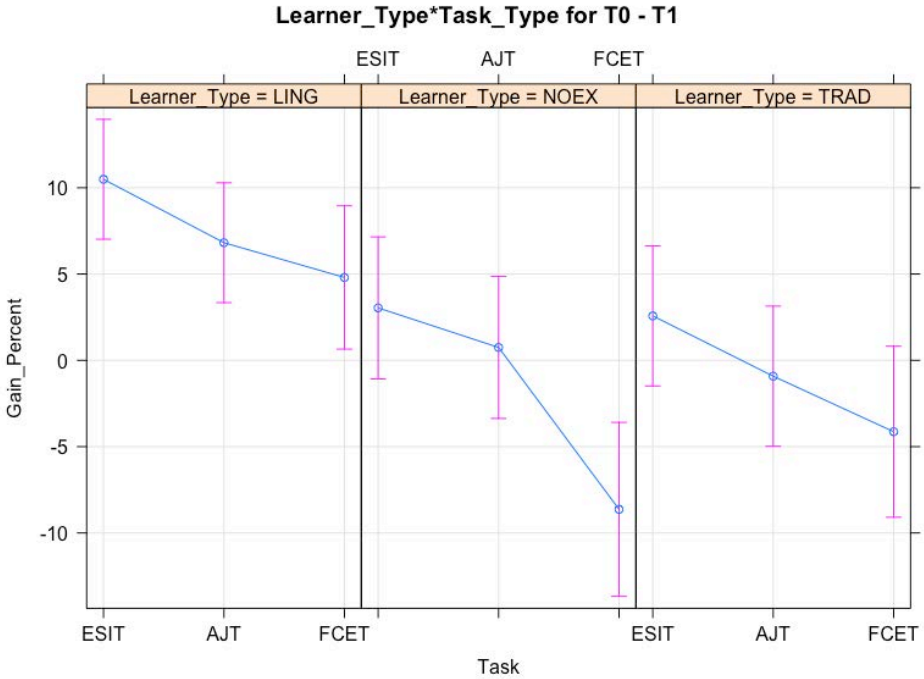

Figure 7.144. Effect plot gain percentage of Learner_Type by Task_Type from T0 to T1

Since the model did reveal significant main effects, Tukey HSD post-hoc analyses were run using the *lsmeans* (Lenth, 2016) package. In the post-hoc analysis by Learner_Type, the analysis confirmed that LING learners made greater gains on the ESIT than the FCET ($p < 0.05$). It also confirmed that TRAD learners made greater gains on the ESIT than FCET ($p < 0.05$). Finally, the post-hoc analysis found that NOEX learners made greater gains on the AJT ($p < 0.001$) and the ESIT ($p < 0.001$) than the FCET.

The next time period under investigation in the study is T0 to T2, or pre-test to delayed post-test. While the descriptive statistics were presented earlier in a table, we present them visually in Figure 7.145.

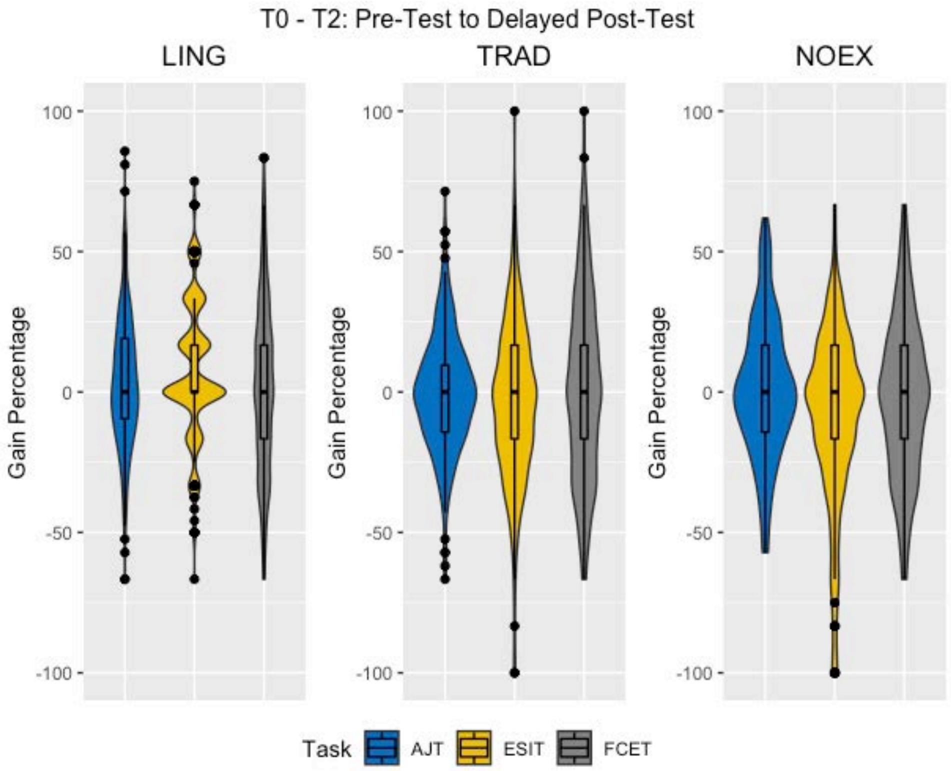

Figure 7.145. Violin plot of mean gain percentage by task for each learner group from T0 to T2

(78) T0 – T2: Pre-Test to Delayed Post-Test

a. Model 4-A:

i. Main effect of Task_Type:AJT ($p < 0.05$)

ii. Main effect of Task_Type:FCET ($p < 0.01$)

iii. Interaction of Learner_Type:NOEX*Task_Type:AJT ($p < 0.001$)

iv. Interaction of Learner_Type:TRAD*Task_Type:AJT ($p < 0.05$)

v. Interaction of Learner_Type:NOEX*Task_Type:FCET ($p < 0.001$)

vi. Interaction of Learner_Type:TRAD*Task_Type:FCET ($p < 0.01$)

b. Model 4-B:

i. Main effect of Task_Type:ESIT ($p < 0.05$)

ii. Interaction of Learner_Type:NOEX*Task_Type:ESIT ($p < 0.001$)

iii. Interaction of Learner_Type:TRAD*Task_Type:ESIT ($p < 0.05$)

c. Model 4-C:

i. Main effect of Task_Type:ESIT ($p < 0.01$)

ii. Interaction of Learner_Type:NOEX*Task_Type:ESIT ($p < 0.001$)

iii. Interaction of Learner_Type:TRAD*Task_Type:ESIT ($p < 0.01$)

d. Model 4-D:

i. No significant main effect predictors

ii. Interaction of Learner_Type:LING*Task_Type:AJT ($p < 0.05$)
iii. Interaction of Learner_Type:NOEX*Task_Type:AJT ($p < 0.05$)
iv. Interaction of Learner_Type:LING*Task_Type:FCET ($p < 0.01$)

e. Model 4-E:
   i. No significant main effect predictors
   ii. Interaction of Lerner_Type:LING*Task_Type:ESIT($p < 0.05$)
   iii. Interaction of Learner_Type:NOEX*Task_Type:ESIT ($p < 0.05$)
f. Model 4-F:
   i. No significant main effect predictors
   ii. Interaction of Learner_Type:LING*Task_Type:ESIT ($p < 0.01$)
g. Model 4-G:
   i. Main effect of Task_Type:AJT ($p < 0.001$)
   ii. Main effect of Task_Type:FCET ($p < 0.05$)
   iii. Interaction of Learner_Type:LING*Task_Type:AJT ($p < 0.001$)
   iv. Interaction of Learner_Type:TRAD*Task_Type:AJT ($p < 0.05$)
   v. Interaction of Learner_Type:LING*Task_Type:FCET ($p < 0.001$)
h. Model 4-H:
   i. Main effect of Task_Type:ESIT ($p < 0.001$)
   ii. Interaction of Learner_Type:LING*Task_Type:ESIT ($p < 0.001$)
   iii. Interaction of Learner_Type:TRAD*Task_Type:ESIT ($p < 0.05$)
i. Model 4-I:
   i. Main effect of Task_Type:ESIT ($p < 0.05$)
   ii. Interaction of Learner_Type:LING*Task_Type:ESIT ($p < 0.001$)

Model 4-A revealed a significant main effect for both Task_Type:AJT (β = -3.90, t(2302.8) = -2.35, $p < 0.05$) and Task_Type:FCET (β = -5.41, t(2316.46) = -2.64, $p < 0.01$), indicating that LING learners made significantly greater gains on the ESIT than the AJT and FCET from T0 to T2. This iteration of Model 4, for T0 to T2, also revealed significant interactions of Learner_Type:NOEX by Task_Type:AJT (β = 13.93, t(2302.8) = 5.06, $p < 0.001$) and Learner_Type:TRAD by Task_Tyep:AJT (β = 7.27, t(2356.26) = 2.48, $p < 0.05$). Both of these interactions found that LING learners made greater gains on the ESIT than the AJT, which was statistically different than the gains demonstrated by NOEX and TRAD, both of which made greater gains on the AJT than the ESIT. Model 4-A also revealed significant interactions of Learner_Type:NOEX by Task_Type:FCET (β = 11.95, t(2302.8) = 3.62, $p < 0.001$) and

Learner_Type:TRAD by Task_Type:FCET ($\beta = 10.75$, $t(2346.38) = 3.14$, $p < 0.01$), indicating that LING learners made greater gains on the ESIT than the FCET when compared to NOEX and TRAD learners who made greater gains on the FCET than the ESIT. Models 5-B and 5-C failed to reveal any new significant main effect or interaction predictors.

Model 4-D, with TRAD and ESIT as the baseline levels, revealed a significant interaction of Learner_Type:NOEX by Task_Type:AJT ($\beta = 6.67$, $t(2349.48) = 2.04$, $p < 0.05$), which found that NOEX displayed much lower gains on the ESIT than the AJT when compared to TRAD learners who displayed a similar pattern with ESIT gains being lower than AJT gains.

Models 5-E and 5-F, with TRAD as the baseline Learner_Type, failed to reveal any new significant main effect or interaction predictors.

Model 4-G, with NOEX and ESIT as the baseline, found main effects of Task_Type:AJT ($\beta = 10.03$, $t(2302.8) = 4.56$, $p < 0.001$) and Task_Type:FCET ($\beta = 6.54$, $t(2315.24) = 2.43$, $p < 0.05$), indicating that NOEX learners made significantly greater gains on both the AJT and FCET than the ESIT from T0 to T2. Models 5-H and 5-I did not reveal any additional significant main effect or significant interaction predictors. These effects are plotted in Figure 7.146.

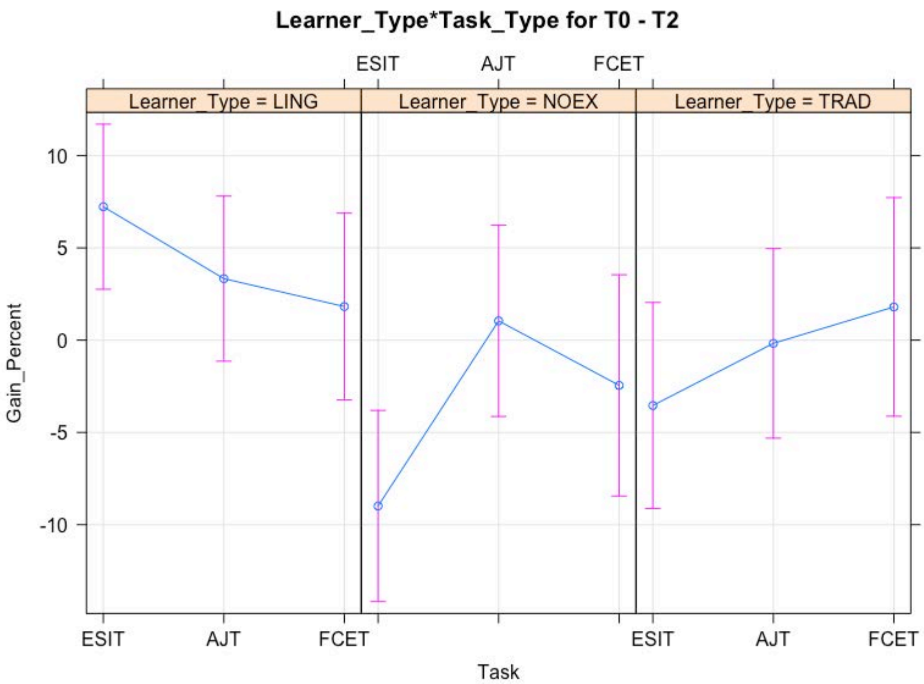

Figure 7.146. Effect plot gain percentage of Learner_Type by Task_Type from T0 to T2

Being as the linear regression model revealed significant main effects, the model was subjected to the same post-hoc analysis as the others, Tukey HSD. The post-hoc analysis by Learner_Type confirmed that LING made significantly greater gains on the ESIT from T0 to T2 than both the AJT ($p < 0.05$) and the FCET ($p < 0.05$). The post-hoc analysis also revealed that NOEX leaners made significantly greater gains from T0 to T2 on the AJT ($p < 0.001$) and FCET ($p < 0.05$) than the ESIT.

To investigate whether or not the effects of instruction were maintained from immediate post-test to delayed post-test, we compare gains between groups and tasks from T1 to T2. While the descriptive statistics were presented earlier in a table, we present them visually in Figure 7.147.

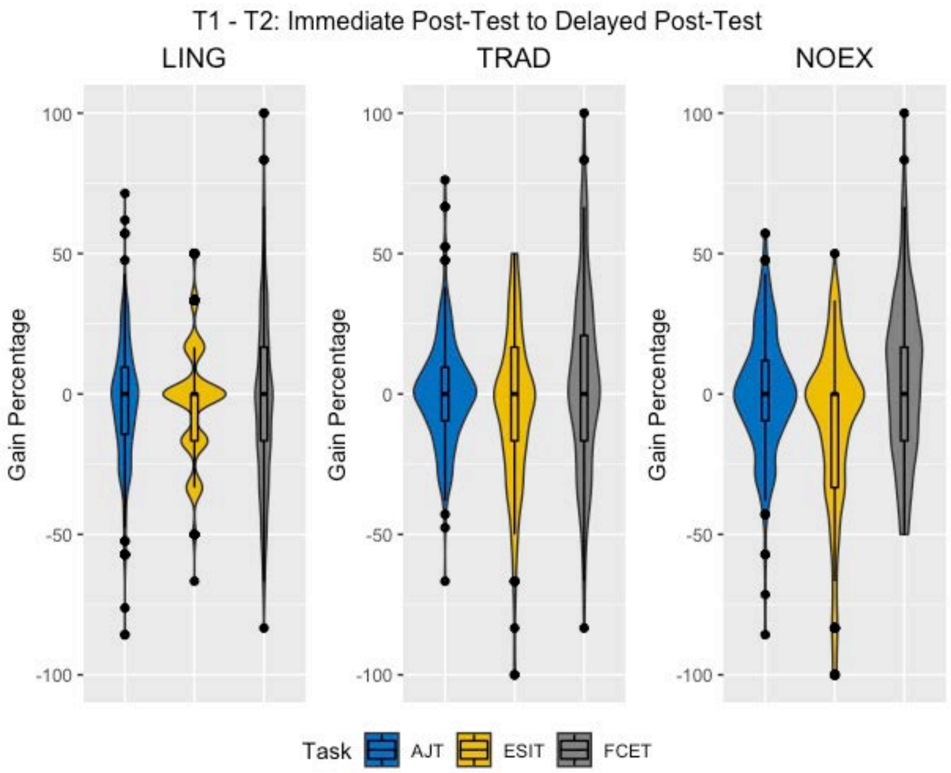

Figure 7.147. Violin plot of mean gain percentage by task for each learner group from T1 to T2

The results of the model are summarized in (79).

(79) T1 – T2: Immediate Post-Test to Delayed Post-Test

a. Model 4-A:

i. No significant main effect predictors

ii. Interaction of Learner_Type:NOEX*Task_Type:AJT($p < 0.001$)

iii. Interaction of Learner_Type:TRAD*Task_Type:AJT($p < 0.05$)

  iv. Interaction of Learner_Type:NOEX*Task_Type:FCET($p < 0.001$)
  v. Interaction of Learner_Type:TRAD*Task_Type:FCET($p < 0.001$)

b. Model 4-B:
  i. No significant main effect predictors
  ii. Interaction of Learner_Type:NOEX*Task_Type:ESIT($p < 0.001$)
  iii. Interaction of Learner_Type:TRAD*Task_Type:ESIT($p < 0.05$)

c. Model 4-C:
  i. No significant main effect predictors
  ii. Interaction of Learner_Type:NOEX*Task_Type:ESIT($p < 0.001$)
  iii. Interaction of Learner_Type:TRAD*Task_Type:ESIT($p < 0.001$)

d. Model 4-D:
  i. Main effect of Task_Type:AJT ($p < 0.01$)
  ii. Main effect of Task_Type:FCET ($p < 0.001$)
  iii. Interaction of Learner_Type:LING*Task_Type:AJT($p < 0.05$)
  iv. Interaction of Learner_Type:NOEX*Task_Type:AJT($p < 0.05$)
  v. Interaction of Learner_Type:LING*Task_Type:FCET($p < 0.001$)

e. Model 4-E:
  i. Main effect of Task_Type:FCET ($p < 0.05$)
  ii. Main effect of Task_Type:ESIT ($p < 0.01$)
  iii. Interaction of Learner_Type:LING*Task_Type:ESIT($p < 0.05$)
  iv. Interaction of Learner_Type:NOEX*Task_Type:ESIT($p < 0.05$)

f. Model 4-F:
  i. Main effect of Task_Type:ESIT ($p < 0.001$)
  ii. Main effect of Task_Type:AJT ($p < 0.05$)
  iii. Interaction of Learner_Type:LING*Task_Type:ESIT($p < 0.001$)

g. Model 4-G:
  i. Main effect of Task_Type:AJT ($p < 0.001$)
  ii. Main effect of Task_Type:FCET ($p < 0.001$)
  iii. Interaction of Learner_Type:LING*Task_Type:AJT($p < 0.001$)
  iv. Interaction of Learner_Type:TRAD*Task_Type:AJT($p < 0.05$)
  v. Interaction of Learner_Type:LING*Task_Type:FCET($p < 0.001$)

h. Model 4-H:
  i. Main effect of Task_Type:ESIT ($p < 0.001$)
  ii. Main effect of Task_Type:FCET ($p < 0.05$)

iii. Interaction of Learner_Type:LING*Task_Type:ESIT($p < 0.001$)
iv. Interaction of Learner_Type:TRAD*Task_Type:ESIT($p < 0.05$)

i. Model 4-I:
   i. Main effect of Task_Type:ESIT ($p < 0.001$)
   ii. Main effect of Task_Type:AJT ($p < 0.05$)
   iii. Interaction of Learner_Type:LING*Task_Type:ESIT($p < 0.001$)

Model 4-A, with LING and ESIT as the baseline, did not reveal any significant main effects of Task_Type, but did reveal a number of significant interactions. The first set of significant interactions revealed were of Learner_Type:NOEX by Task_Type:AJT ($\beta = 12.55$, $t(2302.89) = 4.79$, $p < 0.001$) and Learner_Type:TRAD by Task_Type:AJT ($\beta = 6.28$, $t(2356.26) = 2.26$, $p < 0.05$). Both of these interactions found that while LING learners did not demonstrate any differences in gains on the ESIT and AJT, both NOEX and TRAD made much lower gains on the ESIT than the AJT; therefore, showing greater gains on the AJT than the ESIT when compared to LING learners. This model also found significant interactions of Learner_Type:NOEX by Task_Type:FCET ($\beta = 17.93$, $t(2302.89) = 5.71$, $p < 0.001$) and Learner_Type:TRAD by Task_Type:FCET ($\beta = 10.97$, $t(2346.26) = 3.36$, $p < 0.001$). As with the interaction with AJT, these interactions found that NOEX and TRAD learners made greater gains on the FCET than the ESIT when compared to LING learners, who showed no difference in linguistic gains between the FCET and ESIT. Model 4-B, with LING and AJT as the baseline, and Model 4-C, with LING and FCET as the baseline, failed to reveal any additional significant main effect or interaction predictors.

In Model 4-D, TRAD and ESIT serve as the baseline. This iteration of the model revealed significant main effects of of Task_Type:AJT ($\beta = 6.06$, $t(2365.21) = 2.64$, $p < 0.01$) and Task_Type:FCET ($\beta = 11.28$, $t(2371.39) = 4.16$, $p < 0.001$). These two main effects of Task_Type found that TRAD learners made significantly greater gains from T1 to T2 on both the AJT and FCET than the ESIT. Model 4-D also found a significant interaction of Learner_Type:NOEX by Task_Type:AJT ($\beta = 6.26$, $t(2349.38) = 2.02$, $p < 0.05$), which revealed that NOEX learners made much lower gains on the ESIT than the AJT when compared to TRAD learners. Model 4-E, with TRAD and AJT as the baseline, found a significant main effect of Task_Type:FCET ($\beta = 5.22$, $t(2316.72) = 2.10$, $p < 0.05$), which indicates that TRAD learners made significantly greater gains from T1 to T2 on the FCET than the AJT. Model 4-E failed to reveal any new significant interaction predictors. Model 4-F failed to reveal any new significant main effect or interaction predictors.

Model 4-G, with NOEX and ESIT as the baseline, revealed significant main effects of Task_Type:AJT (β = 12.33, t(2302.89) = 5.89, p < 0.001) and Task_Type:FCET (β = 18.24, t(2316.61) = 7.14, p < 0.001), indicating that NOEX learners made significantly greater gains from T1 to T2 on both the AJT and FCET than the ESIT. This iteration of Model 4 did not reveal any new significant interaction predictors. In Model 4-H, with NOEX and AJT as the baseline levels, a significant main effect of Task_Type:FCET (β = 5.91, t(2316.61) = 2.32, p < 0.05) was revealed, finding that NOEX learners made significantly greater gains on the FCET than the AJT from T1 to T2. Model 4-H did not reveal any new significant interaction predictors. Model 4-I did not reveal any new significant main effect or interaction predictors. The effects of Model 4 for T1 to T2 can be found in Figure 7.148.

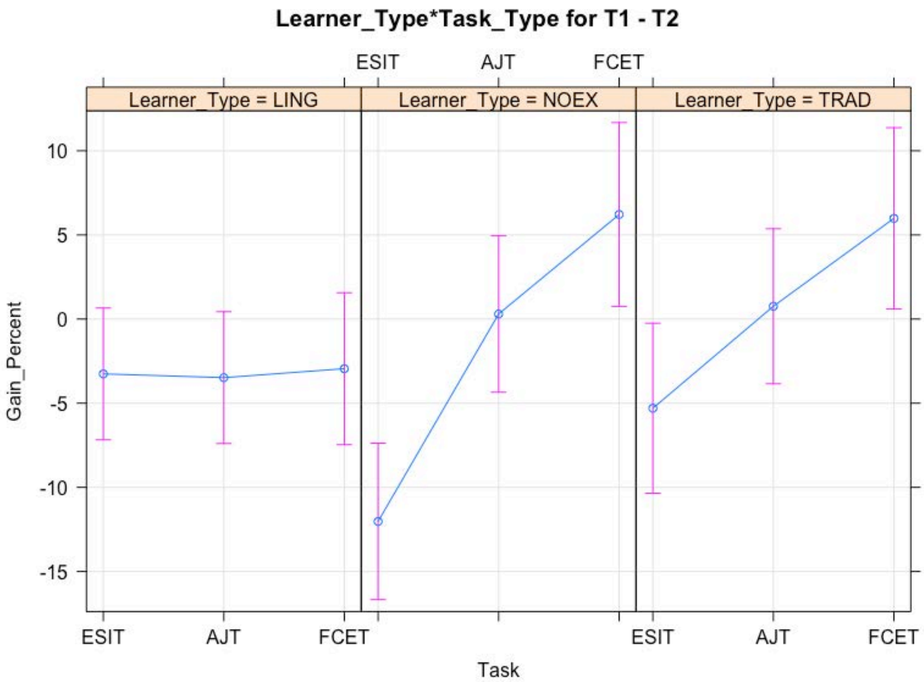

Figure 7.148. Effect plot gain percentage of Learner_Type by Task_Type from T1 to T2

Since the model revealed significant main effects, it was subjected to Tukey HSD post-hoc analysis to confirm these effects. The post-hoc analysis by Learner_Type did not find any significant differences between tasks within the LING group. For TRAD learners, it did confirm that they made significantly greater gains on the AJT (p < 0.05) and FCET (p < 0.001) than the ESIT. Tukey post-hoc analysis also confirmed that NOEX made significantly greater gains on the AJT (p < 0.001) and FCET (p < 0.001) than the ESIT.

7.5 | Summary

In this chapter, we have presented the results, by task, for each of the first three research questions and for all tasks and groups together for the final research question. The data analysis for RQ1 found that L2 learners showed significantly different patterns in their imitation scores, acceptability ratings, and forced-choice selections at pre-test when compared to NS of English. The analysis for the second research question revealed that LING learners had begun to reassemble their noun type features, particularly for object- and substance-uncountable nouns, but these changes were not always significant. A similar trend was also found with TRAD learners, who showed some improvement as well, but again this was not always significant. NOEX learners behaved as predicted, overall, showing little to no improvement over the course of the study.

In the analysis for RQ3, we found that the results of the elicited-sentence imitation task, the most implicit task, found significant gains for both LING and TRAD learner groups. In the presentation of the acceptability judgment task data, we also found that LING and TRAD trended in the predicted direction with regard to their acceptability ratings. Furthermore, the forced-choice data painted an interesting picture, finding very few significant differences and gains across the course of the study. Finally, RQ4 investigated the effects of task type across the course of the study within and between groups. We also found a number of interactions between learner groups and task, suggesting that LING learners tended to perform better on the ESIT and the AJT than the FCET from T0 to T1 and T0 to T2 when compared to the other learner groups in the study. From T1 to T2, we found that LING learners performed about the same on each of the task, while NOEX and TRAD learners performed lower than LING on the ESIT, but better than them on the AJT and FCET. These results seem to suggest that LING instruction may have been the most effective as measured by an ESIT and an AJT, but not as effective when measured by a FCET. In Chapter 8, we will interpret these results and discuss their implications before drawing final conclusions in the final chapter of the dissertation.

Chapter 8: Discussion

"Learn from yesterday, hope for tomorrow.
The important thing is not to stop questioning."
– ALBERT EINSTEIN

The previous chapter presented the results of the different statistical analyses applied to the data from both native (NS) and non-native speakers (NNS). The analyses were conducted by task and research question. In this chapter, we will interpret these results in light of the hypotheses and predictions posited at the end of the methodological chapter and relate these findings to relevant findings in the previous literature.

8.1 | Research Question 1: Presence of L1 Features in the L2

Research Question 1 (RQ1) investigates the presence of L1 features in the L1-Mandarin, L2-English learners prior to intervention. The learning task for L1-Mandarin, L2-English learners is that they must reassemble their [atomic] and [count] features for noun types since English is not a generalized classifier language (GCL). They must also reassemble their [plural] feature to include both [+human] and [–human] nouns. In addition, Mandarin speakers must reassemble their context-[26] and morpheme-dependent [definite] feature to the morphological articles in English.

[26] As previously discussed in Chapter 2:, we use the term *context-dependent* in reference to the distribution of the [definite] feature, which is interpreted not only in the use of demonstratives and measure words but also word order in Mandarin.

The reassembly process, then, requires them to bundle the [count], [atomic], and [plural] features on the noun types and [definite] feature on English articles.

In order to investigate the presence of L1-Mandarin features in the learners' L2 English as measured by the tasks carried out in the study, we analyzed data from both NSs and NNSs. In order to investigate the status of L1 features in the L2 prior to instruction, we compared NSs with NNSs to explore any differences with respect to each noun type in each context. In our analysis, we looked at the treatment of countable, object-uncountable, and substance-uncountable nouns in contexts defined by definiteness and plurality. Definite-plural, indefinite-singular, and zero-plural are all count-selective contexts, whereas zero-plural is uncountable-selective, and definite-singular takes any noun type.

In order to discern if features had been reassembled, we set the baseline noun type in the analysis to object-uncountable nouns. We chose object-uncountable nouns for the analysis because they share one of their noun type feature settings with each of the other noun types in the study: [+atomic] like countable nouns and [–count] like substance-uncountable nouns. In looking at feature reassembly, we are interested in how object-uncountable nouns are being treated in comparison to the other noun types in the two groups under analysis (i.e., NSs and NNSs). In other words, if object-uncountable nouns are treated similarly to countable nouns prior to instruction but not to substance-uncountable nouns, then we can assume that the [+atomic] feature transferred from L1 Mandarin is influencing the L2 grammar. Furthermore, if object-uncountable nouns are being treated similarly to both of the noun types, then we can assume that the [atomic] and [count] features have not yet been successfully reassembled in the L2 and that the learners, therefore, are unable to distinguish any grammatical distinctions between the noun types. We have chosen to do the analysis by context so that we can compare noun types. As we begin to look at feature reassembly, it will become clear that the absence or presence of functional morphological cues influences the acquisition process. We summarize the results for each feature combination in each context task in Table 8.1.

Table 8.1. Summary of the results for NNSs, where ✓ refers to similar performance to NSs, and ✗ refers to significantly less accurate performance

Context	Noun Type Features	ESIT	AJT	FCET
definite-plural	[+count, +atomic]	✓	✗	✗
	[–count, +atomic]	✗	✗	[redacted]

	[–count, –atomic]	✓	✗	
definite-singular	[+count, +atomic]	✓	✗	✓
	[–count, +atomic]	✗	✗	✗
	[–count, –atomic]	✓	✗	✗
indefinite-singular	[+count, +atomic]	✗	✗	✗
	[–count, +atomic]	✗	✗	
	[–count, –atomic]	✗	✗	
zero-plural	[+count, +atomic]	✓	✗	✓
	[–count, +atomic]	✗	✗	
	[–count, –atomic]	✓	✗	
zero-singular	[+count, +atomic]	✓	✓	
	[–count, +atomic]	✗	✗	✗
	[–count, –atomic]	✗	✓	✗

The majority of similar performance between NSs and NNSs was found in the ESIT data. In this task, all instances of L1-Mandarin, L2-English learners performing similarly to English NSs were with regard to [+count, +atomic] and [–count, –atomic] nouns in definite-plural, definite-singular, and zero-plural contexts. Additionally, in a zero-singular context, NNSs performed similarly to NSs with [+count, +atomic] nouns. In the AJT, NNSs performed similarly to NSs in a zero-singular context with regard to both [+count, +atomic] and [–count, –atomic] noun types. The FCET found only two instances of similar performance between NSs and NNSs, which was with [+count, +atomic] nouns in a definite-singular context and a zero-plural context. Since the NNSs displayed some performance similar to that of NSs in nearly every noun type, context, and task, we can establish that they are not initial learners but are somewhere at points within the feature reassembly process. We now turn our attention to a discussion of the different articles and noun type features under investigation to establish to what extent L1 features were present in the L2 prior to instruction.

Drawing on the Bottleneck Hypothesis and the Cline of Difficulty (Slabakova, 2008, 2009a, 2009b), *Hypothesis 1* specifically predicts that while the [atomic] and [count] features may be transferred quite easily onto noun types in English, the learners may demonstrate difficulty in their reassembly of these features by continuing to grammaticize the [atomic] feature setting rather than the [count] feature setting. This hypothesis also predicts that transferring a feature that is dependent on syntactic distribution to a morphological one presents more difficulty than transferring a feature assembled on a morpheme to a different morpheme that requires reassembly.

In our data, we found that in nearly every context and task, there were significant differences between countable nouns, [+count, +atomic], and object-uncountable nouns, [–count, +atomic]. In the ESIT, we actually found that L2 learners were most successful with countable nouns and substance-uncountable nouns. They appeared to have difficulty with object-uncountable nouns in all of the contexts. These results suggest that L2 learners may be implicitly making a distinction between [+atomic] and [–atomic] nouns successfully. This finding was not as strong in the AJT and was nearly non-existent in the FCET. Furthermore, the results of the AJT and the FCET did not show differences between object- and substance-uncountable nouns. In other words, with regard to the results we found in the ESIT, NNSs were most successful when the atomicity and countability features were aligned—that is, when the nouns had features bundled as [+count, +atomic] and [–count, –atomic]—but not when bundled on a noun as [–count, +atomic]. In the AJT, we found that learners displayed the most sensitivity in the zero-singular context, which is mass-selective, but only with noun types that had aligned [count] and [atomic] feature settings. In addition, the FCET data showed that NNSs only performed similarly to NSs with [+count, +atomic] nouns in the definite-singular and zero-plural contexts. We can therefore confirm that the L2 learners in our study are somewhere at points within the reassembly process but have not yet fully reassembled their noun type features since they are showing grammatical distinctions between nouns based on [atomic] feature settings rather than on [count] feature settings.

Furthermore, the L2 learners are also demonstrating some reassembly with the [plural] feature on nouns. In Mandarin, the [plural] feature is only morphologically realized on [+human] nouns or demonstrative determiners that can be used to modify other nouns, while the [definite] feature is syntactic-dependent and not morphologically realized at all. With regard to the [plural] feature assembly on noun types, we found that the L2 learners demonstrated sensitivity to plural marking in the ESIT for [+count, +atomic] and [–count, –atomic] nouns by providing grammatical imitations. For the [–count, –atomic] nouns, this required the learners to correct the stimuli by removing the plural marking in their repetitions. These same results were not found in the AJT or

FCET. Previous research by Hua and Lee (2005) found that L1-Mandarin, L2-English learners demonstrated sensitivity to count-selective and mass-selective contexts, but did not make the same distinctions on a word-by-word basis. In addition, Choi and Ionin (2017) found that L2-English learners displayed sensitivity to plural marking on [–count, –atomic] nouns but not [–count, +atomic] nouns, as measured by a grammaticality judgment task and a self-paced reading task. While this previous research found that L2 learners demonstrated sensitivity between noun types based on the [atomic] feature and plural marking, we did not consistently find the same results. Rather, we found that if learners performed similar to NSs, they were most successful when the atomicity and countability features were aligned—that is, when the nouns had features bundled as [+count, +atomic] and [–count, –atomic]—but not when bundled on a noun as [–count, +atomic]. As predicted, some of the data shows that the learners are demonstrating their corrections and judgments of the [plural] feature based on the [atomic] feature rather than on the [count] feature.

Now that we have established that L2 learners treat noun types differently based on the [count], [atomic], and [plural] feature settings, we now turn out attention to the [definite] feature settings. *Hypothesis 1* predicted that, based on the Cline of Difficulty (Slabakova, 2009a), the [definite] feature would prove more difficult than the noun type features because it requires transfer from the L1 context or morpheme to the L2 morpheme. Furthermore, previous research by Cho and Slabakova (2014) found that if meanings are not represented morphologically, their acquisition will be more difficult and that the most challenging learning task is when there is non-morphological representation of a feature in both the L1 and the L2, suggesting that "the indirect nature of feature expression, as well as the overt and covert feature encoding, should be added as significant factors when considering feature reassembly in L2 acquisition" (p. 186).

With regard to the treatment of noun types based on the [definite] context they are found in, we actually found that the L2 learners performed similarly to NSs in both the definite-singular and definite-plural contexts with both [+count, +atomic] and [–count, –atomic] noun types on the ESIT. The FCET also found learners to be similar to NSs with [+count, +atomic] nouns in the definite-singular context. We did not find similar patterns in the AJT. In the AJT data, we only found that NNSs performed similarly to NSs with regard to [+count, +atomic] and [–count, –atomic] nouns in the zero-singular context. There were no instances of NNSs performing well in the indefinite-singular context. These results suggest that these L2 learners have not completely reassembled their [definite] feature either. Successful reassembly of the [definite] feature would have shown similar results for NSs and NNSs in both [+definite] and [–definite] contexts. As we predicted, we have not seen that thus far in the data.

In summary, we have confirmed that the NNSs are somewhere at points within the feature reassembly process. Prior to intervention, we found that the NNSs treat nouns differently based on the [count], [atomic], and [plural] features. We also found that they were most successful in L2 English when the [count] and [atomic] feature settings were aligned, suggesting that they have not yet completely and properly reassembled the [count] feature, as predicted. In addition, we found that the L2 learners are likely grammaticizing the [atomic] feature since they displayed rejection and corrections of [–count, –atomic] nouns but not of [–count, +atomic] nouns. Finally, we found that the L2 learners have also not yet completely reassembled their [definite] feature since they do not perform equally across all contexts. Therefore, we have confirmed that, prior to instruction, these L2-English learners had begun to reassemble features for English articles and noun types, but they still display the presence of L1 features in their L2 knowledge.

8.2 | Research Question 2: L2 Feature Reassembly (Within Groups)

While there is limited previous research on the acquisition of articles in an Instructed Second Language Acquisition (ISLA) environment, there is also a lack of research on the acquisition of noun types. Now that we have confirmed that L1-Mandarin, L2-English learners display evidence of their L1 features in their L2 linguistic knowledge, we can turn our attention to Research Question 2 (RQ2), which investigates feature reassembly and acquisition within each of the instructional contexts—linguistically-informed (LING), traditional (TRAD), and no extra (NOEX). Specifically, RQ2 asks whether instruction mediates the reassembly of L1 article and noun type features for the L2. Previous research has shown strong evidence in support of explicit instruction (Bowles, 2011; Bruhn de Garavito, 2013; Loewen, 2015; Long, 1983, 2009; Norris & Ortega, 2000; Snape & Yusa, 2013; Sonbul & Schmitt, 2013; Spada & Tomita, 2010). With specific regard to article acquisition, there have been a handful of studies that have investigated article acquisition in an ISLA environment (Abumelha, 2016, 2018; Akakura, 2009, 2012; Lopez, 2017; Master, 1994, 2002; Sabir, 2015, 2018; Snape & Umeda, 2018; Snape & Yusa, 2013; Umeda et al., 2017). Although some of these studies (Lopez, 2017; Snape & Yusa, 2013) did not find any significant effect of instruction, the vast majority of them (Abumelha, 2016, 2018; Akakura, 2009, 2012; Master, 1994, 2002; Sabir, 2015, 2018; Snape & Umeda, 2018; Umeda et al., 2017) found that learners made measurable improvements in L2 linguistic knowledge of English articles following explicit instruction. To our knowledge, there are no studies on the acquisition of English noun types in an ISLA environment and only one study that considers both English articles and noun types together (Yoon, 1993).

We must keep in mind that the motivation for this analysis is twofold. Not only are we interested in the effect of instruction, but more specifically, we are also interested in how instruction mediates the feature reassembly process and eases the bottleneck for successful second language acquisition. Lardiere (2009b, p. 173) posits that "assembling the particular lexical items of a second language requires that the learner reconfigure features from the way these are represented in the first language into new formal configurations on possibly quite different types of lexical items in the L2." Therefore, the greatest difficulty lies in the transfer of the representations of the same features from the L1 that are assembled differently in the L2. This is also predicted by the Cline of Difficulty (Slabakova, 2009a), where the greatest difficulty lies in the transfer of features from context to morpheme and moderate difficulty lies in the transfer of morpheme-to-morpheme features that require reassembly. Furthermore, the Bottleneck Hypothesis (Slabakova, 2008, 2009a, 2009b) hypothesizes that functional morphology presents a real slowdown in language acquisition. Therefore, in order to investigate the effect of instruction of feature reassembly, we now look at learners in each instructional context separately to see how noun types are treated in each article and plurality context across the course of the study.

In order to investigate the effect of instruction on the mediation and facilitation of feature reassembly of L1 features and the acquisition of new features of noun types for the L2, we compared each of the noun types within each context of the study in each learner group across time. In order to view feature reassembly, we set the baseline noun type in the analysis to object-uncountable nouns. As has already been explained, we chose object-uncountable nouns for the baseline for the analysis because these nouns one of their noun type feature settings with countable nouns, [+atomic], and the other with substance-uncountable nouns, [–count]. To look at feature reassembly, we are interested in how object-uncountable nouns are being treated in comparison to the other noun types across time. Since RQ1 established evidence of L1 transfer and influence, we now look at the data to see how these noun types are treated over the course of the study.

8.2.1 | Effects of Linguistically-Informed Instruction

A learning difficulty for learners lies not in the transfer of features, but in the reassembly of them: "Even if the same subset of relevant features [F] has been selected by the L1-L2 pair in question, learners must figure out how to reconfigure them into new language specific lexical items in the target language" (Lardiere, 2009b, p. 187). Therefore, in order to mediate the reassembly of L1 features for the L2 and the acquisition of new L2 features, we designed an instructional context that explicitly teaches the appropriate assembly and settings of English noun type features to L2 learners. This linguistically-informed instruction taught the difference between atomicity and countability, and it explicitly explained how these are assembled with the [plural] feature both in the learners' L1 and L2. The results of the three tasks for LING learners are summarized in Table 8.2. In this table, ✓* refers to significant improvement, ✓ refers to non-significant improvement, ✗ refers to no improvement or non-significant decrease, and ✗* refers to significant decrease.

Table 8.2. Summary of the results for LING learners, where ✓ refers to significant improvement, ✓ refers to non-significant improvement, ✗ refers to no improvement or non-significant decrease, and ✗* refers to significant decrease*

		T0 – T1			T0 – T2			T1 – T2		
Context	**Noun Type Features**	**ESIT**	**AJT**	**FCET**	**ESIT**	**AJT**	**FCET**	**ESIT**	**AJT**	**FCET**
	[+count, +atomic]	✓	✓*	✗	✗	✓	✗	✗	✗	✗
definite-plural	[–count, +atomic]	✓*	✓		✓	✓		✗	✗	
	[–count, –atomic]	✓	✓*		✗	✓		✗	✗	
	[+count, +atomic]	✓	✓	✗	✓	✓	✗	✗	✗	✓
definite-singular	[–count, +atomic]	✓	✓	✓	✓	✓	✓	✓	✓	✗
	[–count, –atomic]	✓	✓	✓	✓	✗	✗	✗	✗	✗
	[+count, +atomic]	✓	✓	✗	✓	✓	✓	✗	✓	✓*
indefinite-singular	[–count, +atomic]	✓	✓		✓*	✓		✓	✓	
	[–count, –atomic]	✓	✓		✓	✗		✗	✗	
	[+count, +atomic]	✓	✓	✓	✓	✓	✗	✗	✗	✗
zero-plural	[–count, +atomic]	✓	✗		✓	✗		✓	✗	
	[–count, –atomic]	✓	✓		✗	✓		✗	✗	
	[+count, +atomic]	✓	✗		✓	✗		✗	✗	
zero-singular	[–count, +atomic]	✓	✓	✓*	✓*	✗	✓*	✓	✗	✗
	[–count, –atomic]	✓	✓	✓	✓	✓	✓	✗	✗	✗

As *Hypothesis 2* predicted, the results of all three tasks revealed that LING learners made improvements in their L2 linguistic knowledge of English article and noun types in the majority of tasks and contexts under investigation. In the discussion for RQ1, we confirmed that learners had not yet completely reassembled their [definite] feature for English articles and [atomic], [count], and [plural] features for noun types prior to instruction. The majority of significant improvement was found from pre-test (T0) to immediate post-test (T1). The vast majority of this significant improvement was found with noun types in the definite-plural context. The data found some significant improvement from T0 to delayed post-test (T2), with the majority of that improvement in a zero-singular context showing that LING instruction had a significant effect on the reassembly of [count] and [atomic] features for English object-uncountable nouns. Finally, we found a bit of significant improvement from T1 to T2 in the FCET with regard to countable nouns in an indefinite-singular context, showing that LING instruction aided in the reassembly of the [definite], [atomic], and [count] features for the indefinite English article and countable nouns.

In reviewing the results from the ESIT, we found a significant increase in the correction scores from T0 to T1 for object-uncountable nouns when the stimuli presented these nouns in a definite-plural context. We also found a significant increase in imitation scores from T0 to T2 for object-uncountable nouns when the stimuli presented them in an indefinite-singular context and zero-singular context. What is remarkable about these results is that definite-plural and indefinite-singular are both count-selective contexts, which shows that LING learners have reassembled their [count] and [atomic] features following instruction. Previous research by Hua and Lee (2005), Choi and Ionin (2017), and Choi et al. (2018) also found that L1-Mandarin, L2-English learners demonstrate sensitivity to uncountable noun types presented in countable-selective contexts and countable nouns presented in uncountable-selective contexts. Furthermore, both definite-plural and indefinite-singular contexts are rich with [definite] feature morphology, which was predicted to present more difficulty for the L2 learners than the reassembly of the noun features, based on the Cline of Difficulty (Slabakova, 2009a). Therefore, it is rather surprising that we found the majority of immediate improvement to be for nouns in these contexts rather than in the contexts that have fewer morphological clues for definiteness.

Similar results were found in the AJT, where we saw a general trend of improved acceptability ratings from T0 to T1 and from T0 to T2. Most notably, we found a significant increase in acceptability ratings for countable nouns and a significant decrease in ratings for substance-uncountable nouns in a definite-plural context. Our findings are similar to those of Choi and Ionin (2017), and Choi et al. (2018), who found that L1-Mandarin, L2-English speakers correctly used plural morphology with [+count, +atomic] nouns and optionally overused it with [–count, +atomic] nouns. They also found that L1-Mandarin speakers displayed sensitivity to plural marking on [–count, –atomic] nouns but not on [–count, +atomic] nouns, as measured by a grammaticality judgment task. This improvement clearly indicates that the learners are treating [+count, +atomic] and [–count, –atomic] features differently in this count-selective context, indicating that they have successfully reassembled the countable and substance-uncountable noun type features.

Finally, in the results of the FCET, we found very little improvement in forced-choice scores for LING learners over the course of the study. We did, however, find that object-uncountable nouns were selected more accurately in a zero-singular context from T0 to T1 and from T0 to T2. In addition, there was also a sudden significant increase in forced-choice scores of countable nouns in an indefinite-singular context from T1 to T2. In a similar previous study that took a GenSLA approach, Snape and Yusa (2013) used an intervention that specifically targeted definiteness, specificity, and genericity but failed to find any difference between post-test results of the experimental and control groups. They did, however, find that learners' perceptions of articles improved, as measured by a transcription task. In our study, lack of significant results throughout the FCET is likely due to the difficulty in the production of functional morphology. While the Bottleneck Hypothesis (Slabakova, 2008, 2009a, 2009b) proposes that functional morphology provides a real slowdown in language acquisition, we have found that LING instruction has led to greater improvements in comprehension tasks, but not in the pure production task (see Section 8.4 for a discussion on the differences between task types).

As hypothesized, if learners have appropriately assembled the [atomic], [count], and [plural] features in their L2 grammar, then we should see improvements in contexts that test those various feature settings. For nouns presented in a definite-plural context, they must be able to take a [+plural] feature in order to be acceptable. As we can see in the data, LING learners demonstrated difficulty with nouns presented in a definite-plural context prior to instruction, but they made significant gains with only allowing [+count, +atomic] nouns to take [+plural] marking, while rejecting nouns that do not take [+plural] marking, [–count, –atomic] (significant improvement) and [–count, +atomic] (non-significant improvement). A similar pattern is found in the indefinite-singular context. In this context, the article *a* is indefinite and takes a noun that has the feature settings [+count, +atomic, –plural]. As we predicted, we see that following instruction, LING learners made significant improvement in their elicited-sentence imitation scores for object-uncountable nouns and improvement in their forced-choice scores of countable nouns in an indefinite-singular context. On the other hand, we found quite a bit of significant improvement for object-uncountable nouns in a zero-singular context. The absence of morphology here may have provided cues to the learners that this was an uncountable-selective context.

When taken all together, these results provide compelling evidence that teaching abstract semantic features to learners may facilitate their feature reassembly and acquisition, as predicted by *Hypothesis 2*. To date, only a handful of studies (Abumelha, 2018; Lopez, 2017; Sabir, 2018; Snape & Umeda, 2018; Snape & Yusa, 2013; Umeda et al., 2017) have investigated the L2 acquisition of English articles from a GenSLA perspective and the effect of instruction in different learning contexts. Both Lopez (2017) and Sabir (2018) investigated the acquisition of English articles by L2 learners in a traditional instruction environment (i.e., using the provided textbooks and materials) rather than in a linguistically-informed environment (i.e., using materials to teach [definite] and [specific] semantic features). While Lopez (2017) stated that she did not find significant improvements with the use of linguistically-informed materials for explicit instruction, Sabir (2018) found that the group which received instruction on article semantics outperformed the uninstructed group at both immediate and delayed post-test. Furthermore, our overall results found that learners receiving linguistically-informed instruction made an overall increase post-intervention in the reassembly process, which is in line with Abumelha (2018), who found that explicit instruction on definiteness, genericity, and plurality accelerated the reassembly process, as measured by an FCET and transcription task.

Although previous research (Lopez, 2017; Lopez & Sabir, 2017; Sabir, 2018; Snape & Yusa, 2013) is mixed in the overall effects of instruction of difficult linguistic structures, it does agree that lack of significant results is likely due to short instructional periods. Therefore, we have to consider to what extent we can realistically predict learners to make linguistic gains following only one hour of instruction. However, linguistically-informed learners were able to make measurable improvements over a short period of instruction in our study. The linguistically-informed instruction used here taught the explicit features of articles and noun types and how they are assembled on particular morphological items in the L2 (English, in this case). The materials also provided an explicit comparison of how the features are assembled in the L1 and the L2, most notably the linguistic differences between [+count] and [–count] nouns in English, which are grammaticized, unlike the distinction between [+atomic] and [–atomic] nouns. Since the learners in this study showed quite a bit of their significant improvement with regard to [–count, +atomic] nouns, which had proven particularly difficult at pre-test, this type of instruction, as measured by the tasks in this study, appears to facilitate the reassembly of L1 features for the L2.

8.2.2 | Effects of Traditional Instruction

The next learner group under investigation was the TRAD learners. These learners received one hour of instruction using their assigned grammar textbook. This method of instruction taught the difference between definite and indefinite articles, as well as the differences between countable and uncountable nouns. The book did not have any specific mention of features that make each article and noun type unique, but it did mention which articles combine with which noun types as well as which noun types can take plural morphology. The overall results of the three tasks for TRAD learners are summarized in Table 8.3.

Table 8.3. Summary of the results for TRAD learners, where ✓ refers to significant improvement, ✓ refers to general improvement, ✗ refers to no improvement, and ✗* refers to significant decrease*

		T0 – T1			T0 – T2			T1 – T2		
Context	**Noun Type Features**	**ESIT**	**AJT**	**FCET**	**ESIT**	**AJT**	**FCET**	**ESIT**	**AJT**	**FCET**
definite-plural	[+count, +atomic]	✗	✗	✗	✗	✗	✗	✗	✓	✗
	[–count, +atomic]	✓	✗		✗	✓*		✗	✓*	
	[–count, –atomic]	✓	✓		✗	✓		✗	✓	
definite-singular	[+count, +atomic]	✗	✓	✗	✗	✓	✗	✗	✓	✓
	[–count, +atomic]	✓	✓	✓	✓	✓	✗	✗	✓	✗
	[–count, –atomic]	✗	✓	✗	✗	✗	✗	✗	✗	✓
indefinite-singular	[+count, +atomic]	✓	✗	✗	✓	✓	✓	✓	✓	✓*
	[–count, +atomic]	✗	✓		✓	✓*		✓	✓	
	[–count, –atomic]	✓	✗		✓	✗		✗	✓	
zero-plural	[+count, +atomic]	✗	✓	✓	✗	✗	✗	✓	✗	✗
	[–count, +atomic]	✓	✗		✓	✗		✓	✓	
	[–count, –atomic]	✓	✗		✗	✗		✗	✗	
zero-singular	[+count, +atomic]	✗	✗		✗	✗		✗	✗	
	[–count, +atomic]	✓	✓	✓	✓	✗	✓*	✗	✗	✓
	[–count, –atomic]	✓	✗	✓	✓	✓	✓	✗	✗	✓

As predicted by our hypothesis, traditional instruction appears to have mediated the reassembly of [count] and [atomic] features for noun types, although not significantly. Based on the Cline of Difficulty (Slabakova, 2009a), we predicted that features transferred from an L1 morpheme to an L2 morpheme (i.e., [atomic], [count], and [plural]) would prove easier to reassemble than those that are transferred from the L1 context (or morpheme in some cases) to an L2 morpheme (i.e., [definite]). While there was overall improvement in many of the contexts and tasks, there was very little significant improvement. From T0 to T1 in the ESIT, we observed improvement with object- and substance-uncountable nouns in nearly every context, but very little improvement with regard to countable nouns. Overall, there was no significant improvement in the ESIT for TRAD learners. Furthermore, the majority of significant improvement was from T0 to T2, with improvement in the AJT for object-uncountable nouns in definite-plural and indefinite-singular contexts and in the FCET for object-uncountable nouns in a zero-singular context. From T1 to T2, we found significant improvement in the AJT for object-uncountable nouns in the definite-plural and then countable nouns in an indefinite-singular context in the FCET.

We found that, while there was no significant immediate effect of instruction, learners demonstrated significant improvement in their sensitivity of object-uncountable nouns presented in two of the count-selective contexts from T0 to T2, similar to the studies of Hua and Lee (2005), Choi and Ionin (2017), and Choi et al. (2018), which found that L2 learners of English from GCLs demonstrate sensitivity to plural marking on uncountable nouns as well as sensitivity to uncountable nouns presented in count-selective contexts. Furthermore, we also found that from T1 to T2, the learners demonstrated even more significant sensitivity to object-uncountable nouns in a definite-plural context. As previously stated, definite-plural, indefinite-singular, and zero-plural are count-selective contexts.

As predicted, if learners have appropriately reassembled the [atomic], [count], and [plural] features for the L2 grammar, then we should see improvements in contexts that select specific combinations of those. We also predicted these features to be more easily reassembled based on the Cline of Difficulty (Slabakova, 2009a). As can be seen in the data, NNSs demonstrated difficulty prior to instruction, and TRAD learners showed little improvement following instruction. TRAD learners failed to demonstrate any significant improvement from T0 to T1. From T0 to T2 and from T1 to T2, however, we do find some significant improvement. While we found some significant improvement in definite-plural, indefinite-singular, and zero-plural contexts, we cannot definitively say that traditional instruction has eased the bottleneck of language acquisition (Slabakova, 2008, 2009a, 2009b) because functional morphology seems to present real difficulty to these learners.

Hypothesis 2 predicted that traditional instruction would have an effect on the reassembly of L1 features of [definite], [count], [atomic], and [plural] for the L2. More specifically, based on previous research, it was predicted that there would be immediate effects of instruction but not delayed effects. Our data analysis did not reveal any significant improvement in linguistic knowledge or reassembly immediately following instruction. Instead, any measurable differences in linguistic knowledge were found from T1 to T2 and from T0 to T2. Contrary to our findings, in two well-cited studies, Master (1994, 2002) conducted article acquisition research in a traditional ISLA environment and found empirical support for the benefits of explicit instruction of the English article system as measured by an FCET. More specifically, Master (1994) found beneficial effects of explicit instruction on explicit knowledge after only one week of instruction, and one month after instruction, Master (2002) further found that L2 learners had improved their understanding of English information structure, which may further help in successful acquisition.

While we can say that the learners have begun to reassemble their features even more so than they had at pre-test, we cannot confidently say that they have completely successfully reassembled their L1 features for the L2 following instruction at either the immediate or delayed post-test. Although traditional instruction was not beneficial in all contexts, we must consider to what extent we can realistically predict learners to make gains following only one hour of instruction. Traditional instruction in this study taught articles and noun types using the participants' assigned grammar textbook (Bunting et al., 2009) and showed how they are combined to create grammatical and ungrammatical noun phrases. Unlike linguistically-informed instruction, these materials made no mention of the features or of how the articles and noun types are formed in the native language. Therefore, we can say that traditional instruction, as measured by the tasks in this study, seems to do little to facilitate the reassembly of L1 features and ease the bottleneck—that is, functional morphology—for more successful second language acquisition.

8.2.3 | Effects of No Extra Instruction

The third learner group under investigation was the NOEX learners. These learners did not receive any additional instruction as part of the study. The hypothesis for these learners was that they would maintain their linguistic knowledge and, therefore, not make any significant changes to the assembly of their noun type features over the course of the study. The overall results of the three tasks for NOEX learners are summarized in Table 8.4.

Table 8.4. Summary of the results for NOEX learners, where ✓ refers to significant improvement, ✓ refers to general improvement, ✗ refers to no improvement, and ✗* refers to significant decrease*

		T0 – T1			T0 – T2			T1 – T2		
Context	**Noun Type Features**	**ESIT**	**AJT**	**FCET**	**ESIT**	**AJT**	**FCET**	**ESIT**	**AJT**	**FCET**
definite-plural	[+count, +atomic]	✗	✓	✗	✗	✗	✗	✗	✗	✗
	[–count, +atomic]	✓	✓		✗	✓*		✗	✓*	
	[–count, –atomic]	✓	✓		✗	✓		✗	✓	
definite-singular	[+count, +atomic]	✗	✓	✗	✗	✓	✗	✗	✗	✓
	[–count, +atomic]	✓	✓	✓	✗	✓	✗	✗	✗	✗
	[–count, –atomic]	✓	✗	✗	✗	✗	✗	✗	✗	✓
indefinite-singular	[+count, +atomic]	✓	✓	✗	✗	✓	✓	✗	✓	✓*
	[–count, +atomic]	✓	✓		✗	✓		✗	✓	
	[–count, –atomic]	✓	✓		✓	✓		✗	✗	
zero-plural	[+count, +atomic]	✗	✓	✗	✗	✗	✗	✗	✗	✓
	[–count, +atomic]	✗	✗		✗	✗		✓	✓	
	[–count, –atomic]	✗	✗		✗	✗		✗	✗	
zero-singular	[+count, +atomic]	✗	✗		✗	✗		✗	✓	
	[–count, +atomic]	✓	✓	✓	✓	✓	✓*	✗	✓	✓*
	[–count, –atomic]	✓	✗	✗	✗	✗	✗	✗	✗	✓

As predicted, we did not find much significant improvement in the data for NOEX learners. For the ESIT data, we found no significant increase in imitation scores for any of the contexts. In the AJT data, we did, however, find that learners made significant improvement in their acceptability ratings for object-uncountable nouns in a definite-plural context from T0 to T2 and from T1 to T2. In the FCET, we also found that NOEX learners made significant improvement in their forced-choice selections of object-uncountable nouns in a zero-singular context from T0 to T2 and from T1 to T2. In addition, we found that NOEX learners made significant improvement with countable nouns in an indefinite-singular context from T1 to T2.

We should first acknowledge that any significant improvement for these learners is not a result of the study. As was the case with all learners in the study, these were students taking L2-English grammar courses during their participation. Since they were recruited from a credit-based program and not from individual classes, there was no way to control if they received lessons on the topics from the project or not. Per the curriculum of the courses these students were enrolled in, the chapter on noun types and articles is "self-study" and is not slated to receive any dedicated class time. Therefore, as a group with no extra instruction, it was hypothesized that these learners would not demonstrate any significant changes in their linguistic knowledge of English articles and noun types. Although we did not find any significant improvement in the ESIT, the significant improvement we found in the AJT is partially in line with previous research. Previous research (Choi & Ionin, 2017; Choi et al., 2018; Hua & Lee, 2005) has found that L2 learners of English from GCLs demonstrate sensitivity to plural marking on uncountable nouns as well as sensitivity to uncountable nouns presented in count-selective contexts. The significant improvement in the AJT shows that NOEX learners began to demonstrate sensitivity to plural marking on object-uncountable nouns from T0 to T2 and from T1 to T2. While additional improvement was found for some other noun types in other count-selective contexts, it was not significant. Significant improvement from T0 to T2 and from T1 to T2 was found for object-uncountable nouns in an uncountable-selective context like zero-singular in the FCET. While these learners did not receive any explicit instruction on articles and noun types as part of the study, significant improvement is likely due to the fact that these learners were still enrolled in their regularly scheduled grammar course. This exposure to continued explicit grammar instruction, even if not on the explicit features and structures under investigation, surely had some effect on their overall improvement.

The same theoretical assumptions of the Cline of Difficulty (Slabakova, 2009a) and the Bottleneck Hypothesis (Slabakova, 2008, 2009a, 2009b) still hold with this group of learners in that we assume that functional morphology will present a real slowdown in learners' language acquisition process. Following the Cline of Difficulty, we predicted that the [atomic], [count], and [plural] features would be more easily reassembled than the [definite] feature would due to their assembly in Mandarin. Surprisingly, even without instruction, we see that the majority of the significant results were found in the AJT for nouns presented in contexts with rich morphology for the [definite] feature. Furthermore, as predicted, the majority of noun type improvement was with object-uncountable nouns, which suggests that these learners have begun to reassemble their [count], [atomic], and [plural] features, as measured by the AJT and FCET. As measured by the ESIT, these learners did, in fact, continue to show difficulty with all of the features under investigation. While confirming our hypothesis and prediction would signal that lack of instruction has not mediated the reassembly process nor has it eased the bottleneck of language acquisition, we also did not find any improvement at all. As previously mentioned in Chapter 6, all learners in the study were recruited from grammar courses in a credit-bearing university ESL program. Therefore, any significant improvement found for NOEX learners is likely due to the participants' continued attendance in their regularly scheduled grammar courses throughout the progression of the study. Although we do not have any specific data on what was taught to the participants in their classes during the data collection periods, we must acknowledge that exposure to the language and explicit grammar instruction could have mediated any improvement found.

In summary, RQ2 specifically sought to investigate whether different types of instruction have measurable effects on the reassembly of L1-Mandarin features of [definite], [count], [atomic], and [plural] for L2-English articles and noun types. Prior to intervention, we found evidence for the presence of L1 features in the L2. After instruction, we found that LING learners displayed patterns representative of more successful reassembly of the features under investigation. In addition, we also found some significant results with both the traditional and no-extra-instruction groups. Therefore, with regard to linguistically-informed and traditional instruction, we can confirm our hypothesis that instruction can mediate the feature reassembly process. As for the no-extra-instruction group, we are unable to definitively reject the hypothesis because these learners did, in fact, demonstrate some unexpected improvement over the course of the data collection.

8.3 | Research Question 3: L2 Feature Reassembly (Between Groups)

Research Question 3 (RQ3) investigates the comparison of linguistic gains in the reassembly of L1 article and noun type features for the L2 between the different instructional contexts across the course of the study. Early on in the data analysis, it was revealed that the learner groups did not perform entirely similarly on all of the tasks in the study at T0. Therefore, we will only compare the gains across time periods between groups, rather than between groups at each specific testing time. While RQ2 investigated the effects of instruction within a group, we now turn our attention to gain comparisons between groups to see if one instructional context proved more beneficial than another.

As predicted by *Hypothesis 3*, linguistically-informed instruction tended to have more of an effect on the development of metalinguistic knowledge and to facilitate feature reassembly to a greater extent than traditional instruction. In the results, we found that in the ESIT, LING learners made significantly greater gains when compared to TRAD and NOEX learners in their ability to provide grammatical corrections and imitations of object-uncountable nouns presented in definite-plural, definite-singular, indefinite-singular, and zero-plural contexts. In other words, we found that in count-selective contexts, LING learners made greater gains than TRAD and NOEX learners did in the reassembly of their [atomic], [count], and [plural] features for uncountable-object nouns by providing grammatical corrections in definite-plural, indefinite-singular, and zero-plural contexts. These findings are in line with previous work by Choi and Ionin (2017) and Choi et al. (2018), which found that L2 learners of English from GCLs demonstrate sensitivity to plural marking, and Hua and Lee (2005), who found that L1-Mandarin learners of L2 English display sensitivity to uncountable nouns in count-selective contexts. While it was not always significant, we found that LING learners made greater gains in their ability to provide imitations of grammatical combinations and correction of ungrammatical imitations, regardless of noun type, in the ESIT when compared to the other L2 groups.

In the AJT, we found that LING learners made greater gains than NOEX with regard to object-uncountable nouns in definite-plural and definite-singular contexts. When compared to TRAD learners, we found that LING learners made significantly greater gains in their ability to treat substance- and object-uncountable nouns more similarly but treat them differently than countable nouns in a definite-plural context. In other words, we found that LING learners made greater gains than TRAD learners in treating substance- and object-uncountable nouns similarly in a definite-plural context, while treating countable nouns significantly differently. This means that LING learners displayed the reassembly of [count] and [atomic] features for L2-English nouns to a greater extent than TRAD learners did, as shown by the rejection of substance- and object-uncountable nouns and their greater acceptance of countable nouns in a definite-plural context.

In the FCET, we found that both LING and TRAD learners made significantly greater gains than NOEX learners with countable nouns in an indefinite-singular context but were not different from one another. We also found that LING and TRAD learners made significantly greater gains with object- and substance-uncountable nouns in a zero-singular context when compared to NOEX learners. As hypothesized, these results show that linguistically-informed instruction was more beneficial in the reassembly of the [atomic], [count], and [plural] features for English articles than traditional or no extra instruction.

When taken together, these findings suggest that LING learners are beginning to reassemble their [count], [atomic], and [plural] features correctly, as they show higher rates of correction in the ESIT and rejection in the AJT of the ungrammatical combination of [–count] and [+plural] features. Following instruction, LING learners displayed patterns of reassembly by rejecting [–count, ±atomic] and [+plural] feature combinations while accepting [+count, +atomic] and [+plural] combinations. For both LING and TRAD learners in the FCET, we found that they made greater gains than NOEX learners with the reassembly of the [count] and [atomic] features for uncountable nouns in a zero-singular context.

In comparing our results to previous literature, we are limited by what research is available. In the handful of ISLA studies that investigate different learning contexts, the effects of linguistically-informed instruction are mixed. Previous research by Lopez (2017) and Sabir (2018), which provided motivation for the current study, investigated the acquisition of English articles by L2 learners in different instructional contexts: a traditional instruction environment (i.e., using the provided textbooks and materials) and a linguistically-informed environment (i.e., using materials to teach [definite] and [specific] semantic features). As previously mentioned, Lopez (2017) did not find significant gains in her method of linguistically-informed instruction, but she attributes some of that lack of gains to not administering the instruction herself and having to modify the instructional materials to be used by a number of different instructors. Sabir (2018), on the other hand, found more promising results. Similar to the results in our study, Sabir (2018) found that the group which received instruction on article semantics outperformed the uninstructed group at both immediate and delayed post-test, although these results were not always significant. Regardless of their individual findings, previous research agrees that there is a benefit to teaching abstract linguistic structures in order to develop metalinguistic knowledge.

What has continued to be surprising in our analysis, though, is that LING learners almost always made the greatest gains in contexts that were rich in [definite] and [plural] morphology. In two of the three tasks, LING learners made greater gains than TRAD and NOEX learners in definite-plural contexts, and in the indefinite-singular context in the other task. These are contexts that were predicted to pose difficulty due to the increased functional morphology (see Slabakova, 2008, 2009a, 2009b) of [definite] and [plural] features that require reassembly in the L2. Recall that based on the Cline of Difficulty (Slabakova, 2009a), the [definite] feature was expected to pose the greatest difficulty for reassembly because the learners had to transfer and reassemble the L1 context- and morpheme-dependent feature to a morpheme in the L2. Furthermore, the [plural] feature needed to be reassembled and bundled on all noun types.

In comparing the effects of intervention, we should also recall what each intervention entailed. Similar to previous research by Lopez (2017) and Sabir (2018), our intervention taught abstract linguistic features to facilitate the acquisition process. In our study, the linguistically-informed intervention explained each of the [definite], [count], and [atomic] features and how they are assembled with English noun types. These materials also explained which noun types take [+plural] marking. Furthermore, the linguistically-informed materials included a component of crosslinguistic analysis which compared the use of articles in noun types in Mandarin and English and outlined common errors faced by L1-Mandarin learners of English. Traditional instruction, on the other hand, simply explains what countable and uncountable nouns are, which articles can be combined, and whether or not the noun type takes a plural form. While traditional instruction was proven in our findings to have some effect on feature reassembly, it was to a lesser extent than linguistically-informed instruction. The NOEX learners did not receive any instructional intervention as part of the study and were predicted not to make any improvement.

Therefore, as hypothesized and predicted, the data show that LING instruction may have not only led to greater gains in the reassembly of features but also to easing the bottleneck of language acquisition and making the acquisition of functional morphology more manageable than other instructional contexts. While we found improvement with traditional instruction, it was to a lesser extent than the effect of teaching abstract linguistic features. Our data show that the overall effect of teaching abstract linguistic features, such as countability, atomicity, and definiteness, and their assembly on noun types and articles in the L2, as well as crosslinguistic differences between the L1 and L2, has led to greater gains than traditional instruction. By making the feature reassembly process more explicit and tangible, the learners were able to work through the different combinations and definitions of their L1 features for English article and noun types and learn their successful assembly in L2 English, in addition to the corresponding functional morphology.

8.4 | Research Question 4: Interaction of Type of Instruction and Task Type

Research Question 4 (RQ4) addressed potential differences between the three different tasks and the data obtained in each of them on the reassembly of L1 features for the L2. The motivation for including a variety of tasks in the data analysis is justified by previous research (Doughty, 2003; R. Ellis, 2005b, 2009b, 2015; R. Ellis et al., 2009; Erlam, 2006, 2009; Han & Ellis, 1998; Loewen, 2009; Norris & Ortega, 2000), which shows that different data collection instruments tap into different types of L2 linguistic knowledge. RQ4 specifically asks what the effect of task type is on overall improvement and its interaction with type of instruction. Previous research posits that it takes large amounts of time, practice, and input for L2 learners to develop implicit knowledge, while explicit knowledge is generally a more direct result of explicit instruction (Doughty, 2003; Loewen, 2015; Norris & Ortega, 2000).

In our study, we consider the ESIT to be the most implicit task in the study and the AJT and FCET to tap more into explicit knowledge. This is supported by previous research by R. Ellis (2009b), the Marsden Project, which followed previous work by Han and Ellis (1998); the Marsden Project was a battery of tests developed to provide separate measures of implicit and explicit knowledge. The results of this project found that an elicited-sentence imitation task provided a convincing measure of implicit knowledge, and an acceptability judgment task (specifically, the ungrammatical sentences) provided a measure of more explicit knowledge. This previous research, as well as all the research conducted by R. Ellis et al. (2009), does not include any evaluation of FCET as a measure of explicit knowledge. However, we consider the FCET task to be the most explicit task in our study, as it is untimed and requires the learners to access their explicit knowledge in order to select the most appropriate missing English article and noun type based on the context provided.

In addition, while we find the ESIT to undoubtedly be the most implicit task in our study (R. Ellis, 2009b, 2015; Erlam, 2006, 2009), we consider the FCET to be the most explicit and the AJT to be middle ground (Bialystok, 1979; Gutiérrez, 2013; Han, 2000; Loewen, 2009). Previous research by Loewen (2009) compared the results of NSs and NNSs on timed and untimed grammaticality judgment tasks and recorded longer response times on ungrammatical sentences than grammatical sentences. In this study, the self-reported use of rules was positively correlated with response time. Loewen (2009) takes this to suggest that longer times were related to more operationalization of explicit knowledge. Therefore, while ungrammatical sentences in an untimed test appeared to encourage L2 learners to access L2 explicit knowledge, the same could not be said about grammatical sentences. In summary, Loewen (2009) found that AJTs are not a pure measure of either explicit or implicit linguistic knowledge. Therefore, we consider the AJT to be middle ground because while it does explicitly ask learners to make judgments of the sentences, these judgments are based on intuition rather than production, as in the ESIT and FCET.

As predicted, LING learners were found to make the greatest gains, although not always significant, from T0 to T1 and T0 to T2, on all three tasks when compared to TRAD and NOEX learners. Unexpectedly, within group, LING learners made significantly greater gains from T0 to

T1 and from T0 to T2 on the ESIT than they did on the AJT and FCET. TRAD learners made the greatest gains on the ESIT from T0 to T1 and on the FCET from T0 to T2. In both of these time periods, the learners displayed a decrease in performance on the AJT. Surprisingly, NOEX learners made positive gains on both the ESIT and AJT from T0 to T1. From T0 to T2, NOEX learners made positive gains only in the AJT, and they made positive gains from T1 to T2 in both the AJT and FCET. Within group, from T1 to T2, LING learners made a decrease of about the same percentage in all three tasks, while the TRAD and NOEX learners both showed positive increases by five percent in the FCET and by less than one percent on the AJT. Since traditional and linguistically-informed instruction are both methods of explicit instruction, we had predicted that they would have a greater effect on the performance development of more explicit tasks like the AJT and FCET. Unexpectedly, though, we found that LING learners made the greatest gains in the ESIT from T0 to T1 and from T0 to T2, showing clear development in their implicit knowledge. TRAD learners, on the other hand, only displayed positive improvement on the ESIT from T0 to T1 but positive improvement on the FCET from both T0 to T2 and T1 to T2.

In our study, both LING and TRAD are forms of explicit instruction, but they differ in their delivery. LING instruction explicitly taught the features associated with English articles and noun types in order to facilitate the reassembly of L1 features for the L2. TRAD instruction, on the other hand, taught English articles and noun types using the participants' course textbook. In both methods of instruction, the intervention lasted no longer than one hour. Previous research (Doughty, 2003; Loewen, 2015; Norris & Ortega, 2000; White, 1991) has found that the effects of explicit instruction have been beneficial, but the same research recognizes that explicit instruction may only lead to gains in explicit knowledge rather than implicit knowledge. This research is contradictory to our findings which showed that the greatest gains were made in the ESIT, a task considered to be a measurement of implicit knowledge. In other words, we found that LING instruction led to greater gains in implicit knowledge, as measured by an ESIT, than explicit knowledge, as measured by an AJT and FCET, both from T0 to T1 and T0 to T2. More specifically, the significant gains made by LING learners from T0 to T1 and from T0 to T2 for the ESIT are nearly double those of both the AJT and FCET. One explanation for our findings might be the overall length of intervention. As mentioned in Chapter 6, we chose to only administer intervention during a single one-hour period. The motivation for this was to stay true to the amount of time that a curriculum item is given during a regular upper-intermediate or advanced-level university ESL course. It might be the case that with this new form of instruction, a longer instruction time may be needed in order to have a greater effect on explicit knowledge. In our results, the vast majority of this improvement for LING learners was found from T0 to T1 but did, in some instances, last into T2. While we tested participants immediately following instruction and three weeks after instruction and found a decrease in development, it still remains to be seen what the long-term effect of instruction is on linguistic retention beyond just a few weeks.

The fact that we found some significant gains in implicit knowledge following explicit instruction lends some support to the Strong Interface Position (DeKeyser, 1995, 1997) of the Interface Hypothesis (N. C. Ellis, 2005). The Strong Interface Position claims that explicit knowledge can, and does, become explicit knowledge over time. While we are unsure as to how much our learners practiced outside of their one-hour instructional intervention, our results unexpectedly found significant improvement in implicit knowledge over a short period of time. These improvements did, in fact, last into the delayed post-test, too. In other words, teaching abstract linguistic features may have actually led to quicker development of implicit knowledge from the beginning, since it was intended to be a method of language instruction to facilitate feature reassembly and not a method of learning individual lexical items.

Since the greatest gains were made through LING instruction, it might be the case that explicit instruction of abstract linguistic features to facilitate feature reassembly might be more effective initially with implicit knowledge since the features are not considered as explicitly as morphology and morphemes are when making linguistic decisions. We must also bear in mind that previous research on linguistically-informed instruction has not considered the development of different kinds of linguistic knowledge. On the other hand, previous research that does deal with the development of different types of linguistic knowledge has only been conducted with interventions that are more similar to traditional instruction, in both implicit and explicit ways. Unlike LING instruction, TRAD instruction teaches the morphology and morphemes but not the individual features and how they are assembled. Therefore, while TRAD learners displayed some patterns of improvement in implicit knowledge, as measured by the ESIT, this explicit instruction over article morphology and lexical items appears to have led to greater gains with explicit knowledge, as measured by an AJT and FCET, which would be in line with previous research (Doughty, 2003; Loewen, 2015; Norris & Ortega, 2000; White, 1991).

We must also consider the differences in task type with regard to production versus comprehension in addition to the implicit/explicit debate. It goes without saying that both comprehension and production of a second language can be affected by crosslinguistic influence

(Odlin, 2013), and each of these pose distinct challenges to language learners (McDonough & Trofimovich, 2012). In our study, we determined that the FCET posed particular difficulty to the learners because while language comprehension involves extracting meaning from a speech signal or text, language production involves converting a message into speech or text using appropriate lexicon and grammar (McDonough & Trofimovich, 2012). In our FCET, learners had to fill in a missing article and noun form following one sentence of context. As Slabakova (2016) notes, lexical semantics present significant difficulty to L2 learners, especially when they have to restructure their lexical knowledge in a way to acquire new markers. In our analysis, production poses particular difficulty for LING and TRAD learners because successful acquisition of the features under analysis required learners to acquire new morphological markers. In addition, the FCET was rated in such a way that learners received a score out of two—a one or zero for article choice and a one or zero for noun choice. If we had isolated the analysis and just looked at noun scores or article scores, we may have found greater improvement in one of these areas. By combining them in our analysis for an overall accuracy score, though, we may have muted any significant improvements. Ultimately, we chose to combine these scores in both the FCET and ESIT because there would be no way to separate article and noun data in the AJT. To that end, while recognizing that this may have made the overall results seem less significant in this particular production task, we must also recognize that previous research acknowledges the differences in difficulty between comprehension and production (Gass et al., 2013; McDonough & Trofimovich, 2012; Norris & Ortega, 2012; Odlin, 2013; Ringbom, 2013; Slabakova, 2016).

We must keep in mind the novel nature of this dissertation. Most previous research on the effects of instruction (Bowles, 2011; Bruhn de Garavito, 2013; Loewen, 2015; Long, 1983, 2009; Lopez, 2017; Lopez & Sabir, 2017; Master, 1994, 2002; Norris & Ortega, 2000; Snape & Yusa, 2013; Sonbul & Schmitt, 2013; Spada & Tomita, 2010), with the exception of a handful of studies, have investigated implicit and explicit instruction using what we have called traditional instruction. There is little research on the effects of linguistically-informed instruction that uses abstract linguistic features to teach difficult grammar features. Therefore, while we did not predict that linguistically-informed instruction would have a greater effect on implicit knowledge than on explicit knowledge, our findings are still telling.

In summary, our results throughout have pointed toward linguistically-informed instruction being more effective, and we have now found that it seems to have been most effective in building up short-term implicit linguistic knowledge and intuition, while also facilitating some gains with explicit knowledge and production as well. We must bear in mind that these results are observed after a one-time, sixty-minute instructional intervention period. It remains to be observed if the effects would be more or less significant following a longer instructional intervention or whether or not these effects would be retained beyond a three-week-delayed post-test. We now turn to the final chapter of the dissertation where we will summarize and directly answer each research question, discuss the implications for both GenSLA research and ISLA pedagogy, and acknowledge the limitations of the present study and the openings for future research.

Chapter 9: Conclusion

"I would have written a shorter letter,
but I did not have the time."

– Blaise Pascal

This dissertation has examined the second language (L2) acquisition of English articles and noun type features by first language (L1) speakers of Mandarin in different instructional contexts. In Mandarin, the semantic universal features of [definite], [count], [atomic], and [plural] are assembled differently than in English. In order to successfully assemble their L1-Mandarin features for L2 English, learners must transfer, disassemble, and then reassemble them on the new L2 morphemes. We have examined the reassembly of these features in two different learning contexts—a traditional approach and a linguistically-informed approach. We also included an L2 learner group that received no extra (NOEX) instruction. In the traditional (TRAD) approach, participants were instructed for one hour on English articles and noun types using their course-assigned textbook, *Grammar & Beyond 4* (Bunting et al., 2009). For linguistically-informed (LING) instruction, participants received one hour of explicit instruction on the universal semantic features at play in the reassembly process: [definiteness], [countability], [atomicity], and [plurality]. We collected our data over three time periods—pre-test (T0), immediate post-test (T1), and delayed post-test (T2)—using three different data collection instruments—an elicited-sentence imitation task (ESIT), an acceptability judgment task (AJT), and a forced-choice elicitation task (FCET). This chapter will briefly summarize the main findings and answer each of the four research questions (RQs) directly. We will then present the implications and contributions of this dissertation to the fields of Generative Second Language Acquisition (GenSLA) and Instructed Second Language Acquisition (ISLA). Finally, limitations will be acknowledged and areas of further research will be outlined; this will be followed by a closing remark.

9.1 | Main Findings: Answering the Research Questions

After having discussed the intervention, data, results, and hypotheses, we now turn back to the original four research questions that motivated and guided this study in order to summarize the main findings.

> **Research Question 1**
> To what extent will L1 features be present in the participants' L2-English articles and noun types prior to intervention, as measured by the potential differences between the L2 learners' and native speakers' performance in an elicited-sentence imitation task, an acceptability judgment task, and a forced-choice elicitation task?

In accordance with the data obtained and analyzed, prior to instruction, the L2 learners in our study displayed patterns representative of L1 features present in the L2 knowledge. Therefore, they were at points somewhere within the reassembly process. In our analysis, we found that L1-Mandarian, L2-English learners treat nouns differently based on the [count], [atomic], and [plural] features. We also found that prior to instruction, these L2-English learners were most successful with English noun types when the [count] and [atomic] features were aligned, suggesting that they had not yet properly reassembled the [count] feature. The non-native speakers (NNSs) in our study tended to favor grammaticizing nouns based on the feature settings from their L1, most notably with the [atomic] feature. Our L2 learners displayed significantly different patterns in their imitation scores, acceptability ratings, and forced-choice selections prior to intervention when compared to English NSs, confirming the presence of L1 feature settings in their L2.

> **Research Question 2**
> Does type of instruction mediate the reassembly of L1 article and noun type features for the L2, as measured by an elicited-sentence imitation task, an acceptability judgment task, and a forced-choice elicitation task?

In our analysis and discussion of different types of instruction and their mediation of the reassembly of L1 features for the L2, we found that LING learners had begun to reassemble their noun type features, particularly for object- and substance-uncountable nouns, although these improvements were not always significant. The majority of improvement for LING learners was found from pre-test to immediate post-test in both the ESIT and AJT. Little to no improvement was found in the FCET for LING learners. We found a similar trend for TRAD learners, who showed some improvement throughout, though not often significant. TRAD learners showed the most significant improvement in the AJT from pre-test to delayed post-test but did not display similar patterns in the AJT. These learners did, however, show some improvement from pre-test to delayed post-test and immediate post-test to delayed post-test in the FCET. As predicted, NOEX learners did not make any significant improvement from pre-test to immediate post-test, but did, in fact, make some significant improvement from immediate post-test to delayed post-test in both the AJT and FCET, likely due to factors external of the research project. Overall, NOEX learners made little improvement, TRAD learners made some improvement, and LING learners made the greatest levels of improvement in their reassembly of L1 features for the L2.

Research Question 3

> What type of instruction will lead to greater gains in the reassembly of L1 article and noun type features for the L2 and the acquisition of new L2 features, as measured by an elicited-sentence imitation task, an acceptability judgment task, and a forced-choice elicitation task?

Our analysis revealed that LING instruction, while not always significantly so, was overall more effective than the two other groups when comparing linguistic gains. The analysis for RQ3 found that LING instruction may have not only led to the greatest gains in feature reassembly but also to easing the bottleneck of language acquisition by making the acquisition of functional morphology more manageable, as compared to the other instructional contexts. While we also found improvement with TRAD instruction, it was to a lesser extent than the effect of teaching abstract linguistic features. For both LING and TRAD learner groups, we found the most significant gains in the ESIT, with LING learners making significantly greater gains than both TRAD and NOEX learners in their ability to provide grammatical corrections and imitations. Both the TRAD and NOEX groups also trended in the predicted direction of gains with regard to the AJT, with only LING learners significantly outperforming the NOEX instruction group. The analysis of the FCET produced fewer significant differences and gains across the course of the study but contained instances of LING and TRAD learners again outperforming NOEX learners. Our analyses revealed that the overall effects of teaching the semantic features of [count], [atomic], [plural], and [definite] led to greater gains in the reassembly of noun types and articles for the L2 than did traditional grammar instruction. We found that by making the feature reassembly process more tangible and explicit, the learners were able to work through the definitions, feature combinations, and crosslinguistic differences in order to reassemble their L1 features for the L2. Additionally, LING instruction not only led to greater gains in feature reassembly but also to the acquisition of the corresponding functional morphology. With that being said, we take these findings to suggest that linguistically-informed instruction proved to be more effective than traditional instruction, as measured by the tasks in our study.

Research Question 4

What is the effect of task type on overall improvement and its interaction with type of instruction?

Task type has been found to influence the results obtained in and across groups. LING learners made greater gains on the ESIT than on the AJT and FCET from pre-test to both immediate and delayed post-test. This gain reveals that while LING instruction appeared to have been most effective overall, it seems to also have been most effective in building up short-term implicit linguistic knowledge and intuition. At the same time, LING instruction appears to have facilitated some gains in explicit linguistic knowledge and production as well, as measured by the AJT and FCET. As for TRAD learners, we found that, from pre-test to immediate post-test, they made the greatest gains in the ESIT but from pre-test to delayed post-test, they made the greatest gains in the FCET when compared within group. TRAD learners displayed a decrease in performance on the AJT in both of these time periods. NOEX learners made the greatest gains on the ESIT from pre-test to immediate post-test, on the AJT from pre-test to delayed post-test, and on the FCET from immediate to delayed post-test. In looking at the overall interactions, neither TRAD nor NOEX made as consistent of gains in each of the tasks across the course of the study as LING learners did.

9.2 | Contributions to GenSLA Research and ISLA Pedagogy

While our findings do not show overwhelming significant differences, they are generally positive and contribute to the very small amount of current research in the field that investigates a form of ISLA pedagogy informed by findings of GenSLA. One of the foundational theoretical claims of this dissertation is that theoretical GenSLA research is not commonly implemented in practical ways in the classroom (Lopez, 2015, 2017; Lopez & Sabir, 2017; Nassaji, 2012; Whong, Gil, et al., 2013a; Whong et al., 2014; Whong, Marsden, et al., 2013). The gap that exists between GenSLA and ISLA research can be summarized in three main points:

vi. GenSLA tends to focus on solving theoretical principles while ISLA tends to focus on research questions that are more pedagogical in nature (Nassaji, 2012).

vii. Many language instructors perceive GenSLA as inaccessible or irrelevant (Whong, Gil, et al., 2013a; Whong, Marsden, et al., 2013).

viii. Linguistic researchers and language instructors need to collaborate in order to make findings from GenSLA available for language teaching (Marsden & Slabakova, 2019).

Based on these points, this dissertation started with two primary questions about GenSLA research and its connection with ISLA:

ix. How can we make GenSLA research more accessible and applicable to language instructors and language classrooms?

x. To what extent is it beneficial for L2 acquisition to create a teaching and learning environment, accessible to both instructors and students, that is informed by both GenSLA research and ISLA pedagogy?

The most relevant contribution of this dissertation is the fact that it has brought GenSLA findings to the forefront and applied them to an instructional environment. To date, the vast majority of GenSLA research has been more theoretical in nature, while ISLA research has been more pedagogically-focused with little attention to GenSLA theoretical findings. In this dissertation, we have created a teaching environment informed by theoretical GenSLA research to teach L2-English articles and noun types in such a way as to mediate and facilitate the feature reassembly process.

The fact that this comprehensive study has created a teaching and learning environment that is informed by GenSLA theory, successfully facilitating the feature reassembly process, greatly contributes to the research in the field, as other studies have found fewer significant results. More specifically, this dissertation has allowed us to contribute a new form of language teaching that takes a feature reassembly approach and explicitly teaches the features needing to be reassembled from the L1 for the L2. While we found that the implementation of our new pedagogy in this project may have been too short for long-term implications, it is possible that the pedagogy might prove more effective if implemented for longer periods of time and was extended to all structures of a grammar course. The creation of these materials would allow instructors to become familiar with GenSLA theory and apply it to their language teaching for more effective L2 acquisition for their students. In fact, it might be even more beneficial to take a GenSLA and crosslinguistic approach to language teaching at the earlier stages of the acquisition process—that is, lower-level courses—to make the overall acquisition process more explicit and tangible for the language learners from the onset. Doing so would allow for this linguistically-informed teaching pedagogy to be implemented in a systematic way that may lead to greater gains in a formal instruction environment. In summary, this dissertation has filled a gap in the research by studying how GenSLA and ISLA can work together to inform one another's methodologies, interventions, and findings.

9.3 | Limitations & Future Research

As with any undertaking of this size, there are a number of limitations to be acknowledged. The first and most obvious limitation is the small number of participants included in the study. While data was originally collected for more than 100 participants overall, quite a bit of it was incomplete and had to be excluded from the final data analysis. It would be ideal to conduct the study again with a larger number of participants, particularly those with similar task performance and feature assembly at pre-test. This larger size would allow us to compare both within and between groups at each testing time. It goes without saying that the data collected and presented in this dissertation is meaningful and substantial in its own right, but this study would have benefited from learners of more closely related feature assembly from the outset. While our learners were of the same general English proficiency level, they were found to be at different points in the reassembly process prior to intervention. How that issue might be avoided is to be determined, but similar task performance prior to instruction would allow for comparison between groups at each testing time.

Another limitation to mention would be the types of tasks included. While we successfully included both comprehension and production tasks, as well as implicit and explicit measures, it would have been beneficial to include a more balanced set of tasks. In the original proposal, and in the data we collected, we intended to have two implicit tasks—an elicited-sentence imitation task and a self-paced reading task—and two explicit tasks—an acceptability judgment task and a forced-choice elicitation task. This would have lent itself well to a split of two comprehension tasks and two production tasks. Unfortunately, though, due to the large amount of data produced by the self-paced reading task, we were unable to include it in the final analysis of the dissertation. In a future project, it would be favorable to include all of the data and be able to make more substantial claims about implicit versus explicit instruction or comprehension versus production improvement.

A further limitation, related to data analysis, is that this project is considerably large and provides a tremendous amount of data with which interpretation and discussion might not have been thorough enough. By taking a feature-based approach to the analysis, we have conducted a large amount of fine-grained analyses that may have masked some of the more notable and significant general findings. Similarly, by choosing to conduct the analysis by context in order to view how each noun type was treated within a given context, we did not have the time and space to conduct any analyses on how different articles are treated across the same noun type. We hope that further analysis of the data collected will provide even more insightful findings and discussions of the feature reassembly process in the instructional contexts that we have investigated.

As mentioned in the Discussion chapter, it also remains to be seen what the longer-term effects are of only one hour of instructional intervention. While we found improvement from T0 to T1 and from T0 to T2 in our analysis, conducting a six- or twelve-month-delayed post-test might reveal any retention effects of the instructional intervention administered. Further research would benefit from comparing the retention, and possible attrition, of feature reassembly following intervention at a much later point in time as well as whether or not the acquisition later shows up in spontaneous speech, thus corroborating the acquisition of implicit knowledge. Of course, conducting even more delayed post-tests is not always feasible in studies, and it was a clear limitation of the present study.

A final limitation, and quite possibly the most unfortunate, was the length of time for intervention. As mentioned in our Methodology chapter, we chose to administer the instructional intervention over a single one-hour period. This was to adhere true to our "teacher-self." Since I conducted this dissertation while maintaining my full-time English as a Second Language teaching position, I know as well as anyone the real amount of time that curriculum items receive in classes—especially when curricula are very lengthy and detailed. To that end, future research might benefit from considering an extension of the instructional intervention period or conducting a "review lesson," as is often done in courses before a quiz, test, or exam. With a longer instructional intervention, we may find a greater extent of feature reassembly and/or greater significance in the results overall.

9.4 | A Final Remark

We hope that this small slice of research in the vast fields of GenSLA and ISLA research will not go unnoticed. In an attempt to bridge GenSLA theoretical research and ISLA pedagogy, we hope that these findings will be accessible to researchers and instructors of all backgrounds. We want to clarify that GenSLA is not meant to be a pedagogy, but the results from GenSLA research should inform ISLA and current teaching pedagogy. One does not simply *teach* GenSLA in a foreign language classroom; rather, one's teaching (i.e., the theory behind one's teaching) should be well-informed by current research findings. In the end, let this project's success not be based purely on the significance of the results, but also on the new connections and knowledge that have been shared between these two fields through the research and design of a new pedagogy.

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Universitat Autònoma de Barcelona

IT'S DEFINITELY ATOMIC:

The Acquisition of Atomicity & Countability by Speakers of Mandarin in an Instructed Second Language Acquisition Context

Dakota J. Thomas-Wilhelm

Doctoral Dissertation
Volume II

Supervisor: Elisabet Pladevall Ballester

Doctorat de Filologia Anglesa
Departament de Filologia Anglesa i Germanística
Universitat Autònoma de Barcelona

2020

UAB

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2020

Table of Contents

VOLUME II

APPENDIX A: ETHICS DOCUMENTS **437**

A.1 | INSTITUTIONAL REVIEW BOARD APPROVAL MEMO 438
A.2 | COMISSÓ D'ÈTICA EN L'EXPERIMENTACIÓ ANIMAL I HUMANA APPROVAL 439
A.3 | LETTER OF INFORMED CONSENT 440
A.4 | PARTICIPANT RECRUITMENT EMAIL 442
A.5 | PARTICIPANT CONFIRMATION EMAIL 443

APPENDIX B: PRE-PARTICIPATION QUESTIONNAIRES **445**

B.1 | NON-NATIVE SPEAKER BIODATA & LANGUAGE USE QUESTIONNAIRE 446
B.2 | NATIVE SPEAKER BIODATA & LANGUAGE USE QUESTIONNAIRE 458
B.3 | OXFORD QUICK PLACEMENT TEST OF ENGLISH 461

APPENDIX C: LINGUISTICALLY-INFORMED INSTRUCTION MATERIALS **473**

C.1 | STUDENT PACKET & WORKSHEETS 474
C.2 | INSTRUCTOR POWERPOINT SLIDES 485

APPENDIX D: TRADITIONAL INSTRUCTION MATERIALS **493**

D.1 | STUDENT TEXTBOOK 494
D.2 | STUDENT WORKBOOK 498
D.3 | INSTRUCTOR POWERPOINT SLIDES 500

APPENDIX E: FEATURE SETTINGS FOR TASK STIMULI **505**

APPENDIX F: ELICITED-SENTENCE IMITATION TASK STIMULI **509**

F.1 | PRACTICE ITEMS 510
F.2 | PRE-TEST TOKENS 510
F.3 | IMMEDIATE POST-TEST TOKENS 513

F.4 | DELAYED POST-TEST TOKENS 516

APPENDIX G: ACCEPTABILITY JUDGMENT TASK STIMULI 521

G.1 | PRACTICE ITEMS 522
G.2 | PRE-TEST TOKENS 522
G.3 | IMMEDIATE POST-TEST TOKENS 525
G.4 | DELAYED POST-TEST TOKENS 528

APPENDIX H: FORCED-CHOICE ELICITATION TASK STIMULI 533

H.1 | PRACTICE ITEMS 534
H.2 | PRE-TEST TOKENS 534
H.3 | IMMEDIATE POST-TEST TOKENS 537
H.4 | DELAYED POST-TEST TOKENS 541

APPENDIX I: STATISTICAL MODELS FOR RESEARCH QUESTION 1 545

APPENDIX J: STATISTICAL MODELS FOR RESEARCH QUESTION 2 553

APPENDIX K: STATISTICAL MODELS FOR RESEARCH QUESTION 3 597

APPENDIX L: STATISTICAL MODELS FOR RESEARCH QUESTION 4 653

APPENDIX M: LIST OF PRESENTATIONS 669

M.1 | CONFERENCE PRESENTATIONS 670
M.2 | SEMINAR & ROUNDTABLE PRESENTATIONS 671

Appendix A: Ethics Documents

A.1 | Institutional Review Board Approval Memo

THE UNIVERSITY OF IOWA

Human Subjects Office/
Institutional Review Board (IRB)
105 Hardin Library for the Health Sciences
600 Newton Road
Iowa City, Iowa 52242-1098
319-335-6564 *Fax* 319-335-7310
irb@uiowa.edu
http://research.uiowa.edu/hso

IRB ID #:	201701718	
To:	Dakota Thomas-Wilhelm	
From:	IRB-02 Univ of Iowa,	DHHS Registration # IRB00000100, DHHS Federalwide Assurance # FWA00003007
Re:	The (Un)Countable Dilemma: Challenges in the acquisition of EFL articles and noun type distinctions by speakers of Chinese and Spanish	

Approval Date: 04/06/17

Next IRB Approval Due Before: 01/31/18

Type of Application:	**Type of Application Review:**	**Approved for Populations:**
☐ New Project	☐ Full Board:	☐ Children
☐ Continuing Review	Meeting Date:	☐ Prisoners
☒ Modification	☒ Expedited	☐ Pregnant Women, Fetuses, Neonates
	☐ Exempt	

Source of Support:

This approval has been electronically signed by IRB Chair:
Janet Karen Williams, PHD
04/06/17 1114

OFFICE OF THE VICE PRESIDENT FOR RESEARCH

A.2 | Comissó d'Ètica en l'Experimentació Animal i Humana Approval

UAB
Universitat Autònoma de Barcelona

Vicerectorat d'Investigació

Comissió d'Ètica en l'Experimentació Animal i Humana (CEEAH)
Universitat Autònoma de Barcelona
08193 Bellaterra (Cerdanyola del Vallès)

Bellaterra (Barcelona), February 28th, 2017

To whom it may concern:

The Ethics Committee on Animal and Human Research of the *Universitat Autònoma de Barcelona* confirms:

According to the policy of the Comissió d'Ètica en Experimentació Animal i Humana (CEEAH) of the Universitat Autònoma de Barcelona (UAB), the research project carried out at the UAB *The (Un)Countable Dilemma: Challenges in the acquisition of EFL articles and noun type distinctions by speakers of Chinese and Spanish* by Thomas Wilheim and under the supervision of Dr. Elisabeth Pladevall Ballester, do not require the approval of the CEEAH .

Yours faithfully,

In Bellaterra (Barcelona), February 28th 2017

Núria Pérez Pastor
Secretary, Ethical Committee UAB

Edifici A - Campus de la UAB – 08193 Bellaterra (Cerdanyola del Vallès) – Barcelona Spain
Tel.: 34 – 93 581 35 78 – Fax: 34 – 93 581 20 23
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A.3 | Letter of Informed Consent

FOR IRB USE ONLY
APPROVED BY: IRB-02
IRB ID #: 201701718
APPROVAL DATE: 02/23/18
EXPIRATION DATE: 12/28/18

We invite you to participate in a research study. The purpose of this research study is to understand the acquisition of English as a Foreign Language by speakers of two different language backgrounds with the assistance of classroom materials based on the native language of the learner.

We are inviting you to participate in this research study because you are a native speaker of Spanish or Chinese and are learning English as a Foreign Language and taking English Language courses in the state of Iowa. We obtained your name and address from the director of your English as a Second Language (ESL) courses. Approximately 200 people will take part in this study at the University of Iowa.

If you agree to participate, we would like you to participate in three sessions, each session lasting about one hour. Prior to the first session, you will be asked to complete two online surveys: one will ask about your ethnic background and language use and the other will assess your current English ability. These pre-participation questionnaires should last no longer than 45 minutes total. When you finish the pre-participation questionnaires, you will be asked to contact me with an email to confirm your participation for the three sessions.

During the first session, you will be asked to complete four tasks. The first one will have you listen to sentences and then repeat the sentences in the form of audio recordingthem after a short delay. The second task will ask you to read sentences and answer questions. The third task will ask you to give judgements on the acceptability of sentences. The fourth task will ask you to fill in the blank by choosing a word from a dropdown list. This will take place in an on-campus computer lab.

The second session will take place one week later and will be a workshop very similar to a regular English grammar class. The workshop will take place in an on-campus classroom and will last about one hour. During the workshop, you will be asked to participate in simulation grammar classroom. There will be a short lecture on some specific grammar points followed by various class activities. The activities will incorporate materials that are specifically designed based on your language background. The grammar workshop will be audio and video recorded. After the grammar workshop, you will be asked to go to a computer lab to complete the second data collection. This data collection should last about one hour. The second session will last approximately two hours in total.

The final session will take place threethree weeks after the secondsecond session. You will be asked to complete the same tasks that you completed during the first and second sessions. This will take place in an on-campus computer lab.

You are free to leave the experiment at any time and you are free to not answer any questions that you would prefer not to answer at any point.

We will keep the information you provide confidential, however federal regulatory agencies and the University of Iowa Institutional Review Board (a committee that reviews and approves research studies) may inspect and copy records pertaining to this research. At the

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APPROVED BY: IRB-02
IRB ID #: 201701718
APPROVAL DATE: 02/23/18
EXPIRATION DATE: 12/28/18

beginning of the study, you will be asked to create a "Participant Code", which you will use to access all the experimental tasks and we will use to identify your data. Once the study is over, the participant code will be replaced with a pseudonym and we will destroy the links between the pseudonym, your participant code, and your name. All records will be maintained in locked offices or in password protected files on a secure computer system. If we write a report about this study, we will do so in such a way that you cannot be identified.

You may become tired or feel uncomfortable during the sessions. You are free to take breaks during the sessions.

You will not benefit personally from being in this study. However, we hope that others may benefit in the future from what we learn because of this study.

You will not have any costs for being in this research study.

Additionally, you will not be paid for being in this research study.

Taking part in this research study is completely voluntary. If you decide not to be in this study, or if you stop participating at any time, you won't be penalized or lose any benefits for which you otherwise qualify.

If you have any questions about the research study itself, please contact Dakota Thomas-Wilhelm by email at dakota-thomas@uiowa.edu or by phone at (319)669-9063. If you experience a research-related injury, please contact: Dakota Thomas-Wilhelm at (319)669-9063. If you have questions about the rights of research subjects, please contact the Human Subjects Office, 105 Hardin Library for the Health Sciences, 600 Newton Rd, The University of Iowa, Iowa City, IA 52242-1098, (319) 335-6564, or e-mail irb@uiowa.edu. To offer input about your experiences as a research subject or to speak to someone other than the research staff, call the Human Subjects Office at the number above.

Thank you very much for your consideration. If you would like to participate, visit https://sites.google.com/site/thomaswilhelmresearchstudy/experimental-study/participation-questionnaires/NNS and follow the links to complete the pre-participation questionnaires. By completing the pre-participation questionnaires, you will indicate your willingness to participate in this study.

Sincerely,

Dakota Thomas-Wilhelm, MA
Lecturer, University of Iowa Department of ESL Programs
dakota-thomas@uiowa.edu
(319)669-9063

A.4 | Participant Recruitment Email

FOR IRB USE ONLY
APPROVED BY: IRB-02
IRB ID #: 201701718
APPROVAL DATE: 12/28/17
EXPIRATION DATE: 12/28/18

SUBJECT LINE: An invitation to participate in a language acquisition study

Hello,

My name is Dakota Thomas-Wilhelm, and I am conducting a research project on the acquisition of English as a Foreign Language (EFL) at the University of Iowa. You are receiving this email because you are an international student who speaks Chinese or Spanish as their native language and are currently attending EFL courses. Your email address was obtained from the director of your English as a Second Language (ESL) courses.

In an effort to improve learning English as a second language, I am looking for people who may be interested completing a short experimental study. The study consists of three sessions. Prior to the first session, participants will be asked to complete a short survey on their language use and background information**.** The first data collection session will be comprised of four experimental tasks. The first session will last about one hour. The second session is a workshop, very similar to that of your English grammar class, and a second data collection. The second session will last two hours in total. There is a final session that includes a final round of data collection. There is no monetary benefit for your participation and all participation is completely voluntary.

What will I be doing in the study?
You will be asked to do four tasks in English using a computer. You will also be asked questions about your experience and language background.

How long is a session?
Approximately one hour. There will be a total of three sessions.

Interested in participating?
Please read the attached consent letter. The consent letter contains important consent information and information on how to join the study.

If you have any questions, please contact me at dakota-thomas@uiowa.edu or call (319)669-9063.

Thank you for interest,

Dakota Thomas-Wilhelm, MA
Lecturer, English as a Second Language Programs
University of Iowa

A.5 | Participant Confirmation Email

FOR IRB USE ONLY
APPROVED BY: IRB-02
IRB ID #: 201701718
APPROVAL DATE: 12/28/17
EXPIRATION DATE: 12/28/18

SUBJECT LINE: Confirmation: Your participation in our language acquisition study

Dear [PARTICIPANT NAME]:

Thank you for agreeing to participate in our English as a Foreign Language acquisition study with the University of Iowa. As I mentioned, you will participate in various data collection tasks and a workshop that resembles an English grammar class. You will not need to prepare anything before our session.

You are scheduled to participate as follows:

DATE: [DAY, DATE]
TIME: [TIME]
PLACE: [ADDRESS, LINK TO MAP]

A few key reminders:

- You will be not be given any monetary compensation for your participation.
- Participation is completely voluntary and you may end your participation at any time.
- You will create a "Participant Code", which will be used to log-in for all of your tasks. Your name will not be used for any purpose beyond this session.

Also, we have only one room scheduled at a time for these sessions so if you find that you cannot participate on your scheduled day, please contact me as soon as possible so I can reschedule your session.

Thanks again!

Dakota Thomas-Wilhelm, MA
Lecturer, English as a Second Language Programs
University of Iowa

Appendix B: Pre-Participation Questionnaires

B.1 | Non-Native Speaker Biodata & Language Use Questionnaire

Personal Information:

First Name ____

Last Name ____

Date of Birth (MM/DD/YYYY) ____

Email Address ____

With this questionnaire, we would like to get an impression of the personal background and language use of Chinese students studying in the United States. This questionnaire is part of the data collection process for the study. The questionnaire has four parts. It is important to note that not all items may apply to you personally. Should you think that a certain item does not apply to you (for example, when you are asked about the language use of your children and you don't have any children), you may skip that particular question and more on to the next. It is important that you answer these questions on your own because we are interested in your language use. If you do not understand a certain question, please do not hesitate to ask the Principal Investigator. Dakota Thomas-Wilhelm can be contacted at dakota-thomas@uiowa.edu. There are no right or wrong answers!

I agree to answer the following questions honestly and to the best of my ability.

☐ I agree.

☐ I agree.

☐ I do not agree.

In order to preserve anonymity and privacy, each participant will be assigned a participant code. Only the researchers will use this code to track all of the information from each of the individual tasks. The participant code consists of the first two letters of your first name and the first two letters of your last name. When preparing for publications, all participant codes will be converted into a four-digit number. All published results will only refer to participants with these numbers and no identifying information will be released.

Please type your participant code in the following space. Remember, the participant code consists of the first two letters of your first name, the first two letters of your last name, and the number of the day you were born.

For example: **Name:** John Smith (August 31, 1980) **Participant code:** JoSm31

____

Language Background:

What gender do you identify as?

- ☐ Male
- ☐ Female
- ☐ Other: ____________________________________
- ☐ I prefer not to answer

Where were you born?

Village/Town: ____

County: ____

Country: ____

What nationality do you have?

- ☐ American
- ☐ Chinese
- ☐ Other: ____________________________________

Would you say that you speak a variety or dialect of Chinese?

- ☐ Standard Chinese
- ☐ A variety or dialect

What is the name of the dialect or variety of Chinese that you speak?

____

What is the highest level of education you have completed?

- ☐ Secondary School
- ☐ Higher Education
- ☐ B.A.
- ☐ M.A.
- ☐ Ph.D.

What level of secondary school have you completed?

- ☐ Grade 9
- ☐ Grade 10
- ☐ Grade 11
- ☐ Grade 12

What level of higher education have you completed?

- ☐ Freshman
- ☐ Sophomore
- ☐ Junior
- ☐ Senior

When did you move to the United States?

- ☐ Month: ______________________________
- ☐ Year: ______________________________

Apart from the United States, have you ever lived in a non-Chinese-speaking country other for a longer period of time (that is, more than 6 months)?

- ☐ No
- ☐ Yes, less than 1 year
- ☐ Yes, 1 year or more

Where?

- ☐ Village/Town/City ______________________________
- ☐ Country ______________________________

How long? (# years, # months)

____

What language(s) did you acquire before starting school? (Indicate all that apply.)

☐ Chinese

☐ English

☐ Other: __________________________

Did you attend any English classes before coming to the United States? (This has to be in an educational environment, like a language school, primary/secondary school, etc.):

☐ No

☐ Yes, less than 3 months

☐ Yes, less than 6 months

☐ Yes, less than 1 year

☐ Yes, more than 1 year

When did you start learning English in a formal setting (e.g. taking English classes, receiving English language instruction, etc.)?

____

How many years have you been learning English?

____

Have you learned English in any kind of immersion context? (e.g. immersion school where all classes are taught in English, studied abroad in an English-speaking country, stayed with an English-speaking family, etc.)

☐ Yes

☐ No

If so, please answer the following:

☐ Context (e.g. immersion school, study abroad, etc.) __________________________

☐ Year ____

☐ Length of time ____

What language or languages did you learn professionally or at school?

____

What language or languages did you learn outside of an educational environment (so outside of school or work)?

____

Are any of your direct family members (e.g. mother, father, grandmother, grandfather, aunts, uncles, etc.) native speakers of English?

- ☐ Yes
- ☐ No

If so, who and how often do you speak English with him/her? (Relation; frequency of contact in English)

____

Have you ever taken an English language proficiency exam? (E.g. TOEFL, Cambridge, etc.)?

- ☐ Yes
- ☐ No

If so, what test and what was your score?

- ☐ English Language Proficiency Exam: ________________________________
- ☐ Score: ________

Self-Rated Language Proficiency:

In general, how would you rate your English language proficiency before you moved to the United States?

- ☐ None
- ☐ Very Bad
- ☐ Bad
- ☐ Sufficient
- ☐ Good
- ☐ Very Good

In general, how would you rate your English language proficiency at the present time?

- ☐ None
- ☐ Very Bad
- ☐ Bad
- ☐ Sufficient
- ☐ Good
- ☐ Very Good

In general, how would you rate your Chinese language proficiency before you moved to the United States?

- ☐ None
- ☐ Very Bad
- ☐ Bad
- ☐ Sufficient
- ☐ Good
- ☐ Very Good

In general, how would you rate your Chinese language proficiency at the present time?

- ☐ None
- ☐ Very Bad
- ☐ Bad
- ☐ Sufficient
- ☐ Good
- ☐ Very Good

Do you consider it important to maintain your Chinese?

- ☐ Unimportant
- ☐ Relatively unimportant
- ☐ Not very important
- ☐ Important
- ☐ Very important

In general, do you have more Chinese- or English-speaking friends in the United States?

- ☐ Only English-speaking friends
- ☐ Both, but more English-speaking friends
- ☐ As many Chinese- as English-speaking friends
- ☐ Both, but more Chinese-speaking friends
- ☐ Only Chinese-speaking friends

Do you feel more at home with Chinese or with American culture?

- ☐ American culture
- ☐ Both, but more with American culture
- ☐ Both cultures, equally
- ☐ Both, but more with Chinese culture
- ☐ Chinese culture

Do you feel more comfortable speaking Chinese or English?

- ☐ English
- ☐ Chinese
- ☐ No preference

Could you elaborate on your answer: why do you feel more comfortable speaking either Chinese or English or why don't you have any preference?

____

____

____

____

Friends/Family/Travel Background:

Have you ever been back to your home country since leaving for the United States?

- ☐ Never
- ☐ Seldom
- ☐ Regularly, 1-2 times a year
- ☐ Regularly, 3-5 times a year
- ☐ Regularly, more than 5 times a year

Could you please indicate what the reason or reasons for such a visit were (you may check more than one box here)?

- ☐ Urgent family matters (such as a wedding or funeral)
- ☐ Visit without a particular reason
- ☐ Another reason

Are you in frequent contact with relatives and friends from your home country?

- ☐ Very rarely
- ☐ Rarely
- ☐ Sometimes
- ☐ Frequently
- ☐ All the time

How do you keep in touch with those relatives and friends in your home country? (Select all that apply.)

- ☐ Telephone
- ☐ Letters
- ☐ E-mail
- ☐ Social Media (e.g. Facebook, Twitter, Instagram, etc.)
- ☐ Skype, FaceTime, or any other internet- and/or video-chat software
- ☐ Another way

In what other way(s)?

____

What language or languages do you mostly use to keep in touch with relatives and friends in your home country?

- ☐ Only English
- ☐ Both English and Chinese, but mostly English
- ☐ Both English and Chinese, without preference
- ☐ Both English and Chinese, but mostly Chinese
- ☐ Only Chinese
- ☐ Other or no answer

Do you think Chinese plays an important role in the relationship between you and your direct family members?

- ☐ Not at all
- ☐ Not much
- ☐ Probably
- ☐ A bit
- ☐ Very much
- ☐ No answer

Have you made many new friends in the United States?

- ☐ Yes
- ☐ No

What is the native language of the majority of these people?

- ☐ English
- ☐ Chinese
- ☐ Equal
- ☐ Another language: ______________________________

How did you meet most of these people?

- ☐ Through mutual friends
- ☐ Through work or school
- ☐ Through a Chinese club or organization
- ☐ Through another way

In what other way?

____

Language Use:

Could you, in the following tables, please indicate to what extent you use your native language (Table 1) and English (Table 2) in the contexts provided? Slide the bar to indicate the "percentage of time" you spend using that language in that context. If a certain context is not applicable to you (for example, if you don't have any pets), you may leave the box empty.

I speak Chinese...

with relatives	
with friends	
to pets	
at work	
in school	
in stores/restaurants	
at clubs or organizations	

I speak English...

with relatives	
with friends	
to pets	
at work	
in school	
in stores/restaurants	
at clubs or organizations	

Have you ever been a member of a Chinese club or organization in the United States?

- ☐ Yes
- ☐ No

Please name the club or organization:

____

Are you now a member of a Chinese club or organization in the United States?

☐ Yes

☐ No

Do you ever listen to Chinese music?

☐ Yes

☐ No

Do you ever watch Chinese television programs?

☐ Yes

☐ No

Do you ever listen to Chinese radio programs?

☐ Yes

☐ No

Do you ever read Chinese newspapers, books, or magazines?

☐ Yes

☐ No

If you have indicated that you never listen to music or radio programs, nor read newspapers, books, or magazines and that you do not watch television programs in your native language, could you indicate why you think that is?

____

____

____

____

Do you think your Chinese language proficiency has changed since you moved to the United States?

☐ Yes, I think it has become worse.

☐ No.

☐ Yes, I think it has become better.

Do you think you use more or less Chinese since you moved to the United States?

- ☐ Yes, I think I use less Chinese.
- ☐ No, I don't think I use more or less Chinese now.
- ☐ Yes, I think I use more Chinese.

Do you see yourself as bilingual? In other words, do you think you are as proficient in Chinese as in English?

- ☐ No.
- ☐ Yes, but I'm more proficient in English.
- ☐ Yes, and I consider myself to be equally proficient in both languages.
- ☐ Yes, but I'm more proficient in Chinese.
- ☐ I do not know.

Conclusion:

Thank you for taking the time to complete this questionnaire. We will contact you with a scheduled time for participation in the study. If you have any comments on the survey or the project, please contact Dakota Thomas-Wilhelm at dakota-thomas@uiowa.edu.

Many thanks,

Dakota J. Thomas-Wilhelm

B.2 | Native Speaker Biodata & Language Use Questionnaire

Personal Information:

First Name ____

Last Name ____

Date of Birth (MM/DD/YYYY) ____

Email Address ____

With this questionnaire, we would like to get an impression of the personal background and language use of native speaking English students studying at the University of Iowa. This questionnaire is part of the data collection process for the study. The short questionnaire only has about 10 questions. It is important to note that not all items may apply to you personally. Should you think that a certain item does not apply to you (for example, when you are asked about the language use of your children and you don't have any children), you may skip that particular question and more on to the next. It is important that you answer these questions on your own because we are interested in your language use. If you do not understand a certain question, please do not hesitate to ask the Principal Investigator. Dakota Thomas-Wilhelm can be contacted at dakota-thomas@uiowa.edu. There are no right or wrong answers!

I agree to answer the following questions honestly and to the best of my ability.

☐ I agree.

☐ I agree.

☐ I do not agree.

In order to preserve anonymity and privacy, each participant will be assigned a participant code. Only the researchers will use this code to track all of the information from each of the individual tasks. The participant code consists of the first two letters of your first name and the first two letters of your last name. When preparing for publications, all participant codes will be converted into a four-digit number. All published results will only refer to participants with these numbers and no identifying information will be released.

Please type your participant code in the following space. Remember, the participant code consists of the first two letters of your first name, the first two letters of your last name, and the number of the day you were born.

For example: **Name:** John Smith (August 31, 1980) **Participant code:** JoSm31

____

Language Background:

What gender do you identify as?

- ☐ Male
- ☐ Female
- ☐ Other: ______________________________
- ☐ I prefer not to answer

Where were you born?

Village/Town: ____

County: ____

Country: ____

What nationality do you have?

- ☐ American
- ☐ Chinese
- ☐ Other

What is your native language?

- ☐ English
- ☐ Chinese
- ☐ Other: ______________________________________

What is the highest level of education you have completed?

- ☐ Secondary School
- ☐ Higher Education
- ☐ B.A.
- ☐ M.A.
- ☐ Ph.D.

What language or languages did you learn professionally or at school?

____
____
____
____

What language or languages did you learn outside of an educational environment (So outside of school or work)?

____
____
____
____

Are any of your direct family members (e.g., mother, father, grandmother, grandfather, aunts, uncles, etc.) non-native speakers of English?

- ☐ Yes
- ☐ No

If yes, who?

____

Conclusion:

Thank you for taking the time to complete this questionnaire. We will contact you with a scheduled time for participation in the study. If you have any comments on the survey or the project, please contact Dakota Thomas-Wilhelm at dakota-thomas@uiowa.edu.

Many thanks,

Dakota J. Thomas-Wilhelm

B.3 | Oxford Quick Placement Test of English

Personal Information

First Name ____

Last Name ____

With this questionnaire, we would like to get a general sense of your English language ability. There are 60 questions, please select the best response to each question. Please carefully read all of the instructions. If any question appears too difficult, feel free to skip it and move onto the next one. The questions get more difficult as you move through the exam. Adapted from: "Oxford Quick Placement Test" written by Oxford University Press

Participant Code

In order to preserve anonymity and privacy, each participant will be assigned a participant code. Only the researchers will use this code to track all of the information from each of the individual tasks. The participant code consists of the first two letters of your first name and the first two letters of your last name. When preparing for publications, all participant codes will be converted into a four-digit number. All published results will only refer to participants with these numbers and no identifying information will be released.

Please type your participant code in the following space. Remember, the participant code consists of the first two letters of your first name, the first two letters of your last name, and the number of the day you were born.

For example: **Name:** John Smith (August 31, 1980) **Participant code:** JoSm31

____

QUESTIONS 1-5

Where can you see this notices? For questions 1 to 5, choose the best answer.

1. **Please leave your room key at Reception**

- ☐ in a shop
- ☐ in a hotel
- ☐ in a taxi

2. **Foreign money changed here**

- ☐ in a library
- ☐ in a bank
- ☐ in a police station

3. **AFTERNOON SHOW BEGINS AT 2PM**

- ☐ outside a theater
- ☐ outside a supermarket
- ☐ outside a restaurant

4. CLOSED FOR HOLIDAYS

Lessons start again on the 8th January

- ☐ at a travel agent's office
- ☐ at a music school
- ☐ at a restaurant

5. Price per night:

£10 a tent
£5 a person

- ☐ at a cinema
- ☐ in a hotel
- ☐ at a camp-site

QUESTIONS 6-10

In this section, you must choose the word which best fits each space in the text below. For questions 6 to 10, mark one answer for each blank.

THE STARS

There are millions of stars in the sky. If you look (6)__________ the sky on a clear night, it is possible to see about 3000 stars. They look small, but they are really (7)__________ big hot balls of burning gas. Some of them are huge, but others are much smaller, like our planet Earth. The biggest stars are very bright, but they only live for a short time. Every day, new stars (8)__________ born and old stars die. All the stars are very far away. the light from the nearest star takes more (9)__________ four years to reach Earth. Hundreds of years ago, people (10)__________ stars, lie the North Star, to know which direction to travel in. Today you can still see that star.

6. __________

- ☐ at
- ☐ up
- ☐ on

7. __________

- ☐ very
- ☐ too
- ☐ much

8. __________

- ☐ is
- ☐ be
- ☐ are

9. __________

- ☐ that
- ☐ of
- ☐ than

10. __________

- ☐ use
- ☐ used
- ☐ using

Questions 11-15

In this section, you must choose the word which best fits each space in the text below. For questions 11 to 15, mark one answer for each blank.

GOOD SMILES AHEAD FOR YOUNG TEETH

Older Britons are the worst in Europe when it comes to keeping their teeth. But British youngsters (11)__________ more to smile about because (12)__________ teeth are among the best. Almost 80% of Britons over 65 have lost all or some (13)__________ their teeth according to a World Health Organization survey. Eating too (14)__________ sugar is part of the problem. Among (15)__________ , 12-year-olds have on average only three missing, decayed, or filled teeth.

11. __________

- ☐ getting
- ☐ got
- ☐ have
- ☐ having

12. __________

- ☐ their
- ☐ his
- ☐ them
- ☐ theirs

13. __________

- ☐ from
- ☐ of
- ☐ among
- ☐ between

14. __________

- ☐ much
- ☐ a lot
- ☐ many
- ☐ deal

15. __________

- ☐ person
- ☐ people
- ☐ children
- ☐ family

QUESTIONS 16-20

In this section, you must choose the word which best fits each space in the text below. For questions 16 to 20, mark one answer for each blank.

CHRISTOPHER COLUMBUS AND THE NEW WORLD

On August 3, 1492, Christopher Columbus set sail from Spain to find a new route to India, China, and Japan. At this time most people thought you would fall off the edge of the world if you sailed too far. Yet sailors such as Columbus had seen how a ship appeared to get lower and lower on the horizon as it sailed away. For Columbus, this (16)__________ that the world was round. He (17)__________ to his men about the distance traveled each day. He did not want them to think that he did not (18)__________ exactly where they were going. (19)__________ , on October 12, 1492, Columbus and his men landed on a small island he named San Salvador. Columbus believed he was in Asia, (20)__________ he was actually in the Caribbean.

16. __________

- ☐ made
- ☐ pointed
- ☐ was
- ☐ proved

17. __________

- ☐ lied
- ☐ told
- ☐ cheated
- ☐ asked

18. __________

- ☐ find
- ☐ know
- ☐ think
- ☐ expect

19. __________

- ☐ Next
- ☐ Secondly
- ☐ Finally
- ☐ Once

20. __________

- ☐ as
- ☐ but
- ☐ because
- ☐ if

QUESTIONS 21-40

In this section, you must choose the word or phrase which best completes each sentence For questions 21 to 40, mark one answer for each blank.

21. The children won't go to sleep __________ we leave a light on outside their bedroom.

- ☐ except
- ☐ otherwise
- ☐ unless
- ☐ but

22. I'll give you my spare keys in case you __________ home before me.

- ☐ would get
- ☐ got
- ☐ will get
- ☐ get

23. My holiday in Paris gave me a great __________ to improve my French accent.

- ☐ occasion
- ☐ chance
- ☐ hope
- ☐ possibility

24. The singer ended the concert __________ her most popular song.

- ☐ by
- ☐ with
- ☐ in
- ☐ as

25. Because it had not rained for several months, there was a __________ of water.

- ☐ shortage
- ☐ drop
- ☐ scarce
- ☐ waste

26. I've always __________ you as my best friend.

- ☐ regarded
- ☐ thought
- ☐ meant
- ☐ supposed

27. She came to live here __________ a month ago.

- ☐ quite
- ☐ beyond

- [ ] already
- [ ] almost
- [ ] hardly
- [ ] not
- [ ] nearly

28. Don't make such a __________! The dentist is only going to look at your teeth.

- [ ] fuss
- [ ] trouble
- [ ] worry
- [ ] reaction

29. He spent a long time looking for a tie which __________ with his new shirt.

- [ ] fixed
- [ ] made
- [ ] went
- [ ] wore

30. Fortunately, __________ from a bump on the head, she suffered no serious injuries from her fall.

- [ ] other
- [ ] except
- [ ] besides
- [ ] apart

31. She had changed so much that __________ anyone recognized her.

- [ ] almost

32. __________ teaching English, she also writes children's books.

- [ ] Moreover
- [ ] As well as
- [ ] In addition
- [ ] Apart

33. It was clear that the young couple were __________ of taking charge of the restaurant.

- [ ] responsible
- [ ] reliable
- [ ] capable
- [ ] able

34. The book __________ of ten chapters, each one covering a different topic.

- [ ] comprises
- [ ] includes
- [ ] consists
- [ ] contains

35. Mary was disappointed with her new shirt as the color __________ very quickly.

- [ ] bleached

- [ ] died
- [ ] vanished
- [ ] faded

36. National leaders from all over the world are expected to attend the ___________ meeting.

- [ ] peak
- [ ] summit
- [ ] top
- [ ] apex

37. Jane remained calm when she won the lottery and ___________ about her business as if nothing had happened.

- [ ] came
- [ ] brought
- [ ] went
- [ ] moved

38. I suggest we ___________ outside the stadium tomorrow at 8:30.

- [ ] meeting
- [ ] meet
- [ ] met
- [ ] will meet

39. My remarks were ___________ as a joke, but she was offended by them.

- [ ] pretended
- [ ] thought
- [ ] meant
- [ ] supposed

40. You ought to take up swimming from the ___________ of your health.

- [ ] concern
- [ ] relief
- [ ] sake
- [ ] cause

Questions 41-45

In this section, you must choose the word or phrase which best fits each space in the text below. For questions 41 to 45, mark one answer for each blank.

CLOCKS

The clock was the first complex mechanical machinery to enter the home, (41)___________ it was too expensive for the (42)___________ person until the 19th century, when (43)___________ production techniques lowered the price. Watches were also developed, but they (44)___________ luxury items until 1868, when the first cheap pocket watch was designed in Switzerland. Watches later became (45)___________ available, and Switzerland became the world's leading watch manufacturing center for the next 100 years.

41. __________

- ☐ despite
- ☐ although
- ☐ otherwise
- ☐ average

42. __________

- ☐ average
- ☐ medium
- ☐ general
- ☐ common

43. __________

- ☐ vast
- ☐ large
- ☐ wide
- ☐ mass

44. __________

- ☐ lasted
- ☐ endured
- ☐ kept
- ☐ remained

45. __________

- ☐ mostly
- ☐ chiefly
- ☐ greatly
- ☐ widely

QUESTIONS 46-50

In this section, you must choose the word or phrase which best fits each space in the text below. For questions 46 to 50, mark one answer for each blank.

DUBLIN CITY WALKS

What better way of getting to know a new city than by walking around it? Whether you choose the Medieval Walk, which will (46)__________ you to the Dublin of 1000 years ago, find out the more (47)__________ history of the city on the eighteenth Century Walk, or meet the ghosts of Dublin's many writers on the Literary Walk, we know you will enjoy the experience. Dublin City Walks (48)__________ twice daily. Meet your guide at 10:30 a.m. or 2:30 p.m. at the Tourist Information Office. No advance (49)__________ is necessary. Special (50)__________ are available for families, children, and parties of more than ten people.

46. __________

- ☐ introduce
- ☐ present
- ☐ move
- ☐ show

47. ___________

- ☐ near
- ☐ late
- ☐ recent
- ☐ close

48. ___________

- ☐ take place
- ☐ occur
- ☐ work
- ☐ function

49. ___________

- ☐ playing
- ☐ reserving
- ☐ warning
- ☐ booking

50. ___________

- ☐ funds
- ☐ costs
- ☐ fees
- ☐ rates

QUESTIONS 51-60

In this section, you must choose the word or phrase which best completes each sentence For questions 51 to 60, mark one answer for each blank.

51. If you're not too tired, we could have a __________ of tennis after lunch.

- [ ] match
- [ ] play
- [ ] game
- [ ] party

52. Don't you get tired __________ watching TV every night?

- [ ] with
- [ ] by
- [ ] of
- [ ] at

53. Go on, finish the dessert. It needs __________ up because it won't stay fresh until tomorrow.

- [ ] eat
- [ ] eating
- [ ] to eat
- [ ] eaten

54. We're not used to __________ invited to very formal occasions

- [ ] be
- [ ] have
- [ ] being
- [ ] having

55. I'd rather we __________ meet this evening because I'm very tired.

- [ ] wouldn't
- [ ] shouldn't
- [ ] hadn't
- [ ] didn't

56. She obviously didn't want to discuss the matter so I didn't __________ the point.

- [ ] maintain
- [ ] chase
- [ ] follow
- [ ] pursue

57. Anyone __________ after the start of the play is not allowed in until the interval.

- [ ] arrives
- [ ] has arrived
- [ ] arriving
- [ ] arrived

58. This new magazine is __________ with interesting stories and useful information.

- [ ] full
- [ ] packed
- [ ] thick
- [ ] compiled

59. The restaurant was far too noisy to be __________ to relaxed conversation.

- [ ] conducive
- [ ] suitable
- [ ] practical
- [ ] fruitful

60. In this branch of medicine, it is vital to __________ open to new ideas.

- [ ] stand
- [ ] continue
- [ ] hold
- [ ] remain

THE END

Thank you for completing the Oxford Quick English Proficiency Test. Your score is _____ out of 60. You can find your approximate level in the table below:

Approximate Level	Score	CEFR
Beginner	0-17	A1
Elementary	18-29	A2
Low-Intermediate	30-39	B1
Intermediate	40-47	B2
High-Intermediate	48-54	C1
Advanced	54069	C2

Appendix C: Linguistically-Informed Instruction Materials

C.1 | Student Packet & Worksheets

English Grammar for Speakers of Chinese: Articles & Noun Type Distinctions

1 | Linguistic Definitions

1.1 | Articles

Articles: a word that introduces or identifies a noun and helps language users distinguish between general and specific statements and shared knowledge

If an article is…

[+definite]: *both* the speaker *and* the listener can identify the noun and answer the question 'Which one?'

In English, there is one article that is **[+definite]**: *the*

Definite Article: refers to an entity that *is identifiable* in a given context

[–definite]: *only* the speaker, *not* the listener, can identify the noun

In English, there are two articles that are **[–definite]**: *a*, *Ø* (zero)

Indefinite Article: refers to an entity that *is not identifiable* in a given context

Zero Article: refers to noun phrases that contain no article and refer to *a general class of things* or *a substance*

1.2 | Noun Types

Nouns: a word that refers to a person place, thing, or idea

[±count]: the feature of a noun that determines whether or not it can have a plural form

[±atomic]: the feature of a noun that determines if it is made up of individuals

If a noun is…

[+count, +atomic]:

In English, there is one type of nouns that is **[+count, +atomic]**:

Countable Nouns: it has separate singular and plural forms, and the plural form takes a morphological –s; these nouns can be counted individually (e.g., dog, dogs)

[–count, ±atomic]:

In English, there are two types of nouns that are **[–count]**:

Uncountable-Substance Nouns [–atomic]: it refers to a substance that cannot be individuated or counted (e.g., toothpaste)

Uncountable-Object Nouns [+atomic]: it refers to a set of objects that can be individuated into countable items (e.g., furniture)

[+flexible]: a semantically ambiguous noun that alternates between being **[–count, –atomic]** and **[+count, +atomic]** depending on the structure of the sentence and the speaker's target meaning

Some explanations adapted from:

Lopez, E. (in press). Teaching the English article system: Definiteness and specificity in linguistically-informed instruction. *Language Teaching Research.*

1.3 | What do you know?

Directions: Read each sentence and the statements that follow it. Check (√) the correct statement.

1.3.1 | Noun Type Distinctions

1. I read a report about crime. It was very disturbing
   a. _____ The first noun is **[+count]** and the second is **[–count]**.
   b. _____ The first noun is **[–count]** and the second is **[+count]**.
2. We give advice to foreigners who want to invest.
   a. _____ The first noun is **[+count]** and the second noun is **[–count]**.
   b. _____ The first noun is **[–count]** and the second noun is **[+count]**.
3. Let's install a light in the closet.
   a. _____ This refers to light in general.
   b. _____ Both the speaker and listener know what light will be installed.
4. She wanted cake, so she went to the store and bought a cake.
   a. _____ The first noun is **[–count, –atomic]** and the second is **[+count, +atomic]**.
   b. _____ The first noun is **[+count, +atomic]** and the second is **[–count, –atomic]**.
5. Diane went to the store to by fabric for the furniture.
   a. _____ The first noun is **[–count, –atomic]** and the second is **[–count, +atomic]**.
   b. _____ The first noun is **[–count, +atomic]** and the second is **[–count, –atomic]**.

1.3.2 | Articles

1. A *manifesto* is a public statement of ideas.
   a. _____ This sentence describes what a manifesto is.
   b. _____ This sentence identifies a specific manifesto.
2. I'm looking for a new cell phone, but I don't know what kind to buy.
   a. _____ The underlined noun phrase is **[+definite]**.
   b. _____ The underlined noun phrase is **[–definite]**.
3. I looked at the apartment yesterday.
   a. _____ Both the speaker and the listener know what apartment was looked at yesterday.
   b. _____ Only the speaker knows what apartment was looked at yesterday.
4. Do you have furniture that we can put in the living room?
   a. _____ The underlined noun phrase is **[+definite]**.
   b. _____ The underlined noun phrase is **[–definite]**.
5. If you go out tonight, don't forget to lock the door.
   a. _____ The underlined noun phrase is **[+definite]**.
   b. _____ The underlined noun phrase is **[–definite]**.

Parts of this activity adapted from:

Bland, S., Savage, A., & Mayer, P. (2012). *Grammar Sense 4: Advanced Grammar & Writing* (1st ed.). New York: Oxford University Press.

2 | Chinese vs. English: A Crosslinguistic Comparison

To put it simply, Chinese does not have articles. While there are ways, numerous ways, to identify generic, definite, and indefinite reference in Chinese, there is no clear or easy way to compare these ways to the English article system.

2.1 | Articles

In a language that does not have definite or indefinite articles, the reference of unmarked nouns is influenced by many factors: context, sentence type, the position of the noun in relation to the verb in the sentence, and the nature of the verb itself.

	English Description	Chinese Description
Definite Article	• with singular (countable, uncountable, or flexible) or plural nouns (countable or flexible) • when you know or assume that your listener is familiar with and thinking about the same specific thing or person you are talking about • when the noun is unique • when the noun was introduced earlier • can often answer the question "Which one(s)?"	• no equivalent in Chinese • other determiners *zhèi* 'this' and *nèi* 'that' mark definiteness • if the noun appears in topic position (pre-verbal), there is not article used • generic or known reference can be achieved with the use of no article
Indefinite Article	• with singular countable or flexible nouns • when the noun is no specifically identified • when the noun is first mentioned and new to someone in the conversation • can be used to classify a noun—used to say "what kind of thing" the noun is	• no equivalent in Chinese • use of the word *yī* 'one'
Zero Article	• when the speaker does not know the specific noun you are talking about • with plural countable nouns and all uncountable nouns • to classify a noun—used to say "what kind of thing" the noun is	• nouns in topic position are unmarked • generic or known reference can be achieved with the use of no article

2.2 | Noun Types

In Chinese, the main category of nouns is called "common nouns". This category includes nouns that, in English, would otherwise be classified as countable or uncountable.

In Chinese, common nouns are those which are preferable to classes of tangible (and sometimes discrete) entities, categories, events, and phenomena in the natural or human world. Discreteness in Chinese does not necessarily imply separateness.

Unmarked common nouns are generally assumed to be plural, rather than singular. The most distinctive feature, as mentioned above, is that Chinese nouns require some kind of measure word that is used in conjunction with a number or demonstrative.

countable nouns: measure classifier + number word or demonstrative

(substance-)uncountable nouns: standard or universal measure word + number word or demonstrative

<table>
<tr><th></th><th>Reference</th><th>English Description</th><th>Chinese Description</th></tr>
<tr><td rowspan="2">Countable Noun</td><td>singular</td><td>• refers to one entity, but can be counted
• must be preceded by the indefinite or definite article—cannot occur alone</td><td rowspan="2">• preceded by a classifier in conjunction with a number or demonstrative
• reference depends on position within the sentence when used with an action verb
○ pre-verbal = definite reference
○ post-verbal = indefinite reference</td></tr>
<tr><td>plural</td><td>• refers to multiple entities
• may be preceded by zero article or the definite article, but not the indefinite article
• takes –s or –es as the plural morpheme</td></tr>
<tr><td rowspan="2">Uncountable Noun</td><td>object</td><td>• represents a whole group of things that is made up of similar but separate items
• may be preceded by zero article or the definite article, but not the indefinite article
• ENG: has no plural form, so does not take a final –s/–es</td><td rowspan="2">• no distinction between "collective meaning" and "individual parts"
• must be grouped, packaged, partitioned, or measured
• preceded by a universal or standard measure word in conjunction with a number or demonstrative
• the classifier yidiǎn(r) 'a little' only occurs with these nouns
• often suffixed by de
• usually have indefinite or generic reference by nature</td></tr>
<tr><td>substance
(material)</td><td>• represents whole masses made up of individual particles or elements, usually is some kind of substance that cannot be divided into separate items
• may be preceded by zero article or the definite article, but not the indefinite article
• ENG: has no plural form, so does not take a final –s/–es</td></tr>
<tr><td rowspan="2">Flexible Noun</td><td>singular</td><td>• has the same reference as a substance-uncountable noun
• must be preceded by the indefinite or definite article—cannot occur alone</td><td>• preceded by a universal or standard measure word in conjunction with a number or demonstrative
• dependent on word order</td></tr>
<tr><td>plural</td><td>• has the same reference as a plural countable noun
• may be preceded by zero article or the definite article, but not the indefinite article
• takes –s or –es as the plural morpheme</td><td>• preceded by a classifier in conjunction with a number or demonstrative dependent on word order</td></tr>
</table>

It is important to note that material nouns (similar to those of English substance-uncountable nouns) have their own specific measure words. In Chinese, material nouns can only be counted after they have first been packaged, partitioned, or measured in terms of national or international standards.

2.3 | Notable Differences

As you have learned from the tables above, English and Chinese are very different regarding the article system and the noun type distinctions. In this section, we are going to look more closely at some of the important differences between these two languages.

2.3.1 | Material Nouns

Material nouns are primarily distinguished from other common nouns because they can only be used in connection with grouping, packaging, partitioning, or standard measures.

Materials nouns can further be distinguished from other common nouns in two ways:

1. the classifier *yīdiǎn(r)* 'a little' only occurs with material nouns
2. when suffixed by the particle *de*, material nouns often indicate composition rather than possession

2.3.2 | Context, Sentence Type, Sentence Position, & Verb Type

When used with action verbs, all pre-verbal unmarked nouns have definite reference, (1). All post-verbal unmarked nouns have indefinite reference, (2).

(1) shū yǐjīng huán le
'The book/books has/have already been returned.'

(2) wǒ qù jiè shū
'I am going/went to borrow a book/some books.'

There are some instances, when a post-verbal unmarked noun may be part of given information. In these instances, the noun is considered to have definite reference.

(3) tā qù zhàogù háizi
'She went to look after the children.'

In expository sentences, it is not impossible for pre-verbal nouns to acquire indefinite or generic reference as well as definite reference. This is all dependent on the context of the sentence.

(4) shū shì zhīshì yǔ wénhuà de shǐzhě
'Books are messengers of knowledge and culture.' (indefinite/generic reference)

(5) shū shì wǒ mǎi de
'I bought the books.'

2.3.3 | Other Markers of Reference

Definite or indefinite reference may also be marked by the use of demonstratives or 'numerals + measure word' phrases.

It is not normal, though, for an indefinite-referenced noun, with a 'numeral + measure word phrase' to be featured in a pre-action-verb position. As a general rule, the shift of indefinite-referenced noun to a pre-action-verb position entails the use of a specific verb, *yǒu* 'there is/are, to exist, to have'.

English Grammar for Speakers of Chinese

2.4 | Common Errors

Some common errors for leaners of English include the following. These are common errors because in most languages, these English uncountable nouns either have plural morphology or function the same as countable nouns.

incorrect	**correct countable form**	**correct uncountable form**
**many homeworks*	*many assignments*	*a lot of homework*
**some slangs*	*some slang expressions*	*some slang*
**many vocabularies*	*many vocabulary words/items*	*a large vocabulary*

Another common mistake is singular and plural reference. Since Chinese does not have a separate plural form for nouns, learners tend to forget to make nouns plural. This can sometimes result in awkward-sounding phrases like: "We have three cat".

Of course, there is also the mistakes related to articles. In Chinese, there is not always a need for articles (*a*, *an*, *the*) in front of nouns, so learners often forget to place the appropriate article when speaking or writing in English.

1. *I went to store.
2. *He likes movie.

There are also times when articles should not be used, but learners insert them anyway. This could be due to the need for classifiers in Chinese for certain nouns, or due to the fact that the learner realizes that they should be aware of using article when using English.

3. *You gained the weight last month.
4. *I found a research that talked about it.

Lastly, there could be any combination of these mistakes

5. *Yesterday, I go to market to buy three duck.
6. He likes to go to mall to shop for the clothing.

These are all common mistakes that are seen by Chinese learners of English. Although these are mistakes that do not *always* interfere with meaning, there are definitely instances that would identify the speaker as a non-native speaker of English to those who are native speakers of English.

Descriptions in this section adapted from:

Bunting, J., Diniz, L., & Reppen, R. (2013). *Grammar and Beyond 4*. New York: Cambridge University Press.
Cowan, R. (2008). *The Teacher's Grammar of English*. New York: Cambridge University Press.
Larsen-Freeman, D. & Celce-Murcia, M. (2016). *The Grammar Book* (3rd ed.). Boston: National Geographic Learning & Cengage Learning.
Yip, P. & Rimmington, D. (2004). *Chinese: A Comprehensive Grammar* (1st ed.). New York: Routledge.

3 | Grammar Practice

3.1 | Categorizing Atomic & Non-Atomic Nouns

Direction: Sort the following nouns into their proper columns.

door	**furniture**	**cinnamon**	**stone**
mustard	**garlic**	**hair**	**ice**
window	**rice**	**boy**	**mail**
jewelry	**luggage**	**cake**	**salt**
tree	**computer**	**hamburger**	**girl**
ketchup	**rock**	**toothpaste**	**paper**
fruit	**traffic**	**money**	**dog**
glass	**dirt**	**chocolate**	**homework**
clothing	**string**	**book**	**cat**

Countable Nouns [+count, +atomic]	**Uncountable-Substance Nouns** [–count, –atomic]	**Uncountable-Object Nouns** [–count, +atomic]	**Flexible Nouns** [+flexible]
____________________	____________________	____________________	____________________
____________________	____________________	____________________	____________________
____________________	____________________	____________________	____________________
____________________	____________________	____________________	____________________
____________________	____________________	____________________	____________________
____________________	____________________	____________________	____________________
____________________	____________________	____________________	____________________
____________________	____________________	____________________	____________________
____________________	____________________	____________________	____________________
____________________	____________________	____________________	____________________
____________________	____________________	____________________	____________________
____________________	____________________	____________________	____________________

English Grammar for Speakers of Chinese

3.2 | Article Use with Noun Types

Directions: Choosing from the box below, complete the following table with the correct articles that can be used with each noun type and reference. Some articles will be used more than once.

a	**an**	**the**	**Ø**

REFERENCE	**COUNT NOUNS [+count]** *singular*	**COUNT NOUNS [+count]** *plural*	**UNCOUNTABL NOUNS [–count]**
indefinite **[–definite]**			
definite **[+definite]**			

3.3 | Identifying Countable & Uncountable Nouns

Directions: Read the sentences below. Underline the *common* nouns in the sentences. Write "C" above the **[+count]** nouns, "UC" above the **[–count]** nouns, and "F" above the flexible nouns.

C C C u

1. I bought some chairs, tables, and desks. In other words, I bought some furniture.
2. Ann likes to wear jewelry. Today she is wearing four rings, six bracelets, and a necklace.
3. Tanner likes chocolates, peanuts, and cherries. Likes to eat a lot of snacks.
4. Don't forget that we have three suitcases. I would hate for the airline to lose our luggage.
5. Jeffrey has enough money. I gave him all the coins I could find.
6. The instructor gave us so much homework. I have three assignments due on Monday!

3.4 | Plurals of Countable & Uncountable Nouns

Directions: Add final **–s**/***–es*** to the *italicized* noun if necessary. Do not add, omit, or change any other words.

1. Jackie has brown *hair*__ and gray *eye*s__.
2. I always drink *water*__ when I'm hot and thirsty.
3. Every day I learn some more new *word*__ in English.
4. We bought some new *clothing*__.

5. I bought a pair of leather *glove*__.
6. At rush hour there are a lot of *car*__ on the highway. Although normally it takes us twenty *minute*__ to drive from home to work, at rush hour it can take an hour because of the heavy *traffic*__.
7. Ann likes to wear *jewelry*__. Today she is wearing four *ring*__, six *bracelet*__, and a *necklace*__.
8. I had *meat*__, *rice*__, *vegetable*__, and some *tea*__ for dinner.
9. *Butterfly*__ begin as *caterpillar*__ and then are transformed into beautiful *insect*__ with vividly colored *wing*__.
10. Last night we heard about a new political crisis in our country. Do you have any more *information*__ about it? Are there any reports of *violence*__? We've heard a lot of rumors about what may be happening, but we're anxious to know the *truth*__. We need *fact*__, not *gossip*__.

3.5 | Converting Countable Nouns to Uncountable Nouns

Directions: Write an uncountable noun that is close in meaning to the countable noun.

[+count]	[–count]
1. a job	work
2. an assignment (for school)	______
3. a chair, a desk, a table	______
4. a banana, an apple	______
5. a coin, a dollar bill	______
6. a ring, a bracelet	______

3.6 | Articles Usage with Generic Nouns

Directions: Add ***a/an*** if the noun is **[+count]**. Write **Ø** in the blank if the noun is **[–count]**. Capitalize as appropriate. **T**

1. __Ø__ ~~t~~*oothpaste* comes in a tube.
2. _____ *rocks* can be very heavy.
3. _____ *cat* was in the park today.
4. _____ *glass* is a small container used for liquids.
5. _____ *doors* can help create privacy.

English Grammar for Speakers of Chinese

6. _____ *computer* can be used to type an essay.
7. _____ *chocolate* is a tasty snack.
8. _____ *money* comes in many different shapes and sizes.
9. _____ *boy* will grow up to be a man.
10. _____ *trees* help produce oxygen.

3.7 | Article Usage with Other Countable & Uncountable Nouns

Directions: Complete the sentences with ***a/an***, ***the***, or **Ø**. Capitalize as necessary.

1. __ø__ B ~~b~~eef is a kind of __ø__ meat.
2. _The_ beef we had for dinner last night was excellent.
3. Jim is wearing __a__ straw hat today.
4. Jim likes to wear _____ hats.
5. _____ hat is _____ article of clothing.
6. _____ hats are _____ articles of clothing.
7. _____ brown hat on that hook over there belongs to Mark.
8. Everyone has _____ problems in _____ life.
9. My grandfather had _____ long life.
10. That book is about _____ life of Helen Keller.
11. Tommy wants to be _____ engineer when he grows up.
12. The Brooklyn Bridge was designed by _____ engineer.
13. John Roebling is _____ name of _____ engineer who designed the Brooklyn Bridge. he died in 1869 from _____ infection before _____ bridge was completed.
14. _____ people wear _____ jewelry to make themselves more attractive.
15. _____ jewelry Diana is wearing today is beautiful.

3.8 | Error Correction

Directions: Check (√) the incorrect sentences and correct them.

1. __√__ I have ^a job.
2. _____ Tom enjoys his works. He has a restaurant and a computer business.
3. _____ Let's listen to a music.
4. _____ The students want to learn more English vocabularies.
5. _____ Is there many traffics at 5:00 P.M.?
6. _____ Are you a hungry? Could I get you some food?
7. _____ My children come home with a lot of homeworks.
8. _____ My eggs and coffee don't taste very good. Eggs are very salty, and coffee is weak.
9. _____ What do you like better for a snack: orange or the orange juice?
10. _____ I'm going to bank. I need money.
11. _____ We need to get any furniture. Do you know good furniture store?

Some activities in this section were taken and adapted from the following sources:
Azar, B. (1998). *Understanding and Using English Grammar* (3rd ed.). New York: Pearson Education.
Azar, B. (1998). *Understanding and Using English Grammar Workbook* (3rd ed.). New York: Pearson Education.
Azar, B., & Hagen, S. (2014). *Basic English Grammar* (4th ed.). New York: Pearson Education.
Azar, B., & Hagen, S. (2014). *Basic English Grammar Workbook* (4th ed.). New York: Person Education.
Blass, L., Denman, B., & Iannuzzi, S. (2013). *Grammar and Beyond Workbook 4*. New York: Cambridge University Press.

C.2 | Instructor PowerPoint Slides

GRAMMAR WORKSHOP:
ARTICLES & NOUN TYPE DISTINCTIONS

ENGLISH GRAMMAR FOR CHINESE LEARNERS

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1

1.1 | LINGUISTIC DEFINITIONS: ARTICLES

- **Articles:** a word that introduces or identifies a noun and helps language users distinguish between general and specific statements and shared knowledge

2

1.1 | LINGUISTIC DEFINITIONS: ARTICLES

- *If an article is…*
  - **[+definite]:** *both* the speaker *and* the listener can identify the noun and answer the question 'Which one?'
    - In English, there is one article that is **[+definite]**: *the*
      - **Definite Article:** refers to an entity that *is identifiable* in a given context
  - **[-definite]:** *only* the speaker, *not* the listener, can identify the noun
    - In English, there are two articles that are **[-definite]**: *a*, *Ø* (zero)
      - **Indefinite Article:** refers to an entity that *is not identifiable* in a given context
      - **Zero Article:** refers to noun phrases that contain no article and refer to *a general class of things* or *a substance*

3

1.2 | LINGUISTIC DEFINITIONS: NOUN TYPES

- **Nouns:** a word that refers to a person place, thing, or idea
  - **[±count]:** the feature of a noun that determines whether or not it can have a plural form
  - **[±atomic]:** the feature of a noun that determines if it is made up of individuals

4

1.2 | LINGUISTIC DEFINITIONS: NOUN TYPES

- *If a noun is…*
  - **[+count, +atomic]:**
    - In English, there is one type of nouns that is **[+count, +atomic]**:
      - **Countable Nouns:** it has separate singular and plural forms, and the plural form takes a morphological -s; these nouns can be counted individually (e.g., dog, dogs)
  - **[-count, ±atomic]:**
    - In English, there are two types of nouns that are **[-count]**:
      - **Uncountable-Substance Nouns [-atomic]:** it refers to a substance that cannot be individuated or counted (e.g., toothpaste)
      - **Uncountable-Object Nouns [+atomic]:** it refers to a set of objects that can be individuated into countable items (e.g., furniture)
  - **[+flexible]:** a semantically ambiguous noun that alternates between being **[-count, -atomic]** and **[+count, +atomic]** depending on the structure of the sentence and the speaker's target meaning

5

1.3 | WHAT DO YOU KNOW?

Directions: Read each sentence and the statements that follow it. Check (√) the correct statement.

1. I read a report about crime. It was very disturbing
   a. _____ The first noun is **[+count]** and the second is **[-count]**.
   b. _____ The first noun is **[-count]** and the second is **[+count]**.
2. We give advice to foreigners who want to invest.
   a. _____ The first noun is **[+count]** and the second noun is **[-count]**.
   b. _____ The first noun is **[-count]** and the second noun is **[+count]**.
3. Let's install a light in the closet.
   a. _____ This refers to light in general.
   b. _____ Both the speaker and listener know what light will be installed.
4. She wanted cake, so she went to the store and bought a cake.
   a. _____ The first noun is **[-count, -atomic]** and the second is **[+count, +atomic]**.
   b. _____ The first noun is **[+count, +atomic]** and the second is **[-count, -atomic]**.
5. Diane went to the store to by fabric for the furniture.
   a. _____ The first noun is **[-count, -atomic]** and the second is **[-count, +atomic]**.
   b. _____ The first noun is **[-count, +atomic]** and the second is **[-count, -atomic]**.

6

1.3 | WHAT DO YOU KNOW?

Directions: Read each sentence and the statements that follow it. Check (√) the correct statement.

1. A *manifesto* is a public statement of ideas.
   a. _____ This sentence describes what a manifesto is.
   b. _____ This sentence identifies a specific manifesto.
2. I'm looking for a new cell phone, but I don't know what kind to buy.
   a. _____ The underlined noun phrase is [**+definite**].
   b. _____ The underlined noun phrase is [**-definite**].
3. I looked at the apartment yesterday.
   a. _____ Both the speaker and the listener know what apartment was looked at yesterday.
   b. _____ Only the speaker knows what apartment was looked at yesterday.
4. Do you have furniture that we can put in the living room?
   a. _____ The underlined noun phrase is [**+definite**].
   b. _____ The underlined noun phrase is [**-definite**].
5. If you go out tonight, don't forget to lock the door.
   a. _____ The underlined noun phrase is [**+definite**].
   b. _____ The underlined noun phrase is [**-definite**].

7

2.1 | LEARNING ENGLISH ARTICLES

	English Description	Chinese Description
Definite Article	• with singular (countable, uncountable, or flexible) or plural nouns (countable or flexible) • when you know or assume that your listener is familiar with and thinking about the same specific thing or person you are talking about • when the noun is unique • when the noun was introduced earlier • can often answer the question "Which one(s)?"	• no equivalent in Chinese • other determiners *zhèi* 'this' and *nèi* 'that' mark definiteness • if the noun appears in topic position (pre-verbal), there is not article used • generic or known reference can be achieved with the use of no article
Indefinite Article	• with singular countable or flexible nouns • when the noun is no specifically identified • when the noun is first mentioned and new to someone in the conversation • can be used to classify a noun—used to say "what kind of thing" the noun is	• no equivalent in Chinese • use of the word *yī* 'one'
Zero Article	• when the speaker does not know the specific noun you are talking about • with plural countable nouns and all uncountable nouns • to classify a noun—used to say "what kind of thing" the noun is	• nouns in topic position are unmarked • generic or known reference can be achieved with the use of no article

8

2.2 | LEARNING ENGLISH NOUN TYPES

	Reference	English Description	Chinese Description
Countable Noun	*singular*	• refers to one entity, but can be counted • must be preceded by the indefinite or definite article—cannot occur alone	• preceded by a classifier in conjunction with a number or demonstrative • reference depends on position within the sentence when used with an action verb ○ pre-verbal = definite reference ○ post-verbal = indefinite reference
	plural	• refers to multiple entities • may be preceded by zero article or the definite article, but not the indefinite article • takes -s or -es as the plural morpheme	
Uncountable Noun	*object*	• represents a whole group of things that is made up of similar but separate items • may be preceded by zero article or the definite article, but not the indefinite article • ENG: has no plural form, so does not take a final -s/-es	• no distinction between "collective meaning" and "individual parts" • must be grouped, packaged, partitioned, or measured • preceded by a universal or standard measure word in conjunction with a number or demonstrative • the classifier *yīdiăn(r)* 'a little' only occurs with these nouns • often suffixed by de • usually have indefinite or generic reference by nature
	substance (material)	• represents whole masses made up of individual particles or elements, usually is some kind of substance that cannot be divided into separate items • may be preceded by zero article or the definite article, but not the indefinite article • ENG: has no plural form, so does not take a final -s/-es	
Flexible Noun	*singular*	• has the same reference as a substance-uncountable noun • must be preceded by the indefinite or definite article—cannot occur alone	• preceded by a universal or standard measure word in conjunction with a number or demonstrative • dependent on word order
	plural	• has the same reference as a plural countable noun • may be preceded by zero article or the definite article, but not the indefinite article • takes -s or -es as the plural morpheme	• preceded by a classifier in conjunction with a number or demonstrative dependent on word order

9

2.3 | NOTABLE DIFFERENCES

- Material (uncountable) nouns are primarily distinguished from other common nouns because they can only be used in connection with grouping, packaging, partitioning, or standard measures.
- Materials nouns can further be distinguished from other common nouns in two ways:
  1) the classifier *yīdiăn(r)* 'a little' only occurs with material nouns
  2) when suffixed by the particle *de*, material nouns often indicate composition rather than possession
- Definite or indefinite reference may also be marked by the use of demonstratives or 'numerals + measure word' phrases.
- It is not normal, though, for an indefinite-referenced noun, with a 'numeral + measure word phrase' to be featured in a pre-action-verb position.
  - Generally, the shift of indefinite-referenced noun to a pre-action-verb position entails the use of a specific verb, *yǒu* 'there is/are, to exist, to have'.

10

2.3 | NOTABLE DIFFERENCES

- When used with action verbs, all pre-verbal unmarked nouns have definite reference, (1). All post-verbal unmarked nouns have indefinite reference, (2).
  1) shū yǐjīng huán le
     'The book/books has/have already been returned.'
  2) wǒ qù jiè shū
     'I am going/went to borrow a book/some books.'
- When a post-verbal unmarked noun is part of given information, the noun is considered to have definite reference.
  3) tā qù zhàogù háizi
     'She went to look after the children.'
- In expository sentences, pre-verbal nouns can acquire indefinite or generic reference as well as definite reference.
  4) shū shì zhīshì yǔ wénhuà de shǐzhě
     'Books are messengers of knowledge and culture.' (indefinite/generic reference)
  5) shū shì wǒ mǎi de
     'I bought the books.'

11

2.4 | COMMON ERRORS

- Incorrect use of plural with uncountable nouns:

INCORRECT	CORRECT COUNTABLE FORM	CORRECT UNCOUNTABLE FORM
**many homeworks*	*many assignments*	*a lot of homework*
**some slangs*	*some slang expressions*	*some slang*
**many vocabularies*	*many vocabulary words/items*	*a large vocabulary*

- Plural reference: Chinese does not have a separate plural form, so learners tend to forget to make nouns plural.

12

2.4 | COMMON ERRORS

- Article use: learners often forget to place appropriate articles when reading and writing in English
  1) *I went to store.
  2) *He likes movie.

- Article misuse: learners sometimes use articles when they do not need to be used
  3) *You gained the weight last month.
  4) *I found a research that talked about it.

- Any combination of the mistakes mentioned:
  5) *Yesterday, I go to market to buy three duck.
  6) He likes to go to mall to shop for the clothing.

13

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14

Appendix D: Traditional Instruction Materials

D.1 | Student Textbook

3 Articles

▶ Grammar Presentation

Articles (*a/an, the*) or no article Ø precede nouns. Articles help writers distinguish between general and specific statements and shared knowledge. This is important in academic writing, including in comparison and contrast writing.

In Latin America, **Ø** *families include* **a** *mother,* **a** *father,* **Ø** *sisters,* **Ø** *brothers,* **Ø** *aunts,* **Ø** *uncles, and* **Ø** *cousins.*

I have not met **the** *family that lives across* **the** *street from my house.*

3.1 Using the Definite Article

a. Use *the* when both the writer and the reader share common knowledge or information about the noun.	*In American families, it is common for* **the** *wife and* **the** *husband to share household duties.* (The writer assumes the reader shares the knowledge that there is usually one wife and one husband in a family.)
b. Use *the* when the noun was introduced earlier in the text and you give more information, or when the noun is related to a noun mentioned earlier.	*Each person in a family has a moral responsibility to aid other members of* **the** *family experiencing financial problems.*
c. Use *the* when you are writing about "which one" (when there is additional information that identifies the specific noun).	*Mexico is* **the** *country that is located south of the United States.*
d. Use *the* with superlatives.	**The** *strictest family I ever met was from the United States.*
e. Use *the* for:	
abbreviations	**the** *CIA,* **the** *UN,* **the** *FBI*
(but usually not for acronyms)	*Ø NASA, Ø NATO*
groups	**the** *media,* **the** *military*
adjectives that refer to a category	**the** *rich,* **the** *elderly*
when there is only one	**the** *president,* **the** *queen,* **the** *United States,* **the** *Alps,* **the** *moon,* **the** *equator*

3.2 Using the Indefinite Article

a. Use *a/an* with a singular count noun when the noun is not specifically identified, or when it is first mentioned and new to the reader.	***A** young Latino man is the new student in class.* (The man is not specifically identified.) *The class read **an** article about cultural values.* (The reader does not know this article.)
b. Do not use *a/an* with noncount or plural nouns. Use *some* or Ø.	*My cousin borrowed **some money** from me, but he has not paid me back yet.* ***Ø** Large **families** can be enjoyable but complicated.*
c. Use *a/an* when introducing a count noun.	***A** young Latina woman is the new student in my class. I found out that she is from Colombia.*

3.3 Using Articles in Discourse

a. In academic writing, paragraphs and essays often begin with generalizations. Use the indefinite article when making generalizations:	
Ø for noncount nouns and plural nouns	*"**Ø** Advertising is about **Ø** norms and **Ø** values, **Ø** aspirations and **Ø** prejudices."* –Anil Ambani
a/an for singular nouns	*In some cultures, **a** teenager is expected to move out of their parents' home and live in **a** college dormitory.*
b. Use the definite article if it refers to a specific noun that is known to the reader. The reference may be:	
direct	*Teens leave their parents' homes to live in a dormitory. **The** parents are often sad to see their children leave.* (*Parents* were already mentioned.)
clear from context	*Although **the** rooms are often very small, most teenagers do not seem to mind.* (Readers know that dormitories have rooms.)

Grammar Application

Exercise 3.1 Indefinite and Definite Articles

A Read the article about how relationships are affected by the mobility of American society. Choose the best article (*a/an, the,* or Ø) for each item. Sometimes more than one answer is possible.

Mobility in the United States

The United States is a very mobile society. People frequently do not live in the same town for their entire lives. Often __Ø__ (1) large corporations require their employees to move if they want to advance in ______ (2) company. Students typically do not go to ______ (3) college near their families. As a result, it is not uncommon for ________ (5) extended families to be separated by hundreds, if not thousands, of miles.

This mobility is probably one of ________ (5) most significant factors influencing ________ (6) relationships in the United States. For example, people tend to be very friendly on a casual basis and open to meeting many new individuals, but these interactions do not always result in ________ (7) close, lasting relationships. There is ________ (8) common tendency of people in ________ (9) United States to say things like, "Let's get together sometime," or "Let's have lunch," and then not follow through with ________ (10) invitation.

People who are not from ________ (11) United States sometimes see this informal style as superficial, and it can be confusing. If someone says, "Let's get together," ________ (12) visitor to the United States might expect the person to make ________ (13) call and suggest ________ (14) meeting time and place. This doesn't always happen. However, ________ (15) visitor who has this experience shouldn't be offended because ________ (16) expression "Let's get together" has almost ________ (17) same meaning as "hello" to many Americans.

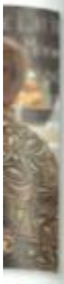
B ***Group Work*** Take turns explaining why you chose each answer in A.

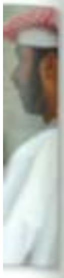
I chose no article for item 1 because corporations is plural and here the writer is referring to all large corporations, not specific large corporations.

Exercise 3.2 More Indefinite and Definite Articles

A Write sentences about cultural differences with the cues in parentheses. Use your own ideas. Use the correct articles.

1. (a definition of *family*) *A family can consist of parents and children, or it can consist of parents, children, grandparents, and others.*
2. (a definition of *values*) ________________
3. (a generalization about cultural differences – what they are) ________________





4. (a description of one cultural difference concerning time, family, relationships, etc.)

____

____

5. (a detail about your difference in item 4) ________________________

____

6. (a statement about a cultural difference that you think is more confusing than any other)

____

____

7. (a generalization about groups and individuals in your culture) __________________

____

B ***Pair Work*** Talk with a partner about your sentences in A. Which sentences are generalizations? Which contain specific nouns? Share your sentences with another pair. Ask the other pair to identify the reason why each article or no article is appropriate.

You used "a family" in this sentence because here you are using a singular count noun to make a generalization.

[redacted]

D.2 | Student Workbook

Articles

1 Complete Sandra's notes for her project on marriage customs in different cultures. Use the correct indefinite article (*a/an*) or Ø if no article is needed.

1. In many cultures, a woman older than 30 may have *a* difficult time finding a suitable husband.
2. In some cultures, it is not uncommon for _____ girls under 18 to be married and have _____ children.
3. In many Middle Eastern cultures, _____ young married men often live in _____ apartment with their parents as well as their wife and children.
4. Sometimes _____ newly married couple's parents give them _____ appliances for their home, such as _____ washing machine and _____ dryer.
5. In the United States, people may marry even if _____ money is tight, but in some cultures, _____ couples might not marry unless they have _____ financial security.
6. In the United States, it is not uncommon for _____ urban families to live first in _____ apartment. They may later move to _____ duplex when their children are older.
7. It can be difficult to adjust to living with _____ new people or in _____ new place.
8. In some cultures, most families live in _____ apartments, and it is common for _____ older relatives to live with them.

2 Complete Lisa's personal web page about her memories of Barranquilla, Colombia. Use the correct indefinite or definite article (*a/an* or *the*) or Ø.

When I was *a* (1) child, my family and I lived in Colombia, _____ (2) country near Venezuela. We lived in _____ (3) city called Barranquilla. Barranquilla has always been _____ (4) diverse city, and it has attracted many of Colombia's recent immigrants. As a result, Barranquilla is _____ (5) Colombian city with _____ (6) most international flavor. There are many ethnic groups, and each used to live in _____ (7) area that had _____ (8) special shops and restaurants. These shops and restaurants reflected _____ (9) culture and taste of that specific ethnic group. Over time, there has been _____ (10) lot of intermarrying, so you can easily find _____ (11) people of Lebanese, Spanish, Italian, and German descent.

64 Unit 7 Comparison and Contrast 3

3 Complete Bree's e-mail to her family in Canada. Use the correct articles (*a/an* or *the*) or Ø.

send

to Mom and Dad

cc

subject My classes in *the* U.S.
(1)

Hi Mom and Dad,

I wanted to tell you a little about what I am learning from my classmates in my classes that started this week. Tim and Erica are _____ (2) sociology classmates of mine. They are brother and sister; they are _____ (3) twins. Their mother is from Morocco, and their father is from _____ (4) country in Asia. I can't remember which. He works for _____ (5) UN. I enjoy their contributions to class discussions because I always gain _____ (6) bit of insight into different cultures. Because of them, I now have _____ (7) idea about _____ (8) role of the extended family in Moroccan culture as well as _____ (9) way in which older people are treated in Moroccan culture. It's been _____ (10) interesting class this semester. In fact, it has been _____ (11) most interesting class all year!

I don't have much time to write this e-mail, so I will write more tomorrow after class. I miss you, and I can't wait for you to visit me in October!

Love,

Bree

D.3 | Instructor PowerPoint Slides

GRAMMAR WORKSHOP:
ARTICLES & NOUN TYPE DISTINCTIONS

GRAMMAR & BEYOND 4 – UNIT 7: ARTICLES

Dakota J. Thomas-Wilhelm
Ph.D. Research Study
Universitat Autònoma de Barcelona

1

ARTICLES

- Articles (*a*/*an*/*the*) or no article Ø precede nouns. Articles help writers distinguish between general and specific statements and shared knowledge. This is important in basic academic writing, including in comparison and contrast writing.

Examples:

- *In Latin America,* **Ø** *families include* ***a*** *mother,* a *father,* **Ø** *sisters,* **Ø** *brothers,* **Ø** *aunts,* **Ø** *uncles, and* **Ø** *cousins.*
- *I have not met* **the** *family that lives across* **the** *street from my house.*

2

1.1 | USING THE DEFINITE ARTICLE

a. Use *the* when both the writer and the reader share common knowledge or information about the noun.	*In American families, it is common for* ***the*** *wife and* ***the*** *husband to share household duties.* (The writer assumes the reader shares knowledge that there is usually one wife and one husband in a family.)
b. Use *the* when the noun was introduced earlier in the text, and you give more information, or when the noun is related to a noun mentioned earlier.	*Each person in a <u>family</u> has a moral responsibility to aid other members of* ***the*** *<u>family</u> experiencing financial problems.*
c. Use *the* when you are writing about "which one" (when there is additional information that identifies the specific noun).	*Mexico is* ***the*** *country that is located south of the United States.*

3

1.1 | USING THE DEFINITE ARTICLE (CONT'D)

d. Use *the* with superlatives.	***The*** *<u>strictest</u> family I ever met was from the United States.*
e. Use *the* for: • abbreviations (but usually not for acronyms) • groups • adjectives that refer to a category • when there is only one	 ***the*** *CIA,* ***the*** *UN,* ***the*** *FBI* Ø NASA, Ø NATO ***the*** *media,* ***the*** *military* ***the*** *rich,* ***the*** *elderly* ***the*** *president,* ***the*** *queen,* ***the*** *United States,* ***the*** *Alps, etc.*

4

1.2 | USING THE INDEFINITE ARTICLE

a. Use *a/an* with a singular count noun when the noun is not specifically identified or when it is first mentioned and new to the reader.	***A*** *young Latin man is the new student in class.* (The man is not specifically identified.) *The class read* ***an*** *article about cultural values.* (The reader does not know this article.)
b. Do not use *a/an* with noncount or plural nouns. Use *some* or Ø.	*My cousin borrowed* **some money** *from me, but he has not paid me back yet.* ***Ø*** *Large* ***families*** *can be enjoyable but complicated.*
c. Use *a/an* when introducing a count noun.	***A*** *young Latina woman is the new student in my class. I found out that she is from Columbia.*

5

1.3 | USING ARTICLES IN DISCOURSE

a. In academic writing, paragraphs and essays often begin with generalizations. Use the indefinite article when making generalizations: • Ø for noncount nouns and plural nouns • *a/an* for singular nouns	*"****Ø*** *Advertising is about* ***Ø*** *norms and* ***Ø*** *values,* ***Ø*** *aspirations and* ***Ø*** *prejudices"* – Anil Ambani *In some cultures,* ***a*** *teenager is expected to move out of their parents' home and live in* ***a*** *college dormitory.*
b. Use the definite article if it refers to a specific noun that is known to the reader. The reference may be: • direct • clear from context	*Teens leave their parents' homes to live in a dormitory.* ***The*** *parents are often sad to see their children leave. (Parents* were already mentioned.) *Although* ***the*** *rooms are often very small, most teenagers do not seem to mind.* (Readers know that dormitories have rooms.)

6

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7

Appendix E: Feature Settings for Task Stimuli

Item Type	Grammaticality	[definite]	[count]	[atomic]	[plural]
c-dp	grammatical	+	+	+	+
c-ds	grammatical	+	+	+	–
c-i	grammatical	–	+	+	–
c-zp	grammatical	–	+	+	+
c-zs	ungrammatical	–	+	+	–
c-dp	grammatical	+	+	+	+
c-ds	grammatical	+	+	+	–
c-i	grammatical	–	+	+	–
c-zp	grammatical	–	+	+	+
c-zs	ungrammatical	–	+	+	–
c-dp	grammatical	+	+	+	+
c-ds	grammatical	+	+	+	–
c-i	grammatical	–	+	+	–
c-zp	grammatical	–	+	+	+
c-zs	ungrammatical	–	+	+	–
mo-dp	ungrammatical	+	–	+	+
mo-ds	grammatical	+	–	+	–
mo-i	ungrammatical	–	–	+	–
mo-zp	ungrammatical	–	–	+	+
mo-zs	grammatical	–	–	+	–
mo-dp	ungrammatical	+	–	+	+
mo-ds	grammatical	+	–	+	–
mo-i	ungrammatical	–	–	+	–
mo-zp	ungrammatical	–	–	+	+
mo-zs	grammatical	–	–	+	–
mo-dp	ungrammatical	+	–	+	+

Item Type	Grammaticality	[definite]	[count]	[atomic]	[plural]
mo-ds	grammatical	+	–	+	–
mo-i	ungrammatical	–	–	+	–
mo-zp	ungrammatical	–	–	+	+
mo-zs	grammatical	–	–	+	–
ms-dp	ungrammatical	+	–	–	+
ms-ds	grammatical	+	–	–	–
ms-i	ungrammatical	–	–	–	–
ms-zp	ungrammatical	–	–	–	+
ms-zs	grammatical	–	–	–	–
ms-dp	ungrammatical	+	–	–	+
ms-ds	grammatical	+	–	–	–
ms-i	ungrammatical	–	–	–	–
ms-zp	ungrammatical	–	–	–	+
ms-zs	grammatical	–	–	–	–
ms-dp	ungrammatical	+	–	–	+
ms-ds	grammatical	+	–	–	–
ms-i	ungrammatical	–	–	–	–
ms-zp	ungrammatical	–	–	–	+
ms-zs	grammatical	–	–	–	–

Item Type Key:

c = countable noun

f = flexible

mo =uncountable-object

ms = uncountable-substance

dp = definite-plural

ds = definite-singular

i = indefinite-singular

zp = zero-plural

zs = zero-singular

Appendix F: Elicited-Sentence Imitation Task Stimuli

F.1 | Practice Items

1. This is a practice sentence.
2. I like to go shopping on the weekends.
3. Spaniards goes to the dinner very late.
4. Vegetables are good for your health.
5. Many of this sentences are about food.

F.2 | Pre-Test Tokens

Countable Nouns in Definite-Plural Context

1. Everyone likes the boys that wear hats.
2. You can buy the doors you like at IKEA.
3. Last year the books were very expensive.

Countable Nouns in Definite-Singular Context

4. I like the boy with curly brown hair.
5. It is dangerous if the door is left open.
6. They said the book should be cheaper now.

Countable Nouns in Indefinite Context

7. Everyone likes a boy as their first child.
8. Everyone needs a door to their house.
9. Americans have a book that tells the truth.

Countable Nouns in Zero-Plural Context

10. People see Ø boys at the beach every day.
11. You can get Ø doors from the store.
12. Everyone needs Ø books to do their homework.

Countable Nouns in Zero-Singular Context

13. The Americans think Ø boy is the best.
14. People have Ø door in their house.
15. Last year Ø book was more expensive.

Flexible Nouns in Definite-Plural Context

16. Americans got the chocolates from England.
17. People should use the stones from the store to make paths.
18. Kids like the strings that are on their blankets.

Flexible Nouns in Definite-Singular Context

19. Many people like the chocolate from Mexico.
20. In Europe, the stone on the street is beautiful.
21. There is always the string that needs to be removed.

Flexible Nouns in Indefinite Context

22. It is good to have a chocolate for your soul.
23. Many people have a stone that is special to them.
24. Some shirts have a string that needs cut.

Flexible Nouns in Zero-Plural Context

25. Young people eat Ø chocolates very frequently.
26. A garden always needs Ø stones to complete it.
27. People should use Ø strings to make things.

Flexible Nouns in Zero-Singular Context

28. Every cook uses Ø chocolate for dessert.
29. Last year, Ø stone was as popular as sand.
30. It is silly that Ø string is not used often.

Uncountable-Object Nouns in Definite-Plural Context

31. Spaniards get the furnitures for their houses from IKEA.
32. The postman does not deliver the mails every day.
33. In Iowa City, the traffics make people late.

Uncountable-Object Nouns in Definite-Singular Context

34. IKEA sells the furniture for your house at a good price.
35. They said the mail does not come on Sundays.
36. Most people do not like the traffic on the weekends.

Uncountable-Object Nouns in Indefinite Context

37. Americans do not have a furniture in their houses.
38. In America, a mail takes three weeks to arrive.
39. Europe does not have a traffic like America.

Uncountable-Object Nouns in Zero-Plural Context

40. They used to make Ø furnitures from trees.
41. People send Ø mails every day in Germany.
42. Everyone hates Ø traffics on Friday nights.

Uncountable-Object Nouns in Zero-Singular Context

43. Most people buy Ø furniture from IKEA.
44. It is unusual to get Ø mail on holidays.
45. There is always Ø traffic after a football game.

Uncountable-Substance Nouns in Definite-Plural Context

46. People buy the salts at a special store.
47. Everyone buys the toothpastes at the store.
48. Children do not like the mustards from McDonald's.

Uncountable-Substance Nouns in Definite-Singular Context

49. Many people like the salt from Poland.
50. In England, the toothpaste is a different color.
51. Heinz makes the mustard that is most popular.

Uncountable-Substance Nouns in Indefinite Context

52. There is a salt that is from a popular company.
53. Young people have a toothpaste that is very different.
54. There should be a mustard on every sandwich.

Uncountable-Substance Nouns in Zero-Plural Context

55. Americans put Ø salts on all of their food.
56. Kids should use Ø toothpastes morning and night.
57. Children say Ø mustards make their food taste bad.

Uncountable-Substance Nouns in Zero-Singular Context

58. Some food has Ø salt and it tastes bad.
59. Germans like Ø toothpaste that has a minty flavor.
60. It is difficult to pick Ø mustard that is tasty.

F.3 | Immediate Post-Test Tokens

Countable Nouns in Definite-Plural Context

1. People say the dogs at the animal shelter are nice.
2. IKEA sells the windows that open all the way.
3. The city planted the trees in the park for a good reason.

Countable Nouns in Definite-Singular Context

4. In American, the dog is a common pet.
5. In a house, the window that faces south gest sunlight.
6. When the tree blocks my view, I get upset.

Countable Nouns in Indefinite Context

7. In China, a dog is a holy animal.
8. There is a window in this room.
9. In Russia, there is a tree that has different leaves.

Countable Nouns in Zero-Plural Context

10. People say Ø dogs are not very nice.
11. People buy Ø windows at the store.
12. It's important that Ø trees are planted often.

Countable Nouns in Zero-Singular Context

13. It is dangerous if Ø dog is not trained properly.
14. Everyone should have Ø window in their room.
15. Sometimes Ø tree is too big for the yard.

Flexible Nouns in Definite-Plural Context

16. In Spain, the cakes for birthdays are made differently.
17. Sometimes the rocks in my garden are very sharp.
18. You should put the papers that you need in a folder.

Flexible Nouns in Definite-Singular Context

19. I think the cake for his birthday should be frosted.
20. People put the rock on the ground to make a path.
21. I have the paper that you need for class.

Flexible Nouns in Indefinite Context

22. In Mexico, a cake is for very special events.
23. Each state has a rock that they are famous for.
24. The university has a paper that is very important.

Flexible Nouns in Zero-Plural Context

25. A good cook makes Ø cakes for birthdays.
26. In Barcelona, there are Ø rocks on all the beaches.
27. Many people use Ø papers to write on.

Flexible Nouns in Zero-Singular Context

28. Many restaurants serve Ø cake for parties.
29. Arizona produces Ø rock for the country.
30. You can buy Ø paper at the store.

Uncountable-Object Nouns in Definite-Plural Context

31. Airlines don't treat the luggages very well.
32. Teachers give the homeworks for Reading class for the weekend.
33. Sometimes the jewelries at the store are expensive.

Uncountable-Object Nouns in Definite-Singular Context

34. It can be difficult to carry the luggage in the airport.
35. I have to turn-in the homework for Grammar when class starts.
36. I got the jewelry from my grandmother.

Uncountable-Object Nouns in Indefinite Context

37. Some people have a luggage that is a different color.
38. Today I have a homework for Grammar class that I need to do.
39. In China, there is a jewelry that is cheap.

Uncountable-Object Nouns in Zero-Plural Context

40. Many people have Ø luggages that are black.
41. Most of the time Ø homeworks are due on Monday.
42. Some people have Ø jewelries that are old.

Uncountable-Object Nouns in Zero-Singular Context

43. I always check Ø luggage at the airport.
44. Most teachers don't give Ø homework on Friday.
45. Most people wear Ø jewelry to look nice.

Uncountable-Substance Nouns in Definite-Plural Context

46. Most people use the garlics to add flavor.
47. Yesterday, the dirts were scattered in the yard.
48. People keep the ketchups from the store in the fridge.

Uncountable-Substance Nouns in Definite-Singular Context

49. I put the garlic in the pantry.
50. People use the dirt in their gardens.
51. People put the ketchup from the store on the table.

Uncountable-Substance Nouns in Indefinite Context

52. Mexicans add a garlic to their tacos.
53. Some people have a dirt for their flowers.
54. Americans have a ketchup with everything.

Uncountable-Substance Nouns in Zero-Plural Context

55. Americans don’t like Ø garlics on everything.
56. Sometimes Ø dirts can be very messy.
57. Chinese people don't like Ø ketchups with fries.

Uncountable-Substance Nouns in Zero-Singular Context

58. In Italy, they use Ø garlic for seasoning.
59. There is usually Ø dirt on the floor.
60. Most people have Ø ketchup with their fries.

F.4 | Delayed Post-Test Tokens

Countable Nouns in Definite-Plural Context

1. Sometimes the girls from your school cause problems.
2. People should adopt the cats from the shelter.
3. At school, the computers in the lab are used often.

Countable Nouns in Definite-Singular Context

4. I like the girl who is on the Today Show.
5. I like the cat that is at the animal shelter.
6. It is not good for the computer on my desk to be left on.

Countable Nouns in Indefinite Context

7. Parents with a girl spend more money.
8. Americans always have a cat in their house.
9. Everyone should have a computer for their work.

Countable Nouns in Zero-Plural Context

10. They say Ø girls misbehave often.
11. They say Ø cats are not very friendly.
12. At the store, Ø computers are very expensive.

Countable Nouns in Zero-Singular Context

13. In the park, Ø girl doesn't get dirty.
14. Spaniards have Ø cat instead of a dog.
15. Most people cannot afford Ø computer in college.

Flexible Nouns in Definite-Plural Context

16. We should give the hamburgers that finish first to the kids.
17. People should put the glasses on the table.
18. I have the hairs that I collected from the patients.

Flexible Nouns in Definite-Singular Context

19. In America, the hamburger is a classic food.
20. Most people clean the glass on the door every day.
21. You should put the hair in the bag.

Flexible Nouns in Indefinite Context

22. Most Americans eat a hamburger every day.
23. In Spain, there is a glass that is very expensive.
24. It is gross to find a hair in your food.

Flexible Nouns in Zero-Plural Context

25. Eating Ø hamburgers is not healthy.
26. They say that Ø glasses can help you see.
27. There are Ø hairs on the table.

Flexible Nouns in Zero-Singular Context

28. It is not a good idea to eat Ø hamburger daily.
29. It is never good to break Ø glass on the ground.
30. Babies are not born with Ø hair very often.

Uncountable-Object Nouns in Definite-Plural Context

31. People should eat the fruits every day.
32. People put the monies in the bank.
33. In America, the clothings that are donated are dirty.

Uncountable-Object Nouns in Definite-Singular Context

34. It is good to have the fruit from your garden.
35. You should put the money that you got in the bank.
36. Sometimes the clothing needs to be cleaned.

Uncountable-Object Nouns in Indefinite Context

37. People eat a fruit in the morning.
38. Most people have a money at their house.
39. People have a clothing in their closet.

Uncountable-Object Nouns in Zero-Plural Context

40. Most people like Ø fruits from the store.
41. Everyone should donate Ø monies to charity.
42. Most people have Ø clothings in their closet.

Uncountable-Object Nouns in Zero-Singular Context

43. Americans eat Ø fruit with every meal.
44. People should save Ø money for college.
45. It is too expensive to buy Ø clothing often.

Uncountable-Substance Nouns in Definite-Plural Context

46. Some people eat the rices from China for breakfast.
47. People put the cinnamons in their ice cream.
48. People put the ices in the freezer.

Uncountable-Substance Nouns in Definite-Singular Context

49. Most people use the rice from China to cook.
50. I usually keep the cinnamon in the cabinet.
51. It is common to buy the ice for parties at the store.

Uncountable-Substance Nouns in Indefinite Context

52. In China, a rice is served with dinner.
53. Kids like a cinnamon in their milk.
54. Spaniards don't like an ice in their coffee.

Uncountable-Substance Nouns in Zero-Plural Context

55. Most people eat Ø rices in the afternoon.
56. Some people like Ø cinnamons in cookies.
57. In China, they don't put Ø ices in their drinks.

Uncountable-Substance Nouns in Zero-Singular Context

58. It is common to have Ø rice with chicken.
59. Other people don't like Ø cinnamon in their cookies.
60. In America, people put Ø ice in their water.

Appendix G: Acceptability Judgment Task Stimuli

G.1 | Practice Items

1. This is a practice sentence that uses good grammar.
2. This is another practice sentence but no grammar is not the good kind.
3. She always does not do her homework on time.
4. I like to think that we might could buy some things for the house.
5. They go to the grocery store on Fridays.

G.2 | Pre-Test Tokens

Countable Nouns in Definite-Plural Context

1. The boys looked at their mom with those sad eyes.
2. Do you know where the doors for the project are?
3. The books on my desk are for studying.

Countable Nouns in Definite-Singular Context

4. The boy would go out of his way to walk home safely.
5. I could see the door from the table.
6. The book is entertaining and I recommend you read it!

Countable Nouns in Indefinite Context

7. There is a boy sitting on the ground with his hands on his head.
8. Every three steps there was a door and I could not find my way around.
9. I have to buy a book for my new class that starts tomorrow.

Countable Nouns in Zero-Plural Context

10. Ø Boys may be influenced by their fathers.
11. There were Ø doors on all sides of the building.
12. Ø Books come in all different shapes and sizes.

Countable Nouns in Zero-Singular Context

13. There was Ø boy on the ground.
14. Ø Door was in the middle of the room because the building had caught on fire.
15. When I arrived in the room, Ø book was all over the desk.

Flexible Nouns in Definite-Plural Context

16. The chocolates from Switzerland are for us.
17. We have the stones for the project, but I think we need more.
18. They have the strings on the table over there.

Flexible Nouns in Definite-Singular Context

19. We need the chocolate to finish baking the cake.
20. The stone is ready to be used.
21. The string is in the cabinet.

Flexible Nouns in Indefinite Context

22. They want a chocolate.
23. I have a stone for him.
24. She has a string for you to hang up the picture.

Flexible Nouns in Zero-Plural Context

25. She bought Ø chocolates for everyone in the office.
26. There are Ø stones in the garden, so pick the one you like best.
27. Do you have Ø strings for the project?

Flexible Nouns in Zero-Singular Context

28. I have Ø chocolate for you since it is your birthday.
29. Do you have Ø stone for the path?
30. Cats can be entertained for hours by playing with Ø string.

Uncountable-Object Nouns in Definite-Plural Context

31. Do you think the furnitures belong to them?
32. I am so angry because the postman does not sort the mails properly.
33. The traffics on Main Street caused him to arrive late.

Uncountable-Object Nouns in Definite-Singular Context

34. They have the furniture in the garage.
35. Last week the postman delivered the mail on Sunday.
36. Today, the traffic in the city center was thinner than usual.

Uncountable-Object Nouns in Indefinite Context

37. We have a furniture in that room.
38. I need to go to the Post Office to send a mail to my mother.
39. People turn when they see there is a traffic.

Uncountable-Object Nouns in Zero-Plural Context

40. I could not understand why Ø furnitures were spread all over the room.
41. While on vacation, the Post Office did not deliver any Ø mails.
42. Ø Traffics in this city cause people to be late to work.

Uncountable-Object Nouns in Zero-Singular Context

43. Would you believe me if I told you that I have Ø furniture older than you?
44. Did the postman bring you Ø mail yesterday?
45. There is Ø traffic in Iowa City every time there is a football game.

Uncountable-Substance Nouns in Definite-Plural Context

46. You can dissolve the salts in the water.
47. The toothpastes contain some mint.
48. Have you seen the mustards we got at the store?

Uncountable-Substance Nouns in Definite-Singular Context

49. The salt in the ocean burns our eyes.
50. We would bring the toothpaste to the kids.
51. The mustard that I bought is in the refrigerator.

Uncountable-Substance Nouns in Indefinite Context

52. Although they think he is crazy, he puts a salt on everything.
53. There is a toothpaste on the table but I am not sure if it is good.
54. She asked for a mustard for her French fries.

Uncountable-Substance Nouns in Zero-Plural Context

55. Can you bring Ø salts to the table?
56. Ø Toothpastes come in tubes.
57. There are Ø mustards for use over there.

Uncountable-Substance Nouns in Zero-Singular Context

58. People do not worry about Ø salt in their food.
59. Did you use Ø toothpaste this morning?
60. Do you like Ø mustard on your sandwich?

G.3 | Immediate Post-Test Tokens

Countable Nouns in Definite-Plural Context

1. The dogs at my house often lay in the bed.
2. He put the windows together.
3. Would you like to plant the trees here or over there?

Countable Nouns in Definite-Singular Context

4. The dog likes to eat dinner at 6:00pm.
5. The window was open, letting in a very cool winter breeze.
6. I cannot believe the tree fell down during the rainstorm last night.

Countable Nouns in Indefinite Context

7. Many people think that a dog is a good starter pet.
8. A window would be beautiful there.
9. I saw a tree that was taller than the house.

Countable Nouns in Zero-Plural Context

10. Ø Dogs play in the park every day.
11. We were in a large room surrounded by Ø windows.
12. Have you seen Ø trees that are tall and slender?

Countable Nouns in Zero-Singular Context

13. While I was at work, Ø dog got into the garden.
14. There is Ø window over by him.
15. There is beautiful Ø tree in the park.

Flexible Nouns in Definite-Plural Context

16. They ordered the cakes for the party on Sunday.
17. The rocks were in a pile over there yesterday.
18. They have the papers for Wednesday.

Flexible Nouns in Definite-Singular Context

19. The cake is for tomorrow.
20. We were looking for the rock for our path.
21. She gets the paper on Sunday.

Flexible Nouns in Indefinite Context

22. We would like a cake for tomorrow, not Wednesday.
23. Have you seen a rock in the garden?
24. I have a paper that you need to use for your assignment.

Flexible Nouns in Zero-Plural Context

25. Do you know if we should order Ø cakes for the party?
26. There were Ø rocks on the sidewalk in front of the house.
27. Ø Papers are always due on Monday, not Friday.

Flexible Nouns in Zero-Singular Context

28. Would you like Ø cake for dessert?
29. I saw Ø rock on the ground yesterday.
30. Do you have Ø paper to bring to the office?

Uncountable-Object Nouns in Definite-Plural Context

31. Have you seen the luggages?
32. You will not get a mark if you do not complete the homeworks on time.
33. Please put the jewelries back in the box before your mother arrives.

Uncountable-Object Nouns in Definite-Singular Context

34. The man carried in the luggage without us even asking
35. Did you submit the homework on time?
36. I was looking for the jewelry when I found your brush.

Uncountable-Object Nouns in Indefinite Context

37. When I travel to Europe, I only take a luggage.
38. We have a homework due tomorrow.
39. Is there a jewelry you like very much?

Uncountable-Object Nouns in Zero-Plural Context

40. I have Ø luggages to bring with me.
41. Although it is not allowed, they work together to finish Ø homeworks.
42. Her Ø jewelries are very expensive.

Uncountable-Object Nouns in Zero-Singular Context

43. Did you see it in your Ø luggage when you left?
44. Many students do Ø homework on the weekends.
45. She is wearing beautiful Ø jewelry.

Uncountable-Substance Nouns in Definite-Plural Context

46. Where did you put the garlics that we purchased earlier?
47. There are the dirts that we bought earlier.
48. She is looking for the ketchups that are from her mother.

Uncountable-Substance Nouns in Definite-Singular Context

49. Have you seen the garlic that was on the table?
50. I was looking for the dirt when I found something else.
51. Could you pass the ketchup over here?

Uncountable-Substance Nouns in Indefinite Context

52. I need a garlic for the soup that I am making.
53. Do you have a dirt for the garden?
54. If you get a ketchup, can you please share with me?

Uncountable-Substance Nouns in Zero-Plural Context

55. I was looking for Ø garlics to add to the dish.
56. I thought that you could buy Ø dirts at the store.
57. Do you have Ø ketchups for the food later?

Uncountable-Substance Nouns in Zero-Singular Context

58. Do you have Ø garlic for the recipe?
59. We need Ø dirt for the garden.
60. I asked for Ø ketchup but I did not get any.

G.4 | Delayed Post-Test Tokens

Countable Nouns in Definite-Plural Context

1. Skye is friends with the girls who live down the street.
2. I cannot believe she let the cats come into the house like that.
3. The library said the computers were for everyone to use.

Countable Nouns in Definite-Singular Context

4. I was wondering if the girl had found her way to the bus or not.
5. He said the cat that was in the yard belongs to the neighbors.
6. Debbie said the computer on the desk is very big.

Countable Nouns in Indefinite Context

7. When I was on the bus, I saw a girl who looked like she was lost.
8. I have a cat that likes to play with all of the children.
9. I have a computer if you would like to borrow it.

Countable Nouns in Zero-Plural Context

10. I like Ø girls and my brother does, too.
11. She likes to adopt Ø cats from the animal shelter.
12. The school bought Ø computers for every student in their final year.

Countable Nouns in Zero-Singular Context

13. I saw that there was Ø girl in the park earlier.
14. I could not believe Ø cat was in the kitchen.
15. They were looking for Ø computer but they found something else.

Flexible Nouns in Definite-Plural Context

16. Where did you put the hamburgers that I cooked earlier?
17. Can you clean the glasses that are in the sink?
18. I tried the clean the hairs from the floor but it was nearly impossible.

Flexible Nouns in Definite-Singular Context

19. I think the hamburger tastes a little bad.
20. I want you to put the glass in the sink when you are done with it.
21. I like the hair that she has in this scene.

Flexible Nouns in Indefinite Context

22. Would you like to have a hamburger for dinner tonight?
23. Where is a glass that I can use for water?
24. Oh my, I just found a hair in my brownie that I got at the cafeteria.

Flexible Nouns in Zero-Plural Context

25. We should make Ø hamburgers for dinner tonight!
26. I have Ø glasses that can be used for water.
27. There are Ø hairs on the floor that have fallen off of someone.

Flexible Nouns in Zero-Singular Context

28. Do you consider Ø hamburger to be your meat of choice?
29. Why is there Ø glass all over the floor in here?
30. I could not believe that there was Ø hair on the table.

Uncountable-Object Nouns in Definite-Plural Context

31. She had said the fruits were for eating.
32. You said that you put the monies in a safe place.
33. Jeff told me the clothings on the couch were for someone else.

Uncountable-Object Nouns in Definite-Singular Context

34. You can have the fruit for your dessert.
35. Where is the money that I gave you for your birthday?
36. What do you think of the clothing that I bought for my trip?

Uncountable-Object Nouns in Indefinite Context

37. Do you have a fruit for your lunch?
38. There was a money on the floor earlier but somebody picked it up.
39. We saw a clothing on the couch earlier but put in on the table.

Uncountable-Object Nouns in Zero-Plural Context

40. There were Ø fruits on the counter for you to take with you.
41. Did you put Ø monies in the bank like I told you to?
42. I thought that you would be interested in Ø clothings but I was wrong.

Uncountable-Object Nouns in Zero-Singular Context

43. Debbie said she likes to have Ø fruit with her lunch.
44. Tanner does not have Ø money to pay you back.
45. I was looking for Ø clothing when I found the remote.

Uncountable-Substance Nouns in Definite-Plural Context

46. I like the rices that I get when I have Korean food.
47. I was looking for the cinnamons, but in the wrong place.
48. I think the ices will be melted by the time we arrive.

Uncountable-Substance Nouns in Definite-Singular Context

49. Did you get the rice for the recipe?
50. Can you believe the cinnamon was not properly added to the recipe?
51. I like that the ice is already in the cup.

Uncountable-Substance Nouns in Indefinite Context

52. There seemed to be a rice on the plate.
53. Johnathan asked for a cinnamon to be added to his coffee.
54. Do you have an ice for my drink that is outside?

Uncountable-Substance Nouns in Zero-Plural Context

55. They often use Ø rices to stuff the peppers and make dinner.
56. There are not many people who like Ø cinnamons in their hot cocoa.
57. We will need Ø ices for the guests that are coming to our house.

Uncountable-Substance Nouns in Zero-Singular Context

58. She likes to use Ø rice instead of stuffing.
59. There is an abundance of Ø cinnamon in the cupboard.
60. I would like Ø ice in my coffee, please.

Appendix H: Forced-Choice Elicitation Task Stimuli

H.1 | Practice Items

1. *Welcome to the study.*

   This is the first practice item.
2. *What does Joe like to do?*

   Jo likes to go to school
3. *What does he think?*

   He thinks she has pretty hair.
4. *I have Mrs. Kruse!*

   Do you like the teacher?
5. *Do you like Mr. Fink?*

   I cannot stand my math class.

H.2 | Pre-Test Tokens

Countable Nouns in Definite-Plural Context

1. *Which ones do you like?*

   Personally, I think the doors on the left look better.
2. *Which ones do you like?*

   Personally, I think the doors on the left look better.
3. *Did you buy your materials for the class?*

   I cannot remember the books the teacher told us to buy for the class.

Countable Nouns in Definite-Singular Context

4. *I need to paint it!*

   Would you like the door to be blue or red?
5. *I need to paint it!*

   Would you like the door to be blue or red?
6. *I told you how much I liked that one!*

   Where did you put the book that you were telling me about?

Countable Nouns in Indefinite Context

7. *What should we buy for the back of the house?*

   I think we need to buy a door for the back of the house.

8. *What should we buy for the back of the house?*

   I think we need to buy a door for the back of the house.

9. *I have been reading a lot lately.*

   Do you have a book that you would recommend to a young child?

Countable Nouns in Zero-Plural Context

10. *Were you able to find what you were looking for?*

    Yes, the store had Ø doors of all different shapes and sizes.

11. *Were you able to find what you were looking for?*

    Yes, the store had Ø doors of all different shapes and sizes.

12. *How should we make a donation to the orphanage?*

    We can buy and donate Ø books to the children in need.

Flexible Nouns in Definite-Plural Context

13. *Where did you put them?*

    I put the chocolates in the fridge so that they would not melt.

14. *They completed their landscaping this week.*

    Some of the neighbors wondered if the stones were too much for the design.

15. *Where did they go?*

    Tanner said that he took the strings that we cut for our own project! Argh!

Flexible Nouns in Definite-Singular Context

16. *What is wrong?*

    She wonders if the chocolate that we have will be enough for the recipe.

17. *Jane gave the gnomes a gift.*

    The gnomes thought the stone that was given to them looked very nice by their house.

18. *Did you see where he put it?*

    The string that I bought yesterday seems to have disappeared.

Flexible Nouns in Indefinite Context

19. *Did you talk to Steven?*

    Yes, he recommended a chocolate that was made in France. Yummy!

20. *Skye just finished her gnome garden.*

    Chad said that a stone would be a nice addition to the gnome garden.

21. *We need to do something to make this look better.*

    Would it be better if we added a string to the end of this?

Flexible Nouns in Zero-Plural Context

22. *What does John do?*

    He sells Ø chocolates at the store down the street.

23. *They said that Skye wanted to use more materials.*

    Skye forgot that she could use Ø stones for her art project.

24. *The house looks so clean!*

    There were Ø strings on the floor before I cleaned the house.

Flexible Nouns in Zero-Singular Context

25. *Did you read the recipe?*

    The recipe requires that we use Ø chocolate for the desserts.

26. *The city wanted to make the park look very nice.*

    They spent a lot of money on Ø stone for the new park.

27. *Did he say he needed more material?*

    He had said that he needed Ø string to finish the blanket he was making.

Uncountable-Object Nouns in Definite-Singular Context

28. *What were you looking for earlier today?*

    I was at the storage unit looking for the furniture I need for the spare bedroom.

29. *Did you call the post office about our trip?*

    We should have the Post Office hold the mail while we are gone for a week.

30. *Why were you late today?*

    The traffic on Liberty Street always causes congestion for over 10 blocks.

Uncountable-Object Nouns in Zero-Singular Context

31. *What do you think of the room?*

    This room is just full of beautiful Ø furniture.
32. *Did they deliver anything today?*

    Since today is a holiday we will probably not get Ø mail.
33. *They really need to make the lanes on Main Street bigger!*

    I cannot believe Ø traffic on Main Street always blocks the intersections.

Uncountable-Substance Nouns in Definite-Singular Context

34. *Are you looking for something?*

    Where did you put the salt? I cannot find it.
35. *Where did you put it after you finished brushing your teeth?*

    I thought I put the toothpaste on the counter when I was finished.
36. *Where is it?*

    John said that the mustard was in the refrigerator.

Uncountable-Substance Nouns in Zero-Singular Context

37. *Jeffrey does not like French fries that taste plain.*

    Jeffrey often orders Ø salt on his fries when he is at restaurants.
38. *I already brushed my teeth.*

    Did you put Ø toothpaste on your toothbrush before brushing your teeth?
39. *Does she need anything?*

    Chelsea would like Ø mustard for her sandwich, please.

H.3 | Immediate Post-Test Tokens

Countable Nouns in Definite-Plural Context

1. *Have you tried training them?*

   I would like to think the dogs would behave if we trained them properly.
2. *What is the outside going to look like?*

   Well, I really think that the windows should go on the sides.
3. *What did Tanner say?*

   Tanner said the trees in the park looked very nice today.

Countable Nouns in Definite-Singular Context

4. *I would really like to get a pet for the kids.*

   Do you think the dog we saw yesterday would behave?

5. *I think it should go over here.*

   Do you think that is a good place for the window we bought?

6. *Where did she say we should put it?*

   She thinks that we should put the tree from the garden right there.

Countable Nouns in Indefinite Context

7. *What do you think about getting a pet for the kids?*

   I do not know if our kids are ready for a dog or not.

8. *There should be more natural light.*

   I agree. I think that a window would look very nice on the front.

9. *Do you think they are missing something?*

   I wonder if a tree would look nice.

Countable Nouns in Zero-Plural Context

10. *Have you seen any for adoption?*

    There is someone down the street selling Ø dogs. We should get one!

11. *The outside should be more beautiful.*

    We should get Ø windows for the garden shed.

12. *What do you think of the neighborhood?*

    I think the streets lined with Ø trees are very beautiful.

Flexible Nouns in Definite-Plural Context

13. *What did you think of the food?*

    Jeff said that the cakes from the store yesterday were a little dry.

14. *I need you to unload everything.*

    Where should the rocks from the park be put?

15. *Did the fire destroy them?*

    Yes, the company said that the papers had been destroyed in the fire.

Flexible Nouns in Definite-Singular Context

16. *Did Chad have a good birthday?*

    Chad said he really liked the cake that we got him very much.

17. *We need to order more building materials.*

    I think we should get the rock we need from the store in Coralville.

18. *Do they ever check the news?*

    Yeah, they ordered the paper that comes weekly, but they have yet to receive it.

Flexible Nouns in Indefinite Context

19. *Do we need anything from the store?*

    The office said that we need a cake for a party on Friday.

20. *I do not know where the path actually starts.*

    Should we put a rock to identify the start of the path?

21. *What is Skye looking for?*

    She is looking for a paper about learning English.

Flexible Nouns in Zero-Plural Context

22. *I think there are going to be a lot of people at the party.*

    Do you think we should order Ø cakes?

23. *When it rains, the path nearly washes out.*

    I wonder if Ø rocks would make the path more solid.

24. *Did I forget to shut the window in the office?*

    Yes, there were Ø papers all over the place.

Flexible Nouns in Zero-Singular Context

25. *Did she like the food?*

    She was happy to have Ø cake that was vanilla flavored.

26. *What do you think would look nice in the garden?*

    She said that they wanted to use Ø rock instead of grass for the garden.

27. *What is wrong?*

    The printer says it needs Ø paper.

Uncountable-Object Nouns in Definite-Singular Context

28. *Did they say where it is?*

    They said that the luggage had been put on the wrong flight.

29. *Do we have a test this week?*

    No, but do not forget that the homework that was assigned on Monday is due on Friday.

30. *What did Dani have to say?*

    She said that the jewelry at this particular store was stunning and inexpensive.

Uncountable-Object Nouns in Zero-Singular Context

31. *Did you talk to the airline?*

    The airline said that Ø luggage must be under 50 pounds.

32. *Is it really that surprising?*

    I cannot believe your teacher assigned Ø homework for this holiday break.

33. *I cannot believe you are going to buy me a gift!*

    Do you like to wear Ø jewelry often?

Uncountable-Substance Nouns in Definite-Singular Context

34. *What were you looking for?*

    I was looking for the garlic that we bought at the store earlier today.

35. *How should we fill this hole?*

    I think we should get the dirt that we took from the garden.

36. *Would you like something?*

    Can you please pass the ketchup to me?

Uncountable-Substance Nouns in Zero-Singular Context

37. *Do they need something?*

    They will need Ø garlic for the pasta they are making.

38. *I want to start a garden!*

    Do you have Ø dirt to plant vegetables in?

39. *I need some condiments!*

    Do you want Ø ketchup with your dinner?

H.4 | Delayed Post-Test Tokens

Countable Nouns in Definite-Plural Context

1. *You can invite two friends to dinner.*

   Can I invite the girls from the park?

2. *What are they doing?*

   I am not sure! I have never seen the cats act like this.

3. *What did they say at the school board meeting?*

   They said that the computers cost the school nearly 1,000 dollars.

Countable Nouns in Definite-Singular Context

4. *What did Debbie say?*

   Debbie said the girl that she saw this morning looked angry.

5. *Did he see my little cutie?*

   Yes, he said he saw the cat sitting on the couch.

6. *Is he getting along well?*

   He does not like to use the computer that we provide for him.

Countable Nouns in Indefinite Context

7. *Did Tamar see anyone around?*

   Tamar said there was a girl sitting on the steps of the house.

8. *I need a pet that is easy to take care of.*

   Would you be happy with a cat that does not eat often?

9. *Why is Tanner so happy?*

   He bought a computer at the store today!

Countable Nouns in Zero-Plural Context

10. *John, what do you think about this?*

    Well, I think Ø girls spend too much time on their hair.

11. *I have all different kinds of pets.*

    Do you have Ø cats that like to eat soft food only?

12. *What do you think of the new policy?*

    I absolutely agree. Ø computers are too distracting for the students.

Flexible Nouns in Definite-Plural Context

13. *Thank you for dinner. Those were fantastic!*

    Do you like the hamburgers that we made for the cookout?

14. *Do you like everything that you bought?*

    I think the glasses that we bought from the discount store are very nice.

15. *This house was such a mess!*

    Chad said the hairs that were on the table were from the pets that were here.

Flexible Nouns in Definite-Singular Context

16. *I do not think I like this meat.*

    Next time we should buy the hamburger that is from local farms.

17. *Oh my, did it break?*

    Yes, Skye said the glass fell off the table.

18. *I love the new haircut!*

    Good! It is the hair that I wanted!

Flexible Nouns in Indefinite Context

19. *I like to eat sandwiches. That's for sure!*

    Would you consider a hamburger to be your sandwich of choice?

20. *Did he say something?*

    He was asking for a glass that he could put some soup in.

21. *What happened?*

    Debbie said there was a hair in the cookie that she was eating for dessert.

Flexible Nouns in Zero-Plural Context

22. *Do you have any food preferences on the weekends?*

    Debbie does not like Ø hamburgers on the weekends.

23. *What an outrageous price!*

    I did not know that Ø glasses were that expensive.

24. *What is wrong with the blanket?*

    Skye said there were Ø hairs all over the blanket.

Flexible Nouns in Zero-Singular Context

25. *What do you prefer?*

    I prefer to eat Ø hamburger instead of chicken sometimes.

26. *Oh, no! What happened to his foot?*

    Tanner said that there was Ø glass on the ground and he accidentally stepped in it.

27. *This restaurant needs to be shutdown.*

    There should not be Ø hair in the food.

Uncountable-Object Nouns in Definite-Singular Context

28. *Did they lose something?*

    They were looking for the fruit that they bought.

29. *I cannot believe I lost it!*

    I thought giving you the money from earlier was a good idea, but I was wrong.

30. *I like these new dry fit shirts.*

    They designed the clothing so that it would not get so warm in the summer.

Uncountable-Object Nouns in Zero-Singular Context

31. *Did you pay attention to the talk?*

    They said Ø fruit has a lot of sugar but little fat.

32. *I got a lot of cards in the mail.*

    Did you get Ø money from your mother for your birthday?

33. *How often do people donate?*

    Chad said that Ø clothing is only worn once before donating it.

Uncountable-Substance Nouns in Definite-Singular Context

34. *Did she like the food at the new restaurant?*

    She said the rice that she had with her dinner was cold.

35. *What is she looking for?*

    She is looking for the cinnamon that she bought at the store.

36. *Do you think we need to buy a new cooler?*

    It would be best if the ice was not going to melt during the trip.

Uncountable-Substance Nouns in Zero-Singular Context

37. *These prices are unbelievable!*

    Can you believe that Ø rice is so expensive in this store?

38. *I would like toast for breakfast.*

    Would you like Ø cinnamon on your toast?

39. *What did the police officers say?*

    They said that there was Ø ice all over the road.

Appendix I: Statistical Models for Research Question 1

Table I.1. LMER output for ESIT – RQ1, definite-singular context

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (L1:Mandarin, Noun_Type:Object)	1.46	0.09	28.00	1.28	1.64	15.47	0.0000
L1:English	0.29	0.11	123.35	0.09	0.50	2.69	0.0081
Noun_Type:Count	0.35	0.13	27.54	0.11	0.60	2.75	0.0104
Noun_Type:Substance	0.09	0.13	27.54	-0.15	0.34	0.73	0.4700
L1:English*Noun_Type:Count	-0.12	0.14	132.85	-0.40	0.13	-0.90	0.3703
L1:English*Noun_Type:Substance	-0.06	0.14	132.85	-0.32	0.21	-0.41	0.6829

Table I.2. LMER output for ESIT – RQ1, definite-singular context

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (L1:Mandarin, Noun_Type:Object)	1.76	0.06	29.81	1.64	1.88	27.72	0.0000
L1:English	0.24	0.08	128.26	0.09	0.39	3.07	0.0026
Noun_Type:Count	0.07	0.09	29.08	-0.10	0.23	0.76	0.4529
Noun_Type:Substance	0.02	0.09	29.08	-0.15	0.18	0.20	0.8456
L1:English*Noun_Type:Count	-0.07	0.11	130.66	-0.27	0.14	-0.63	0.5296
L1:English*Noun_Type:Substance	-0.03	0.11	130.66	-0.23	0.17	-0.28	0.7782

Table I.3. LMER output for ESIT – RQ1, indefinite-singular context

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept (L1:Mandarin, Noun_Type:Object)	1.34	0.08	24.24	1.18	1.49	16.40	0.0000
L1:English	0.47	0.09	113.03	0.30	0.65	5.15	0.0000
Noun_Type:Count	0.36	0.11	23.83	0.15	0.57	3.16	0.0043
Noun_Type:Substance	0.09	0.11	23.83	-0.13	0.30	0.78	0.4421
L1:English*Noun_Type:Count	-0.17	0.12	113.76	-0.42	0.06	-1.39	0.1661
L1:English*Noun_Type:Substance	-0.14	0.12	113.76	-0.37	0.11	-1.13	0.2595

Table I.4. LMER output for ESIT – RQ1, zero-plural context

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept (L1:Mandarin, Noun_Type:Object)	1.38	0.10	33.33	1.19	1.57	13.70	0.0000
L1:English	0.48	0.11	153.63	0.28	0.69	4.51	0.0000
Noun_Type:Count	0.41	0.14	33.18	0.15	0.66	2.98	0.0054
Noun_Type:Substance	0.06	0.13	31.06	-0.18	0.31	0.48	0.6366
L1:English*Noun_Type:Count	-0.26	0.14	187.13	-0.53	0.00	-1.93	0.0548
L1:English*Noun_Type:Substance	-0.25	0.13	172.03	-0.51	0.01	-1.87	0.0630

Table I.5. LMER output for ESIT – RQ1, zero-singular context

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept (L1:Mandarin, Noun_Type:Object)	1.56	0.06	20.05	1.44	1.67	24.55	0.0000
L1:English	0.45	0.09	104.24	0.28	0.61	5.13	0.0000
Noun_Type:Count	0.07	0.09	18.78	-0.10	0.23	0.77	0.4493
Noun_Type:Substance	-0.08	0.10	19.31	-0.26	0.10	-0.81	0.4257
L1:English*Noun_Type:Count	-0.21	0.12	100.26	-0.42	0.02	-1.76	0.0808
L1:English*Noun_Type:Substance	0.05	0.12	78.29	-0.19	0.29	0.41	0.6860

Table I.6. LMER output for AJT – RQ1, definite-plural context

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept (L1:Mandarin, Noun_Type:Object)	5.31	0.18	17.69	4.96	5.65	28.73	0.0000
L1:English	-2.89	0.28	157.42	-3.42	-2.34	-10.28	0.0000
Noun_Type:Count	-0.74	0.23	12.37	-1.17	-0.30	-3.16	0.0079
Noun_Type:Substance	-0.02	0.23	12.37	-0.47	0.43	-0.08	0.9342
L1:English*Noun_Type:Count	4.44	0.33	144.31	3.81	5.08	13.44	0.0000
L1:English*Noun_Type:Substance	-0.08	0.33	144.31	-0.75	0.53	-0.25	0.8038

Table I.7. LMER output for AJT – RQ1, definite-singular context

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (L1:Mandarin, Noun_Type:Object)	4.95	0.24	23.74	4.49	5.42	20.34	0.0000
L1:English	1.12	0.30	166.56	0.55	1.71	3.71	0.0003
Noun_Type:Count	-0.33	0.33	21.82	-0.94	0.29	-1.00	0.3285
Noun_Type:Substance	0.34	0.33	21.82	-0.27	0.96	1.06	0.3028
L1:English*Noun_Type:Count	0.58	0.38	174.37	-0.15	1.31	1.52	0.1294
L1:English*Noun_Type:Substance	-0.13	0.38	174.37	-0.87	0.59	-0.33	0.7420

Table I.8. LMER output for AJT – RQ1, indefinite-singular context

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (L1:Mandarin, Noun_Type:Object)	4.79	0.32	29.78	4.18	5.41	15.05	0.0000
L1:English	-1.98	0.33	199.99	-2.65	-1.35	-5.99	0.0000
Noun_Type:Count	0.23	0.43	29.06	-0.61	1.06	0.54	0.5940
Noun_Type:Substance	-0.57	0.43	29.06	-1.39	0.24	-1.33	0.1930
L1:English*Noun_Type:Count	3.25	0.42	247.11	2.45	4.10	7.73	0.0000
L1:English*Noun_Type:Substance	0.48	0.42	247.11	-0.33	1.29	1.15	0.2510

Table I.9. LMER output for AJT – RQ1, zero-plural context

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept (L1:Mandarin, Noun_Type:Object)	4.67	0.25	9.58	4.22	5.10	18.75	0.0000
L1:English	-2.34	0.30	84.62	-2.90	-1.77	-7.68	0.0000
Noun_Type:Count	0.63	0.33	8.72	0.04	1.21	1.89	0.0918
Noun_Type:Substance	0.10	0.33	8.72	-0.49	0.70	0.30	0.7705
L1:English*Noun_Type:Count	3.24	0.38	79.74	2.53	3.94	8.59	0.0000
L1:English*Noun_Type:Substance	-0.40	0.38	79.74	-1.15	0.27	-1.07	0.2867

Table I.10. LMER output for AJT – RQ1, zero-singular context

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept (L1:Mandarin, Noun_Type:Object)	4.84	0.40	27.23	4.08	5.59	12.00	0.0000
L1:English	1.55	0.36	222.83	0.87	2.25	4.34	0.0000
Noun_Type:Count	-0.40	0.54	25.99	-1.41	0.61	-0.75	0.4620
Noun_Type:Substance	0.93	0.54	25.99	-0.08	1.94	1.73	0.0958
L1:English*Noun_Type:Count	-2.37	0.43	389.78	-3.20	-1.52	-5.48	0.0000
L1:English*Noun_Type:Substance	-0.73	0.43	389.78	-1.56	0.11	-1.69	0.0923

Table I.11. LMER output for FCET – RQ1, definite-singular context

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept (L1:Mandarin, Noun_Type:Count)	1.35	0.13	11.40	1.10	1.61	10.61	0.0000
L1:English	0.36	0.13	45.33	0.11	0.61	2.82	0.0072

Table I.12. LMER output for FCET – RQ1, definite-plural context

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept (L1:Mandarin, Noun_Type:Object)	1.15	0.10	30.32	0.96	1.34	11.39	0.0000
L1:English	0.74	0.12	109.90	0.51	0.97	6.22	0.0000
Noun_Type:Count	0.36	0.13	29.25	0.11	0.61	2.67	0.0123
Noun_Type:Substance	0.31	0.13	29.25	0.05	0.56	2.27	0.0308
L1:English*Noun_Type:Count	-0.54	0.15	114.88	-0.83	-0.26	-3.61	0.0005
L1:English*Noun_Type:Substance	-0.20	0.15	114.88	-0.49	0.08	-1.35	0.1790

Table I.13. LMER output for FCET – RQ1, indefinite-singular context

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept (L1:Mandarin, Noun_Type:Count)	1.20	0.15	9.46	0.90	1.49	8.23	0.0000
L1:English	0.54	0.18	32.34	0.20	0.88	3.07	0.0043

Table I.14. LMER output for FCET – RQ1, zero-plural context

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept (L1:Mandarin, Noun_Type:Count)	1.41	0.09	4.38	1.16	1.58	15.72	0.0001
L1:English	-0.08	0.13	24.16	-0.35	0.22	-0.60	0.5570

Table I.15. LMER output for FCET – RQ1, zero-singular context

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept (L1:Mandarin, Noun_Type:Object)	0.91	0.09	13.10	0.74	1.08	9.95	0.0000
L1:English	0.58	0.11	51.61	0.37	0.80	5.10	0.0000
Noun_Type:Substance	0.31	0.12	11.83	0.09	0.53	2.69	0.0199
L1:English*Noun_Type:Substance	-0.12	0.13	48.07	-0.38	0.12	-0.95	0.3470

Appendix J: Statistical Models for Research Question 2

Table J.1. LMER output for ESIT – RQ2, definite-plural context (LING learners)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T0, Noun_Type:Object)	1.36	0.12	20.78	1.15	1.57	10.96	0.0000
Testing_Time:T1	0.39	0.17	23.45	0.10	0.68	2.35	0.0274
Testing_Time:T2	0.26	0.17	20.30	-0.04	0.55	1.47	0.1569
Noun_Type:Count	0.54	0.17	20.30	0.25	0.84	3.13	0.0052
Noun_Type:Substance	0.09	0.17	20.30	-0.21	0.38	0.51	0.6146
Testing_Time:T1*Noun_Type:Count	-0.36	0.24	24.05	-0.76	0.05	-1.52	0.1427
Testing_Time:T2*Noun_Type:Count	-0.32	0.25	20.30	-0.74	0.10	-1.31	0.2046
Testing_Time:T1*Noun_Type:Substance	-0.09	0.24	23.06	-0.50	0.31	-0.38	0.7071
Testing_Time:T2*Noun_Type:Substance	-0.38	0.25	20.30	-0.80	0.04	-1.54	0.1398

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T1, Noun_Type:Object)	1.75	0.11	28.94	1.55	1.94	15.29	0.0000
Testing_Time:T0	-0.39	0.17	23.45	-0.68	-0.10	-2.35	0.0274
Testing_Time:T2	-0.14	0.17	23.45	-0.42	0.15	-0.83	0.4174
Noun_Type:Count	0.19	0.16	30.08	-0.09	0.46	1.18	0.2459
Noun_Type:Substance	0.00	0.16	27.02	-0.28	0.27	-0.01	0.9930
Testing_Time:T0*Noun_Type:Count	0.36	0.24	24.05	-0.05	0.76	1.52	0.1427
Testing_Time:T2*Noun_Type:Count	0.03	0.24	24.05	-0.37	0.44	0.15	0.8848
Testing_Time:T0*Noun_Type:Substance	0.09	0.24	23.06	-0.31	0.50	0.38	0.7071
Testing_Time:T2*Noun_Type:Substance	-0.29	0.24	23.06	-0.69	0.12	-1.21	0.2383

Table J.2. LMER output for ESIT – RQ2, definite-singular context (LING learners)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T0, Noun_Type:Object)	1.36	0.12	20.78	1.15	1.57	10.96	0.0000
Testing_Time:T1	-0.01	0.12	16.29	-0.19	0.21	-0.08	0.9370
Testing_Time:T2	0.17	0.12	14.32	-0.03	0.36	1.37	0.1930
Noun_Type:Count	0.08	0.12	14.32	-0.12	0.28	0.64	0.5340
Noun_Type:Substance	0.07	0.12	14.32	-0.13	0.26	0.55	0.5930
Testing_Time:T1*Noun_Type:Count	0.08	0.17	16.64	-0.22	0.33	0.48	0.6380
Testing_Time:T2*Noun_Type:Count	-0.16	0.17	14.32	-0.44	0.12	-0.90	0.3820
Testing_Time:T1*Noun_Type:Substance	0.11	0.17	16.06	-0.18	0.37	0.68	0.5090
Testing_Time:T2*Noun_Type:Substance	-0.10	0.17	14.32	-0.38	0.18	-0.58	0.5710

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T1, Noun_Type:Object)	1.75	0.11	28.94	1.55	1.94	15.29	0.0000
Testing_Time:T0	0.01	0.12	16.29	-0.21	0.19	0.08	0.9370
Testing_Time:T2	0.18	0.12	16.29	-0.04	0.35	1.49	0.1560
Noun_Type:Count	0.16	0.11	20.08	-0.06	0.33	1.39	0.1800
Noun_Type:Substance	0.18	0.12	18.42	-0.04	0.35	1.56	0.1350
Testing_Time:T0*Noun_Type:Count	-0.08	0.17	16.64	-0.33	0.22	-0.48	0.6380
Testing_Time:T2*Noun_Type:Count	-0.24	0.17	16.64	-0.49	0.06	-1.41	0.1760
Testing_Time:T0*Noun_Type:Substance	-0.11	0.17	16.06	-0.37	0.18	-0.68	0.5090
Testing_Time:T2*Noun_Type:Substance	-0.21	0.17	16.06	-0.47	0.08	-1.27	0.2220

Table J.3. LMER output for ESIT – RQ2, indefinite-singular context (LING learners)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T0, Noun_Type:Object)	1.36	0.12	20.78	1.15	1.57	10.96	0.0000
Testing_Time:T1	0.25	0.14	16.16	0.03	0.47	1.84	0.0843
Testing_Time:T2	0.42	0.14	14.18	0.19	0.65	3.00	0.0094
Noun_Type:Count	0.52	0.14	14.18	0.29	0.75	3.71	0.0023
Noun_Type:Substance	0.07	0.14	14.18	-0.16	0.29	0.47	0.6426
Testing_Time:T1*Noun_Type:Count	-0.07	0.19	15.93	-0.38	0.26	-0.35	0.7300
Testing_Time:T2*Noun_Type:Count	-0.27	0.20	14.18	-0.59	0.06	-1.34	0.2010
Testing_Time:T1*Noun_Type:Substance	0.07	0.19	16.52	-0.23	0.40	0.38	0.7083
Testing_Time:T2*Noun_Type:Substance	-0.11	0.20	14.18	-0.43	0.21	-0.56	0.5851

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T1, Noun_Type:Object)	1.75	0.11	28.94	1.55	1.94	15.29	0.0000
Testing_Time:T0	-0.25	0.14	16.16	-0.47	-0.03	-1.84	0.0843
Testing_Time:T2	0.17	0.14	16.16	-0.05	0.40	1.26	0.2261
Noun_Type:Count	0.45	0.13	18.33	0.24	0.68	3.43	0.0029
Noun_Type:Substance	0.14	0.13	20.04	-0.06	0.37	1.07	0.2971
Testing_Time:T0*Noun_Type:Count	0.07	0.19	15.93	-0.26	0.38	0.35	0.7300
Testing_Time:T2*Noun_Type:Count	-0.20	0.19	15.93	-0.52	0.11	-1.03	0.3188
Testing_Time:T0*Noun_Type:Substance	-0.07	0.19	16.52	-0.40	0.23	-0.38	0.7083
Testing_Time:T2*Noun_Type:Substance	-0.18	0.19	16.52	-0.51	0.12	-0.96	0.3510

Table J.4. LMER output for ESIT – RQ2, zero-plural context (LING learners)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T0, Noun_Type:Object)	1.36	0.12	20.78	1.15	1.57	10.96	0.0000
Testing_Time:T1	0.27	0.14	21.20	0.02	0.51	1.91	0.0705
Testing_Time:T2	0.27	0.15	19.28	0.02	0.52	1.81	0.0858
Noun_Type:Count	0.50	0.15	19.28	0.25	0.75	3.40	0.0030
Noun_Type:Substance	0.10	0.14	19.28	-0.14	0.33	0.71	0.4888
Testing_Time:T1*Noun_Type:Count	-0.16	0.20	21.27	-0.50	0.19	-0.81	0.4261
Testing_Time:T2*Noun_Type:Count	-0.17	0.21	19.28	-0.52	0.19	-0.80	0.4334
Testing_Time:T1*Noun_Type:Substance	-0.24	0.20	21.42	-0.56	0.10	-1.20	0.2442
Testing_Time:T2*Noun_Type:Substance	-0.49	0.20	19.28	-0.83	-0.15	-2.41	0.0261

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T1, Noun_Type:Object)	1.75	0.11	28.94	1.55	1.94	15.29	0.0000
Testing_Time:T0	-0.27	0.14	21.20	-0.51	-0.02	-1.91	0.0705
Testing_Time:T2	-0.01	0.14	21.20	-0.24	0.24	-0.05	0.9611
Noun_Type:Count	0.34	0.14	23.85	0.11	0.59	2.40	0.0248
Noun_Type:Substance	-0.14	0.14	23.85	-0.37	0.11	-0.99	0.3342
Testing_Time:T0*Noun_Type:Count	0.16	0.20	21.27	-0.19	0.50	0.81	0.4261
Testing_Time:T2*Noun_Type:Count	0.00	0.20	21.27	-0.36	0.33	-0.01	0.9930
Testing_Time:T0*Noun_Type:Substance	0.24	0.20	21.42	-0.10	0.56	1.20	0.2442
Testing_Time:T2*Noun_Type:Substance	-0.25	0.20	21.27	-0.60	0.09	-1.24	0.2302

Table J.5. LMER output for ESIT – RQ2, zero-singular context (LING learners)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>∣t∣)
Intercept (Testing_Time:T0, Noun_Type:Object)	1.36	0.12	20.78	1.15	1.57	10.96	0.0000
Testing_Time:T1	0.31	0.15	17.36	0.06	0.56	2.05	0.0553
Testing_Time:T2	0.37	0.16	15.55	0.11	0.62	2.36	0.0319
Noun_Type:Count	-0.08	0.16	15.55	-0.33	0.18	-0.50	0.6241
Noun_Type:Substance	-0.19	0.17	15.55	-0.47	0.10	-1.09	0.2941
Testing_Time:T1*Noun_Type:Count	-0.13	0.21	17.05	-0.47	0.24	-0.61	0.5533
Testing_Time:T2*Noun_Type:Count	-0.29	0.22	15.55	-0.65	0.07	-1.31	0.2082
Testing_Time:T1*Noun_Type:Substance	0.18	0.22	18.62	-0.18	0.56	0.79	0.4390
Testing_Time:T2*Noun_Type:Substance	0.01	0.23	15.55	-0.37	0.39	0.05	0.9626

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>∣t∣)
Intercept (Testing_Time:T1, Noun_Type:Object)	1.75	0.11	28.94	1.55	1.94	15.29	0.0000
Testing_Time:T0	-0.31	0.15	17.36	-0.56	-0.06	-2.05	0.0553
Testing_Time:T2	0.06	0.15	17.36	-0.19	0.31	0.37	0.7150
Noun_Type:Count	-0.21	0.15	18.97	-0.44	0.05	-1.40	0.1769
Noun_Type:Substance	-0.01	0.14	25.44	-0.24	0.23	-0.09	0.9320
Testing_Time:T0*Noun_Type:Count	0.13	0.21	17.05	-0.24	0.47	0.61	0.5533
Testing_Time:T2*Noun_Type:Count	-0.16	0.21	17.05	-0.53	0.18	-0.74	0.4692
Testing_Time:T0*Noun_Type:Substance	-0.18	0.22	18.62	-0.56	0.18	-0.79	0.4390
Testing_Time:T2*Noun_Type:Substance	-0.17	0.21	19.12	-0.52	0.17	-0.79	0.4389

Table J.6. LMER output for AJT – RQ2, definite-plural context (LING learners)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T0, Noun_Type:Object)	4.98	0.26	24.94	4.53	5.42	19.51	0.0000
Testing_Time:T1	-0.27	0.33	18.00	-0.83	0.29	-0.81	0.4273
Testing_Time:T2	-0.17	0.33	18.00	-0.73	0.39	-0.51	0.6179
Noun_Type:Count	-0.74	0.33	18.00	-1.30	-0.19	-2.27	0.0359
Noun_Type:Substance	0.40	0.33	18.00	-0.16	0.96	1.22	0.2388
Testing_Time:T1*Noun_Type:Count	1.51	0.46	18.00	0.72	2.30	3.26	0.0044
Testing_Time:T2*Noun_Type:Count	0.52	0.46	18.00	-0.27	1.31	1.13	0.2755
Testing_Time:T1*Noun_Type:Substance	-0.93	0.46	18.00	-1.72	-0.14	-2.01	0.0596
Testing_Time:T2*Noun_Type:Substance	-0.53	0.46	18.00	-1.32	0.26	-1.15	0.2657

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T1, Noun_Type:Object)	4.71	0.26	24.94	4.27	5.15	18.47	0.0000
Testing_Time:T0	0.27	0.33	18.00	-0.29	0.83	0.81	0.4273
Testing_Time:T2	0.10	0.33	18.00	-0.46	0.66	0.31	0.7642
Noun_Type:Count	0.77	0.33	18.00	0.21	1.33	2.34	0.0313
Noun_Type:Substance	-0.53	0.33	18.00	-1.09	0.03	-1.62	0.1217
Testing_Time:T0*Noun_Type:Count	-1.51	0.46	18.00	-2.30	-0.72	-3.26	0.0044
Testing_Time:T2*Noun_Type:Count	-0.99	0.46	18.00	-1.78	-0.20	-2.13	0.0472
Testing_Time:T0*Noun_Type:Substance	0.93	0.46	18.00	0.14	1.72	2.01	0.0596
Testing_Time:T2*Noun_Type:Substance	0.40	0.46	18.00	-0.39	1.19	0.86	0.4003

Table J.7. LMER output for AJT – RQ2, definite-singular context (LING learners)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T0, Noun_Type:Object)	4.91	0.32	22.62	4.36	5.46	15.29	0.0000
Testing_Time:T1	0.31	0.43	18.00	-0.41	1.03	0.73	0.4760
Testing_Time:T2	0.53	0.43	18.00	-0.18	1.25	1.25	0.2280
Noun_Type:Count	-0.49	0.43	18.00	-1.21	0.23	-1.15	0.2670
Noun_Type:Substance	0.34	0.43	18.00	-0.37	1.06	0.81	0.4310
Testing_Time:T1*Noun_Type:Count	0.68	0.60	18.00	-0.34	1.69	1.12	0.2770
Testing_Time:T2*Noun_Type:Count	0.40	0.60	18.00	-0.61	1.41	0.66	0.5160
Testing_Time:T1*Noun_Type:Substance	-0.01	0.60	18.00	-1.03	1.00	-0.02	0.9860
Testing_Time:T2*Noun_Type:Substance	-0.81	0.60	18.00	-1.83	0.20	-1.34	0.1960

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T1, Noun_Type:Object)	5.22	0.32	22.62	4.67	5.77	16.26	0.0000
Testing_Time:T0	-0.31	0.43	18.00	-1.03	0.41	-0.73	0.4760
Testing_Time:T2	0.22	0.43	18.00	-0.50	0.94	0.52	0.6090
Noun_Type:Count	0.19	0.43	18.00	-0.53	0.91	0.44	0.6640
Noun_Type:Substance	0.33	0.43	18.00	-0.38	1.05	0.78	0.4450
Testing_Time:T0*Noun_Type:Count	-0.68	0.60	18.00	-1.69	0.34	-1.12	0.2770
Testing_Time:T2*Noun_Type:Count	-0.28	0.60	18.00	-1.29	0.74	-0.46	0.6510
Testing_Time:T0*Noun_Type:Substance	0.01	0.60	18.00	-1.00	1.03	0.02	0.9860
Testing_Time:T2*Noun_Type:Substance	-0.80	0.60	18.00	-1.81	0.21	-1.32	0.2020

Table J.8. LMER output for AJT – RQ2, indefinite-singular context (LING learners)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T0, Noun_Type:Object)	4.82	0.42	20.94	4.10	5.54	11.36	0.0000
Testing_Time:T1	-0.41	0.58	18.00	-1.38	0.56	-0.71	0.4850
Testing_Time:T2	-0.64	0.58	18.00	-1.61	0.32	-1.12	0.2790
Noun_Type:Count	-0.03	0.58	18.00	-1.00	0.93	-0.06	0.9550
Noun_Type:Substance	-0.33	0.58	18.00	-1.30	0.63	-0.58	0.5710
Testing_Time:T1*Noun_Type:Count	0.78	0.82	18.00	-0.59	2.15	0.95	0.3530
Testing_Time:T2*Noun_Type:Count	1.12	0.82	18.00	-0.25	2.49	1.38	0.1860
Testing_Time:T1*Noun_Type:Substance	0.18	0.82	18.00	-1.19	1.55	0.22	0.8300
Testing_Time:T2*Noun_Type:Substance	0.79	0.82	18.00	-0.58	2.16	0.97	0.3470

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T1, Noun_Type:Object)	4.41	0.42	20.94	3.69	5.13	10.39	0.0000
Testing_Time:T0	0.41	0.58	18.00	-0.56	1.38	0.71	0.4850
Testing_Time:T2	-0.23	0.58	18.00	-1.20	0.73	-0.40	0.6910
Noun_Type:Count	0.74	0.58	18.00	-0.22	1.71	1.29	0.2130
Noun_Type:Substance	-0.16	0.58	18.00	-1.12	0.81	-0.27	0.7910
Testing_Time:T0*Noun_Type:Count	-0.78	0.82	18.00	-2.15	0.59	-0.95	0.3530
Testing_Time:T2*Noun_Type:Count	0.34	0.82	18.00	-1.02	1.71	0.42	0.6780
Testing_Time:T0*Noun_Type:Substance	-0.18	0.82	18.00	-1.55	1.19	-0.22	0.8300
Testing_Time:T2*Noun_Type:Substance	0.61	0.82	18.00	-0.76	1.98	0.75	0.4640

Table J.9. LMER output for AJT – RQ2, zero-plural context (LING learners)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept (Testing_Time:T0, Noun_Type:Object)	4.52	0.27	24.71	4.05	4.99	16.55	0.0000
Testing_Time:T1	0.06	0.35	18.00	-0.54	0.65	0.16	0.8768
Testing_Time:T2	0.16	0.35	18.00	-0.44	0.75	0.44	0.6650
Noun_Type:Count	0.76	0.35	18.00	0.16	1.35	2.14	0.0465
Noun_Type:Substance	0.53	0.35	18.00	-0.06	1.13	1.51	0.1486
Testing_Time:T1*Noun_Type:Count	0.42	0.50	18.00	-0.42	1.26	0.85	0.4093
Testing_Time:T2*Noun_Type:Count	0.08	0.50	18.00	-0.76	0.92	0.16	0.8781
Testing_Time:T1*Noun_Type:Substance	-0.74	0.50	18.00	-1.59	0.10	-1.49	0.1536
Testing_Time:T2*Noun_Type:Substance	-0.48	0.50	18.00	-1.32	0.36	-0.96	0.3517

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept (Testing_Time:T1, Noun_Type:Object)	4.58	0.27	24.71	4.11	5.05	16.76	0.0000
Testing_Time:T0	-0.06	0.35	18.00	-0.65	0.54	-0.16	0.8768
Testing_Time:T2	0.10	0.35	18.00	-0.49	0.69	0.28	0.7804
Noun_Type:Count	1.18	0.35	18.00	0.58	1.77	3.33	0.0037
Noun_Type:Substance	-0.21	0.35	18.00	-0.81	0.38	-0.60	0.5577
Testing_Time:T0*Noun_Type:Count	-0.42	0.50	18.00	-1.26	0.42	-0.85	0.4093
Testing_Time:T2*Noun_Type:Count	-0.34	0.50	18.00	-1.19	0.50	-0.69	0.4995
Testing_Time:T0*Noun_Type:Substance	0.74	0.50	18.00	-0.10	1.59	1.49	0.1536
Testing_Time:T2*Noun_Type:Substance	0.27	0.50	18.00	-0.57	1.11	0.53	0.6002

Table J.10. LMER output for AJT – RQ2, zero-singular context (LING learners)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept (Testing_Time:T0, Noun_Type:Object)	4.80	0.38	21.60	4.15	5.45	12.58	0.0000
Testing_Time:T1	0.93	0.51	18.00	0.07	1.80	1.82	0.0863
Testing_Time:T2	0.50	0.51	18.00	-0.36	1.36	0.97	0.3438
Noun_Type:Count	-0.70	0.51	18.00	-1.56	0.16	-1.36	0.1903
Noun_Type:Substance	0.77	0.51	18.00	-0.10	1.63	1.49	0.1533
Testing_Time:T1*Noun_Type:Count	-0.26	0.73	18.00	-1.48	0.96	-0.35	0.7294
Testing_Time:T2*Noun_Type:Count	0.22	0.73	18.00	-1.00	1.44	0.31	0.7635
Testing_Time:T1*Noun_Type:Substance	-0.47	0.73	18.00	-1.69	0.75	-0.64	0.5292
Testing_Time:T2*Noun_Type:Substance	-0.57	0.73	18.00	-1.79	0.65	-0.78	0.4460

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept (Testing_Time:T1, Noun_Type:Object)	5.73	0.38	21.60	5.09	6.38	15.03	0.0000
Testing_Time:T0	-0.93	0.51	18.00	-1.80	-0.07	-1.82	0.0863
Testing_Time:T2	-0.43	0.51	18.00	-1.30	0.43	-0.84	0.4105
Noun_Type:Count	-0.96	0.51	18.00	-1.82	-0.09	-1.86	0.0796
Noun_Type:Substance	0.30	0.51	18.00	-0.56	1.16	0.58	0.5669
Testing_Time:T0*Noun_Type:Count	0.26	0.73	18.00	-0.96	1.48	0.35	0.7294
Testing_Time:T2*Noun_Type:Count	0.48	0.73	18.00	-0.74	1.70	0.66	0.5195
Testing_Time:T0*Noun_Type:Substance	0.47	0.73	18.00	-0.75	1.69	0.64	0.5292
Testing_Time:T2*Noun_Type:Substance	-0.10	0.73	18.00	-1.32	1.12	-0.14	0.8922

Table J.11. LMER output for FCET – RQ2, definite-plural context (LING learners)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept (Testing_Time:T0, Noun_Type:Count)	1.36	0.16	7.46	1.07	1.65	8.49	0.0000
Testing_Time:T1	-0.16	0.21	6.00	-0.54	0.23	-0.73	0.4940
Testing_Time:T2	-0.34	0.21	6.00	-0.73	0.04	-1.61	0.1580

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept (Testing_Time:T1, Noun_Type:Count)	1.20	0.16	7.46	0.91	1.49	7.52	0.0001
Testing_Time:T0	0.16	0.21	6.00	-0.23	0.54	0.73	0.4940
Testing_Time:T2	-0.19	0.21	6.00	-0.58	0.20	-0.89	0.4100

Table J.12. LMER output for FCET – RQ2, definite-singular context (LING learners)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T0, Noun_Type:Object)	1.06	0.17	19.60	0.78	1.33	6.38	0.0000
Testing_Time:T1	0.38	0.23	18.00	0.00	0.76	1.65	0.1161
Testing_Time:T2	0.02	0.23	18.00	-0.36	0.40	0.10	0.9237
Noun_Type:Count	0.50	0.23	18.00	0.12	0.88	2.19	0.0424
Noun_Type:Substance	0.30	0.23	18.00	-0.08	0.68	1.31	0.2064
Testing_Time:T1*Noun_Type:Count	-0.54	0.32	18.00	-1.09	0.00	-1.68	0.1098
Testing_Time:T2*Noun_Type:Count	-0.13	0.32	18.00	-0.67	0.41	-0.41	0.6852
Testing_Time:T1*Noun_Type:Substance	-0.28	0.32	18.00	-0.82	0.26	-0.86	0.4020
Testing_Time:T2*Noun_Type:Substance	-0.08	0.32	18.00	-0.62	0.46	-0.24	0.8128

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T1, Noun_Type:Object)	1.43	0.17	19.60	1.16	1.71	8.67	0.0000
Testing_Time:T0	-0.38	0.23	18.00	-0.76	0.00	-1.65	0.1160
Testing_Time:T2	-0.36	0.23	18.00	-0.74	0.03	-1.55	0.1380
Noun_Type:Count	-0.04	0.23	18.00	-0.43	0.34	-0.19	0.8480
Noun_Type:Substance	0.02	0.23	18.00	-0.36	0.40	0.10	0.9240
Testing_Time:T0*Noun_Type:Count	0.54	0.32	18.00	0.00	1.09	1.68	0.1100
Testing_Time:T2*Noun_Type:Count	0.41	0.32	18.00	-0.13	0.95	1.27	0.2200
Testing_Time:T0*Noun_Type:Substance	0.28	0.32	18.00	-0.26	0.82	0.86	0.4020
Testing_Time:T2*Noun_Type:Substance	0.20	0.32	18.00	-0.34	0.74	0.62	0.5440

Table J.13. LMER output for FCET – RQ2, indefinite-singular context (LING learners)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept (Testing_Time:T0, Noun_Type:Count)	1.22	0.16	7.27	0.93	1.52	7.55	0.0001
Testing_Time:T1	-0.19	0.22	6.00	-0.59	0.21	-0.87	0.4194
Testing_Time:T2	0.41	0.22	6.00	0.01	0.81	1.89	0.1082

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept (Testing_Time:T1, Noun_Type:Count)	1.03	0.16	7.27	0.74	1.33	6.38	0.0003
Testing_Time:T0	0.19	0.22	6.00	-0.21	0.59	0.87	0.4194
Testing_Time:T2	0.60	0.22	6.00	0.20	1.00	2.75	0.0331

Table J.14. LMER output for FCET – RQ2, zero-plural context (LING learners)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept (Testing_Time:T0, Noun_Type:Count)	1.44	0.23	7.33	1.02	1.87	6.24	0.0004
Testing_Time:T1	0.03	0.31	6.00	-0.53	0.60	0.11	0.9181
Testing_Time:T2	-0.28	0.31	6.00	-0.84	0.29	-0.89	0.4062

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept (Testing_Time:T1, Noun_Type:Count)	1.48	0.23	7.33	1.06	1.90	6.38	0.0003
Testing_Time:T0	-0.03	0.31	6.00	-0.60	0.53	-0.11	0.9181
Testing_Time:T2	-0.31	0.31	6.00	-0.88	0.26	-1.00	0.3558

Table J.15. LMER output for FCET – RQ2, zero-singular context (LING learners)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T0, Noun_Type:Object)	0.87	0.12	15.79	0.66	1.08	7.16	0.0000
Testing_Time:T1	0.52	0.16	12.00	0.25	0.80	3.28	0.0066
Testing_Time:T2	0.46	0.16	12.00	0.18	0.73	2.86	0.0143
Noun_Type:Substance	0.36	0.16	12.00	0.08	0.63	2.23	0.0454
Testing_Time:T1*Noun_Type:Substance	-0.19	0.23	12.00	-0.58	0.20	-0.84	0.4180
Testing_Time:T2*Noun_Type:Substance	-0.24	0.23	12.00	-0.63	0.14	-1.09	0.2990

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T1, Noun_Type:Object)	1.39	0.12	15.79	1.18	1.60	11.48	0.0000
Testing_Time:T0	-0.52	0.16	12.00	-0.80	-0.25	-3.28	0.0066
Testing_Time:T2	-0.07	0.16	12.00	-0.34	0.21	-0.42	0.6828
Noun_Type:Substance	0.17	0.16	12.00	-0.11	0.44	1.05	0.3159
Testing_Time:T0*Noun_Type:Substance	0.19	0.23	12.00	-0.20	0.58	0.84	0.4180
Testing_Time:T2*Noun_Type:Substance	-0.06	0.23	12.00	-0.44	0.33	-0.25	0.8093

Table J.16. LMER output for ESIT – RQ2, definite-plural context (TRAD learners)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept (Testing_Time:T0, Noun_Type:Object)	1.41	0.13	21.12	1.19	1.63	10.84	0.0000
Testing_Time:T1	0.19	0.17	16.83	-0.10	0.47	1.08	0.2951
Testing_Time:T2	-0.17	0.18	18.26	-0.48	0.12	-0.98	0.3393
Noun_Type:Count	0.37	0.17	16.83	0.08	0.66	2.16	0.0454
Noun_Type:Substance	0.04	0.17	16.83	-0.25	0.32	0.22	0.8315
Testing_Time:T1*Noun_Type:Count	-0.52	0.24	16.83	-0.92	-0.11	-2.14	0.0474
Testing_Time:T2*Noun_Type:Count	-0.20	0.25	18.23	-0.61	0.23	-0.79	0.4388
Testing_Time:T1*Noun_Type:Substance	-0.11	0.24	16.83	-0.52	0.29	-0.46	0.6525
Testing_Time:T2*Noun_Type:Substance	0.00	0.25	19.34	-0.42	0.43	-0.01	0.9899

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept (Testing_Time:T1, Noun_Type:Object)	1.59	0.13	21.12	1.37	1.81	12.26	0.0000
Testing_Time:T0	-0.19	0.17	16.83	-0.47	0.10	-1.08	0.2951
Testing_Time:T2	-0.36	0.18	18.26	-0.66	-0.07	-2.03	0.0567
Noun_Type:Count	-0.15	0.17	16.83	-0.43	0.14	-0.86	0.3995
Noun_Type:Substance	-0.07	0.17	16.83	-0.36	0.21	-0.43	0.6710
Testing_Time:T0*Noun_Type:Count	0.52	0.24	16.83	0.11	0.92	2.14	0.0474
Testing_Time:T2*Noun_Type:Count	0.32	0.25	18.23	-0.09	0.75	1.29	0.2118
Testing_Time:T0*Noun_Type:Substance	0.11	0.24	16.83	-0.29	0.52	0.46	0.6525
Testing_Time:T2*Noun_Type:Substance	0.11	0.25	19.34	-0.31	0.54	0.43	0.6739

Table J.17. LMER output for ESIT – RQ2, definite-singular context (TRAD learners)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T0, Noun_Type:Object)	1.41	0.13	21.12	1.19	1.63	10.84	0.0000
Testing_Time:T1	0.13	0.19	16.67	-0.19	0.45	0.67	0.5090
Testing_Time:T2	0.08	0.20	17.60	-0.25	0.41	0.41	0.6880
Noun_Type:Count	0.13	0.19	16.67	-0.19	0.45	0.67	0.5090
Noun_Type:Substance	0.20	0.19	16.67	-0.12	0.52	1.06	0.3040
Testing_Time:T1*Noun_Type:Count	-0.24	0.27	16.67	-0.69	0.21	-0.89	0.3880
Testing_Time:T2*Noun_Type:Count	-0.25	0.28	17.57	-0.71	0.22	-0.91	0.3780
Testing_Time:T1*Noun_Type:Substance	-0.17	0.27	16.67	-0.62	0.29	-0.61	0.5480
Testing_Time:T2*Noun_Type:Substance	-0.26	0.28	18.18	-0.73	0.21	-0.94	0.3620

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T1, Noun_Type:Object)	1.59	0.13	21.12	1.37	1.81	12.26	0.0000
Testing_Time:T0	-0.13	0.19	16.67	-0.45	0.19	-0.67	0.5090
Testing_Time:T2	-0.05	0.20	17.60	-0.38	0.28	-0.26	0.8010
Noun_Type:Count	-0.11	0.19	16.67	-0.43	0.21	-0.58	0.5710
Noun_Type:Substance	0.04	0.19	16.67	-0.28	0.36	0.19	0.8500
Testing_Time:T0*Noun_Type:Count	0.24	0.27	16.67	-0.21	0.69	0.89	0.3880
Testing_Time:T2*Noun_Type:Count	-0.01	0.28	17.57	-0.46	0.46	-0.03	0.9740
Testing_Time:T0*Noun_Type:Substance	0.17	0.27	16.67	-0.29	0.62	0.61	0.5480
Testing_Time:T2*Noun_Type:Substance	-0.09	0.28	18.18	-0.56	0.37	-0.34	0.7410

Table J.18. LMER output for ESIT – RQ2, indefinite-singular context (TRAD learners)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T0, Noun_Type:Object)	1.41	0.13	21.12	1.19	1.63	10.84	0.0000
Testing_Time:T1	0.00	0.19	17.88	-0.32	0.32	0.00	1.0000
Testing_Time:T2	0.11	0.19	17.88	-0.21	0.44	0.58	0.5710
Noun_Type:Count	0.26	0.19	17.88	-0.07	0.58	1.35	0.1950
Noun_Type:Substance	-0.07	0.19	17.88	-0.40	0.25	-0.38	0.7050
Testing_Time:T1*Noun_Type:Count	0.19	0.27	17.88	-0.27	0.64	0.68	0.5060
Testing_Time:T2*Noun_Type:Count	0.15	0.28	19.80	-0.32	0.63	0.55	0.5890
Testing_Time:T1*Noun_Type:Substance	0.11	0.27	17.88	-0.35	0.57	0.41	0.6880
Testing_Time:T2*Noun_Type:Substance	-0.07	0.27	17.88	-0.53	0.38	-0.27	0.7890

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T1, Noun_Type:Object)	1.59	0.13	21.12	1.37	1.81	12.26	0.0000
Testing_Time:T0	0.00	0.19	17.88	-0.32	0.32	0.00	1.0000
Testing_Time:T2	0.11	0.19	17.88	-0.21	0.44	0.58	0.5714
Noun_Type:Count	0.44	0.19	17.88	0.12	0.77	2.31	0.0333
Noun_Type:Substance	0.04	0.19	17.88	-0.29	0.36	0.19	0.8498
Testing_Time:T0*Noun_Type:Count	-0.19	0.27	17.88	-0.64	0.27	-0.68	0.5055
Testing_Time:T2*Noun_Type:Count	-0.03	0.28	19.80	-0.51	0.44	-0.11	0.9108
Testing_Time:T0*Noun_Type:Substance	-0.11	0.27	17.88	-0.57	0.35	-0.41	0.6883
Testing_Time:T2*Noun_Type:Substance	-0.19	0.27	17.88	-0.64	0.27	-0.68	0.5055

Table J.19. LMER output for ESIT – RQ2, zero-plural context (TRAD learners)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T0, Noun_Type:Object)	1.41	0.13	21.12	1.19	1.63	10.84	0.0000
Testing_Time:T1	0.07	0.22	18.45	-0.30	0.45	0.34	0.7412
Testing_Time:T2	0.25	0.23	20.44	-0.14	0.64	1.10	0.2834
Noun_Type:Count	0.41	0.22	18.45	0.03	0.78	1.84	0.0813
Noun_Type:Substance	0.09	0.21	18.45	-0.26	0.44	0.43	0.6753
Testing_Time:T1*Noun_Type:Count	-0.13	0.31	18.45	-0.66	0.40	-0.42	0.6830
Testing_Time:T2*Noun_Type:Count	-0.24	0.32	21.03	-0.79	0.31	-0.74	0.4706
Testing_Time:T1*Noun_Type:Substance	-0.03	0.30	18.45	-0.54	0.48	-0.11	0.9159
Testing_Time:T2*Noun_Type:Substance	-0.64	0.31	20.48	-1.17	-0.12	-2.06	0.0521

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T1, Noun_Type:Object)	1.59	0.13	21.12	1.37	1.81	12.26	0.0000
Testing_Time:T0	-0.07	0.22	18.45	-0.45	0.30	-0.34	0.7412
Testing_Time:T2	0.18	0.23	20.44	-0.21	0.56	0.78	0.4469
Noun_Type:Count	0.28	0.22	18.45	-0.10	0.65	1.26	0.2243
Noun_Type:Substance	0.06	0.22	18.45	-0.32	0.43	0.25	0.8042
Testing_Time:T0*Noun_Type:Count	0.13	0.31	18.45	-0.40	0.66	0.42	0.6830
Testing_Time:T2*Noun_Type:Count	-0.11	0.32	21.03	-0.66	0.44	-0.33	0.7420
Testing_Time:T0*Noun_Type:Substance	0.03	0.30	18.45	-0.48	0.54	0.11	0.9159
Testing_Time:T2*Noun_Type:Substance	-0.61	0.32	20.35	-1.16	-0.07	-1.90	0.0719

Table J.20. LMER output for ESIT – RQ2, zero-singular context (TRAD learners)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T0, Noun_Type:Object)	1.41	0.13	21.12	1.19	1.63	10.84	0.0000
Testing_Time:T1	0.22	0.13	15.67	0.01	0.43	1.69	0.1110
Testing_Time:T2	0.05	0.14	19.24	-0.16	0.29	0.38	0.7100
Noun_Type:Count	0.02	0.13	15.67	-0.19	0.23	0.14	0.8900
Noun_Type:Substance	-0.14	0.15	15.67	-0.37	0.10	-0.95	0.3590
Testing_Time:T1*Noun_Type:Count	-0.35	0.19	15.67	-0.65	-0.06	-1.89	0.0770
Testing_Time:T2*Noun_Type:Count	-0.31	0.19	17.42	-0.63	-0.02	-1.63	0.1220
Testing_Time:T1*Noun_Type:Substance	0.19	0.20	15.67	-0.12	0.51	0.99	0.3390
Testing_Time:T2*Noun_Type:Substance	0.07	0.20	17.82	-0.27	0.39	0.36	0.7240

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T1, Noun_Type:Object)	1.59	0.13	21.12	1.37	1.81	12.26	0.0000
Testing_Time:T0	-0.22	0.13	15.67	-0.44	-0.01	-1.69	0.1107
Testing_Time:T2	-0.17	0.14	19.24	-0.39	0.07	-1.22	0.2387
Noun_Type:Count	-0.33	0.13	15.67	-0.55	-0.12	-2.54	0.0223
Noun_Type:Substance	0.06	0.13	15.67	-0.16	0.27	0.42	0.6783
Testing_Time:T0*Noun_Type:Count	0.35	0.19	15.67	0.05	0.66	1.89	0.0770
Testing_Time:T2*Noun_Type:Count	0.04	0.19	17.42	-0.29	0.35	0.21	0.8374
Testing_Time:T0*Noun_Type:Substance	-0.19	0.20	15.67	-0.52	0.13	-0.99	0.3390
Testing_Time:T2*Noun_Type:Substance	-0.12	0.19	18.09	-0.45	0.19	-0.62	0.5402

Table J.21. LMER output for AJT – RQ2, definite-plural context (TRAD learners)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept (Testing_Time:T0, Noun_Type:Object)	5.33	0.33	23.69	4.77	5.89	16.30	0.0000
Testing_Time:T1	0.02	0.43	18.00	-0.70	0.73	0.04	0.9658
Testing_Time:T2	-0.98	0.43	18.00	-1.70	-0.27	-2.30	0.0334
Noun_Type:Count	-0.39	0.43	18.00	-1.11	0.33	-0.91	0.3734
Noun_Type:Substance	-0.30	0.43	18.00	-1.01	0.42	-0.70	0.4957
Testing_Time:T1*Noun_Type:Count	-0.39	0.60	18.00	-1.40	0.62	-0.65	0.5268
Testing_Time:T2*Noun_Type:Count	0.63	0.60	18.00	-0.38	1.64	1.05	0.3099
Testing_Time:T1*Noun_Type:Substance	-0.20	0.60	18.00	-1.22	0.81	-0.34	0.7392
Testing_Time:T2*Noun_Type:Substance	0.39	0.60	18.00	-0.62	1.40	0.65	0.5268

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept (Testing_Time:T1, Noun_Type:Object)	5.35	0.33	23.69	4.79	5.91	16.35	0.0000
Testing_Time:T0	-0.02	0.43	18.00	-0.73	0.70	-0.04	0.9658
Testing_Time:T2	-1.00	0.43	18.00	-1.72	-0.28	-2.35	0.0306
Noun_Type:Count	-0.78	0.43	18.00	-1.49	-0.06	-1.83	0.0846
Noun_Type:Substance	-0.50	0.43	18.00	-1.22	0.22	-1.17	0.2559
Testing_Time:T0*Noun_Type:Count	0.39	0.60	18.00	-0.62	1.40	0.65	0.5268
Testing_Time:T2*Noun_Type:Count	1.02	0.60	18.00	0.01	2.03	1.69	0.1082
Testing_Time:T0*Noun_Type:Substance	0.20	0.60	18.00	-0.81	1.22	0.34	0.7392
Testing_Time:T2*Noun_Type:Substance	0.59	0.60	18.00	-0.42	1.61	0.98	0.3384

Table J.22. LMER output for AJT – RQ2, definite-singular context (TRAD learners)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T0, Noun_Type:Object)	4.65	0.41	24.51	3.95	5.35	11.39	0.0000
Testing_Time:T1	0.46	0.53	18.00	-0.42	1.35	0.88	0.3910
Testing_Time:T2	0.52	0.53	18.00	-0.37	1.41	0.98	0.3380
Noun_Type:Count	0.17	0.53	18.00	-0.72	1.05	0.32	0.7550
Noun_Type:Substance	0.65	0.53	18.00	-0.24	1.53	1.23	0.2350
Testing_Time:T1*Noun_Type:Count	-0.31	0.75	18.00	-1.57	0.94	-0.42	0.6780
Testing_Time:T2*Noun_Type:Count	-0.11	0.75	18.00	-1.37	1.14	-0.15	0.8830
Testing_Time:T1*Noun_Type:Substance	-0.41	0.75	18.00	-1.66	0.85	-0.55	0.5910
Testing_Time:T2*Noun_Type:Substance	-1.00	0.75	18.00	-2.25	0.25	-1.34	0.1960

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T1, Noun_Type:Object)	5.11	0.41	24.51	4.41	5.81	12.52	0.0000
Testing_Time:T0	-0.46	0.53	18.00	-1.35	0.42	-0.88	0.3910
Testing_Time:T2	0.06	0.53	18.00	-0.83	0.94	0.11	0.9170
Noun_Type:Count	-0.15	0.53	18.00	-1.03	0.74	-0.28	0.7820
Noun_Type:Substance	0.24	0.53	18.00	-0.65	1.13	0.46	0.6530
Testing_Time:T0*Noun_Type:Count	0.31	0.75	18.00	-0.94	1.57	0.42	0.6780
Testing_Time:T2*Noun_Type:Count	0.20	0.75	18.00	-1.05	1.46	0.27	0.7880
Testing_Time:T0*Noun_Type:Substance	0.41	0.75	18.00	-0.85	1.66	0.55	0.5910
Testing_Time:T2*Noun_Type:Substance	-0.59	0.75	18.00	-1.85	0.66	-0.80	0.4370

Table J.23. LMER output for AJT – RQ2, indefinite-singular context (TRAD learners)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T0, Noun_Type:Object)	5.20	0.36	22.99	4.59	5.82	14.45	0.0000
Testing_Time:T1	-0.44	0.47	18.00	-1.24	0.35	-0.94	0.3608
Testing_Time:T2	-1.00	0.47	18.00	-1.80	-0.20	-2.11	0.0491
Noun_Type:Count	-0.09	0.47	18.00	-0.89	0.70	-0.20	0.8473
Noun_Type:Substance	-1.06	0.47	18.00	-1.85	-0.26	-2.23	0.0390
Testing_Time:T1*Noun_Type:Count	0.19	0.67	18.00	-0.94	1.31	0.28	0.7855
Testing_Time:T2*Noun_Type:Count	1.07	0.67	18.00	-0.05	2.20	1.60	0.1265
Testing_Time:T1*Noun_Type:Substance	1.20	0.67	18.00	0.08	2.33	1.80	0.0894
Testing_Time:T2*Noun_Type:Substance	1.43	0.67	18.00	0.30	2.55	2.13	0.0475

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T1, Noun_Type:Object)	4.76	0.36	22.99	4.14	5.37	13.22	0.0000
Testing_Time:T0	0.44	0.47	18.00	-0.35	1.24	0.94	0.3608
Testing_Time:T2	-0.56	0.47	18.00	-1.35	0.24	-1.17	0.2564
Noun_Type:Count	0.09	0.47	18.00	-0.70	0.89	0.20	0.8473
Noun_Type:Substance	0.15	0.47	18.00	-0.65	0.94	0.31	0.7582
Testing_Time:T0*Noun_Type:Count	-0.19	0.67	18.00	-1.31	0.94	-0.28	0.7855
Testing_Time:T2*Noun_Type:Count	0.89	0.67	18.00	-0.24	2.02	1.33	0.2014
Testing_Time:T0*Noun_Type:Substance	-1.20	0.67	18.00	-2.33	-0.08	-1.80	0.0894
Testing_Time:T2*Noun_Type:Substance	0.22	0.67	18.00	-0.90	1.35	0.33	0.7441

Table J.24. LMER output for AJT – RQ2, zero-plural context (TRAD learners)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T0, Noun_Type:Object)	4.59	0.30	29.90	4.06	5.13	15.50	0.0000
Testing_Time:T1	0.20	0.34	18.00	-0.38	0.79	0.60	0.5570
Testing_Time:T2	0.02	0.34	18.00	-0.57	0.60	0.05	0.9572
Noun_Type:Count	0.87	0.34	18.00	0.28	1.46	2.56	0.0198
Noun_Type:Substance	0.07	0.34	18.00	-0.51	0.66	0.22	0.8302
Testing_Time:T1*Noun_Type:Count	-0.07	0.48	18.00	-0.90	0.75	-0.15	0.8794
Testing_Time:T2*Noun_Type:Count	-0.26	0.48	18.00	-1.09	0.57	-0.54	0.5967
Testing_Time:T1*Noun_Type:Substance	-0.15	0.48	18.00	-0.98	0.68	-0.31	0.7618
Testing_Time:T2*Noun_Type:Substance	0.28	0.48	18.00	-0.55	1.11	0.58	0.5710

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T1, Noun_Type:Object)	4.80	0.30	29.90	4.27	5.32	16.19	0.0000
Testing_Time:T0	-0.20	0.34	18.00	-0.79	0.38	-0.60	0.5570
Testing_Time:T2	-0.19	0.34	18.00	-0.77	0.40	-0.54	0.5930
Noun_Type:Count	0.80	0.34	18.00	0.21	1.38	2.34	0.0310
Noun_Type:Substance	-0.07	0.34	18.00	-0.66	0.51	-0.22	0.8300
Testing_Time:T0*Noun_Type:Count	0.07	0.48	18.00	-0.75	0.90	0.15	0.8790
Testing_Time:T2*Noun_Type:Count	-0.19	0.48	18.00	-1.01	0.64	-0.39	0.7050
Testing_Time:T0*Noun_Type:Substance	0.15	0.48	18.00	-0.68	0.97	0.31	0.7620
Testing_Time:T2*Noun_Type:Substance	0.43	0.48	18.00	-0.40	1.25	0.89	0.3880

Table J.25. LMER output for AJT – RQ2, zero-singular context (TRAD learners)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T0, Noun_Type:Object)	4.69	0.39	25.29	4.01	5.36	11.99	0.0000
Testing_Time:T1	0.59	0.50	18.00	-0.25	1.43	1.19	0.2500
Testing_Time:T2	0.33	0.50	18.00	-0.51	1.17	0.67	0.5120
Noun_Type:Count	-0.74	0.50	18.00	-1.58	0.10	-1.49	0.1540
Noun_Type:Substance	0.74	0.50	18.00	-0.10	1.58	1.49	0.1540
Testing_Time:T1*Noun_Type:Count	0.22	0.70	18.00	-0.96	1.41	0.32	0.7560
Testing_Time:T2*Noun_Type:Count	0.67	0.70	18.00	-0.52	1.85	0.95	0.3570
Testing_Time:T1*Noun_Type:Substance	-1.09	0.70	18.00	-2.28	0.09	-1.55	0.1380
Testing_Time:T2*Noun_Type:Substance	-0.61	0.70	18.00	-1.80	0.58	-0.87	0.3970

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T1, Noun_Type:Object)	5.28	0.39	25.29	4.60	5.95	13.51	0.0000
Testing_Time:T0	-0.59	0.50	18.00	-1.43	0.25	-1.19	0.2500
Testing_Time:T2	-0.26	0.50	18.00	-1.10	0.58	-0.52	0.6090
Noun_Type:Count	-0.52	0.50	18.00	-1.36	0.32	-1.04	0.3120
Noun_Type:Substance	-0.35	0.50	18.00	-1.19	0.49	-0.71	0.4890
Testing_Time:T0*Noun_Type:Count	-0.22	0.70	18.00	-1.41	0.96	-0.32	0.7560
Testing_Time:T2*Noun_Type:Count	0.44	0.70	18.00	-0.74	1.63	0.63	0.5360
Testing_Time:T0*Noun_Type:Substance	1.09	0.70	18.00	-0.09	2.28	1.55	0.1380
Testing_Time:T2*Noun_Type:Substance	0.48	0.70	18.00	-0.70	1.67	0.68	0.5030

Table J.26. LMER output for FCET – RQ2, definite-plural context (TRAD learners)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept (Testing_Time:T0, Noun_Type:Count)	1.30	0.18	6.61	0.97	1.62	7.13	0.0002
Testing_Time:T1	-0.17	0.25	6.00	-0.62	0.29	-0.67	0.5309
Testing_Time:T2	-0.24	0.25	6.00	-0.69	0.21	-0.96	0.3741

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept (Testing_Time:T1, Noun_Type:Count)	1.13	0.18	6.61	0.80	1.46	6.21	0.0006
Testing_Time:T0	0.17	0.25	6.00	-0.29	0.62	0.67	0.5309
Testing_Time:T2	-0.07	0.25	6.00	-0.53	0.38	-0.30	0.7776

Table J.27. LMER output for FCET – RQ2, definite-singular context (TRAD learners)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T0, Noun_Type:Object)	1.33	0.18	21.75	1.02	1.65	7.26	0.0000
Testing_Time:T1	0.13	0.25	18.00	-0.28	0.54	0.53	0.6060
Testing_Time:T2	-0.24	0.25	18.00	-0.65	0.17	-0.98	0.3420
Noun_Type:Count	0.37	0.25	18.00	-0.04	0.78	1.50	0.1500
Noun_Type:Substance	0.22	0.25	18.00	-0.19	0.64	0.90	0.3790
Testing_Time:T1*Noun_Type:Count	-0.48	0.35	18.00	-1.07	0.10	-1.38	0.1840
Testing_Time:T2*Noun_Type:Count	-0.04	0.35	18.00	-0.62	0.55	-0.11	0.9170
Testing_Time:T1*Noun_Type:Substance	-0.44	0.35	18.00	-1.03	0.14	-1.27	0.2190
Testing_Time:T2*Noun_Type:Substance	0.07	0.35	18.00	-0.51	0.66	0.21	0.8340

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T1, Noun_Type:Object)	1.46	0.18	21.75	1.15	1.77	7.96	0.0000
Testing_Time:T0	-0.13	0.25	18.00	-0.54	0.28	-0.53	0.6060
Testing_Time:T2	-0.37	0.25	18.00	-0.78	0.04	-1.50	0.1500
Noun_Type:Count	-0.11	0.25	18.00	-0.52	0.30	-0.45	0.6580
Noun_Type:Substance	-0.22	0.25	18.00	-0.64	0.19	-0.90	0.3790
Testing_Time:T0*Noun_Type:Count	0.48	0.35	18.00	-0.10	1.07	1.38	0.1840
Testing_Time:T2*Noun_Type:Count	0.44	0.35	18.00	-0.14	1.03	1.27	0.2190
Testing_Time:T0*Noun_Type:Substance	0.44	0.35	18.00	-0.14	1.03	1.27	0.2190
Testing_Time:T2*Noun_Type:Substance	0.52	0.35	18.00	-0.07	1.10	1.49	0.1540

Table J.28. LMER output for FCET – RQ2, indefinite-singular context (TRAD learners)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept (Testing_Time:T0, Noun_Type:Count)	1.19	0.23	6.79	0.78	1.59	5.26	0.0013
Testing_Time:T1	-0.30	0.31	6.00	-0.85	0.26	-0.96	0.3738
Testing_Time:T2	0.67	0.31	6.00	0.11	1.22	2.16	0.0739

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept (Testing_Time:T1, Noun_Type:Count)	0.89	0.23	6.79	0.48	1.30	3.95	0.0059
Testing_Time:T0	0.30	0.31	6.00	-0.26	0.85	0.96	0.3738
Testing_Time:T2	0.96	0.31	6.00	0.40	1.52	3.12	0.0205

Table J.29. LMER output for FCET – RQ2, zero-plural context (TRAD learners)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept (Testing_Time:T0, Noun_Type:Count)	1.48	0.18	6.00	1.17	1.79	8.45	0.0002
Testing_Time:T1	0.06	0.25	6.00	-0.39	0.50	0.22	0.8302
Testing_Time:T2	-0.09	0.25	6.00	-0.54	0.35	-0.37	0.7217

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept (Testing_Time:T1, Noun_Type:Count)	1.54	0.18	6.00	1.22	1.85	8.77	0.0001
Testing_Time:T0	-0.06	0.25	6.00	-0.50	0.39	-0.22	0.8302
Testing_Time:T2	-0.15	0.25	6.00	-0.59	0.30	-0.60	0.5721

Table J.30. LMER output for FCET – RQ2, zero-singular context (TRAD learners)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T0, Noun_Type:Object)	0.98	0.11	15.56	0.78	1.18	8.62	0.0000
Testing_Time:T1	0.30	0.15	12.00	0.04	0.55	1.98	0.0712
Testing_Time:T2	0.41	0.15	12.00	0.15	0.66	2.72	0.0186
Noun_Type:Substance	0.37	0.15	12.00	0.11	0.63	2.47	0.0293
Testing_Time:T1*Noun_Type:Substance	-0.22	0.21	12.00	-0.59	0.14	-1.05	0.3145
Testing_Time:T2*Noun_Type:Substance	-0.17	0.21	12.00	-0.53	0.20	-0.79	0.4464

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T1, Noun_Type:Object)	1.28	0.11	15.56	1.08	1.48	11.22	0.0000
Testing_Time:T0	-0.30	0.15	12.00	-0.55	-0.04	-1.98	0.0712
Testing_Time:T2	0.11	0.15	12.00	-0.15	0.37	0.74	0.4722
Noun_Type:Substance	0.15	0.15	12.00	-0.11	0.41	0.99	0.3419
Testing_Time:T0*Noun_Type:Substance	0.22	0.21	12.00	-0.14	0.59	1.05	0.3145
Testing_Time:T2*Noun_Type:Substance	0.06	0.21	12.00	-0.31	0.42	0.26	0.7974

Table J.31. LMER output for ESIT – RQ2, definite-plural context (NOEX learners)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T0, Noun_Type:Object)	1.49	0.12	21.55	1.28	1.70	12.08	0.0000
Testing_Time:T1	0.08	0.17	18.00	-0.20	0.36	0.47	0.6410
Testing_Time:T2	-0.20	0.17	18.00	-0.47	0.08	-1.19	0.2510
Noun_Type:Count	0.33	0.17	18.00	0.06	0.61	2.02	0.0590
Noun_Type:Substance	0.02	0.17	18.00	-0.26	0.30	0.12	0.9070
Testing_Time:T1*Noun_Type:Count	-0.08	0.23	18.00	-0.47	0.31	-0.34	0.7410
Testing_Time:T2*Noun_Type:Count	-0.20	0.23	18.00	-0.59	0.20	-0.84	0.4130
Testing_Time:T1*Noun_Type:Substance	-0.02	0.23	18.00	-0.41	0.37	-0.08	0.9340
Testing_Time:T2*Noun_Type:Substance	-0.25	0.23	18.00	-0.65	0.14	-1.09	0.2900

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T1, Noun_Type:Object)	1.57	0.12	21.55	1.36	1.78	12.72	0.0000
Testing_Time:T0	-0.08	0.17	18.00	-0.36	0.20	-0.47	0.6410
Testing_Time:T2	-0.27	0.17	18.00	-0.55	0.00	-1.66	0.1140
Noun_Type:Count	0.25	0.17	18.00	-0.02	0.53	1.54	0.1410
Noun_Type:Substance	0.00	0.17	18.00	-0.28	0.28	0.00	1.0000
Testing_Time:T0*Noun_Type:Count	0.08	0.23	18.00	-0.31	0.47	0.34	0.7410
Testing_Time:T2*Noun_Type:Count	-0.12	0.23	18.00	-0.51	0.27	-0.50	0.6210
Testing_Time:T0*Noun_Type:Substance	0.02	0.23	18.00	-0.37	0.41	0.08	0.9340
Testing_Time:T2*Noun_Type:Substance	-0.24	0.23	18.00	-0.63	0.16	-1.01	0.3280

Table J.32. LMER output for ESIT – RQ2, definite-singular context (NOEX learners)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept (Testing_Time:T0, Noun_Type:Object)	1.49	0.12	21.55	1.28	1.70	12.08	0.0000
Testing_Time:T1	0.02	0.12	18.00	-0.19	0.23	0.16	0.8760
Testing_Time:T2	-0.20	0.12	18.00	-0.41	0.01	-1.59	0.1300
Noun_Type:Count	-0.02	0.12	18.00	-0.23	0.19	-0.16	0.8760
Noun_Type:Substance	-0.25	0.12	18.00	-0.47	-0.04	-2.06	0.0540
Testing_Time:T1*Noun_Type:Count	-0.12	0.17	18.00	-0.41	0.18	-0.67	0.5100
Testing_Time:T2*Noun_Type:Count	-0.04	0.17	18.00	-0.34	0.26	-0.22	0.8250
Testing_Time:T1*Noun_Type:Substance	0.29	0.17	18.00	0.00	0.59	1.68	0.1100
Testing_Time:T2*Noun_Type:Substance	0.10	0.17	18.00	-0.20	0.40	0.56	0.5820

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept (Testing_Time:T1, Noun_Type:Object)	1.57	0.12	21.55	1.36	1.78	12.72	0.0000
Testing_Time:T0	-0.02	0.12	18.00	-0.23	0.19	-0.16	0.8758
Testing_Time:T2	-0.22	0.12	18.00	-0.42	-0.01	-1.74	0.0982
Noun_Type:Count	-0.14	0.12	18.00	-0.35	0.07	-1.11	0.2817
Noun_Type:Substance	0.04	0.12	18.00	-0.17	0.25	0.32	0.7548
Testing_Time:T0*Noun_Type:Count	0.12	0.17	18.00	-0.18	0.41	0.67	0.5097
Testing_Time:T2*Noun_Type:Count	0.08	0.17	18.00	-0.22	0.37	0.45	0.6592
Testing_Time:T0*Noun_Type:Substance	-0.29	0.17	18.00	-0.59	0.00	-1.68	0.1099
Testing_Time:T2*Noun_Type:Substance	-0.20	0.17	18.00	-0.49	0.10	-1.12	0.2770

Table J.33. LMER output for ESIT – RQ2, indefinite-singular context (NOEX learners)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T0, Noun_Type:Object)	1.49	0.12	21.55	1.28	1.70	12.08	0.0000
Testing_Time:T1	0.06	0.14	18.00	-0.18	0.29	0.42	0.6810
Testing_Time:T2	-0.06	0.14	18.00	-0.29	0.18	-0.42	0.6810
Noun_Type:Count	0.47	0.14	18.00	0.23	0.71	3.34	0.0036
Noun_Type:Substance	-0.04	0.14	18.00	-0.27	0.20	-0.28	0.7838
Testing_Time:T1*Noun_Type:Count	0.08	0.20	18.00	-0.25	0.41	0.39	0.6983
Testing_Time:T2*Noun_Type:Count	-0.02	0.20	18.00	-0.35	0.31	-0.10	0.9226
Testing_Time:T1*Noun_Type:Substance	0.29	0.20	18.00	-0.04	0.63	1.48	0.1569
Testing_Time:T2*Noun_Type:Substance	0.16	0.20	18.00	-0.18	0.49	0.79	0.4410

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T1, Noun_Type:Object)	1.57	0.12	21.55	1.36	1.78	12.72	0.0000
Testing_Time:T0	-0.06	0.14	18.00	-0.29	0.18	-0.42	0.6810
Testing_Time:T2	-0.12	0.14	18.00	-0.35	0.12	-0.84	0.4143
Noun_Type:Count	0.55	0.14	18.00	0.31	0.78	3.90	0.0011
Noun_Type:Substance	0.25	0.14	18.00	0.02	0.49	1.81	0.0869
Testing_Time:T0*Noun_Type:Count	-0.08	0.20	18.00	-0.41	0.25	-0.39	0.6983
Testing_Time:T2*Noun_Type:Count	-0.10	0.20	18.00	-0.43	0.24	-0.49	0.6284
Testing_Time:T0*Noun_Type:Substance	-0.29	0.20	18.00	-0.63	0.04	-1.48	0.1569
Testing_Time:T2*Noun_Type:Substance	-0.14	0.20	18.00	-0.47	0.20	-0.69	0.4994

Table J.34. LMER output for ESIT – RQ2, zero-plural context (NOEX learners)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T0, Noun_Type:Object)	1.49	0.12	21.55	1.28	1.70	12.08	0.0000
Testing_Time:T1	-0.04	0.21	19.00	-0.39	0.31	-0.19	0.8538
Testing_Time:T2	0.00	0.21	19.00	-0.35	0.35	0.00	1.0000
Noun_Type:Count	0.39	0.21	19.00	0.04	0.75	1.87	0.0773
Noun_Type:Substance	-0.01	0.20	19.00	-0.34	0.32	-0.05	0.9607
Testing_Time:T1*Noun_Type:Count	0.04	0.30	19.00	-0.46	0.54	0.13	0.8963
Testing_Time:T2*Noun_Type:Count	-0.08	0.30	19.00	-0.58	0.42	-0.26	0.7945
Testing_Time:T1*Noun_Type:Substance	0.03	0.29	19.00	-0.45	0.51	0.10	0.9196
Testing_Time:T2*Noun_Type:Substance	-0.40	0.29	19.00	-0.89	0.08	-1.40	0.1781

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T1, Noun_Type:Object)	1.57	0.12	21.55	1.36	1.78	12.72	0.0000
Testing_Time:T0	0.04	0.21	19.00	-0.31	0.39	0.19	0.8538
Testing_Time:T2	0.04	0.21	19.00	-0.31	0.39	0.19	0.8538
Noun_Type:Count	0.43	0.21	19.00	0.08	0.78	2.06	0.0539
Noun_Type:Substance	0.02	0.21	19.00	-0.33	0.37	0.09	0.9266
Testing_Time:T0*Noun_Type:Count	-0.04	0.30	19.00	-0.54	0.46	-0.13	0.8963
Testing_Time:T2*Noun_Type:Count	-0.12	0.30	19.00	-0.62	0.38	-0.40	0.6963
Testing_Time:T0*Noun_Type:Substance	-0.03	0.29	19.00	-0.51	0.45	-0.10	0.9196
Testing_Time:T2*Noun_Type:Substance	-0.43	0.30	19.00	-0.93	0.07	-1.45	0.1625

Table J.35. LMER output for ESIT – RQ2, zero-singular context (NOEX learners)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T0, Noun_Type:Object)	1.49	0.12	21.55	1.28	1.70	12.08	0.0000
Testing_Time:T1	0.29	0.17	17.00	0.02	0.57	1.78	0.0931
Testing_Time:T2	0.08	0.17	17.00	-0.20	0.35	0.48	0.6412
Noun_Type:Count	0.25	0.17	17.00	-0.02	0.53	1.54	0.1414
Noun_Type:Substance	0.20	0.18	17.00	-0.11	0.50	1.06	0.3035
Testing_Time:T1*Noun_Type:Count	-0.57	0.23	17.00	-0.96	-0.18	-2.43	0.0263
Testing_Time:T2*Noun_Type:Count	-0.53	0.23	17.00	-0.92	-0.14	-2.27	0.0369
Testing_Time:T1*Noun_Type:Substance	-0.27	0.25	17.00	-0.69	0.14	-1.11	0.2836
Testing_Time:T2*Noun_Type:Substance	-0.31	0.25	17.00	-0.73	0.10	-1.27	0.2228

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T1, Noun_Type:Object)	1.57	0.12	21.55	1.36	1.78	12.72	0.0000
Testing_Time:T0	-0.29	0.17	17.00	-0.57	-0.02	-1.78	0.0931
Testing_Time:T2	-0.22	0.17	17.00	-0.49	0.06	-1.31	0.2093
Noun_Type:Count	-0.31	0.17	17.00	-0.59	-0.04	-1.90	0.0748
Noun_Type:Substance	-0.08	0.17	17.00	-0.35	0.20	-0.48	0.6412
Testing_Time:T0*Noun_Type:Count	0.57	0.23	17.00	0.18	0.96	2.43	0.0263
Testing_Time:T2*Noun_Type:Count	0.04	0.23	17.00	-0.35	0.43	0.17	0.8687
Testing_Time:T0*Noun_Type:Substance	0.27	0.25	17.00	-0.14	0.69	1.11	0.2836
Testing_Time:T2*Noun_Type:Substance	-0.04	0.23	17.00	-0.43	0.35	-0.17	0.8687

Table J.36. LMER output for AJT – RQ2, definite-plural context (NOEX learners)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T0, Noun_Type:Object)	5.82	0.30	29.63	5.27	6.38	19.35	0.0000
Testing_Time:T1	-0.06	0.34	18.00	-0.67	0.55	-0.17	0.8648
Testing_Time:T2	-0.80	0.34	18.00	-1.41	-0.20	-2.36	0.0297
Noun_Type:Count	-1.24	0.34	18.00	-1.84	-0.63	-3.63	0.0019
Noun_Type:Substance	-0.08	0.34	18.00	-0.69	0.53	-0.23	0.8204
Testing_Time:T1*Noun_Type:Count	0.71	0.48	18.00	-0.15	1.57	1.47	0.1599
Testing_Time:T2*Noun_Type:Count	0.76	0.48	18.00	-0.09	1.62	1.59	0.1297
Testing_Time:T1*Noun_Type:Substance	-0.16	0.48	18.00	-1.02	0.70	-0.33	0.7484
Testing_Time:T2*Noun_Type:Substance	0.02	0.48	18.00	-0.84	0.88	0.04	0.9680

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T1, Noun_Type:Object)	5.76	0.30	29.63	5.21	6.32	19.15	0.0000
Testing_Time:T0	0.06	0.34	18.00	-0.55	0.67	0.17	0.8648
Testing_Time:T2	-0.75	0.34	18.00	-1.35	-0.14	-2.19	0.0421
Noun_Type:Count	-0.53	0.34	18.00	-1.14	0.08	-1.56	0.1374
Noun_Type:Substance	-0.24	0.34	18.00	-0.84	0.37	-0.69	0.4984
Testing_Time:T0*Noun_Type:Count	-0.71	0.48	18.00	-1.57	0.15	-1.47	0.1599
Testing_Time:T2*Noun_Type:Count	0.06	0.48	18.00	-0.80	0.92	0.12	0.9041
Testing_Time:T0*Noun_Type:Substance	0.16	0.48	18.00	-0.70	1.02	0.33	0.7484
Testing_Time:T2*Noun_Type:Substance	0.18	0.48	18.00	-0.68	1.04	0.37	0.7183

Table J.37. LMER output for AJT – RQ2, definite-singular context (NOEX learners)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept (Testing_Time:T0, Noun_Type:Object)	5.00	0.42	23.28	4.29	5.71	11.98	0.0000
Testing_Time:T1	0.20	0.55	18.00	-0.72	1.12	0.36	0.7240
Testing_Time:T2	0.10	0.55	18.00	-0.82	1.02	0.18	0.8600
Noun_Type:Count	-0.51	0.55	18.00	-1.43	0.41	-0.93	0.3640
Noun_Type:Substance	0.39	0.55	18.00	-0.53	1.31	0.72	0.4830
Testing_Time:T1*Noun_Type:Count	0.43	0.77	18.00	-0.87	1.73	0.56	0.5840
Testing_Time:T2*Noun_Type:Count	0.29	0.77	18.00	-1.01	1.59	0.38	0.7080
Testing_Time:T1*Noun_Type:Substance	-0.25	0.77	18.00	-1.56	1.05	-0.33	0.7460
Testing_Time:T2*Noun_Type:Substance	-0.94	0.77	18.00	-2.24	0.36	-1.22	0.2400

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept (Testing_Time:T1, Noun_Type:Object)	5.20	0.42	23.28	4.48	5.91	12.45	0.0000
Testing_Time:T0	-0.20	0.55	18.00	-1.12	0.72	-0.36	0.7240
Testing_Time:T2	-0.10	0.55	18.00	-1.02	0.82	-0.18	0.8600
Noun_Type:Count	-0.08	0.55	18.00	-1.00	0.84	-0.14	0.8880
Noun_Type:Substance	0.14	0.55	18.00	-0.78	1.06	0.25	0.8050
Testing_Time:T0*Noun_Type:Count	-0.43	0.77	18.00	-1.73	0.87	-0.56	0.5840
Testing_Time:T2*Noun_Type:Count	-0.14	0.77	18.00	-1.44	1.16	-0.18	0.8610
Testing_Time:T0*Noun_Type:Substance	0.25	0.77	18.00	-1.05	1.56	0.33	0.7460
Testing_Time:T2*Noun_Type:Substance	-0.69	0.77	18.00	-1.99	0.61	-0.89	0.3870

Table J.38. LMER output for AJT – RQ2, indefinite-singular context (NOEX learners)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T0, Noun_Type:Object)	5.51	0.41	25.53	4.81	6.21	13.54	0.0000
Testing_Time:T1	-0.37	0.52	18.00	-1.24	0.50	-0.72	0.4790
Testing_Time:T2	-0.51	0.52	18.00	-1.38	0.36	-0.99	0.3360
Noun_Type:Count	-0.67	0.52	18.00	-1.53	0.20	-1.29	0.2120
Noun_Type:Substance	-0.53	0.52	18.00	-1.40	0.34	-1.03	0.3180
Testing_Time:T1*Noun_Type:Count	0.43	0.73	18.00	-0.80	1.66	0.59	0.5610
Testing_Time:T2*Noun_Type:Count	0.78	0.73	18.00	-0.44	2.01	1.08	0.2960
Testing_Time:T1*Noun_Type:Substance	0.04	0.73	18.00	-1.19	1.27	0.05	0.9580
Testing_Time:T2*Noun_Type:Substance	0.27	0.73	18.00	-0.95	1.50	0.38	0.7110

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T1, Noun_Type:Object)	5.14	0.41	25.53	4.44	5.84	12.62	0.0000
Testing_Time:T0	0.37	0.52	18.00	-0.50	1.24	0.72	0.4790
Testing_Time:T2	-0.14	0.52	18.00	-1.01	0.73	-0.27	0.7930
Noun_Type:Count	-0.24	0.52	18.00	-1.10	0.63	-0.46	0.6540
Noun_Type:Substance	-0.49	0.52	18.00	-1.36	0.38	-0.95	0.3540
Testing_Time:T0*Noun_Type:Count	-0.43	0.73	18.00	-1.66	0.80	-0.59	0.5610
Testing_Time:T2*Noun_Type:Count	0.35	0.73	18.00	-0.87	1.58	0.48	0.6340
Testing_Time:T0*Noun_Type:Substance	-0.04	0.73	18.00	-1.27	1.19	-0.05	0.9580
Testing_Time:T2*Noun_Type:Substance	0.24	0.73	18.00	-0.99	1.46	0.32	0.7510

Table J.39. LMER output for AJT – RQ2, zero-plural context (NOEX learners)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T0, Noun_Type:Object)	4.90	0.36	25.04	4.28	5.53	13.54	0.0000
Testing_Time:T1	0.37	0.46	18.00	-0.40	1.15	0.81	0.4290
Testing_Time:T2	0.00	0.46	18.00	-0.78	0.78	0.00	1.0000
Noun_Type:Count	0.31	0.46	18.00	-0.46	1.09	0.68	0.5050
Noun_Type:Substance	-0.14	0.46	18.00	-0.91	0.64	-0.30	0.7690
Testing_Time:T1*Noun_Type:Count	-0.16	0.65	18.00	-1.25	0.94	-0.24	0.8120
Testing_Time:T2*Noun_Type:Count	-0.49	0.65	18.00	-1.59	0.61	-0.75	0.4620
Testing_Time:T1*Noun_Type:Substance	0.35	0.65	18.00	-0.74	1.45	0.54	0.5950
Testing_Time:T2*Noun_Type:Substance	0.12	0.65	18.00	-0.98	1.21	0.18	0.8590

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T1, Noun_Type:Object)	5.27	0.36	25.04	4.65	5.90	14.56	0.0000
Testing_Time:T0	-0.37	0.46	18.00	-1.15	0.40	-0.81	0.4290
Testing_Time:T2	-0.37	0.46	18.00	-1.15	0.40	-0.81	0.4290
Noun_Type:Count	0.16	0.46	18.00	-0.62	0.93	0.34	0.7370
Noun_Type:Substance	0.22	0.46	18.00	-0.56	0.99	0.47	0.6450
Testing_Time:T0*Noun_Type:Count	0.16	0.65	18.00	-0.94	1.25	0.24	0.8120
Testing_Time:T2*Noun_Type:Count	-0.33	0.65	18.00	-1.43	0.76	-0.51	0.6150
Testing_Time:T0*Noun_Type:Substance	-0.35	0.65	18.00	-1.45	0.74	-0.54	0.5950
Testing_Time:T2*Noun_Type:Substance	-0.24	0.65	18.00	-1.33	0.86	-0.36	0.7220

Table J.40. LMER output for AJT – RQ2, zero-singular context (NOEX learners)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T0, Noun_Type:Object)	4.84	0.40	23.91	4.16	5.53	12.13	0.0000
Testing_Time:T1	0.33	0.52	18.00	-0.54	1.20	0.64	0.5280
Testing_Time:T2	0.65	0.52	18.00	-0.22	1.52	1.25	0.2276
Noun_Type:Count	-0.33	0.52	18.00	-1.20	0.54	-0.64	0.5280
Noun_Type:Substance	1.18	0.52	18.00	0.31	2.05	2.27	0.0357
Testing_Time:T1*Noun_Type:Count	0.08	0.73	18.00	-1.15	1.31	0.11	0.9159
Testing_Time:T2*Noun_Type:Count	-0.33	0.73	18.00	-1.57	0.90	-0.46	0.6546
Testing_Time:T1*Noun_Type:Substance	-1.04	0.73	18.00	-2.27	0.19	-1.42	0.1731
Testing_Time:T2*Noun_Type:Substance	-1.49	0.73	18.00	-2.72	-0.26	-2.03	0.0569

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T1, Noun_Type:Object)	5.18	0.40	23.91	4.49	5.86	12.97	0.0000
Testing_Time:T0	-0.33	0.52	18.00	-1.20	0.54	-0.64	0.5280
Testing_Time:T2	0.31	0.52	18.00	-0.56	1.19	0.61	0.5520
Noun_Type:Count	-0.25	0.52	18.00	-1.13	0.62	-0.49	0.6290
Noun_Type:Substance	0.14	0.52	18.00	-0.73	1.01	0.27	0.7940
Testing_Time:T0*Noun_Type:Count	-0.08	0.73	18.00	-1.31	1.15	-0.11	0.9160
Testing_Time:T2*Noun_Type:Count	-0.41	0.73	18.00	-1.64	0.82	-0.56	0.5810
Testing_Time:T0*Noun_Type:Substance	1.04	0.73	18.00	-0.19	2.27	1.42	0.1730
Testing_Time:T2*Noun_Type:Substance	-0.45	0.73	18.00	-1.68	0.78	-0.62	0.5460

Table J.41. LMER output for FCET – RQ2, definite-plural context (NOEX learners)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept (Testing_Time:T0, Noun_Type:Count)	1.31	0.18	8.57	0.98	1.64	7.27	0.0001
Testing_Time:T1	-0.16	0.23	6.00	-0.58	0.27	-0.68	0.5240
Testing_Time:T2	-0.27	0.23	6.00	-0.70	0.15	-1.18	0.2810

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept (Testing_Time:T1, Noun_Type:Count)	1.16	0.18	8.57	0.83	1.49	6.40	0.0002
Testing_Time:T0	0.16	0.23	6.00	-0.27	0.58	0.68	0.5242
Testing_Time:T2	-0.12	0.23	6.00	-0.54	0.31	-0.51	0.6302

Table J.42. LMER output for FCET – RQ2, definite-singular context (NOEX learners)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T0, Noun_Type:Object)	1.14	0.17	23.21	0.85	1.42	6.85	0.0000
Testing_Time:T1	0.20	0.22	18.00	-0.17	0.56	0.90	0.3802
Testing_Time:T2	-0.12	0.22	18.00	-0.48	0.25	-0.54	0.5960
Noun_Type:Count	0.25	0.22	18.00	-0.11	0.62	1.17	0.2574
Noun_Type:Substance	0.35	0.22	18.00	-0.01	0.72	1.62	0.1228
Testing_Time:T1*Noun_Type:Count	-0.35	0.31	18.00	-0.87	0.17	-1.15	0.2672
Testing_Time:T2*Noun_Type:Count	-0.02	0.31	18.00	-0.54	0.50	-0.06	0.9500
Testing_Time:T1*Noun_Type:Substance	-0.63	0.31	18.00	-1.15	-0.11	-2.04	0.0568
Testing_Time:T2*Noun_Type:Substance	-0.27	0.31	18.00	-0.79	0.24	-0.89	0.3849

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T1, Noun_Type:Object)	1.33	0.17	23.21	1.05	1.62	8.04	0.0000
Testing_Time:T0	-0.20	0.22	18.00	-0.56	0.17	-0.90	0.3802
Testing_Time:T2	-0.31	0.22	18.00	-0.68	0.05	-1.44	0.1672
Noun_Type:Count	-0.10	0.22	18.00	-0.46	0.27	-0.45	0.6582
Noun_Type:Substance	-0.27	0.22	18.00	-0.64	0.09	-1.26	0.2239
Testing_Time:T0*Noun_Type:Count	0.35	0.31	18.00	-0.17	0.87	1.15	0.2672
Testing_Time:T2*Noun_Type:Count	0.33	0.31	18.00	-0.18	0.85	1.08	0.2938
Testing_Time:T0*Noun_Type:Substance	0.63	0.31	18.00	0.11	1.15	2.04	0.0568
Testing_Time:T2*Noun_Type:Substance	0.35	0.31	18.00	-0.17	0.87	1.15	0.2672

Table J.43. LMER output for FCET – RQ2, indefinite-singular context (NOEX learners)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T0, Noun_Type:Count)	1.31	0.20	11.96	0.94	1.68	6.59	0.0000
Testing_Time:T1	-0.53	0.23	6.00	-0.96	-0.10	-2.32	0.0598
Testing_Time:T2	0.14	0.23	6.00	-0.29	0.56	0.60	0.5703

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T1, Noun_Type:Count)	0.78	0.20	11.96	0.42	1.15	3.94	0.0020
Testing_Time:T0	0.53	0.23	6.00	0.10	0.96	2.32	0.0598
Testing_Time:T2	0.67	0.23	6.00	0.24	1.09	2.92	0.0268

Table J.44. LMER output for FCET – RQ2, zero-plural context (NOEX learners)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T0, Noun_Type:Count)	1.41	0.23	6.86	0.99	1.83	6.11	0.0005
Testing_Time:T1	-0.16	0.32	6.00	-0.73	0.42	-0.50	0.6370
Testing_Time:T2	-0.04	0.32	6.00	-0.61	0.53	-0.12	0.9052

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept (Testing_Time:T1, Noun_Type:Count)	1.25	0.23	6.86	0.84	1.67	5.43	0.0011
Testing_Time:T0	0.16	0.32	6.00	-0.42	0.73	0.50	0.6370
Testing_Time:T2	0.12	0.32	6.00	-0.45	0.69	0.37	0.7223

Table J.45. LMER output for FCET – RQ2, zero-singular context (NOEX learners)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept (Testing_Time:T0, Noun_Type:Object)	0.80	0.13	24.27	0.56	1.05	6.03	0.0000
Testing_Time:T1	0.18	0.14	12.00	-0.07	0.42	1.25	0.2344
Testing_Time:T2	0.53	0.14	12.00	0.28	0.77	3.76	0.0027
Noun_Type:Substance	0.45	0.14	12.00	0.21	0.70	3.20	0.0076
Testing_Time:T1*Noun_Type:Substance	-0.41	0.20	12.00	-0.76	-0.07	-2.07	0.0611
Testing_Time:T2*Noun_Type:Substance	-0.61	0.20	12.00	-0.95	-0.26	-3.05	0.0101

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept (Testing_Time:T1, Noun_Type:Object)	0.98	0.13	24.27	0.74	1.22	7.36	0.0000
Testing_Time:T0	-0.18	0.14	12.00	-0.42	0.07	-1.25	0.2344
Testing_Time:T2	0.35	0.14	12.00	0.11	0.60	2.50	0.0277
Noun_Type:Substance	0.04	0.14	12.00	-0.21	0.28	0.28	0.7856
Testing_Time:T0*Noun_Type:Substance	0.41	0.20	12.00	0.07	0.76	2.07	0.0611
Testing_Time:T2*Noun_Type:Substance	-0.20	0.20	12.00	-0.54	0.15	-0.98	0.3447

Appendix K: Statistical Models for Research Question 3

Table K.1. LMER output for ESIT – RQ3, definite-plural context (Intercept: Learner_Type:LING, Testing_Time:T0, Noun_Type:Object)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	1.36	0.11	31.81	1.16	1.55	12.02	0.0000
Learner_Type:NOEX	0.13	0.11	783.68	-0.09	0.36	1.18	0.2382
Learner_Type:TRAD	0.05	0.11	783.68	-0.17	0.27	0.46	0.6436
Testing_Time:T1	0.39	0.15	31.96	0.12	0.65	2.54	0.0160
Testing_Time:T2	0.26	0.16	28.68	-0.01	0.52	1.65	0.1107
Noun_Type:Count	0.54	0.16	28.68	0.28	0.81	3.51	0.0015
Noun_Type:Substance	0.09	0.16	28.68	-0.18	0.36	0.57	0.5714
Learner_Type:NOEX*Testing_Time:T1	-0.30	0.15	1622.00	-0.59	-0.01	-2.00	0.0461
Learner_Type:TRAD*Testing_Time:T1	-0.19	0.15	1622.08	-0.48	0.09	-1.31	0.1918
Learner_Type:NOEX*Testing_Time:T2	-0.45	0.15	1619.66	-0.74	-0.16	-3.02	0.0026
Learner_Type:TRAD*Testing_Time:T2	-0.43	0.15	1624.17	-0.72	-0.13	-2.83	0.0047
Learner_Type:NOEX*Noun_Type:Count	-0.21	0.15	1619.66	-0.50	0.08	-1.41	0.1581
Learner_Type:TRAD*Noun_Type:Count	-0.17	0.15	1619.66	-0.46	0.11	-1.19	0.2360
Learner_Type:NOEX*Noun_Type:Substance	-0.07	0.15	1619.66	-0.36	0.22	-0.46	0.6431
Learner_Type:TRAD*Noun_Type:Substance	-0.05	0.15	1619.66	-0.34	0.23	-0.35	0.7240
Testing_Time:T1*Noun_Type:Count	-0.36	0.21	32.54	-0.73	0.02	-1.66	0.1057
Testing_Time:T2*Noun_Type:Count	-0.32	0.22	28.68	-0.70	0.06	-1.47	0.1531
Testing_Time:T1*Noun_Type:Substance	-0.10	0.22	31.63	-0.47	0.28	-0.44	0.6613
Testing_Time:T2*Noun_Type:Substance	-0.38	0.22	28.68	-0.76	0.00	-1.72	0.0961
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Count	0.27	0.21	1622.19	-0.14	0.69	1.30	0.1943
Learner_Type:TRAD*Testing_Time:T1*Noun_Type:Count	-0.17	0.21	1622.28	-0.57	0.24	-0.80	0.4259
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Count	0.13	0.21	1619.66	-0.29	0.54	0.60	0.5508
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Count	0.13	0.21	1622.07	-0.29	0.54	0.59	0.5563
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Substance	0.08	0.21	1621.99	-0.33	0.49	0.38	0.7033
Learner_Type:TRAD*Testing_Time:T1*Noun_Type:Substance	-0.01	0.21	1622.07	-0.42	0.39	-0.05	0.9581
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	0.12	0.21	1619.66	-0.29	0.54	0.58	0.5612
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Substance	0.36	0.22	1623.97	-0.06	0.78	1.66	0.0980

Table K.2. LMER output for ESIT – RQ3, definite-plural context (Intercept: Learner_Type:LING, Testing_Time:T1, Noun_Type:Object)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	1.74	0.11	40.51	1.55	1.93	16.12	<2e-16
Learner_Type:NOEX	-0.16	0.11	785.50	-0.39	0.06	-1.44	0.1513
Learner_Type:TRAD	-0.14	0.11	785.60	-0.36	0.08	-1.25	0.2122
Testing_Time:T0	-0.39	0.15	31.96	-0.65	-0.12	-2.54	0.0160
Testing_Time:T2	-0.13	0.15	31.96	-0.39	0.13	-0.86	0.3957
Noun_Type:Count	0.19	0.15	37.80	-0.07	0.45	1.28	0.2089
Noun_Type:Substance	-0.01	0.15	35.39	-0.27	0.25	-0.04	0.9670
Learner_Type:NOEX*Testing_Time:T0	0.30	0.15	1622.00	0.01	0.59	2.00	0.0461
Learner_Type:TRAD*Testing_Time:T0	0.19	0.15	1622.00	-0.09	0.48	1.31	0.1918
Learner_Type:NOEX*Testing_Time:T2	-0.15	0.15	1622.00	-0.44	0.14	-1.02	0.3062
Learner_Type:TRAD*Testing_Time:T2	-0.23	0.15	1626.00	-0.53	0.06	-1.56	0.1198
Learner_Type:NOEX*Noun_Type:Count	0.06	0.15	1625.00	-0.23	0.36	0.43	0.6711
Learner_Type:TRAD*Noun_Type:Count	-0.34	0.15	1625.00	-0.63	-0.05	-2.31	0.0210
Learner_Type:NOEX*Noun_Type:Substance	0.01	0.15	1624.00	-0.28	0.30	0.08	0.9398
Learner_Type:TRAD*Noun_Type:Substance	-0.06	0.15	1624.00	-0.35	0.22	-0.43	0.6692
Testing_Time:T0*Noun_Type:Count	0.36	0.21	32.54	-0.02	0.73	1.66	0.1057
Testing_Time:T2*Noun_Type:Count	0.03	0.21	32.54	-0.34	0.41	0.16	0.8751
Testing_Time:T0*Noun_Type:Substance	0.10	0.22	31.63	-0.28	0.47	0.44	0.6613
Testing_Time:T2*Noun_Type:Substance	-0.28	0.22	31.63	-0.65	0.09	-1.31	0.1981
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Count	-0.27	0.21	1622.00	-0.69	0.14	-1.30	0.1943
Learner_Type:TRAD*Testing_Time:T0*Noun_Type:Count	0.17	0.21	1622.00	-0.24	0.57	0.80	0.4259
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Count	-0.15	0.21	1622.00	-0.56	0.26	-0.70	0.4827
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Count	0.29	0.21	1624.00	-0.12	0.71	1.37	0.1723
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Substance	-0.08	0.21	1622.00	-0.49	0.33	-0.38	0.7033
Learner_Type:TRAD*Testing_Time:T0*Noun_Type:Substance	0.01	0.21	1622.00	-0.39	0.42	0.05	0.9580
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	0.04	0.21	1622.00	-0.37	0.46	0.20	0.8415
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Substance	0.37	0.22	1626.00	-0.05	0.79	1.71	0.0882

Table K.3. LMER output for ESIT – RQ3, definite-plural context (Intercept: Learner_Type:TRAD, Testing_Time:T0, Noun_Type:Object)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept	1.41	0.13	49.01	1.18	1.63	11.18	0.0000
Learner_Type:LING	-0.05	0.11	783.70	-0.27	0.17	-0.46	0.6436
Learner_Type:NOEX	0.08	0.13	783.70	-0.16	0.33	0.65	0.5149
Testing_Time:T1	0.19	0.17	47.44	-0.11	0.49	1.14	0.2584
Testing_Time:T2	-0.17	0.17	45.96	-0.48	0.14	-0.98	0.3345
Noun_Type:Count	0.37	0.17	42.84	0.07	0.67	2.16	0.0367
Noun_Type:Substance	0.04	0.17	42.84	-0.27	0.34	0.22	0.8303
Learner_Type:LING*Testing_Time:T1	0.19	0.15	1622.00	-0.09	0.48	1.31	0.1918
Learner_Type:NOEX*Testing_Time:T1	-0.11	0.17	1620.00	-0.43	0.22	-0.64	0.5216
Learner_Type:LING*Testing_Time:T2	0.43	0.15	1624.00	0.13	0.72	2.83	0.0047
Learner_Type:NOEX*Testing_Time:T2	-0.03	0.17	1623.00	-0.35	0.31	-0.15	0.8807
Learner_Type:LING*Noun_Type:Count	0.17	0.15	1620.00	-0.11	0.46	1.19	0.2360
Learner_Type:NOEX*Noun_Type:Count	-0.04	0.17	1620.00	-0.36	0.29	-0.22	0.8241
Learner_Type:LING*Noun_Type:Substance	0.05	0.15	1620.00	-0.23	0.34	0.35	0.7240
Learner_Type:NOEX*Noun_Type:Substance	-0.02	0.17	1620.00	-0.34	0.31	-0.11	0.9167
Testing_Time:T1*Noun_Type:Count	-0.52	0.24	48.20	-0.95	-0.10	-2.17	0.0348
Testing_Time:T2*Noun_Type:Count	-0.20	0.25	45.90	-0.63	0.24	-0.80	0.4297
Testing_Time:T1*Noun_Type:Substance	-0.11	0.24	46.90	-0.53	0.32	-0.44	0.6616
Testing_Time:T2*Noun_Type:Substance	-0.02	0.25	48.01	-0.46	0.43	-0.08	0.9364
Learner_Type:LING*Testing_Time:T1*Noun_Type:Count	0.17	0.21	1622.00	-0.24	0.57	0.80	0.4259
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Count	0.44	0.24	1620.00	-0.02	0.90	1.87	0.0619
Learner_Type:LING*Testing_Time:T2*Noun_Type:Count	-0.13	0.21	1622.00	-0.54	0.29	-0.59	0.5563
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Count	0.00	0.24	1622.00	-0.47	0.47	0.00	0.9969
Learner_Type:LING*Testing_Time:T1*Noun_Type:Substance	0.01	0.21	1622.00	-0.39	0.42	0.05	0.9581
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Substance	0.09	0.24	1620.00	-0.37	0.55	0.39	0.6977
Learner_Type:LING*Testing_Time:T2*Noun_Type:Substance	-0.36	0.22	1624.00	-0.78	0.06	-1.66	0.0980
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	-0.23	0.24	1623.00	-0.71	0.24	-0.97	0.3339

Table K.4. LMER output for ESIT – RQ3, definite-plural context (Intercept: Learner_Type:TRAD, Testing_Time:T1, Noun_Type:Object)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	1.60	0.12	60.86	1.38	1.82	12.97	0.0000
Learner_Type:LING	0.14	0.11	785.60	-0.08	0.36	1.25	0.2122
Learner_Type:NOEX	-0.02	0.13	783.68	-0.27	0.22	-0.19	0.8505
Testing_Time:T0	-0.19	0.17	47.44	-0.49	0.11	-1.14	0.2584
Testing_Time:T2	-0.37	0.17	50.96	-0.67	-0.06	-2.11	0.0400
Noun_Type:Count	-0.15	0.17	54.97	-0.45	0.15	-0.90	0.3714
Noun_Type:Substance	-0.07	0.17	51.75	-0.37	0.23	-0.41	0.6842
Learner_Type:LING*Testing_Time:T0	-0.19	0.15	1622.08	-0.48	0.09	-1.31	0.1918
Learner_Type:NOEX*Testing_Time:T0	0.11	0.17	1619.66	-0.22	0.43	0.64	0.5216
Learner_Type:LING*Testing_Time:T2	0.23	0.15	1626.32	-0.06	0.53	1.56	0.1198
Learner_Type:NOEX*Testing_Time:T2	0.08	0.17	1623.22	-0.25	0.41	0.48	0.6323
Learner_Type:LING*Noun_Type:Count	0.34	0.15	1624.70	0.05	0.63	2.31	0.0210
Learner_Type:NOEX*Noun_Type:Count	0.40	0.17	1619.66	0.08	0.73	2.42	0.0156
Learner_Type:LING*Noun_Type:Substance	0.06	0.15	1624.31	-0.22	0.35	0.43	0.6692
Learner_Type:NOEX*Noun_Type:Substance	0.07	0.17	1619.66	-0.25	0.40	0.45	0.6566
Testing_Time:T0*Noun_Type:Count	0.52	0.24	48.20	0.10	0.95	2.17	0.0348
Testing_Time:T2*Noun_Type:Count	0.32	0.24	51.72	-0.11	0.76	1.33	0.1902
Testing_Time:T0*Noun_Type:Substance	0.11	0.24	46.90	-0.32	0.53	0.44	0.6616
Testing_Time:T2*Noun_Type:Substance	0.09	0.25	52.65	-0.35	0.53	0.35	0.7302
Learner_Type:LING*Testing_Time:T0*Noun_Type:Count	-0.17	0.21	1622.28	-0.57	0.24	-0.80	0.4259
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Count	-0.44	0.24	1619.66	-0.90	0.02	-1.87	0.0619
Learner_Type:LING*Testing_Time:T2*Noun_Type:Count	-0.29	0.21	1624.40	-0.71	0.12	-1.37	0.1723
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Count	-0.44	0.24	1621.57	-0.91	0.03	-1.83	0.0675
Learner_Type:LING*Testing_Time:T0*Noun_Type:Substance	-0.01	0.21	1622.07	-0.42	0.39	-0.05	0.9580
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Substance	-0.09	0.24	1619.66	-0.55	0.37	-0.39	0.6977
Learner_Type:LING*Testing_Time:T2*Noun_Type:Substance	-0.37	0.22	1626.03	-0.79	0.05	-1.71	0.0882
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	-0.33	0.24	1623.08	-0.80	0.14	-1.34	0.1794

Table K.5. LMER output for ESIT – RQ3, definite-singular context (Intercept: Learner_Type:LING, Testing_Time:T0, Noun_Type:Object)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	1.77	0.10	29.33	1.60	1.93	18.30	< 2e-16
Learner_Type:NOEX	0.12	0.10	465.30	-0.08	0.31	1.15	0.2510
Learner_Type:TRAD	-0.14	0.10	465.30	-0.33	0.06	-1.39	0.1663
Testing_Time:T1	0.01	0.13	26.66	-0.20	0.24	0.05	0.9622
Testing_Time:T2	0.17	0.13	23.87	-0.05	0.39	1.29	0.2102
Noun_Type:Count	0.08	0.13	23.87	-0.14	0.30	0.60	0.5536
Noun_Type:Substance	0.07	0.13	23.87	-0.15	0.29	0.52	0.6113
Learner_Type:NOEX*Testing_Time:T1	-0.04	0.12	1620.00	-0.28	0.20	-0.32	0.7478
Learner_Type:TRAD*Testing_Time:T1	0.07	0.12	1620.00	-0.16	0.31	0.59	0.5579
Learner_Type:NOEX*Testing_Time:T2	-0.36	0.12	1617.00	-0.60	-0.12	-2.96	0.0031
Learner_Type:TRAD*Testing_Time:T2	-0.08	0.12	1621.00	-0.33	0.16	-0.69	0.4914
Learner_Type:NOEX*Noun_Type:Count	-0.10	0.12	1617.00	-0.34	0.14	-0.79	0.4271
Learner_Type:TRAD*Noun_Type:Count	0.05	0.12	1617.00	-0.18	0.29	0.43	0.6668
Learner_Type:NOEX*Noun_Type:Substance	-0.32	0.12	1617.00	-0.56	-0.08	-2.62	0.0088
Learner_Type:TRAD*Noun_Type:Substance	0.14	0.12	1617.00	-0.10	0.37	1.14	0.2552
Testing_Time:T1*Noun_Type:Count	0.06	0.18	27.16	-0.26	0.36	0.36	0.7214
Testing_Time:T2*Noun_Type:Count	-0.16	0.18	23.87	-0.47	0.16	-0.85	0.4039
Testing_Time:T1*Noun_Type:Substance	0.10	0.18	26.38	-0.23	0.39	0.54	0.5952
Testing_Time:T2*Noun_Type:Substance	-0.10	0.18	23.87	-0.41	0.21	-0.55	0.5900
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Count	-0.13	0.17	1620.00	-0.47	0.21	-0.72	0.4713
Learner_Type:TRAD*Testing_Time:T1*Noun_Type:Count	-0.25	0.17	1620.00	-0.58	0.08	-1.46	0.1455
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Count	0.12	0.17	1617.00	-0.22	0.45	0.67	0.5023
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Count	-0.09	0.17	1620.00	-0.43	0.26	-0.51	0.6108
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Substance	0.25	0.17	1620.00	-0.09	0.59	1.46	0.1443
Learner_Type:TRAD*Testing_Time:T1*Noun_Type:Substance	-0.21	0.17	1620.00	-0.54	0.12	-1.22	0.2234
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	0.20	0.17	1617.00	-0.14	0.54	1.14	0.2535
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Substance	-0.17	0.18	1621.00	-0.51	0.18	-0.94	0.3471

Table K.6. LMER output for ESIT – RQ3, definite-singular context (Intercept: Learner_Type:LING, Testing_Time:T1, Noun_Type:Object)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	1.77	0.09	37.82	1.62	1.95	19.14	0.0000
Learner_Type:NOEX	0.08	0.10	466.40	-0.12	0.27	0.76	0.4494
Learner_Type:TRAD	-0.07	0.10	466.40	-0.26	0.13	-0.67	0.5020
Testing_Time:T0	-0.01	0.13	26.66	-0.24	0.20	-0.05	0.9622
Testing_Time:T2	0.16	0.13	26.66	-0.07	0.36	1.27	0.2152
Noun_Type:Count	0.14	0.12	31.69	-0.09	0.34	1.16	0.2553
Noun_Type:Substance	0.16	0.12	29.60	-0.07	0.36	1.32	0.1982
Learner_Type:NOEX*Testing_Time:T0	0.04	0.12	1620.00	-0.20	0.28	0.32	0.7478
Learner_Type:TRAD*Testing_Time:T0	-0.07	0.12	1620.00	-0.31	0.16	-0.59	0.5579
Learner_Type:NOEX*Testing_Time:T2	-0.32	0.12	1620.00	-0.56	-0.09	-2.64	0.0085
Learner_Type:TRAD*Testing_Time:T2	-0.16	0.12	1624.00	-0.40	0.08	-1.26	0.2080
Learner_Type:NOEX*Noun_Type:Count	-0.22	0.12	1623.00	-0.46	0.02	-1.81	0.0701
Learner_Type:TRAD*Noun_Type:Count	-0.20	0.12	1623.00	-0.43	0.04	-1.63	0.1036
Learner_Type:NOEX*Noun_Type:Substance	-0.07	0.12	1622.00	-0.31	0.17	-0.56	0.5782
Learner_Type:TRAD*Noun_Type:Substance	-0.07	0.12	1622.00	-0.31	0.16	-0.58	0.5590
Testing_Time:T0*Noun_Type:Count	-0.06	0.18	27.16	-0.36	0.26	-0.36	0.7214
Testing_Time:T2*Noun_Type:Count	-0.22	0.18	27.16	-0.51	0.10	-1.23	0.2282
Testing_Time:T0*Noun_Type:Substance	-0.10	0.18	26.38	-0.39	0.23	-0.54	0.5952
Testing_Time:T2*Noun_Type:Substance	-0.20	0.18	26.38	-0.49	0.13	-1.10	0.2830
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Count	0.13	0.17	1620.00	-0.21	0.47	0.72	0.4713
Learner_Type:TRAD*Testing_Time:T0*Noun_Type:Count	0.25	0.17	1620.00	-0.08	0.58	1.46	0.1455
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Count	0.24	0.17	1620.00	-0.10	0.58	1.39	0.1643
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Count	0.16	0.17	1622.00	-0.18	0.50	0.91	0.3617
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Substance	-0.25	0.17	1620.00	-0.59	0.09	-1.46	0.1443
Learner_Type:TRAD*Testing_Time:T0*Noun_Type:Substance	0.21	0.17	1620.00	-0.12	0.54	1.22	0.2234
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	-0.06	0.17	1620.00	-0.39	0.28	-0.32	0.7499
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Substance	0.04	0.18	1623.00	-0.30	0.39	0.23	0.8180

Table K.7. LMER output for ESIT – RQ3, definite-singular context (Intercept: Learner_Type:TRAD, Testing_Time:T0, Noun_Type:Object)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept	1.63	0.11	46.00	1.44	1.82	15.02	0.0000
Learner_Type:LING	0.14	0.10	465.34	-0.06	0.33	1.39	0.1663
Learner_Type:NOEX	0.25	0.11	465.34	0.03	0.47	2.25	0.0247
Testing_Time:T1	0.08	0.14	39.21	-0.16	0.34	0.54	0.5905
Testing_Time:T2	0.08	0.15	37.81	-0.17	0.34	0.56	0.5772
Noun_Type:Count	0.13	0.14	35.28	-0.12	0.38	0.91	0.3700
Noun_Type:Substance	0.20	0.14	35.28	-0.04	0.45	1.43	0.1624
Learner_Type:LING*Testing_Time:T1	-0.07	0.12	1619.77	-0.31	0.16	-0.59	0.5579
Learner_Type:NOEX*Testing_Time:T1	-0.11	0.14	1616.82	-0.38	0.16	-0.81	0.4206
Learner_Type:LING*Testing_Time:T2	0.08	0.12	1620.94	-0.16	0.33	0.69	0.4914
Learner_Type:NOEX*Testing_Time:T2	-0.28	0.14	1620.08	-0.55	-0.01	-2.00	0.0462
Learner_Type:LING*Noun_Type:Count	-0.05	0.12	1616.82	-0.29	0.18	-0.43	0.6668
Learner_Type:NOEX*Noun_Type:Count	-0.15	0.14	1616.82	-0.42	0.12	-1.09	0.2747
Learner_Type:LING*Noun_Type:Substance	-0.14	0.12	1616.82	-0.37	0.10	-1.14	0.2552
Learner_Type:NOEX*Noun_Type:Substance	-0.46	0.14	1616.82	-0.73	-0.19	-3.36	0.0008
Testing_Time:T1*Noun_Type:Count	-0.18	0.20	39.88	-0.55	0.15	-0.92	0.3621
Testing_Time:T2*Noun_Type:Count	-0.24	0.21	37.75	-0.60	0.12	-1.19	0.2417
Testing_Time:T1*Noun_Type:Substance	-0.11	0.20	38.76	-0.48	0.22	-0.56	0.5817
Testing_Time:T2*Noun_Type:Substance	-0.27	0.21	39.46	-0.63	0.10	-1.28	0.2068
Learner_Type:LING*Testing_Time:T1*Noun_Type:Count	0.25	0.17	1620.01	-0.08	0.58	1.46	0.1455
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Count	0.12	0.19	1616.82	-0.25	0.50	0.64	0.5240
Learner_Type:LING*Testing_Time:T2*Noun_Type:Count	0.09	0.17	1619.57	-0.26	0.43	0.51	0.6108
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Count	0.21	0.20	1619.00	-0.18	0.59	1.04	0.2975
Learner_Type:LING*Testing_Time:T1*Noun_Type:Substance	0.21	0.17	1619.75	-0.12	0.54	1.22	0.2234
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Substance	0.46	0.19	1616.82	0.08	0.84	2.39	0.0172
Learner_Type:LING*Testing_Time:T2*Noun_Type:Substance	0.17	0.18	1620.90	-0.18	0.51	0.94	0.3471
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	0.36	0.20	1620.06	-0.02	0.75	1.83	0.0674

Table K.8. LMER output for ESIT – RQ3, definite-singular context (Intercept: Learner_Type:TRAD, Testing_Time:T1, Noun_Type:Object)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	1.71	0.11	57.63	1.53	1.91	16.03	0.0000
Learner_Type:LING	0.07	0.10	466.40	-0.13	0.26	0.67	0.5020
Learner_Type:NOEX	0.14	0.11	465.30	-0.08	0.36	1.27	0.2038
Testing_Time:T0	-0.08	0.14	39.21	-0.34	0.16	-0.54	0.5905
Testing_Time:T2	0.01	0.14	42.07	-0.26	0.24	0.04	0.9720
Noun_Type:Count	-0.05	0.14	45.74	-0.32	0.18	-0.39	0.6988
Noun_Type:Substance	0.09	0.14	42.94	-0.17	0.32	0.66	0.5118
Learner_Type:LING*Testing_Time:T0	0.07	0.12	1620.00	-0.16	0.31	0.59	0.5579
Learner_Type:NOEX*Testing_Time:T0	0.11	0.14	1617.00	-0.16	0.38	0.81	0.4206
Learner_Type:LING*Testing_Time:T2	0.16	0.12	1624.00	-0.08	0.40	1.26	0.2080
Learner_Type:NOEX*Testing_Time:T2	-0.17	0.14	1620.00	-0.44	0.10	-1.21	0.2284
Learner_Type:LING*Noun_Type:Count	0.20	0.12	1623.00	-0.04	0.43	1.63	0.1036
Learner_Type:NOEX*Noun_Type:Count	-0.03	0.14	1617.00	-0.29	0.24	-0.19	0.8482
Learner_Type:LING*Noun_Type:Substance	0.07	0.12	1622.00	-0.16	0.31	0.58	0.5590
Learner_Type:NOEX*Noun_Type:Substance	0.00	0.14	1617.00	-0.26	0.27	0.02	0.9873
Testing_Time:T0*Noun_Type:Count	0.18	0.20	39.88	-0.15	0.55	0.92	0.3621
Testing_Time:T2*Noun_Type:Count	-0.06	0.20	42.73	-0.40	0.32	-0.30	0.7671
Testing_Time:T0*Noun_Type:Substance	0.11	0.20	38.76	-0.22	0.48	0.56	0.5817
Testing_Time:T2*Noun_Type:Substance	-0.16	0.21	43.43	-0.50	0.22	-0.76	0.4539
Learner_Type:LING*Testing_Time:T0*Noun_Type:Count	-0.25	0.17	1620.00	-0.58	0.08	-1.46	0.1455
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Count	-0.12	0.19	1617.00	-0.50	0.25	-0.64	0.5240
Learner_Type:LING*Testing_Time:T2*Noun_Type:Count	-0.16	0.17	1622.00	-0.50	0.18	-0.91	0.3616
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Count	0.08	0.20	1619.00	-0.31	0.46	0.42	0.6768
Learner_Type:LING*Testing_Time:T0*Noun_Type:Substance	-0.21	0.17	1620.00	-0.54	0.12	-1.22	0.2234
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Substance	-0.46	0.19	1617.00	-0.84	-0.08	-2.39	0.0172
Learner_Type:LING*Testing_Time:T2*Noun_Type:Substance	-0.04	0.18	1623.00	-0.39	0.30	-0.23	0.8180
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	-0.10	0.20	1620.00	-0.48	0.29	-0.48	0.6297

Table K.9. LMER output for ESIT – RQ3, indefinite-singular context (Intercept: Learner_Type:LING, Testing_Time:T0, Noun_Type:Object)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	1.22	0.11	22.60	1.03	1.41	10.99	0.0000
Learner_Type:NOEX	0.07	0.10	724.14	-0.12	0.26	0.74	0.4607
Learner_Type:TRAD	0.13	0.10	724.14	-0.06	0.32	1.36	0.1758
Testing_Time:T1	0.25	0.15	23.59	0.00	0.50	1.69	0.1045
Testing_Time:T2	0.42	0.15	20.71	0.16	0.68	2.75	0.0122
Noun_Type:Count	0.52	0.15	20.71	0.26	0.78	3.40	0.0028
Noun_Type:Substance	0.07	0.15	20.71	-0.19	0.32	0.43	0.6692
Learner_Type:NOEX*Testing_Time:T1	-0.19	0.13	1624.91	-0.43	0.06	-1.47	0.1428
Learner_Type:TRAD*Testing_Time:T1	-0.24	0.12	1625.04	-0.49	0.00	-1.97	0.0495
Learner_Type:NOEX*Testing_Time:T2	-0.48	0.13	1621.18	-0.73	-0.23	-3.80	0.0001
Learner_Type:TRAD*Testing_Time:T2	-0.31	0.12	1621.18	-0.55	-0.07	-2.51	0.0124
Learner_Type:NOEX*Noun_Type:Count	-0.05	0.13	1621.18	-0.30	0.20	-0.41	0.6831
Learner_Type:TRAD*Noun_Type:Count	-0.26	0.12	1621.18	-0.51	-0.02	-2.12	0.0344
Learner_Type:NOEX*Noun_Type:Substance	-0.11	0.13	1621.18	-0.35	0.14	-0.84	0.4026
Learner_Type:TRAD*Noun_Type:Substance	-0.14	0.12	1621.18	-0.38	0.10	-1.13	0.2574
Testing_Time:T1*Noun_Type:Count	-0.07	0.21	23.26	-0.42	0.30	-0.32	0.7550
Testing_Time:T2*Noun_Type:Count	-0.27	0.22	20.71	-0.63	0.10	-1.23	0.2340
Testing_Time:T1*Noun_Type:Substance	0.07	0.21	24.13	-0.27	0.44	0.36	0.7248
Testing_Time:T2*Noun_Type:Substance	-0.11	0.22	20.71	-0.48	0.25	-0.51	0.6149
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Count	0.12	0.18	1624.88	-0.23	0.47	0.68	0.4965
Learner_Type:TRAD*Testing_Time:T1*Noun_Type:Count	0.23	0.18	1625.00	-0.11	0.57	1.30	0.1938
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Count	0.25	0.18	1621.18	-0.10	0.60	1.38	0.1674
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Count	0.41	0.18	1634.65	0.05	0.77	2.21	0.0271
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Substance	0.17	0.18	1625.16	-0.18	0.52	0.94	0.3500
Learner_Type:TRAD*Testing_Time:T1*Noun_Type:Substance	-0.02	0.18	1625.30	-0.36	0.33	-0.09	0.9288
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	0.27	0.18	1621.18	-0.08	0.62	1.50	0.1343
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Substance	0.04	0.18	1621.18	-0.31	0.38	0.21	0.8330

Table K.10. LMER output for ESIT – RQ3, indefinite-singular context (Intercept: Learner_Type:LING, Testing_Time:T1, Noun_Type:Object)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept	1.47	0.10	30.51	1.29	1.65	14.09	0.0000
Learner_Type:NOEX	-0.11	0.10	726.72	-0.30	0.08	-1.17	0.2442
Learner_Type:TRAD	-0.11	0.10	726.81	-0.30	0.07	-1.20	0.2313
Testing_Time:T0	-0.25	0.15	23.59	-0.50	0.00	-1.69	0.1045
Testing_Time:T2	0.17	0.15	23.59	-0.08	0.42	1.14	0.2644
Noun_Type:Count	0.46	0.14	26.74	0.21	0.71	3.14	0.0041
Noun_Type:Substance	0.14	0.14	29.27	-0.09	0.40	0.99	0.3297
Learner_Type:NOEX*Testing_Time:T0	0.19	0.13	1624.91	-0.06	0.43	1.47	0.1428
Learner_Type:TRAD*Testing_Time:T0	0.24	0.12	1625.04	0.00	0.49	1.97	0.0495
Learner_Type:NOEX*Testing_Time:T2	-0.30	0.13	1624.91	-0.54	-0.05	-2.34	0.0197
Learner_Type:TRAD*Testing_Time:T2	-0.07	0.12	1625.04	-0.31	0.18	-0.54	0.5912
Learner_Type:NOEX*Noun_Type:Count	0.07	0.13	1628.25	-0.18	0.32	0.55	0.5800
Learner_Type:TRAD*Noun_Type:Count	-0.03	0.12	1628.49	-0.28	0.21	-0.28	0.7815
Learner_Type:NOEX*Noun_Type:Substance	0.06	0.13	1628.77	-0.18	0.31	0.49	0.6277
Learner_Type:TRAD*Noun_Type:Substance	-0.16	0.12	1629.02	-0.40	0.09	-1.26	0.2086
Testing_Time:T0*Noun_Type:Count	0.07	0.21	23.26	-0.30	0.42	0.32	0.7550
Testing_Time:T2*Noun_Type:Count	-0.20	0.21	23.26	-0.56	0.15	-0.95	0.3538
Testing_Time:T0*Noun_Type:Substance	-0.07	0.21	24.13	-0.44	0.27	-0.36	0.7248
Testing_Time:T2*Noun_Type:Substance	-0.19	0.21	24.13	-0.55	0.16	-0.89	0.3844
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Count	-0.12	0.18	1624.88	-0.47	0.23	-0.68	0.4965
Learner_Type:TRAD*Testing_Time:T0*Noun_Type:Count	-0.23	0.18	1625.00	-0.57	0.11	-1.30	0.1938
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Count	0.13	0.18	1624.88	-0.22	0.47	0.70	0.4838
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Count	0.18	0.18	1638.16	-0.18	0.54	0.98	0.3298
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Substance	-0.17	0.18	1625.16	-0.52	0.18	-0.94	0.3500
Learner_Type:TRAD*Testing_Time:T0*Noun_Type:Substance	0.02	0.18	1625.30	-0.33	0.36	0.09	0.9288
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	0.10	0.18	1625.16	-0.25	0.45	0.56	0.5738
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Substance	0.05	0.18	1625.30	-0.29	0.39	0.30	0.7642

Table K.11. LMER output for ESIT – RQ3, indefinite-singular context (Intercept: Learner_Type:TRAD, Testing_Time:T0, Noun_Type:Object)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	1.35	0.12	31.65	1.14	1.56	11.17	0.0000
Learner_Type:LING	-0.13	0.10	724.10	-0.32	0.06	-1.36	0.1758
Learner_Type:NOEX	-0.06	0.11	724.10	-0.27	0.15	-0.53	0.5949
Testing_Time:T1	0.01	0.16	32.08	-0.28	0.29	0.05	0.9640
Testing_Time:T2	0.11	0.17	28.01	-0.17	0.40	0.67	0.5084
Noun_Type:Count	0.26	0.17	28.01	-0.02	0.54	1.56	0.1293
Noun_Type:Substance	-0.07	0.17	28.01	-0.36	0.21	-0.45	0.6586
Learner_Type:LING*Testing_Time:T1	0.24	0.12	1625.00	0.00	0.49	1.97	0.0495
Learner_Type:NOEX*Testing_Time:T1	0.06	0.14	1621.00	-0.22	0.33	0.42	0.6764
Learner_Type:LING*Testing_Time:T2	0.31	0.12	1621.00	0.07	0.55	2.51	0.0124
Learner_Type:NOEX*Testing_Time:T2	-0.17	0.14	1621.00	-0.45	0.11	-1.21	0.2280
Learner_Type:LING*Noun_Type:Count	0.26	0.12	1621.00	0.02	0.51	2.12	0.0344
Learner_Type:NOEX*Noun_Type:Count	0.21	0.14	1621.00	-0.06	0.49	1.50	0.1339
Learner_Type:LING*Noun_Type:Substance	0.14	0.12	1621.00	-0.10	0.38	1.13	0.2574
Learner_Type:NOEX*Noun_Type:Substance	0.03	0.14	1621.00	-0.24	0.31	0.25	0.8046
Testing_Time:T1*Noun_Type:Count	0.16	0.23	31.58	-0.23	0.57	0.70	0.4888
Testing_Time:T2*Noun_Type:Count	0.14	0.24	31.46	-0.28	0.56	0.59	0.5606
Testing_Time:T1*Noun_Type:Substance	0.06	0.23	32.80	-0.32	0.47	0.26	0.7989
Testing_Time:T2*Noun_Type:Substance	-0.07	0.23	28.01	-0.48	0.33	-0.32	0.7545
Learner_Type:LING*Testing_Time:T1*Noun_Type:Count	-0.23	0.18	1625.00	-0.57	0.11	-1.30	0.1938
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Count	-0.11	0.20	1621.00	-0.50	0.28	-0.54	0.5922
Learner_Type:LING*Testing_Time:T2*Noun_Type:Count	-0.41	0.18	1635.00	-0.77	-0.05	-2.21	0.0271
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Count	-0.16	0.21	1632.00	-0.57	0.24	-0.78	0.4358
Learner_Type:LING*Testing_Time:T1*Noun_Type:Substance	0.02	0.18	1625.00	-0.33	0.36	0.09	0.9288
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Substance	0.18	0.20	1621.00	-0.21	0.57	0.92	0.3585
Learner_Type:LING*Testing_Time:T2*Noun_Type:Substance	-0.04	0.18	1621.00	-0.38	0.31	-0.21	0.8330
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	0.23	0.20	1621.00	-0.16	0.62	1.16	0.2467

Table K.12. LMER output for ESIT – RQ3, indefinite-singular context (Intercept: Learner_Type:TRAD, Testing_Time:T1, Noun_Type:Object)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	1.36	0.12	42.67	1.15	1.56	11.62	0.0000
Learner_Type:LING	0.11	0.10	726.80	-0.07	0.30	1.20	0.2312
Learner_Type:NOEX	0.00	0.11	724.10	-0.21	0.21	0.01	0.9920
Testing_Time:T0	-0.01	0.16	32.08	-0.29	0.28	-0.05	0.9640
Testing_Time:T2	0.10	0.16	32.08	-0.18	0.39	0.64	0.5290
Noun_Type:Count	0.42	0.16	36.20	0.15	0.71	2.62	0.0127
Noun_Type:Substance	-0.02	0.16	39.53	-0.28	0.28	-0.10	0.9251
Learner_Type:LING*Testing_Time:T0	-0.24	0.12	1625.00	-0.49	0.00	-1.97	0.0495
Learner_Type:NOEX*Testing_Time:T0	-0.06	0.14	1621.00	-0.33	0.22	-0.42	0.6764
Learner_Type:LING*Testing_Time:T2	0.07	0.12	1625.00	-0.18	0.31	0.54	0.5912
Learner_Type:NOEX*Testing_Time:T2	-0.23	0.14	1621.00	-0.50	0.05	-1.62	0.1047
Learner_Type:LING*Noun_Type:Count	0.03	0.12	1628.00	-0.21	0.28	0.28	0.7815
Learner_Type:NOEX*Noun_Type:Count	0.10	0.14	1621.00	-0.17	0.38	0.74	0.4581
Learner_Type:LING*Noun_Type:Substance	0.16	0.12	1629.00	-0.09	0.40	1.26	0.2086
Learner_Type:NOEX*Noun_Type:Substance	0.22	0.14	1621.00	-0.06	0.49	1.55	0.1222
Testing_Time:T0*Noun_Type:Count	-0.16	0.23	31.58	-0.57	0.23	-0.70	0.4888
Testing_Time:T2*Noun_Type:Count	-0.02	0.24	35.60	-0.44	0.39	-0.08	0.9345
Testing_Time:T0*Noun_Type:Substance	-0.06	0.23	32.80	-0.47	0.32	-0.26	0.7989
Testing_Time:T2*Noun_Type:Substance	-0.13	0.23	32.80	-0.54	0.25	-0.58	0.5665
Learner_Type:LING*Testing_Time:T0*Noun_Type:Count	0.23	0.18	1625.00	-0.11	0.57	1.30	0.1938
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Count	0.11	0.20	1621.00	-0.28	0.50	0.54	0.5922
Learner_Type:LING*Testing_Time:T2*Noun_Type:Count	-0.18	0.18	1638.00	-0.54	0.18	-0.98	0.3298
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Count	-0.05	0.21	1632.00	-0.46	0.35	-0.27	0.7912
Learner_Type:LING*Testing_Time:T0*Noun_Type:Substance	-0.02	0.18	1625.00	-0.36	0.33	-0.09	0.9288
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Substance	-0.18	0.20	1621.00	-0.57	0.21	-0.92	0.3585
Learner_Type:LING*Testing_Time:T2*Noun_Type:Substance	-0.05	0.18	1625.00	-0.39	0.29	-0.30	0.7642
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	0.05	0.20	1621.00	-0.34	0.44	0.24	0.8099

Table K.13. LMER output for ESIT – RQ3, zero-plural context (Intercept: Learner_Type:LING, Testing_Time:T0, Noun_Type:Object)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept	1.31	0.13	26.12	1.09	1.53	10.40	0.0000
Learner_Type:NOEX	0.14	0.10	864.80	-0.05	0.33	1.41	0.1582
Learner_Type:TRAD	0.00	0.10	864.80	-0.19	0.19	0.04	0.9696
Testing_Time:T1	0.28	0.17	27.50	-0.02	0.57	1.66	0.1094
Testing_Time:T2	0.27	0.18	24.72	-0.03	0.57	1.52	0.1420
Noun_Type:Count	0.50	0.18	24.72	0.20	0.80	2.84	0.0088
Noun_Type:Substance	0.10	0.16	24.72	-0.18	0.38	0.59	0.5597
Learner_Type:NOEX*Testing_Time:T1	-0.28	0.13	1665.00	-0.54	-0.03	-2.14	0.0323
Learner_Type:TRAD*Testing_Time:T1	-0.17	0.13	1665.00	-0.42	0.08	-1.30	0.1932
Learner_Type:NOEX*Testing_Time:T2	-0.27	0.13	1661.00	-0.52	-0.01	-2.03	0.0421
Learner_Type:TRAD*Testing_Time:T2	0.00	0.14	1674.00	-0.27	0.26	-0.03	0.9780
Learner_Type:NOEX*Noun_Type:Count	-0.11	0.13	1661.00	-0.36	0.15	-0.82	0.4108
Learner_Type:TRAD*Noun_Type:Count	-0.09	0.13	1661.00	-0.34	0.16	-0.72	0.4721
Learner_Type:NOEX*Noun_Type:Substance	-0.11	0.12	1661.00	-0.35	0.13	-0.87	0.3828
Learner_Type:TRAD*Noun_Type:Substance	-0.01	0.12	1661.00	-0.24	0.23	-0.08	0.9387
Testing_Time:T1*Noun_Type:Count	-0.18	0.24	27.62	-0.58	0.25	-0.76	0.4559
Testing_Time:T2*Noun_Type:Count	-0.17	0.25	24.72	-0.59	0.26	-0.67	0.5088
Testing_Time:T1*Noun_Type:Substance	-0.24	0.23	27.84	-0.64	0.17	-1.03	0.3109
Testing_Time:T2*Noun_Type:Substance	-0.49	0.24	24.72	-0.90	-0.07	-2.02	0.0544
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Count	0.15	0.19	1664.00	-0.22	0.51	0.78	0.4337
Learner_Type:TRAD*Testing_Time:T1*Noun_Type:Count	-0.02	0.18	1664.00	-0.38	0.33	-0.13	0.8970
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Count	0.09	0.19	1661.00	-0.27	0.45	0.48	0.6341
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Count	-0.09	0.20	1665.00	-0.47	0.30	-0.44	0.6607
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Substance	0.25	0.18	1665.00	-0.10	0.60	1.38	0.1686
Learner_Type:TRAD*Testing_Time:T1*Noun_Type:Substance	0.19	0.18	1665.00	-0.16	0.53	1.05	0.2930
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	0.08	0.18	1661.00	-0.27	0.43	0.47	0.6392
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Substance	-0.16	0.19	1663.00	-0.53	0.20	-0.88	0.3790

Table K.14. LMER output for ESIT – RQ3, zero-plural context (Intercept: Learner_Type:LING, Testing_Time:T1, Noun_Type:Object)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept	1.59	0.12	33.25	1.38	1.79	13.44	0.0000
Learner_Type:NOEX	-0.14	0.10	868.33	-0.33	0.05	-1.42	0.1551
Learner_Type:TRAD	-0.16	0.10	868.45	-0.35	0.02	-1.68	0.0926
Testing_Time:T0	-0.28	0.17	27.50	-0.57	0.02	-1.66	0.1094
Testing_Time:T2	-0.02	0.17	27.50	-0.30	0.29	-0.09	0.9285
Noun_Type:Count	0.32	0.16	31.59	0.05	0.62	1.93	0.0626
Noun_Type:Substance	-0.14	0.16	31.59	-0.42	0.15	-0.87	0.3918
Learner_Type:NOEX*Testing_Time:T0	0.28	0.13	1664.50	0.03	0.54	2.14	0.0323
Learner_Type:TRAD*Testing_Time:T0	0.17	0.13	1664.64	-0.08	0.42	1.30	0.1932
Learner_Type:NOEX*Testing_Time:T2	0.01	0.13	1664.50	-0.24	0.27	0.11	0.9132
Learner_Type:TRAD*Testing_Time:T2	0.16	0.14	1677.66	-0.10	0.43	1.20	0.2291
Learner_Type:NOEX*Noun_Type:Count	0.04	0.13	1667.73	-0.22	0.29	0.29	0.7757
Learner_Type:TRAD*Noun_Type:Count	-0.12	0.13	1667.96	-0.37	0.14	-0.90	0.3675
Learner_Type:NOEX*Noun_Type:Substance	0.14	0.13	1667.73	-0.12	0.40	1.07	0.2851
Learner_Type:TRAD*Noun_Type:Substance	0.18	0.13	1667.96	-0.07	0.43	1.37	0.1716
Testing_Time:T0*Noun_Type:Count	0.18	0.24	27.62	-0.25	0.58	0.76	0.4559
Testing_Time:T2*Noun_Type:Count	0.02	0.24	27.62	-0.41	0.42	0.06	0.9491
Testing_Time:T0*Noun_Type:Substance	0.24	0.23	27.84	-0.17	0.64	1.03	0.3109
Testing_Time:T2*Noun_Type:Substance	-0.25	0.24	27.62	-0.67	0.17	-1.02	0.3162
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Count	-0.15	0.19	1664.36	-0.51	0.22	-0.78	0.4337
Learner_Type:TRAD*Testing_Time:T0*Noun_Type:Count	0.02	0.18	1664.49	-0.33	0.38	0.13	0.8970
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Count	-0.06	0.19	1664.36	-0.42	0.30	-0.31	0.7586
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Count	-0.06	0.20	1667.94	-0.45	0.32	-0.32	0.7502
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Substance	-0.25	0.18	1664.60	-0.60	0.10	-1.38	0.1686
Learner_Type:TRAD*Testing_Time:T0*Noun_Type:Substance	-0.19	0.18	1664.74	-0.53	0.16	-1.05	0.2930
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	-0.16	0.19	1664.36	-0.53	0.20	-0.88	0.3790
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Substance	-0.35	0.19	1665.79	-0.73	0.02	-1.82	0.0690

Table K.15. LMER output for ESIT – RQ3, zero-plural context (Intercept: Learner_Type:TRAD, Testing_Time:T0, Noun_Type:Object)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept	1.32	0.14	34.39	1.08	1.55	9.73	0.0000
Learner_Type:LING	0.00	0.10	864.80	-0.19	0.19	-0.04	0.9696
Learner_Type:NOEX	0.14	0.11	864.80	-0.08	0.35	1.23	0.2175
Testing_Time:T1	0.11	0.18	35.57	-0.22	0.43	0.62	0.5380
Testing_Time:T2	0.26	0.19	35.40	-0.07	0.60	1.37	0.1804
Noun_Type:Count	0.41	0.19	31.77	0.08	0.73	2.18	0.0371
Noun_Type:Substance	0.09	0.18	31.77	-0.22	0.39	0.50	0.6189
Learner_Type:LING*Testing_Time:T1	0.17	0.13	1665.00	-0.08	0.42	1.30	0.1932
Learner_Type:NOEX*Testing_Time:T1	-0.11	0.15	1661.00	-0.40	0.17	-0.78	0.4380
Learner_Type:LING*Testing_Time:T2	0.00	0.14	1674.00	-0.26	0.27	0.03	0.9780
Learner_Type:NOEX*Testing_Time:T2	-0.26	0.15	1672.00	-0.56	0.04	-1.72	0.0852
Learner_Type:LING*Noun_Type:Count	0.09	0.13	1661.00	-0.16	0.34	0.72	0.4721
Learner_Type:NOEX*Noun_Type:Count	-0.02	0.15	1661.00	-0.30	0.27	-0.10	0.9168
Learner_Type:LING*Noun_Type:Substance	0.01	0.12	1661.00	-0.23	0.24	0.08	0.9387
Learner_Type:NOEX*Noun_Type:Substance	-0.10	0.14	1661.00	-0.36	0.17	-0.72	0.4742
Testing_Time:T1*Noun_Type:Count	-0.21	0.26	35.76	-0.64	0.27	-0.79	0.4338
Testing_Time:T2*Noun_Type:Count	-0.25	0.27	36.65	-0.73	0.23	-0.92	0.3633
Testing_Time:T1*Noun_Type:Substance	-0.05	0.25	36.06	-0.49	0.39	-0.22	0.8291
Testing_Time:T2*Noun_Type:Substance	-0.65	0.26	35.49	-1.11	-0.19	-2.47	0.0186
Learner_Type:LING*Testing_Time:T1*Noun_Type:Count	0.02	0.18	1664.00	-0.33	0.38	0.13	0.8970
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Count	0.17	0.21	1661.00	-0.23	0.57	0.82	0.4137
Learner_Type:LING*Testing_Time:T2*Noun_Type:Count	0.09	0.20	1665.00	-0.30	0.47	0.44	0.6607
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Count	0.17	0.22	1664.00	-0.25	0.60	0.80	0.4260
Learner_Type:LING*Testing_Time:T1*Noun_Type:Substance	-0.19	0.18	1665.00	-0.53	0.16	-1.05	0.2930
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Substance	0.06	0.20	1661.00	-0.33	0.45	0.31	0.7572
Learner_Type:LING*Testing_Time:T2*Noun_Type:Substance	0.16	0.19	1663.00	-0.20	0.53	0.88	0.3790
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	0.25	0.21	1662.00	-0.16	0.66	1.19	0.2352

Table K.16. LMER output for ESIT – RQ3, zero-plural context (Intercept: Learner_Type:TRAD, Testing_Time:T1, Noun_Type:Object)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	1.43	0.13	43.99	1.19	1.65	10.94	0.0000
Learner_Type:LING	0.16	0.10	868.50	-0.02	0.35	1.68	0.0926
Learner_Type:NOEX	0.02	0.11	864.80	-0.19	0.24	0.21	0.8358
Testing_Time:T0	-0.11	0.18	35.57	-0.43	0.22	-0.62	0.5380
Testing_Time:T2	0.15	0.19	39.77	-0.18	0.49	0.79	0.4374
Noun_Type:Count	0.20	0.18	40.96	-0.10	0.54	1.12	0.2701
Noun_Type:Substance	0.03	0.18	40.96	-0.28	0.36	0.19	0.8544
Learner_Type:LING*Testing_Time:T0	-0.17	0.13	1665.00	-0.42	0.08	-1.30	0.1932
Learner_Type:NOEX*Testing_Time:T0	0.11	0.15	1661.00	-0.17	0.40	0.78	0.4380
Learner_Type:LING*Testing_Time:T2	-0.16	0.14	1678.00	-0.43	0.10	-1.20	0.2291
Learner_Type:NOEX*Testing_Time:T2	-0.15	0.15	1672.00	-0.45	0.15	-0.98	0.3271
Learner_Type:LING*Noun_Type:Count	0.12	0.13	1668.00	-0.14	0.37	0.90	0.3675
Learner_Type:NOEX*Noun_Type:Count	0.15	0.15	1661.00	-0.13	0.44	1.05	0.2930
Learner_Type:LING*Noun_Type:Substance	-0.18	0.13	1668.00	-0.43	0.07	-1.37	0.1716
Learner_Type:NOEX*Noun_Type:Substance	-0.04	0.15	1661.00	-0.32	0.25	-0.25	0.8056
Testing_Time:T0*Noun_Type:Count	0.21	0.26	35.76	-0.27	0.64	0.79	0.4338
Testing_Time:T2*Noun_Type:Count	-0.05	0.27	41.46	-0.54	0.41	-0.17	0.8629
Testing_Time:T0*Noun_Type:Substance	0.05	0.25	36.06	-0.39	0.49	0.22	0.8291
Testing_Time:T2*Noun_Type:Substance	-0.60	0.27	39.83	-1.07	-0.13	-2.23	0.0314
Learner_Type:LING*Testing_Time:T0*Noun_Type:Count	-0.02	0.18	1664.00	-0.38	0.33	-0.13	0.8970
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Count	-0.17	0.21	1661.00	-0.57	0.23	-0.82	0.4137
Learner_Type:LING*Testing_Time:T2*Noun_Type:Count	0.06	0.20	1668.00	-0.32	0.45	0.32	0.7502
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Count	0.01	0.22	1664.00	-0.42	0.43	0.03	0.9804
Learner_Type:LING*Testing_Time:T0*Noun_Type:Substance	0.19	0.18	1665.00	-0.16	0.53	1.05	0.2930
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Substance	-0.06	0.20	1661.00	-0.45	0.33	-0.31	0.7572
Learner_Type:LING*Testing_Time:T2*Noun_Type:Substance	0.35	0.19	1666.00	-0.02	0.73	1.82	0.0690
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	0.19	0.22	1662.00	-0.23	0.61	0.87	0.3866

Table K.17. LMER output for ESIT – RQ3, zero-singular context (Intercept: Learner_Type:LING, Testing_Time:T0, Noun_Type:Object)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	1.56	0.10	26.46	1.39	1.72	16.20	0.0000
Learner_Type:NOEX	-0.05	0.10	998.10	-0.24	0.14	-0.47	0.6401
Learner_Type:TRAD	0.06	0.10	998.10	-0.13	0.24	0.58	0.5632
Testing_Time:T1	0.31	0.13	27.05	0.08	0.53	2.34	0.0270
Testing_Time:T2	0.37	0.13	24.88	0.14	0.59	2.74	0.0111
Noun_Type:Count	-0.08	0.13	24.88	-0.30	0.15	-0.58	0.5659
Noun_Type:Substance	-0.19	0.15	24.88	-0.44	0.06	-1.26	0.2180
Learner_Type:NOEX*Testing_Time:T1	0.00	0.13	1564.00	-0.26	0.25	-0.03	0.9748
Learner_Type:TRAD*Testing_Time:T1	-0.08	0.13	1564.00	-0.33	0.18	-0.59	0.5589
Learner_Type:NOEX*Testing_Time:T2	-0.29	0.13	1562.00	-0.55	-0.03	-2.18	0.0297
Learner_Type:TRAD*Testing_Time:T2	-0.32	0.14	1577.00	-0.58	-0.05	-2.31	0.0209
Learner_Type:NOEX*Noun_Type:Count	0.33	0.13	1562.00	0.07	0.59	2.51	0.0121
Learner_Type:TRAD*Noun_Type:Count	0.10	0.13	1562.00	-0.16	0.35	0.74	0.4593
Learner_Type:NOEX*Noun_Type:Substance	0.39	0.15	1562.00	0.10	0.67	2.60	0.0094
Learner_Type:TRAD*Noun_Type:Substance	0.05	0.15	1562.00	-0.23	0.33	0.34	0.7311
Testing_Time:T1*Noun_Type:Count	-0.11	0.19	26.74	-0.42	0.22	-0.58	0.5645
Testing_Time:T2*Noun_Type:Count	-0.29	0.19	24.88	-0.61	0.03	-1.53	0.1391
Testing_Time:T1*Noun_Type:Substance	0.19	0.20	28.55	-0.14	0.53	0.98	0.3362
Testing_Time:T2*Noun_Type:Substance	0.01	0.20	24.88	-0.33	0.35	0.06	0.9563
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Count	-0.49	0.19	1563.00	-0.86	-0.13	-2.63	0.0087
Learner_Type:TRAD*Testing_Time:T1*Noun_Type:Count	-0.28	0.18	1563.00	-0.63	0.08	-1.50	0.1341
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Count	-0.24	0.19	1562.00	-0.61	0.13	-1.28	0.1994
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Count	-0.02	0.19	1570.00	-0.39	0.35	-0.10	0.9195
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Substance	-0.49	0.20	1564.00	-0.88	-0.10	-2.46	0.0142
Learner_Type:TRAD*Testing_Time:T1*Noun_Type:Substance	-0.02	0.20	1564.00	-0.40	0.36	-0.10	0.9221
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	-0.32	0.20	1562.00	-0.71	0.06	-1.64	0.1023
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Substance	0.07	0.20	1566.00	-0.33	0.46	0.35	0.7250

Table K.18. LMER output for ESIT – RQ3, zero-singular context (Intercept: Learner_Type:LING, Testing_Time:T1, Noun_Type:Object)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	1.86	0.09	31.73	1.70	2.02	20.09	< 2e-16
Learner_Type:NOEX	-0.05	0.10	1000.00	-0.24	0.14	-0.51	0.6100
Learner_Type:TRAD	-0.02	0.10	1000.00	-0.21	0.17	-0.21	0.8309
Testing_Time:T0	-0.31	0.13	27.05	-0.53	-0.08	-2.34	0.0270
Testing_Time:T2	0.06	0.13	27.05	-0.16	0.29	0.45	0.6534
Noun_Type:Count	-0.19	0.13	28.96	-0.40	0.05	-1.44	0.1611
Noun_Type:Substance	0.00	0.13	35.29	-0.21	0.23	0.02	0.9860
Learner_Type:NOEX*Testing_Time:T0	0.00	0.13	1564.00	-0.25	0.26	0.03	0.9748
Learner_Type:TRAD*Testing_Time:T0	0.08	0.13	1564.00	-0.18	0.33	0.59	0.5589
Learner_Type:NOEX*Testing_Time:T2	-0.28	0.13	1564.00	-0.54	-0.03	-2.14	0.0322
Learner_Type:TRAD*Testing_Time:T2	-0.24	0.14	1579.00	-0.51	0.03	-1.76	0.0789
Learner_Type:NOEX*Noun_Type:Count	-0.16	0.13	1565.00	-0.42	0.10	-1.21	0.2277
Learner_Type:TRAD*Noun_Type:Count	-0.18	0.13	1565.00	-0.43	0.08	-1.38	0.1680
Learner_Type:NOEX*Noun_Type:Substance	-0.10	0.13	1567.00	-0.36	0.16	-0.78	0.4369
Learner_Type:TRAD*Noun_Type:Substance	0.03	0.13	1567.00	-0.22	0.29	0.24	0.8124
Testing_Time:T0*Noun_Type:Count	0.11	0.19	26.74	-0.22	0.42	0.58	0.5645
Testing_Time:T2*Noun_Type:Count	-0.18	0.19	26.74	-0.51	0.13	-0.97	0.3416
Testing_Time:T0*Noun_Type:Substance	-0.19	0.20	28.55	-0.53	0.14	-0.98	0.3362
Testing_Time:T2*Noun_Type:Substance	-0.18	0.18	29.10	-0.50	0.13	-0.98	0.3350
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Count	0.49	0.19	1563.00	0.13	0.86	2.63	0.0087
Learner_Type:TRAD*Testing_Time:T0*Noun_Type:Count	0.28	0.18	1563.00	-0.08	0.63	1.50	0.1341
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Count	0.25	0.19	1563.00	-0.11	0.62	1.35	0.1787
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Count	0.26	0.19	1572.00	-0.12	0.62	1.36	0.1754
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Substance	0.49	0.20	1564.00	0.10	0.88	2.46	0.0142
Learner_Type:TRAD*Testing_Time:T0*Noun_Type:Substance	0.02	0.20	1564.00	-0.36	0.40	0.10	0.9221
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	0.16	0.19	1564.00	-0.20	0.53	0.87	0.3839
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Substance	0.09	0.19	1569.00	-0.29	0.46	0.47	0.6376

Table K.19. LMER output for ESIT – RQ3, zero-singular context (Intercept: Learner_Type:TRAD, Testing_Time:T0, Noun_Type:Object)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	1.61	0.11	41.14	1.42	1.80	15.00	0.0000
Learner_Type:LING	-0.06	0.10	998.07	-0.24	0.13	-0.58	0.5632
Learner_Type:NOEX	-0.10	0.11	998.07	-0.31	0.11	-0.93	0.3528
Testing_Time:T1	0.23	0.15	40.80	-0.03	0.49	1.56	0.1256
Testing_Time:T2	0.05	0.16	44.92	-0.22	0.32	0.31	0.7548
Noun_Type:Count	0.02	0.15	37.98	-0.24	0.28	0.13	0.9015
Noun_Type:Substance	-0.14	0.17	37.98	-0.43	0.15	-0.84	0.4086
Learner_Type:LING*Testing_Time:T1	0.08	0.13	1563.82	-0.18	0.33	0.59	0.5589
Learner_Type:NOEX*Testing_Time:T1	0.07	0.15	1561.60	-0.22	0.36	0.49	0.6262
Learner_Type:LING*Testing_Time:T2	0.32	0.14	1577.37	0.05	0.58	2.31	0.0209
Learner_Type:NOEX*Testing_Time:T2	0.03	0.15	1574.27	-0.27	0.33	0.19	0.8474
Learner_Type:LING*Noun_Type:Count	-0.10	0.13	1561.60	-0.35	0.16	-0.74	0.4593
Learner_Type:NOEX*Noun_Type:Count	0.24	0.15	1561.60	-0.05	0.52	1.60	0.1094
Learner_Type:LING*Noun_Type:Substance	-0.05	0.15	1561.60	-0.33	0.23	-0.34	0.7311
Learner_Type:NOEX*Noun_Type:Substance	0.33	0.16	1561.60	0.01	0.66	2.03	0.0425
Testing_Time:T1*Noun_Type:Count	-0.38	0.21	40.44	-0.74	-0.01	-1.84	0.0732
Testing_Time:T2*Noun_Type:Count	-0.31	0.21	41.38	-0.69	0.07	-1.43	0.1593
Testing_Time:T1*Noun_Type:Substance	0.17	0.22	43.22	-0.21	0.57	0.78	0.4393
Testing_Time:T2*Noun_Type:Substance	0.08	0.23	42.23	-0.32	0.48	0.36	0.7215
Learner_Type:LING*Testing_Time:T1*Noun_Type:Count	0.28	0.18	1563.43	-0.08	0.63	1.50	0.1341
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Count	-0.22	0.21	1561.60	-0.62	0.19	-1.04	0.2991
Learner_Type:LING*Testing_Time:T2*Noun_Type:Count	0.02	0.19	1570.11	-0.35	0.39	0.10	0.9195
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Count	-0.22	0.21	1568.33	-0.64	0.20	-1.04	0.2997
Learner_Type:LING*Testing_Time:T1*Noun_Type:Substance	0.02	0.20	1564.23	-0.36	0.40	0.10	0.9221
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Substance	-0.47	0.22	1561.60	-0.90	-0.04	-2.12	0.0343
Learner_Type:LING*Testing_Time:T2*Noun_Type:Substance	-0.07	0.20	1566.23	-0.46	0.33	-0.35	0.7250
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	-0.40	0.23	1565.27	-0.84	0.05	-1.74	0.0821

Table K.20. LMER output for ESIT – RQ3, zero-singular context (Intercept: Learner_Type:TRAD, Testing_Time:T1, Noun_Type:Object)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	1.84	0.11	47.73	1.65	2.03	17.37	0.0000
Learner_Type:LING	0.02	0.10	1000.00	-0.17	0.21	0.21	0.8309
Learner_Type:NOEX	-0.03	0.11	998.10	-0.24	0.18	-0.27	0.7873
Testing_Time:T0	-0.23	0.15	40.80	-0.49	0.03	-1.56	0.1256
Testing_Time:T2	-0.18	0.15	48.33	-0.45	0.09	-1.18	0.2434
Noun_Type:Count	-0.37	0.15	43.20	-0.61	-0.10	-2.49	0.0167
Noun_Type:Substance	0.03	0.14	51.95	-0.22	0.30	0.23	0.8198
Learner_Type:LING*Testing_Time:T0	-0.08	0.13	1564.00	-0.33	0.18	-0.59	0.5589
Learner_Type:NOEX*Testing_Time:T0	-0.07	0.15	1562.00	-0.36	0.22	-0.49	0.6262
Learner_Type:LING*Testing_Time:T2	0.24	0.14	1579.00	-0.03	0.51	1.76	0.0789
Learner_Type:NOEX*Testing_Time:T2	-0.04	0.15	1574.00	-0.35	0.26	-0.27	0.7842
Learner_Type:LING*Noun_Type:Count	0.18	0.13	1565.00	-0.08	0.43	1.38	0.1680
Learner_Type:NOEX*Noun_Type:Count	0.02	0.15	1562.00	-0.27	0.31	0.13	0.8943
Learner_Type:LING*Noun_Type:Substance	-0.03	0.13	1567.00	-0.29	0.22	-0.24	0.8124
Learner_Type:NOEX*Noun_Type:Substance	-0.13	0.15	1562.00	-0.42	0.15	-0.91	0.3641
Testing_Time:T0*Noun_Type:Count	0.38	0.21	40.44	0.01	0.74	1.84	0.0732
Testing_Time:T2*Noun_Type:Count	0.08	0.21	44.09	-0.31	0.44	0.36	0.7223
Testing_Time:T0*Noun_Type:Substance	-0.17	0.22	43.22	-0.57	0.21	-0.78	0.4393
Testing_Time:T2*Noun_Type:Substance	-0.09	0.21	49.65	-0.48	0.28	-0.42	0.6767
Learner_Type:LING*Testing_Time:T0*Noun_Type:Count	-0.28	0.18	1563.00	-0.63	0.08	-1.50	0.1341
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Count	0.22	0.21	1562.00	-0.19	0.62	1.04	0.2991
Learner_Type:LING*Testing_Time:T2*Noun_Type:Count	-0.26	0.19	1572.00	-0.62	0.12	-1.36	0.1754
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Count	0.00	0.21	1568.00	-0.42	0.41	-0.02	0.9827
Learner_Type:LING*Testing_Time:T0*Noun_Type:Substance	-0.02	0.20	1564.00	-0.40	0.36	-0.10	0.9221
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Substance	0.47	0.22	1562.00	0.04	0.90	2.12	0.0343
Learner_Type:LING*Testing_Time:T2*Noun_Type:Substance	-0.09	0.19	1569.00	-0.46	0.29	-0.47	0.6376
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	0.07	0.22	1566.00	-0.34	0.50	0.34	0.7346

Table K.21. LMER output for AJT – RQ3, definite-plural context (Intercept: Learner_Type:LING, Testing_Time:T0, Noun_Type:Object)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	4.98	0.28	46.36	4.48	5.47	17.79	< 2e-16
Learner_Type:NOEX	0.85	0.35	427.56	0.16	1.53	2.39	0.0175
Learner_Type:TRAD	0.36	0.35	427.56	-0.32	1.03	1.02	0.3076
Testing_Time:T1	-0.27	0.36	33.60	-0.90	0.36	-0.74	0.4667
Testing_Time:T2	-0.17	0.36	33.60	-0.80	0.46	-0.46	0.6484
Noun_Type:Count	-0.74	0.36	33.60	-1.38	-0.11	-2.06	0.0477
Noun_Type:Substance	0.40	0.36	33.60	-0.23	1.03	1.10	0.2773
Learner_Type:NOEX*Testing_Time:T1	0.21	0.43	1648.00	-0.62	1.04	0.49	0.6251
Learner_Type:TRAD*Testing_Time:T1	0.29	0.42	1648.00	-0.53	1.10	0.68	0.4949
Learner_Type:NOEX*Testing_Time:T2	-0.64	0.43	1648.00	-1.47	0.19	-1.50	0.1343
Learner_Type:TRAD*Testing_Time:T2	-0.81	0.42	1648.00	-1.63	0.00	-1.95	0.0513
Learner_Type:NOEX*Noun_Type:Count	-0.49	0.43	1648.00	-1.32	0.34	-1.15	0.2486
Learner_Type:TRAD*Noun_Type:Count	0.36	0.42	1648.00	-0.46	1.17	0.85	0.3948
Learner_Type:NOEX*Noun_Type:Substance	-0.48	0.43	1648.00	-1.31	0.35	-1.13	0.2608
Learner_Type:TRAD*Noun_Type:Substance	-0.70	0.42	1648.00	-1.51	0.12	-1.67	0.0957
Testing_Time:T1*Noun_Type:Count	1.51	0.51	33.60	0.62	2.40	2.95	0.0058
Testing_Time:T2*Noun_Type:Count	0.52	0.51	33.60	-0.37	1.41	1.02	0.3152
Testing_Time:T1*Noun_Type:Substance	-0.93	0.51	33.60	-1.83	-0.04	-1.82	0.0773
Testing_Time:T2*Noun_Type:Substance	-0.53	0.51	33.60	-1.43	0.36	-1.04	0.3052
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Count	-0.81	0.60	1648.00	-1.98	0.37	-1.34	0.1809
Learner_Type:TRAD*Testing_Time:T1*Noun_Type:Count	-1.90	0.59	1648.00	-3.05	-0.75	-3.22	0.0013
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Count	0.24	0.60	1648.00	-0.93	1.42	0.40	0.6869
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Count	0.11	0.59	1648.00	-1.05	1.26	0.18	0.8558
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Substance	0.78	0.60	1648.00	-0.40	1.95	1.29	0.1969
Learner_Type:TRAD*Testing_Time:T1*Noun_Type:Substance	0.73	0.59	1648.00	-0.42	1.88	1.24	0.2170
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	0.55	0.60	1648.00	-0.62	1.73	0.92	0.3581
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Substance	0.92	0.59	1648.00	-0.23	2.08	1.56	0.1187

Table K.22. LMER output for AJT – RQ3, definite-plural context (Intercept: Learner_Type:LING, Testing_Time:T1, Noun_Type:Object)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	4.71	0.28	46.36	4.22	5.21	16.84	0.0000
Learner_Type:NOEX	1.05	0.35	427.56	0.36	1.74	2.97	0.0031
Learner_Type:TRAD	0.64	0.35	427.56	-0.04	1.32	1.84	0.0664
Testing_Time:T0	0.27	0.36	33.60	-0.36	0.90	0.74	0.4667
Testing_Time:T2	0.10	0.36	33.60	-0.53	0.73	0.28	0.7842
Noun_Type:Count	0.77	0.36	33.60	0.14	1.40	2.12	0.0418
Noun_Type:Substance	-0.53	0.36	33.60	-1.16	0.10	-1.47	0.1502
Learner_Type:NOEX*Testing_Time:T0	-0.21	0.43	1648.00	-1.04	0.62	-0.49	0.6251
Learner_Type:TRAD*Testing_Time:T0	-0.29	0.42	1648.00	-1.10	0.53	-0.68	0.4949
Learner_Type:NOEX*Testing_Time:T2	-0.85	0.43	1648.00	-1.68	-0.01	-1.99	0.0471
Learner_Type:TRAD*Testing_Time:T2	-1.10	0.42	1648.00	-1.92	-0.28	-2.63	0.0085
Learner_Type:NOEX*Noun_Type:Count	-1.30	0.43	1648.00	-2.13	-0.47	-3.05	0.0023
Learner_Type:TRAD*Noun_Type:Count	-1.54	0.42	1648.00	-2.36	-0.73	-3.70	0.0002
Learner_Type:NOEX*Noun_Type:Substance	0.30	0.43	1648.00	-0.53	1.13	0.70	0.4836
Learner_Type:TRAD*Noun_Type:Substance	0.03	0.42	1648.00	-0.78	0.85	0.08	0.9364
Testing_Time:T0*Noun_Type:Count	-1.51	0.51	33.60	-2.40	-0.62	-2.95	0.0057
Testing_Time:T2*Noun_Type:Count	-0.99	0.51	33.60	-1.88	-0.10	-1.93	0.0620
Testing_Time:T0*Noun_Type:Substance	0.93	0.51	33.60	0.04	1.83	1.82	0.0773
Testing_Time:T2*Noun_Type:Substance	0.40	0.51	33.60	-0.49	1.29	0.78	0.4403
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Count	0.81	0.60	1648.00	-0.37	1.98	1.34	0.1809
Learner_Type:TRAD*Testing_Time:T0*Noun_Type:Count	1.90	0.59	1648.00	0.75	3.05	3.22	0.0013
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Count	1.05	0.60	1648.00	-0.13	2.22	1.74	0.0817
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Count	2.01	0.59	1648.00	0.85	3.16	3.40	0.0007
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Substance	-0.78	0.60	1648.00	-1.95	0.40	-1.29	0.1969
Learner_Type:TRAD*Testing_Time:T0*Noun_Type:Substance	-0.73	0.59	1648.00	-1.88	0.42	-1.24	0.2170
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	-0.22	0.60	1648.00	-1.40	0.95	-0.37	0.7102
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Substance	0.19	0.59	1648.00	-0.96	1.35	0.33	0.7445

Table K.23. LMER output for AJT – RQ3, definite-plural context (Intercept: Learner_Type:TRAD, Testing_Time:T0, Noun_Type:Object)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	5.33	0.33	83.95	4.74	5.93	16.18	0.00
Learner_Type:LING	-0.36	0.35	427.56	-1.03	0.32	-1.02	0.31
Learner_Type:NOEX	0.49	0.39	427.56	-0.28	1.26	1.24	0.22
Testing_Time:T1	0.02	0.42	59.31	-0.73	0.77	0.04	0.96
Testing_Time:T2	-0.98	0.42	59.31	-1.73	-0.23	-2.35	0.02
Noun_Type:Count	-0.39	0.42	59.31	-1.14	0.36	-0.93	0.36
Noun_Type:Substance	-0.30	0.42	59.31	-1.04	0.45	-0.71	0.48
Learner_Type:LING*Testing_Time:T1	-0.29	0.42	1648.00	-1.10	0.53	-0.68	0.49
Learner_Type:NOEX*Testing_Time:T1	-0.08	0.47	1648.00	-1.00	0.85	-0.16	0.87
Learner_Type:LING*Testing_Time:T2	0.81	0.42	1648.00	0.00	1.63	1.95	0.05
Learner_Type:NOEX*Testing_Time:T2	0.18	0.47	1648.00	-0.75	1.10	0.38	0.71
Learner_Type:LING*Noun_Type:Count	-0.36	0.42	1648.00	-1.17	0.46	-0.85	0.39
Learner_Type:NOEX*Noun_Type:Count	-0.85	0.47	1648.00	-1.77	0.08	-1.79	0.07
Learner_Type:LING*Noun_Type:Substance	0.70	0.42	1648.00	-0.12	1.51	1.67	0.10
Learner_Type:NOEX*Noun_Type:Substance	0.22	0.47	1648.00	-0.71	1.14	0.46	0.65
Testing_Time:T1*Noun_Type:Count	-0.39	0.59	59.31	-1.45	0.67	-0.66	0.51
Testing_Time:T2*Noun_Type:Count	0.63	0.59	59.31	-0.43	1.69	1.07	0.29
Testing_Time:T1*Noun_Type:Substance	-0.20	0.59	59.31	-1.26	0.85	-0.35	0.73
Testing_Time:T2*Noun_Type:Substance	0.39	0.59	59.31	-0.67	1.45	0.66	0.51
Learner_Type:LING*Testing_Time:T1*Noun_Type:Count	1.90	0.59	1648.00	0.75	3.05	3.22	0.00
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Count	1.09	0.67	1648.00	-0.21	2.40	1.63	0.10
Learner_Type:LING*Testing_Time:T2*Noun_Type:Count	-0.11	0.59	1648.00	-1.26	1.05	-0.18	0.86
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Count	0.14	0.67	1648.00	-1.17	1.44	0.20	0.84
Learner_Type:LING*Testing_Time:T1*Noun_Type:Substance	-0.73	0.59	1648.00	-1.88	0.42	-1.24	0.22
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Substance	0.05	0.67	1648.00	-1.26	1.35	0.07	0.94
Learner_Type:LING*Testing_Time:T2*Noun_Type:Substance	-0.92	0.59	1648.00	-2.08	0.23	-1.56	0.12
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	-0.37	0.67	1648.00	-1.68	0.94	-0.55	0.58

Table K.24. LMER output for AJT – RQ3, definite-plural context (Intercept: Learner_Type:TRAD, Testing_Time:T1, Noun_Type:Object)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	5.35	0.33	83.95	4.75	5.95	16.24	0.0000
Learner_Type:LING	-0.64	0.35	427.56	-1.32	0.04	-1.84	0.0664
Learner_Type:NOEX	0.41	0.39	427.56	-0.35	1.18	1.05	0.2964
Testing_Time:T0	-0.02	0.42	59.31	-0.77	0.73	-0.04	0.9648
Testing_Time:T2	-1.00	0.42	59.31	-1.75	-0.25	-2.39	0.0200
Noun_Type:Count	-0.78	0.42	59.31	-1.53	-0.03	-1.86	0.0678
Noun_Type:Substance	-0.50	0.42	59.31	-1.25	0.25	-1.20	0.2365
Learner_Type:LING*Testing_Time:T0	0.29	0.42	1648.00	-0.53	1.10	0.68	0.4949
Learner_Type:NOEX*Testing_Time:T0	0.08	0.47	1648.00	-0.85	1.00	0.16	0.8704
Learner_Type:LING*Testing_Time:T2	1.10	0.42	1648.00	0.28	1.92	2.63	0.0085
Learner_Type:NOEX*Testing_Time:T2	0.25	0.47	1648.00	-0.67	1.18	0.54	0.5907
Learner_Type:LING*Noun_Type:Count	1.54	0.42	1648.00	0.73	2.36	3.70	0.0002
Learner_Type:NOEX*Noun_Type:Count	0.25	0.47	1648.00	-0.68	1.17	0.52	0.6002
Learner_Type:LING*Noun_Type:Substance	-0.03	0.42	1648.00	-0.85	0.78	-0.08	0.9364
Learner_Type:NOEX*Noun_Type:Substance	0.26	0.47	1648.00	-0.66	1.19	0.56	0.5765
Testing_Time:T0*Noun_Type:Count	0.39	0.59	59.31	-0.67	1.45	0.66	0.5133
Testing_Time:T2*Noun_Type:Count	1.02	0.59	59.31	-0.04	2.08	1.72	0.0902
Testing_Time:T0*Noun_Type:Substance	0.20	0.59	59.31	-0.85	1.26	0.35	0.7317
Testing_Time:T2*Noun_Type:Substance	0.59	0.59	59.31	-0.47	1.65	1.00	0.3203
Learner_Type:LING*Testing_Time:T0*Noun_Type:Count	-1.90	0.59	1648.00	-3.05	-0.75	-3.22	0.0013
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Count	-1.09	0.67	1648.00	-2.40	0.21	-1.63	0.1025
Learner_Type:LING*Testing_Time:T2*Noun_Type:Count	-2.01	0.59	1648.00	-3.16	-0.85	-3.40	0.0007
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Count	-0.96	0.67	1648.00	-2.27	0.35	-1.43	0.1523
Learner_Type:LING*Testing_Time:T0*Noun_Type:Substance	0.73	0.59	1648.00	-0.42	1.88	1.24	0.2170
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Substance	-0.05	0.67	1648.00	-1.35	1.26	-0.07	0.9443
Learner_Type:LING*Testing_Time:T2*Noun_Type:Substance	-0.19	0.59	1648.00	-1.35	0.96	-0.33	0.7445
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	-0.42	0.67	1648.00	-1.72	0.89	-0.62	0.5347

Table K.25. LMER output for AJT – RQ3, definite-singular context (Intercept: Learner_Type:LING, Testing_Time:T0, Noun_Type:Object)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	4.91	0.36	29.33	4.28	5.54	13.47	0.0000
Learner_Type:NOEX	0.09	0.34	358.42	-0.58	0.76	0.26	0.7955
Learner_Type:TRAD	-0.26	0.34	358.42	-0.92	0.39	-0.78	0.4352
Testing_Time:T1	0.31	0.49	23.76	-0.52	1.14	0.64	0.5302
Testing_Time:T2	0.53	0.49	23.76	-0.30	1.37	1.09	0.2857
Noun_Type:Count	-0.49	0.49	23.76	-1.32	0.34	-1.00	0.3269
Noun_Type:Substance	0.34	0.49	23.76	-0.49	1.18	0.71	0.4875
Learner_Type:NOEX*Testing_Time:T1	-0.12	0.40	1648.00	-0.89	0.66	-0.29	0.7729
Learner_Type:TRAD*Testing_Time:T1	0.15	0.39	1648.00	-0.61	0.92	0.39	0.6980
Learner_Type:NOEX*Testing_Time:T2	-0.44	0.40	1648.00	-1.21	0.34	-1.09	0.2748
Learner_Type:TRAD*Testing_Time:T2	-0.01	0.39	1648.00	-0.78	0.75	-0.04	0.9698
Learner_Type:NOEX*Noun_Type:Count	-0.02	0.40	1648.00	-0.80	0.76	-0.05	0.9581
Learner_Type:TRAD*Noun_Type:Count	0.66	0.39	1648.00	-0.11	1.42	1.68	0.0941
Learner_Type:NOEX*Noun_Type:Substance	0.05	0.40	1648.00	-0.73	0.83	0.12	0.9047
Learner_Type:TRAD*Noun_Type:Substance	0.30	0.39	1648.00	-0.46	1.07	0.78	0.4378
Testing_Time:T1*Noun_Type:Count	0.68	0.69	23.76	-0.50	1.85	0.98	0.3363
Testing_Time:T2*Noun_Type:Count	0.40	0.69	23.76	-0.78	1.58	0.58	0.5679
Testing_Time:T1*Noun_Type:Substance	-0.01	0.69	23.76	-1.19	1.17	-0.02	0.9873
Testing_Time:T2*Noun_Type:Substance	-0.81	0.69	23.76	-1.99	0.37	-1.17	0.2519
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Count	-0.25	0.56	1648.00	-1.35	0.85	-0.44	0.6620
Learner_Type:TRAD*Testing_Time:T1*Noun_Type:Count	-0.99	0.55	1648.00	-2.07	0.09	-1.79	0.0731
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Count	-0.11	0.56	1648.00	-1.21	0.99	-0.19	0.8510
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Count	-0.51	0.55	1648.00	-1.59	0.57	-0.92	0.3559
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Substance	-0.24	0.56	1648.00	-1.34	0.86	-0.43	0.6653
Learner_Type:TRAD*Testing_Time:T1*Noun_Type:Substance	-0.40	0.55	1648.00	-1.48	0.68	-0.72	0.4741
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	-0.13	0.56	1648.00	-1.23	0.97	-0.23	0.8175
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Substance	-0.19	0.55	1648.00	-1.27	0.89	-0.34	0.7329

Table K.26. LMER output for AJT – RQ3, definite-singular context (Intercept: Learner_Type:LING, Testing_Time:T1, Noun_Type:Object)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	5.22	0.36	29.33	4.59	5.85	14.32	0.0000
Learner_Type:NOEX	-0.03	0.34	358.42	-0.69	0.64	-0.08	0.9392
Learner_Type:TRAD	-0.11	0.34	358.42	-0.77	0.54	-0.33	0.7415
Testing_Time:T0	-0.31	0.49	23.76	-1.14	0.52	-0.64	0.5302
Testing_Time:T2	0.22	0.49	23.76	-0.61	1.05	0.46	0.6532
Noun_Type:Count	0.19	0.49	23.76	-0.64	1.02	0.39	0.7024
Noun_Type:Substance	0.33	0.49	23.76	-0.50	1.17	0.68	0.5015
Learner_Type:NOEX*Testing_Time:T0	0.12	0.40	1648.00	-0.66	0.89	0.29	0.7729
Learner_Type:TRAD*Testing_Time:T0	-0.15	0.39	1648.00	-0.92	0.61	-0.39	0.6980
Learner_Type:NOEX*Testing_Time:T2	-0.32	0.40	1648.00	-1.10	0.46	-0.80	0.4217
Learner_Type:TRAD*Testing_Time:T2	-0.17	0.39	1648.00	-0.93	0.60	-0.43	0.6702
Learner_Type:NOEX*Noun_Type:Count	-0.27	0.40	1648.00	-1.05	0.51	-0.67	0.5024
Learner_Type:TRAD*Noun_Type:Count	-0.34	0.39	1648.00	-1.10	0.43	-0.86	0.3892
Learner_Type:NOEX*Noun_Type:Substance	-0.20	0.40	1648.00	-0.97	0.58	-0.49	0.6227
Learner_Type:TRAD*Noun_Type:Substance	-0.09	0.39	1648.00	-0.86	0.67	-0.24	0.8130
Testing_Time:T0*Noun_Type:Count	-0.68	0.69	23.76	-1.85	0.50	-0.98	0.3363
Testing_Time:T2*Noun_Type:Count	-0.28	0.69	23.76	-1.45	0.90	-0.40	0.6911
Testing_Time:T0*Noun_Type:Substance	0.01	0.69	23.76	-1.17	1.19	0.02	0.9873
Testing_Time:T2*Noun_Type:Substance	-0.80	0.69	23.76	-1.98	0.38	-1.16	0.2582
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Count	0.25	0.56	1648.00	-0.85	1.35	0.44	0.6620
Learner_Type:TRAD*Testing_Time:T0*Noun_Type:Count	0.99	0.55	1648.00	-0.09	2.07	1.79	0.0731
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Count	0.14	0.56	1648.00	-0.96	1.24	0.25	0.8031
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Count	0.48	0.55	1648.00	-0.60	1.56	0.87	0.3844
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Substance	0.24	0.56	1648.00	-0.86	1.34	0.43	0.6653
Learner_Type:TRAD*Testing_Time:T0*Noun_Type:Substance	0.40	0.55	1648.00	-0.68	1.48	0.72	0.4741
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	0.11	0.56	1648.00	-0.99	1.21	0.20	0.8401
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Substance	0.21	0.55	1648.00	-0.87	1.29	0.38	0.7079

Table K.27. LMER output for AJT – RQ3, definite-singular context (Intercept: Learner_Type:TRAD, Testing_Time:T0, Noun_Type:Object)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	4.65	0.40	42.54	3.94	5.35	11.57	0.0000
Learner_Type:LING	0.26	0.34	358.42	-0.39	0.92	0.78	0.4352
Learner_Type:NOEX	0.35	0.38	358.42	-0.39	1.09	0.92	0.3574
Testing_Time:T1	0.46	0.53	31.96	-0.45	1.37	0.88	0.3854
Testing_Time:T2	0.52	0.53	31.96	-0.39	1.43	0.99	0.3317
Noun_Type:Count	0.17	0.53	31.96	-0.75	1.08	0.32	0.7535
Noun_Type:Substance	0.65	0.53	31.96	-0.26	1.56	1.23	0.2269
Learner_Type:LING*Testing_Time:T1	-0.15	0.39	1648.00	-0.92	0.61	-0.39	0.6980
Learner_Type:NOEX*Testing_Time:T1	-0.27	0.44	1648.00	-1.13	0.60	-0.60	0.5478
Learner_Type:LING*Testing_Time:T2	0.01	0.39	1648.00	-0.75	0.78	0.04	0.9698
Learner_Type:NOEX*Testing_Time:T2	-0.42	0.44	1648.00	-1.29	0.45	-0.95	0.3437
Learner_Type:LING*Noun_Type:Count	-0.66	0.39	1648.00	-1.42	0.11	-1.68	0.0941
Learner_Type:NOEX*Noun_Type:Count	-0.68	0.44	1648.00	-1.54	0.19	-1.52	0.1277
Learner_Type:LING*Noun_Type:Substance	-0.30	0.39	1648.00	-1.07	0.46	-0.78	0.4378
Learner_Type:NOEX*Noun_Type:Substance	-0.26	0.44	1648.00	-1.12	0.61	-0.58	0.5642
Testing_Time:T1*Noun_Type:Count	-0.31	0.74	31.96	-1.60	0.97	-0.42	0.6750
Testing_Time:T2*Noun_Type:Count	-0.11	0.74	31.96	-1.40	1.18	-0.15	0.8822
Testing_Time:T1*Noun_Type:Substance	-0.41	0.74	31.96	-1.70	0.88	-0.55	0.5878
Testing_Time:T2*Noun_Type:Substance	-1.00	0.74	31.96	-2.29	0.29	-1.34	0.1884
Learner_Type:LING*Testing_Time:T1*Noun_Type:Count	0.99	0.55	1648.00	-0.09	2.07	1.79	0.0731
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Count	0.75	0.63	1648.00	-0.48	1.97	1.19	0.2348
Learner_Type:LING*Testing_Time:T2*Noun_Type:Count	0.51	0.55	1648.00	-0.57	1.59	0.92	0.3559
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Count	0.41	0.63	1648.00	-0.82	1.63	0.65	0.5187
Learner_Type:LING*Testing_Time:T1*Noun_Type:Substance	0.40	0.55	1648.00	-0.68	1.48	0.72	0.4741
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Substance	0.15	0.63	1648.00	-1.07	1.38	0.24	0.8081
Learner_Type:LING*Testing_Time:T2*Noun_Type:Substance	0.19	0.55	1648.00	-0.89	1.27	0.34	0.7329
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	0.06	0.63	1648.00	-1.17	1.28	0.09	0.9254

Table K.28. LMER output for AJT – RQ3, definite-singular context (Intercept: Learner_Type:TRAD, Testing_Time:T1, Noun_Type:Object)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	5.11	0.40	42.54	4.41	5.82	12.72	0.0000
Learner_Type:LING	0.11	0.34	358.42	-0.54	0.77	0.33	0.7415
Learner_Type:NOEX	0.08	0.38	358.42	-0.66	0.83	0.22	0.8240
Testing_Time:T0	-0.46	0.53	31.96	-1.37	0.45	-0.88	0.3854
Testing_Time:T2	0.06	0.53	31.96	-0.86	0.97	0.11	0.9166
Noun_Type:Count	-0.15	0.53	31.96	-1.06	0.76	-0.28	0.7801
Noun_Type:Substance	0.24	0.53	31.96	-0.67	1.15	0.46	0.6503
Learner_Type:LING*Testing_Time:T0	0.15	0.39	1648.00	-0.61	0.92	0.39	0.6980
Learner_Type:NOEX*Testing_Time:T0	0.27	0.44	1648.00	-0.60	1.13	0.60	0.5478
Learner_Type:LING*Testing_Time:T2	0.17	0.39	1648.00	-0.60	0.93	0.43	0.6702
Learner_Type:NOEX*Testing_Time:T2	-0.15	0.44	1648.00	-1.02	0.71	-0.35	0.7294
Learner_Type:LING*Noun_Type:Count	0.34	0.39	1648.00	-0.43	1.10	0.86	0.3892
Learner_Type:NOEX*Noun_Type:Count	0.07	0.44	1648.00	-0.80	0.94	0.16	0.8752
Learner_Type:LING*Noun_Type:Substance	0.09	0.39	1648.00	-0.67	0.86	0.24	0.8130
Learner_Type:NOEX*Noun_Type:Substance	-0.10	0.44	1648.00	-0.97	0.76	-0.23	0.8157
Testing_Time:T0*Noun_Type:Count	0.31	0.74	31.96	-0.97	1.60	0.42	0.6750
Testing_Time:T2*Noun_Type:Count	0.20	0.74	31.96	-1.09	1.49	0.27	0.7860
Testing_Time:T0*Noun_Type:Substance	0.41	0.74	31.96	-0.88	1.70	0.55	0.5878
Testing_Time:T2*Noun_Type:Substance	-0.59	0.74	31.96	-1.88	0.70	-0.80	0.4316
Learner_Type:LING*Testing_Time:T0*Noun_Type:Count	-0.99	0.55	1648.00	-2.07	0.09	-1.79	0.0731
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Count	-0.75	0.63	1648.00	-1.97	0.48	-1.19	0.2348
Learner_Type:LING*Testing_Time:T2*Noun_Type:Count	-0.48	0.55	1648.00	-1.56	0.60	-0.87	0.3844
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Count	-0.34	0.63	1648.00	-1.57	0.88	-0.54	0.5871
Learner_Type:LING*Testing_Time:T0*Noun_Type:Substance	-0.40	0.55	1648.00	-1.48	0.68	-0.72	0.4741
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Substance	-0.15	0.63	1648.00	-1.38	1.07	-0.24	0.8081
Learner_Type:LING*Testing_Time:T2*Noun_Type:Substance	-0.21	0.55	1648.00	-1.29	0.87	-0.38	0.7079
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	-0.09	0.63	1648.00	-1.32	1.13	-0.15	0.8814

Table K.29. LMER output for AJT – RQ3, indefinite-singular context (Intercept: Learner_Type:LING, Testing_Time:T0, Noun_Type:Object)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	4.82	0.39	28.98	4.16	5.49	12.44	0.0000
Learner_Type:NOEX	0.69	0.36	402.38	-0.02	1.39	1.89	0.0592
Learner_Type:TRAD	0.38	0.36	402.38	-0.31	1.08	1.07	0.2858
Testing_Time:T1	-0.41	0.52	23.95	-1.30	0.48	-0.79	0.4384
Testing_Time:T2	-0.64	0.52	23.95	-1.53	0.24	-1.24	0.2287
Noun_Type:Count	-0.03	0.52	23.95	-0.92	0.86	-0.06	0.9496
Noun_Type:Substance	-0.33	0.52	23.95	-1.22	0.56	-0.64	0.5289
Learner_Type:NOEX*Testing_Time:T1	0.04	0.43	1648.00	-0.80	0.88	0.09	0.9288
Learner_Type:TRAD*Testing_Time:T1	-0.03	0.42	1648.00	-0.86	0.79	-0.08	0.9373
Learner_Type:NOEX*Testing_Time:T2	0.13	0.43	1648.00	-0.71	0.98	0.31	0.7551
Learner_Type:TRAD*Testing_Time:T2	-0.36	0.42	1648.00	-1.18	0.47	-0.84	0.4016
Learner_Type:NOEX*Noun_Type:Count	-0.63	0.43	1648.00	-1.48	0.21	-1.47	0.1424
Learner_Type:TRAD*Noun_Type:Count	-0.06	0.42	1648.00	-0.89	0.77	-0.14	0.8888
Learner_Type:NOEX*Noun_Type:Substance	-0.20	0.43	1648.00	-1.04	0.65	-0.45	0.6496
Learner_Type:TRAD*Noun_Type:Substance	-0.72	0.42	1648.00	-1.55	0.10	-1.70	0.0886
Testing_Time:T1*Noun_Type:Count	0.78	0.74	23.95	-0.48	2.03	1.05	0.3023
Testing_Time:T2*Noun_Type:Count	1.12	0.74	23.95	-0.13	2.38	1.52	0.1414
Testing_Time:T1*Noun_Type:Substance	0.18	0.74	23.95	-1.08	1.43	0.24	0.8116
Testing_Time:T2*Noun_Type:Substance	0.79	0.74	23.95	-0.47	2.05	1.07	0.2956
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Count	-0.35	0.61	1648.00	-1.54	0.84	-0.57	0.5704
Learner_Type:TRAD*Testing_Time:T1*Noun_Type:Count	-0.59	0.60	1648.00	-1.76	0.58	-0.99	0.3230
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Count	-0.34	0.61	1648.00	-1.53	0.85	-0.55	0.5799
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Count	-0.05	0.60	1648.00	-1.22	1.12	-0.08	0.9360
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Substance	-0.14	0.61	1648.00	-1.33	1.05	-0.23	0.8204
Learner_Type:TRAD*Testing_Time:T1*Noun_Type:Substance	1.03	0.60	1648.00	-0.14	2.20	1.71	0.0872
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	-0.51	0.61	1648.00	-1.71	0.68	-0.84	0.3994
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Substance	0.64	0.60	1648.00	-0.53	1.81	1.06	0.2880

Table K.30. LMER output for AJT – RQ3, indefinite-singular context (Intercept: Learner_Type:LING, Testing_Time:T1, Noun_Type:Object)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	4.41	0.39	28.98	3.74	5.08	11.38	0.0000
Learner_Type:NOEX	0.73	0.36	402.40	0.02	1.43	2.00	0.0464
Learner_Type:TRAD	0.35	0.36	402.40	-0.35	1.04	0.98	0.3299
Testing_Time:T0	0.41	0.52	23.95	-0.48	1.30	0.79	0.4384
Testing_Time:T2	-0.23	0.52	23.95	-1.12	0.66	-0.45	0.6587
Noun_Type:Count	0.74	0.52	23.95	-0.14	1.63	1.43	0.1665
Noun_Type:Substance	-0.16	0.52	23.95	-1.04	0.73	-0.30	0.7682
Learner_Type:NOEX*Testing_Time:T0	-0.04	0.43	1648.00	-0.88	0.80	-0.09	0.9288
Learner_Type:TRAD*Testing_Time:T0	0.03	0.42	1648.00	-0.79	0.86	0.08	0.9373
Learner_Type:NOEX*Testing_Time:T2	0.10	0.43	1648.00	-0.75	0.94	0.22	0.8238
Learner_Type:TRAD*Testing_Time:T2	-0.32	0.42	1648.00	-1.15	0.50	-0.76	0.4472
Learner_Type:NOEX*Noun_Type:Count	-0.98	0.43	1648.00	-1.82	-0.14	-2.27	0.0233
Learner_Type:TRAD*Noun_Type:Count	-0.65	0.42	1648.00	-1.48	0.18	-1.54	0.1242
Learner_Type:NOEX*Noun_Type:Substance	-0.33	0.43	1648.00	-1.18	0.51	-0.78	0.4382
Learner_Type:TRAD*Noun_Type:Substance	0.30	0.42	1648.00	-0.52	1.13	0.72	0.4737
Testing_Time:T0*Noun_Type:Count	-0.78	0.74	23.95	-2.03	0.48	-1.05	0.3023
Testing_Time:T2*Noun_Type:Count	0.34	0.74	23.95	-0.91	1.60	0.47	0.6448
Testing_Time:T0*Noun_Type:Substance	-0.18	0.74	23.95	-1.43	1.08	-0.24	0.8116
Testing_Time:T2*Noun_Type:Substance	0.61	0.74	23.95	-0.65	1.87	0.83	0.4157
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Count	0.35	0.61	1648.00	-0.84	1.54	0.57	0.5704
Learner_Type:TRAD*Testing_Time:T0*Noun_Type:Count	0.59	0.60	1648.00	-0.58	1.76	0.99	0.3230
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Count	0.01	0.61	1648.00	-1.18	1.20	0.01	0.9889
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Count	0.54	0.60	1648.00	-0.63	1.71	0.91	0.3638
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Substance	0.14	0.61	1648.00	-1.05	1.33	0.23	0.8204
Learner_Type:TRAD*Testing_Time:T0*Noun_Type:Substance	-1.03	0.60	1648.00	-2.20	0.14	-1.71	0.0872
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	-0.38	0.61	1648.00	-1.57	0.82	-0.62	0.5381
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Substance	-0.39	0.60	1648.00	-1.56	0.78	-0.65	0.5165

Table K.31. LMER output for AJT – RQ3, indefinite-singular context (Intercept: Learner_Type:TRAD, Testing_Time:T0, Noun_Type:Object)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept	5.20	0.43	42.05	4.45	5.95	12.20	0.0000
Learner_Type:LING	-0.38	0.36	402.38	-1.08	0.31	-1.07	0.2858
Learner_Type:NOEX	0.31	0.40	402.38	-0.48	1.09	0.76	0.4500
Testing_Time:T1	-0.44	0.56	32.48	-1.42	0.53	-0.79	0.4357
Testing_Time:T2	-1.00	0.56	32.48	-1.98	-0.02	-1.78	0.0851
Noun_Type:Count	-0.09	0.56	32.48	-1.07	0.88	-0.16	0.8704
Noun_Type:Substance	-1.06	0.56	32.48	-2.03	-0.08	-1.87	0.0699
Learner_Type:LING*Testing_Time:T1	0.03	0.42	1648.00	-0.79	0.86	0.08	0.9373
Learner_Type:NOEX*Testing_Time:T1	0.07	0.48	1648.00	-0.87	1.01	0.15	0.8811
Learner_Type:LING*Testing_Time:T2	0.36	0.42	1648.00	-0.47	1.18	0.84	0.4016
Learner_Type:NOEX*Testing_Time:T2	0.49	0.48	1648.00	-0.45	1.43	1.02	0.3081
Learner_Type:LING*Noun_Type:Count	0.06	0.42	1648.00	-0.77	0.89	0.14	0.8888
Learner_Type:NOEX*Noun_Type:Count	-0.57	0.48	1648.00	-1.51	0.36	-1.19	0.2326
Learner_Type:LING*Noun_Type:Substance	0.72	0.42	1648.00	-0.10	1.55	1.70	0.0886
Learner_Type:NOEX*Noun_Type:Substance	0.53	0.48	1648.00	-0.41	1.46	1.09	0.2740
Testing_Time:T1*Noun_Type:Count	0.19	0.80	32.48	-1.20	1.57	0.23	0.8176
Testing_Time:T2*Noun_Type:Count	1.07	0.80	32.48	-0.31	2.46	1.35	0.1868
Testing_Time:T1*Noun_Type:Substance	1.20	0.80	32.48	-0.18	2.58	1.51	0.1403
Testing_Time:T2*Noun_Type:Substance	1.43	0.80	32.48	0.04	2.81	1.79	0.0827
Learner_Type:LING*Testing_Time:T1*Noun_Type:Count	0.59	0.60	1648.00	-0.58	1.76	0.99	0.3230
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Count	0.25	0.68	1648.00	-1.08	1.57	0.36	0.7173
Learner_Type:LING*Testing_Time:T2*Noun_Type:Count	0.05	0.60	1648.00	-1.12	1.22	0.08	0.9360
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Count	-0.29	0.68	1648.00	-1.62	1.04	-0.43	0.6700
Learner_Type:LING*Testing_Time:T1*Noun_Type:Substance	-1.03	0.60	1648.00	-2.20	0.14	-1.71	0.0872
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Substance	-1.16	0.68	1648.00	-2.49	0.16	-1.71	0.0870
Learner_Type:LING*Testing_Time:T2*Noun_Type:Substance	-0.64	0.60	1648.00	-1.81	0.53	-1.06	0.2880
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	-1.15	0.68	1648.00	-2.48	0.18	-1.69	0.0906

Table K.32. LMER output for AJT – RQ3, indefinite-singular context (Intercept: Learner_Type:TRAD, Testing_Time:T1, Noun_Type:Object)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	4.76	0.43	42.05	4.01	5.51	11.16	0.0000
Learner_Type:LING	-0.35	0.36	402.38	-1.04	0.35	-0.98	0.3299
Learner_Type:NOEX	0.38	0.40	402.38	-0.41	1.17	0.93	0.3510
Testing_Time:T0	0.44	0.56	32.48	-0.53	1.42	0.79	0.4357
Testing_Time:T2	-0.56	0.56	32.48	-1.53	0.42	-0.99	0.3312
Noun_Type:Count	0.09	0.56	32.48	-0.88	1.07	0.16	0.8704
Noun_Type:Substance	0.15	0.56	32.48	-0.83	1.12	0.26	0.7941
Learner_Type:LING*Testing_Time:T0	-0.03	0.42	1648.00	-0.86	0.79	-0.08	0.9373
Learner_Type:NOEX*Testing_Time:T0	-0.07	0.48	1648.00	-1.01	0.87	-0.15	0.8811
Learner_Type:LING*Testing_Time:T2	0.32	0.42	1648.00	-0.50	1.15	0.76	0.4472
Learner_Type:NOEX*Testing_Time:T2	0.42	0.48	1648.00	-0.52	1.36	0.87	0.3844
Learner_Type:LING*Noun_Type:Count	0.65	0.42	1648.00	-0.18	1.48	1.54	0.1242
Learner_Type:NOEX*Noun_Type:Count	-0.33	0.48	1648.00	-1.27	0.61	-0.68	0.4953
Learner_Type:LING*Noun_Type:Substance	-0.30	0.42	1648.00	-1.13	0.52	-0.72	0.4737
Learner_Type:NOEX*Noun_Type:Substance	-0.64	0.48	1648.00	-1.58	0.30	-1.33	0.1844
Testing_Time:T0*Noun_Type:Count	-0.19	0.80	32.48	-1.57	1.20	-0.23	0.8176
Testing_Time:T2*Noun_Type:Count	0.89	0.80	32.48	-0.49	2.27	1.12	0.2725
Testing_Time:T0*Noun_Type:Substance	-1.20	0.80	32.48	-2.58	0.18	-1.51	0.1403
Testing_Time:T2*Noun_Type:Substance	0.22	0.80	32.48	-1.16	1.60	0.28	0.7820
Learner_Type:LING*Testing_Time:T0*Noun_Type:Count	-0.59	0.60	1648.00	-1.76	0.58	-0.99	0.3230
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Count	-0.25	0.68	1648.00	-1.57	1.08	-0.36	0.7173
Learner_Type:LING*Testing_Time:T2*Noun_Type:Count	-0.54	0.60	1648.00	-1.71	0.63	-0.91	0.3638
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Count	-0.54	0.68	1648.00	-1.86	0.79	-0.79	0.4307
Learner_Type:LING*Testing_Time:T0*Noun_Type:Substance	1.03	0.60	1648.00	-0.14	2.20	1.71	0.0872
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Substance	1.16	0.68	1648.00	-0.16	2.49	1.71	0.0870
Learner_Type:LING*Testing_Time:T2*Noun_Type:Substance	0.39	0.60	1648.00	-0.78	1.56	0.65	0.5165
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	0.01	0.68	1648.00	-1.31	1.34	0.02	0.9847

Table K.32. LMER output for AJT – RQ3, zero-plural context (Intercept: Learner_Type:LING, Testing_Time:T0, Noun_Type:Object)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept	4.52	0.27	53.43	4.04	5.00	16.84	0.0000
Learner_Type:NOEX	0.38	0.36	379.61	-0.31	1.07	1.06	0.2882
Learner_Type:TRAD	0.07	0.35	379.61	-0.61	0.75	0.20	0.8410
Testing_Time:T1	0.06	0.34	36.27	-0.54	0.65	0.16	0.8712
Testing_Time:T2	0.16	0.34	36.27	-0.44	0.75	0.46	0.6503
Noun_Type:Count	0.76	0.34	36.27	0.16	1.35	2.22	0.0327
Noun_Type:Substance	0.53	0.34	36.27	-0.06	1.13	1.57	0.1257
Learner_Type:NOEX*Testing_Time:T1	0.32	0.42	1648.00	-0.50	1.14	0.76	0.4500
Learner_Type:TRAD*Testing_Time:T1	0.15	0.41	1648.00	-0.66	0.95	0.36	0.7192
Learner_Type:NOEX*Testing_Time:T2	-0.16	0.42	1648.00	-0.97	0.66	-0.37	0.7109
Learner_Type:TRAD*Testing_Time:T2	-0.14	0.41	1648.00	-0.94	0.67	-0.33	0.7395
Learner_Type:NOEX*Noun_Type:Count	-0.44	0.42	1648.00	-1.26	0.38	-1.05	0.2925
Learner_Type:TRAD*Noun_Type:Count	0.11	0.41	1648.00	-0.69	0.92	0.28	0.7806
Learner_Type:NOEX*Noun_Type:Substance	-0.67	0.42	1648.00	-1.49	0.15	-1.60	0.1102
Learner_Type:TRAD*Noun_Type:Substance	-0.46	0.41	1648.00	-1.26	0.34	-1.12	0.2652
Testing_Time:T1*Noun_Type:Count	0.42	0.48	36.27	-0.42	1.26	0.88	0.3860
Testing_Time:T2*Noun_Type:Count	0.08	0.48	36.27	-0.76	0.92	0.16	0.8725
Testing_Time:T1*Noun_Type:Substance	-0.74	0.48	36.27	-1.59	0.10	-1.55	0.1305
Testing_Time:T2*Noun_Type:Substance	-0.48	0.48	36.27	-1.32	0.36	-0.99	0.3273
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Count	-0.58	0.59	1648.00	-1.74	0.58	-0.98	0.3292
Learner_Type:TRAD*Testing_Time:T1*Noun_Type:Count	-0.50	0.58	1648.00	-1.63	0.64	-0.85	0.3945
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Count	-0.57	0.59	1648.00	-1.73	0.59	-0.96	0.3386
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Count	-0.34	0.58	1648.00	-1.47	0.80	-0.58	0.5631
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Substance	1.10	0.59	1648.00	-0.06	2.26	1.85	0.0646
Learner_Type:TRAD*Testing_Time:T1*Noun_Type:Substance	0.60	0.58	1648.00	-0.54	1.73	1.02	0.3063
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	0.60	0.59	1648.00	-0.56	1.75	1.00	0.3158
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Substance	0.76	0.58	1648.00	-0.38	1.89	1.30	0.1950

Table K.34. LMER output for AJT – RQ3, zero-plural context (Intercept: Learner_Type:LING, Testing_Time:T1, Noun_Type:Object)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept	4.58	0.27	53.43	4.10	5.06	17.04	0.0000
Learner_Type:NOEX	0.70	0.36	379.61	0.00	1.39	1.95	0.0517
Learner_Type:TRAD	0.22	0.35	379.61	-0.46	0.90	0.62	0.5335
Testing_Time:T0	-0.06	0.34	36.27	-0.65	0.54	-0.16	0.8712
Testing_Time:T2	0.10	0.34	36.27	-0.50	0.70	0.29	0.7705
Noun_Type:Count	1.18	0.34	36.27	0.58	1.77	3.46	0.0014
Noun_Type:Substance	-0.21	0.34	36.27	-0.81	0.38	-0.62	0.5388
Learner_Type:NOEX*Testing_Time:T0	-0.32	0.42	1648.00	-1.14	0.50	-0.76	0.4501
Learner_Type:TRAD*Testing_Time:T0	-0.15	0.41	1648.00	-0.95	0.66	-0.36	0.7193
Learner_Type:NOEX*Testing_Time:T2	-0.47	0.42	1648.00	-1.29	0.35	-1.13	0.2602
Learner_Type:TRAD*Testing_Time:T2	-0.29	0.41	1648.00	-1.09	0.52	-0.69	0.4890
Learner_Type:NOEX*Noun_Type:Count	-1.02	0.42	1648.00	-1.84	-0.20	-2.43	0.0151
Learner_Type:TRAD*Noun_Type:Count	-0.38	0.41	1648.00	-1.19	0.42	-0.93	0.3547
Learner_Type:NOEX*Noun_Type:Substance	0.43	0.42	1648.00	-0.39	1.25	1.02	0.3092
Learner_Type:TRAD*Noun_Type:Substance	0.14	0.41	1648.00	-0.67	0.94	0.33	0.7395
Testing_Time:T0*Noun_Type:Count	-0.42	0.48	36.27	-1.26	0.42	-0.88	0.3860
Testing_Time:T2*Noun_Type:Count	-0.34	0.48	36.27	-1.19	0.50	-0.72	0.4787
Testing_Time:T0*Noun_Type:Substance	0.74	0.48	36.27	-0.10	1.59	1.55	0.1305
Testing_Time:T2*Noun_Type:Substance	0.27	0.48	36.27	-0.58	1.11	0.55	0.5828
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Count	0.58	0.59	1648.00	-0.58	1.74	0.98	0.3292
Learner_Type:TRAD*Testing_Time:T0*Noun_Type:Count	0.50	0.58	1648.00	-0.64	1.63	0.85	0.3945
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Count	0.01	0.59	1648.00	-1.15	1.17	0.02	0.9851
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Count	0.16	0.58	1648.00	-0.98	1.30	0.27	0.7847
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Substance	-1.10	0.59	1648.00	-2.26	0.06	-1.85	0.0646
Learner_Type:TRAD*Testing_Time:T0*Noun_Type:Substance	-0.60	0.58	1648.00	-1.73	0.54	-1.02	0.3063
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	-0.50	0.59	1648.00	-1.66	0.66	-0.85	0.3977
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Substance	0.16	0.58	1648.00	-0.98	1.30	0.27	0.7847

Table K.35. LMER output for AJT – RQ3, zero-plural context (Intercept: Learner_Type:TRAD, Testing_Time:T0, Noun_Type:Object)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	4.59	0.32	98.90	4.01	5.18	14.32	0.0000
Learner_Type:LING	-0.07	0.35	379.61	-0.75	0.61	-0.20	0.8410
Learner_Type:NOEX	0.31	0.40	379.61	-0.46	1.08	0.78	0.4372
Testing_Time:T1	0.20	0.40	67.22	-0.51	0.92	0.51	0.6102
Testing_Time:T2	0.02	0.40	67.22	-0.70	0.73	0.05	0.9630
Noun_Type:Count	0.87	0.40	67.22	0.15	1.59	2.19	0.0321
Noun_Type:Substance	0.07	0.40	67.22	-0.64	0.79	0.19	0.8528
Learner_Type:LING*Testing_Time:T1	-0.15	0.41	1648.00	-0.95	0.66	-0.36	0.7192
Learner_Type:NOEX*Testing_Time:T1	0.17	0.47	1648.00	-0.74	1.08	0.36	0.7180
Learner_Type:LING*Testing_Time:T2	0.14	0.41	1648.00	-0.67	0.94	0.33	0.7395
Learner_Type:NOEX*Testing_Time:T2	-0.02	0.47	1648.00	-0.93	0.89	-0.04	0.9684
Learner_Type:LING*Noun_Type:Count	-0.11	0.41	1648.00	-0.92	0.69	-0.28	0.7806
Learner_Type:NOEX*Noun_Type:Count	-0.56	0.47	1648.00	-1.47	0.36	-1.19	0.2339
Learner_Type:LING*Noun_Type:Substance	0.46	0.41	1648.00	-0.34	1.26	1.12	0.2652
Learner_Type:NOEX*Noun_Type:Substance	-0.21	0.47	1648.00	-1.12	0.70	-0.45	0.6513
Testing_Time:T1*Noun_Type:Count	-0.07	0.56	67.22	-1.09	0.94	-0.13	0.8956
Testing_Time:T2*Noun_Type:Count	-0.26	0.56	67.22	-1.27	0.75	-0.46	0.6464
Testing_Time:T1*Noun_Type:Substance	-0.15	0.56	67.22	-1.16	0.86	-0.26	0.7931
Testing_Time:T2*Noun_Type:Substance	0.28	0.56	67.22	-0.74	1.29	0.49	0.6230
Learner_Type:LING*Testing_Time:T1*Noun_Type:Count	0.50	0.58	1648.00	-0.64	1.63	0.85	0.3945
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Count	-0.08	0.66	1648.00	-1.37	1.21	-0.13	0.9003
Learner_Type:LING*Testing_Time:T2*Noun_Type:Count	0.34	0.58	1648.00	-0.80	1.47	0.58	0.5631
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Count	-0.23	0.66	1648.00	-1.52	1.06	-0.35	0.7269
Learner_Type:LING*Testing_Time:T1*Noun_Type:Substance	-0.60	0.58	1648.00	-1.73	0.54	-1.02	0.3063
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Substance	0.50	0.66	1648.00	-0.79	1.79	0.76	0.4485
Learner_Type:LING*Testing_Time:T2*Noun_Type:Substance	-0.76	0.58	1648.00	-1.89	0.38	-1.30	0.1950
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	-0.16	0.66	1648.00	-1.45	1.13	-0.24	0.8086

Table K.36. LMER output for AJT – RQ3, zero-plural context (Intercept: Learner_Type:TRAD, Testing_Time:T1, Noun_Type:Object)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	4.80	0.32	98.90	4.21	5.38	14.95	0.0000
Learner_Type:LING	-0.22	0.35	379.61	-0.90	0.46	-0.62	0.5335
Learner_Type:NOEX	0.48	0.40	379.61	-0.29	1.25	1.20	0.2300
Testing_Time:T0	-0.20	0.40	67.22	-0.92	0.51	-0.51	0.6102
Testing_Time:T2	-0.19	0.40	67.22	-0.90	0.53	-0.47	0.6430
Noun_Type:Count	0.80	0.40	67.22	0.08	1.51	2.00	0.0493
Noun_Type:Substance	-0.07	0.40	67.22	-0.79	0.64	-0.19	0.8528
Learner_Type:LING*Testing_Time:T0	0.15	0.41	1648.00	-0.66	0.95	0.36	0.7192
Learner_Type:NOEX*Testing_Time:T0	-0.17	0.47	1648.00	-1.08	0.74	-0.36	0.7180
Learner_Type:LING*Testing_Time:T2	0.29	0.41	1648.00	-0.52	1.09	0.69	0.4890
Learner_Type:NOEX*Testing_Time:T2	-0.19	0.47	1648.00	-1.10	0.72	-0.40	0.6886
Learner_Type:LING*Noun_Type:Count	0.38	0.41	1648.00	-0.42	1.19	0.93	0.3547
Learner_Type:NOEX*Noun_Type:Count	-0.64	0.47	1648.00	-1.55	0.27	-1.37	0.1715
Learner_Type:LING*Noun_Type:Substance	-0.14	0.41	1648.00	-0.94	0.67	-0.33	0.7395
Learner_Type:NOEX*Noun_Type:Substance	0.29	0.47	1648.00	-0.62	1.20	0.62	0.5354
Testing_Time:T0*Noun_Type:Count	0.07	0.56	67.22	-0.94	1.09	0.13	0.8956
Testing_Time:T2*Noun_Type:Count	-0.19	0.56	67.22	-1.20	0.83	-0.33	0.7430
Testing_Time:T0*Noun_Type:Substance	0.15	0.56	67.22	-0.86	1.16	0.26	0.7931
Testing_Time:T2*Noun_Type:Substance	0.43	0.56	67.22	-0.59	1.44	0.76	0.4516
Learner_Type:LING*Testing_Time:T0*Noun_Type:Count	-0.50	0.58	1648.00	-1.63	0.64	-0.85	0.3945
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Count	0.08	0.66	1648.00	-1.21	1.37	0.13	0.9003
Learner_Type:LING*Testing_Time:T2*Noun_Type:Count	-0.16	0.58	1648.00	-1.30	0.98	-0.27	0.7847
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Count	-0.15	0.66	1648.00	-1.44	1.14	-0.22	0.8227
Learner_Type:LING*Testing_Time:T0*Noun_Type:Substance	0.60	0.58	1648.00	-0.54	1.73	1.02	0.3063
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Substance	-0.50	0.66	1648.00	-1.79	0.79	-0.76	0.4485
Learner_Type:LING*Testing_Time:T2*Noun_Type:Substance	-0.16	0.58	1648.00	-1.30	0.98	-0.27	0.7847
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	-0.66	0.66	1648.00	-1.95	0.63	-1.00	0.3173

Table K.37. LMER output for AJT – RQ3, zero-singular context (Intercept: Learner_Type:LING, Testing_Time:T0, Noun_Type:Object)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	4.80	0.37	29.25	4.16	5.44	13.02	0.0000
Learner_Type:NOEX	0.04	0.34	335.23	-0.62	0.71	0.13	0.9002
Learner_Type:TRAD	-0.11	0.34	335.23	-0.77	0.54	-0.34	0.7340
Testing_Time:T1	0.93	0.49	23.49	0.09	1.77	1.89	0.0706
Testing_Time:T2	0.50	0.49	23.49	-0.34	1.34	1.02	0.3206
Noun_Type:Count	-0.70	0.49	23.49	-1.54	0.14	-1.42	0.1686
Noun_Type:Substance	0.77	0.49	23.49	-0.07	1.61	1.56	0.1331
Learner_Type:NOEX*Testing_Time:T1	-0.60	0.39	1648.00	-1.37	0.17	-1.52	0.1284
Learner_Type:TRAD*Testing_Time:T1	-0.34	0.39	1648.00	-1.10	0.42	-0.88	0.3792
Learner_Type:NOEX*Testing_Time:T2	0.15	0.39	1648.00	-0.62	0.92	0.37	0.7093
Learner_Type:TRAD*Testing_Time:T2	-0.17	0.39	1648.00	-0.92	0.59	-0.43	0.6671
Learner_Type:NOEX*Noun_Type:Count	0.37	0.39	1648.00	-0.40	1.14	0.93	0.3527
Learner_Type:TRAD*Noun_Type:Count	-0.04	0.39	1648.00	-0.80	0.72	-0.11	0.9163
Learner_Type:NOEX*Noun_Type:Substance	0.41	0.39	1648.00	-0.36	1.18	1.04	0.2990
Learner_Type:TRAD*Noun_Type:Substance	-0.03	0.39	1648.00	-0.78	0.73	-0.07	0.9466
Testing_Time:T1*Noun_Type:Count	-0.26	0.70	23.49	-1.44	0.93	-0.37	0.7171
Testing_Time:T2*Noun_Type:Count	0.22	0.70	23.49	-0.96	1.41	0.32	0.7526
Testing_Time:T1*Noun_Type:Substance	-0.47	0.70	23.49	-1.65	0.72	-0.67	0.5096
Testing_Time:T2*Noun_Type:Substance	-0.57	0.70	23.49	-1.75	0.62	-0.81	0.4243
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Count	0.33	0.56	1648.00	-0.75	1.42	0.60	0.5494
Learner_Type:TRAD*Testing_Time:T1*Noun_Type:Count	0.48	0.55	1648.00	-0.59	1.55	0.87	0.3833
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Count	-0.56	0.56	1648.00	-1.64	0.53	-1.00	0.3194
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Count	0.44	0.55	1648.00	-0.62	1.51	0.81	0.4173
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Substance	-0.57	0.56	1648.00	-1.66	0.52	-1.03	0.3048
Learner_Type:TRAD*Testing_Time:T1*Noun_Type:Substance	-0.63	0.55	1648.00	-1.70	0.44	-1.14	0.2534
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	-0.92	0.56	1648.00	-2.01	0.17	-1.66	0.0980
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Substance	-0.04	0.55	1648.00	-1.11	1.02	-0.08	0.9353

Table K.38. LMER output for AJT – RQ3, zero-singular context (Intercept: Learner_Type:LING, Testing_Time:T1, Noun_Type:Object)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept	5.73	0.37	29.25	5.10	6.37	15.55	0.0000
Learner_Type:NOEX	-0.56	0.34	335.23	-1.22	0.11	-1.62	0.1062
Learner_Type:TRAD	-0.46	0.34	335.23	-1.11	0.20	-1.35	0.1781
Testing_Time:T0	-0.93	0.49	23.49	-1.77	-0.09	-1.89	0.0706
Testing_Time:T2	-0.43	0.49	23.49	-1.27	0.41	-0.88	0.3881
Noun_Type:Count	-0.96	0.49	23.49	-1.79	-0.12	-1.94	0.0646
Noun_Type:Substance	0.30	0.49	23.49	-0.54	1.14	0.61	0.5485
Learner_Type:NOEX*Testing_Time:T0	0.60	0.39	1648.00	-0.17	1.37	1.52	0.1284
Learner_Type:TRAD*Testing_Time:T0	0.34	0.39	1648.00	-0.42	1.10	0.88	0.3792
Learner_Type:NOEX*Testing_Time:T2	0.75	0.39	1648.00	-0.02	1.52	1.89	0.0584
Learner_Type:TRAD*Testing_Time:T2	0.17	0.39	1648.00	-0.58	0.93	0.45	0.6532
Learner_Type:NOEX*Noun_Type:Count	0.70	0.39	1648.00	-0.07	1.47	1.78	0.0758
Learner_Type:TRAD*Noun_Type:Count	0.44	0.39	1648.00	-0.32	1.19	1.13	0.2594
Learner_Type:NOEX*Noun_Type:Substance	-0.16	0.39	1648.00	-0.93	0.61	-0.41	0.6799
Learner_Type:TRAD*Noun_Type:Substance	-0.65	0.39	1648.00	-1.41	0.10	-1.68	0.0926
Testing_Time:T0*Noun_Type:Count	0.26	0.70	23.49	-0.93	1.44	0.37	0.7171
Testing_Time:T2*Noun_Type:Count	0.48	0.70	23.49	-0.71	1.66	0.69	0.4997
Testing_Time:T0*Noun_Type:Substance	0.47	0.70	23.49	-0.72	1.65	0.67	0.5096
Testing_Time:T2*Noun_Type:Substance	-0.10	0.70	23.49	-1.29	1.09	-0.14	0.8871
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Count	-0.33	0.56	1648.00	-1.42	0.75	-0.60	0.5494
Learner_Type:TRAD*Testing_Time:T0*Noun_Type:Count	-0.48	0.55	1648.00	-1.55	0.59	-0.87	0.3833
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Count	-0.89	0.56	1648.00	-1.98	0.20	-1.60	0.1110
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Count	-0.03	0.55	1648.00	-1.10	1.04	-0.06	0.9515
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Substance	0.57	0.56	1648.00	-0.52	1.66	1.03	0.3048
Learner_Type:TRAD*Testing_Time:T0*Noun_Type:Substance	0.63	0.55	1648.00	-0.44	1.70	1.14	0.2534
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	-0.35	0.56	1648.00	-1.44	0.74	-0.63	0.5293
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Substance	0.58	0.55	1648.00	-0.49	1.65	1.06	0.2886

Table K.39. LMER output for AJT – RQ3, zero-singular context (Intercept: Learner_Type:TRAD, Testing_Time:T0, Noun_Type:Object)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	4.69	0.41	42.16	3.97	5.40	11.55	0.0000
Learner_Type:LING	0.11	0.34	335.23	-0.54	0.77	0.34	0.7340
Learner_Type:NOEX	0.16	0.38	335.23	-0.59	0.90	0.41	0.6800
Testing_Time:T1	0.59	0.53	31.29	-0.32	1.51	1.12	0.2720
Testing_Time:T2	0.33	0.53	31.29	-0.58	1.25	0.63	0.5340
Noun_Type:Count	-0.74	0.53	31.29	-1.66	0.18	-1.40	0.1720
Noun_Type:Substance	0.74	0.53	31.29	-0.18	1.66	1.40	0.1720
Learner_Type:LING*Testing_Time:T1	0.34	0.39	1648.00	-0.42	1.10	0.88	0.3790
Learner_Type:NOEX*Testing_Time:T1	-0.26	0.44	1648.00	-1.12	0.60	-0.59	0.5550
Learner_Type:LING*Testing_Time:T2	0.17	0.39	1648.00	-0.59	0.92	0.43	0.6670
Learner_Type:NOEX*Testing_Time:T2	0.31	0.44	1648.00	-0.54	1.17	0.71	0.4750
Learner_Type:LING*Noun_Type:Count	0.04	0.39	1648.00	-0.72	0.80	0.11	0.9160
Learner_Type:NOEX*Noun_Type:Count	0.41	0.44	1648.00	-0.45	1.27	0.93	0.3540
Learner_Type:LING*Noun_Type:Substance	0.03	0.39	1648.00	-0.73	0.78	0.07	0.9470
Learner_Type:NOEX*Noun_Type:Substance	0.44	0.44	1648.00	-0.42	1.29	0.99	0.3220
Testing_Time:T1*Noun_Type:Count	0.22	0.75	31.29	-1.07	1.52	0.30	0.7690
Testing_Time:T2*Noun_Type:Count	0.67	0.75	31.29	-0.63	1.96	0.89	0.3800
Testing_Time:T1*Noun_Type:Substance	-1.09	0.75	31.29	-2.39	0.20	-1.46	0.1540
Testing_Time:T2*Noun_Type:Substance	-0.61	0.75	31.29	-1.91	0.69	-0.82	0.4210
Learner_Type:LING*Testing_Time:T1*Noun_Type:Count	-0.48	0.55	1648.00	-1.55	0.59	-0.87	0.3830
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Count	-0.14	0.62	1648.00	-1.36	1.07	-0.23	0.8170
Learner_Type:LING*Testing_Time:T2*Noun_Type:Count	-0.44	0.55	1648.00	-1.51	0.62	-0.81	0.4170
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Count	-1.00	0.62	1648.00	-2.21	0.21	-1.61	0.1080
Learner_Type:LING*Testing_Time:T1*Noun_Type:Substance	0.63	0.55	1648.00	-0.44	1.70	1.14	0.2530
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Substance	0.05	0.62	1648.00	-1.16	1.27	0.09	0.9320
Learner_Type:LING*Testing_Time:T2*Noun_Type:Substance	0.04	0.55	1648.00	-1.02	1.11	0.08	0.9350
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	-0.88	0.62	1648.00	-2.09	0.33	-1.42	0.1570

Table K.40. LMER output for AJT – RQ3, zero-singular context (Intercept: Learner_Type:TRAD, Testing_Time:T1, Noun_Type:Object)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	5.28	0.41	42.16	4.57	5.99	13.01	0.0000
Learner_Type:LING	0.46	0.34	335.23	-0.20	1.11	1.35	0.1781
Learner_Type:NOEX	-0.10	0.38	335.23	-0.85	0.64	-0.27	0.7915
Testing_Time:T0	-0.59	0.53	31.29	-1.51	0.32	-1.12	0.2716
Testing_Time:T2	-0.26	0.53	31.29	-1.18	0.66	-0.49	0.6278
Noun_Type:Count	-0.52	0.53	31.29	-1.44	0.40	-0.98	0.3349
Noun_Type:Substance	-0.35	0.53	31.29	-1.27	0.56	-0.67	0.5112
Learner_Type:LING*Testing_Time:T0	-0.34	0.39	1648.00	-1.10	0.42	-0.88	0.3792
Learner_Type:NOEX*Testing_Time:T0	0.26	0.44	1648.00	-0.60	1.12	0.59	0.5553
Learner_Type:LING*Testing_Time:T2	-0.17	0.39	1648.00	-0.93	0.58	-0.45	0.6532
Learner_Type:NOEX*Testing_Time:T2	0.57	0.44	1648.00	-0.28	1.43	1.30	0.1924
Learner_Type:LING*Noun_Type:Count	-0.44	0.39	1648.00	-1.19	0.32	-1.13	0.2594
Learner_Type:NOEX*Noun_Type:Count	0.26	0.44	1648.00	-0.59	1.12	0.60	0.5486
Learner_Type:LING*Noun_Type:Substance	0.65	0.39	1648.00	-0.10	1.41	1.68	0.0926
Learner_Type:NOEX*Noun_Type:Substance	0.49	0.44	1648.00	-0.37	1.35	1.11	0.2658
Testing_Time:T0*Noun_Type:Count	-0.22	0.75	31.29	-1.52	1.07	-0.30	0.7686
Testing_Time:T2*Noun_Type:Count	0.44	0.75	31.29	-0.85	1.74	0.59	0.5571
Testing_Time:T0*Noun_Type:Substance	1.09	0.75	31.29	-0.20	2.39	1.46	0.1545
Testing_Time:T2*Noun_Type:Substance	0.48	0.75	31.29	-0.81	1.78	0.64	0.5249
Learner_Type:LING*Testing_Time:T0*Noun_Type:Count	0.48	0.55	1648.00	-0.59	1.55	0.87	0.3833
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Count	0.14	0.62	1648.00	-1.07	1.36	0.23	0.8170
Learner_Type:LING*Testing_Time:T2*Noun_Type:Count	0.03	0.55	1648.00	-1.04	1.10	0.06	0.9515
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Count	-0.86	0.62	1648.00	-2.07	0.36	-1.38	0.1684
Learner_Type:LING*Testing_Time:T0*Noun_Type:Substance	-0.63	0.55	1648.00	-1.70	0.44	-1.14	0.2534
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Substance	-0.05	0.62	1648.00	-1.27	1.16	-0.09	0.9316
Learner_Type:LING*Testing_Time:T2*Noun_Type:Substance	-0.58	0.55	1648.00	-1.65	0.49	-1.06	0.2886
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	-0.93	0.62	1648.00	-2.15	0.28	-1.50	0.1337

Table K.41. LMER output for FCET – RQ3, definite-plural context (Intercept: Learner_Type:LING, Testing_Time:T0, Noun_Type:Count)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept	1.36	0.17	8.40	1.06	1.66	8.13	0.0000
Learner_Type:NOEX	-0.04	0.13	164.82	-0.29	0.21	-0.32	0.7460
Learner_Type:TRAD	-0.06	0.13	164.82	-0.31	0.19	-0.47	0.6400
Testing_Time:T1	-0.16	0.23	7.04	-0.56	0.25	-0.69	0.5120
Testing_Time:T2	-0.34	0.23	7.04	-0.75	0.06	-1.53	0.1700
Learner_Type:NOEX*Testing_Time:T1	0.00	0.14	508.00	-0.28	0.28	-0.01	0.9930
Learner_Type:TRAD*Testing_Time:T1	-0.01	0.14	508.00	-0.28	0.26	-0.08	0.9360
Learner_Type:NOEX*Testing_Time:T2	0.07	0.14	508.00	-0.21	0.35	0.49	0.6220
Learner_Type:TRAD*Testing_Time:T2	0.10	0.14	508.00	-0.17	0.38	0.75	0.4570

Table K.42. LMER output for FCET – RQ3, definite-plural context (Intercept: Learner_Type:LING, Testing_Time:T1, Noun_Type:Count)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept	1.20	0.17	8.40	0.90	1.50	7.20	0.0001
Learner_Type:NOEX	-0.04	0.13	164.82	-0.29	0.21	-0.34	0.7380
Learner_Type:TRAD	-0.07	0.13	164.82	-0.32	0.18	-0.56	0.5790
Testing_Time:T0	0.16	0.23	7.04	-0.25	0.56	0.69	0.5120
Testing_Time:T2	-0.19	0.23	7.04	-0.60	0.22	-0.84	0.4300
Learner_Type:NOEX*Testing_Time:T0	0.00	0.14	508.00	-0.28	0.28	0.01	0.9930
Learner_Type:TRAD*Testing_Time:T0	0.01	0.14	508.00	-0.26	0.28	0.08	0.9360
Learner_Type:NOEX*Testing_Time:T2	0.07	0.14	508.00	-0.21	0.35	0.50	0.6160
Learner_Type:TRAD*Testing_Time:T2	0.11	0.14	508.00	-0.16	0.39	0.82	0.4100

Table K.43. LMER output for FCET – RQ3, definite-plural context (Intercept: Learner_Type:TRAD, Testing_Time:T0, Noun_Type:Count)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept	1.30	0.18	10.96	0.98	1.62	7.27	0.0000
Learner_Type:LING	0.06	0.13	164.82	-0.19	0.31	0.47	0.6400
Learner_Type:NOEX	0.02	0.14	164.82	-0.26	0.30	0.12	0.9040
Testing_Time:T1	-0.17	0.24	8.45	-0.59	0.26	-0.71	0.4990
Testing_Time:T2	-0.24	0.24	8.45	-0.67	0.18	-1.02	0.3360
Learner_Type:LING*Testing_Time:T1	0.01	0.14	508.00	-0.26	0.28	0.08	0.9360
Learner_Type:NOEX*Testing_Time:T1	0.01	0.16	508.00	-0.30	0.32	0.06	0.9510
Learner_Type:LING*Testing_Time:T2	-0.10	0.14	508.00	-0.38	0.17	-0.75	0.4570
Learner_Type:NOEX*Testing_Time:T2	-0.03	0.16	508.00	-0.34	0.28	-0.21	0.8310

Table K.44. LMER output for FCET – RQ3, definite-plural context (Intercept: Learner_Type:TRAD, Testing_Time:T1, Noun_Type:Count)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept	1.13	0.18	10.96	0.81	1.45	6.33	0.0001
Learner_Type:LING	0.07	0.13	164.82	-0.18	0.32	0.56	0.5790
Learner_Type:NOEX	0.03	0.14	164.82	-0.25	0.31	0.19	0.8500
Testing_Time:T0	0.17	0.24	8.45	-0.26	0.59	0.71	0.4990
Testing_Time:T2	-0.07	0.24	8.45	-0.50	0.35	-0.31	0.7610
Learner_Type:LING*Testing_Time:T0	-0.01	0.14	508.00	-0.28	0.26	-0.08	0.9360
Learner_Type:NOEX*Testing_Time:T0	-0.01	0.16	508.00	-0.32	0.30	-0.06	0.9510
Learner_Type:LING*Testing_Time:T2	-0.11	0.14	508.00	-0.39	0.16	-0.82	0.4100
Learner_Type:NOEX*Testing_Time:T2	-0.04	0.16	508.00	-0.35	0.27	-0.28	0.7830

Table K.45. LMER output for FCET – RQ3, definite-singular context (Intercept: Learner_Type:LING, Testing_Time:T0, Noun_Type:Object)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	1.06	0.16	24.63	0.77	1.34	6.40	0.0000
Learner_Type:NOEX	0.08	0.13	433.27	-0.17	0.33	0.64	0.5252
Learner_Type:TRAD	0.28	0.13	433.27	0.03	0.52	2.20	0.0282
Testing_Time:T1	0.38	0.23	21.78	0.00	0.76	1.67	0.1090
Testing_Time:T2	0.02	0.23	21.78	-0.36	0.40	0.10	0.9226
Noun_Type:Count	0.50	0.23	21.78	0.12	0.88	2.21	0.0378
Noun_Type:Substance	0.30	0.23	21.78	-0.08	0.68	1.33	0.1983
Learner_Type:NOEX*Testing_Time:T1	-0.18	0.15	1648.00	-0.48	0.12	-1.18	0.2398
Learner_Type:TRAD*Testing_Time:T1	-0.25	0.15	1648.00	-0.54	0.05	-1.64	0.1022
Learner_Type:NOEX*Testing_Time:T2	-0.14	0.15	1648.00	-0.44	0.16	-0.91	0.3655
Learner_Type:TRAD*Testing_Time:T2	-0.26	0.15	1648.00	-0.56	0.03	-1.73	0.0833
Learner_Type:NOEX*Noun_Type:Count	-0.25	0.15	1648.00	-0.55	0.06	-1.59	0.1129
Learner_Type:TRAD*Noun_Type:Count	-0.13	0.15	1648.00	-0.43	0.17	-0.85	0.3932
Learner_Type:NOEX*Noun_Type:Substance	0.05	0.15	1648.00	-0.25	0.35	0.34	0.7319
Learner_Type:TRAD*Noun_Type:Substance	-0.08	0.15	1648.00	-0.37	0.22	-0.51	0.6084
Testing_Time:T1*Noun_Type:Count	-0.54	0.32	21.78	-1.08	0.00	-1.70	0.1028
Testing_Time:T2*Noun_Type:Count	-0.13	0.32	21.78	-0.67	0.41	-0.42	0.6807
Testing_Time:T1*Noun_Type:Substance	-0.28	0.32	21.78	-0.82	0.26	-0.87	0.3944
Testing_Time:T2*Noun_Type:Substance	-0.08	0.32	21.78	-0.62	0.46	-0.24	0.8101
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Count	0.19	0.22	1648.00	-0.24	0.62	0.88	0.3810
Learner_Type:TRAD*Testing_Time:T1*Noun_Type:Count	0.06	0.21	1648.00	-0.36	0.48	0.29	0.7693
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Count	0.11	0.22	1648.00	-0.31	0.54	0.52	0.6029
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Count	0.10	0.21	1648.00	-0.32	0.52	0.45	0.6537
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Substance	-0.35	0.22	1648.00	-0.78	0.08	-1.60	0.1098
Learner_Type:TRAD*Testing_Time:T1*Noun_Type:Substance	-0.17	0.21	1648.00	-0.59	0.25	-0.78	0.4375
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	-0.20	0.22	1648.00	-0.62	0.23	-0.90	0.3681
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Substance	0.15	0.21	1648.00	-0.27	0.57	0.71	0.4794

Table K.46. LMER output for FCET – RQ3, definite-singular context (Intercept: Learner_Type:LING, Testing_Time:T1, Noun_Type:Object)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	1.43	0.16	24.63	1.15	1.71	8.69	0.0000
Learner_Type:NOEX	-0.10	0.13	433.27	-0.35	0.15	-0.78	0.4370
Learner_Type:TRAD	0.03	0.13	433.27	-0.22	0.28	0.24	0.8140
Testing_Time:T0	-0.38	0.23	21.78	-0.76	0.00	-1.67	0.1090
Testing_Time:T2	-0.36	0.23	21.78	-0.74	0.03	-1.57	0.1300
Noun_Type:Count	-0.04	0.23	21.78	-0.43	0.34	-0.20	0.8460
Noun_Type:Substance	0.02	0.23	21.78	-0.36	0.40	0.10	0.9230
Learner_Type:NOEX*Testing_Time:T0	0.18	0.15	1648.00	-0.12	0.48	1.18	0.2400
Learner_Type:TRAD*Testing_Time:T0	0.25	0.15	1648.00	-0.05	0.54	1.64	0.1020
Learner_Type:NOEX*Testing_Time:T2	0.04	0.15	1648.00	-0.26	0.34	0.27	0.7870
Learner_Type:TRAD*Testing_Time:T2	-0.01	0.15	1648.00	-0.31	0.28	-0.10	0.9220
Learner_Type:NOEX*Noun_Type:Count	-0.05	0.15	1648.00	-0.36	0.25	-0.35	0.7290
Learner_Type:TRAD*Noun_Type:Count	-0.07	0.15	1648.00	-0.36	0.23	-0.44	0.6610
Learner_Type:NOEX*Noun_Type:Substance	-0.30	0.15	1648.00	-0.60	0.00	-1.92	0.0550
Learner_Type:TRAD*Noun_Type:Substance	-0.24	0.15	1648.00	-0.54	0.05	-1.61	0.1070
Testing_Time:T0*Noun_Type:Count	0.54	0.32	21.78	0.00	1.08	1.70	0.1030
Testing_Time:T2*Noun_Type:Count	0.41	0.32	21.78	-0.13	0.95	1.29	0.2120
Testing_Time:T0*Noun_Type:Substance	0.28	0.32	21.78	-0.26	0.82	0.87	0.3940
Testing_Time:T2*Noun_Type:Substance	0.20	0.32	21.78	-0.34	0.74	0.63	0.5380
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Count	-0.19	0.22	1648.00	-0.62	0.24	-0.88	0.3810
Learner_Type:TRAD*Testing_Time:T0*Noun_Type:Count	-0.06	0.21	1648.00	-0.48	0.36	-0.29	0.7690
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Count	-0.08	0.22	1648.00	-0.50	0.35	-0.36	0.7220
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Count	0.03	0.21	1648.00	-0.39	0.45	0.16	0.8770
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Substance	0.35	0.22	1648.00	-0.08	0.78	1.60	0.1100
Learner_Type:TRAD*Testing_Time:T0*Noun_Type:Substance	0.17	0.21	1648.00	-0.25	0.59	0.78	0.4380
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	0.15	0.22	1648.00	-0.27	0.58	0.70	0.4840
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Substance	0.32	0.21	1648.00	-0.10	0.74	1.48	0.1380

Table K.47. LMER output for FCET – RQ3, definite-singular context (Intercept: Learner_Type:TRAD, Testing_Time:T0, Noun_Type:Object)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	1.33	0.18	32.22	1.03	1.64	7.55	0.0000
Learner_Type:LING	-0.28	0.13	433.27	-0.52	-0.03	-2.20	0.0282
Learner_Type:NOEX	-0.20	0.14	433.27	-0.47	0.08	-1.37	0.1715
Testing_Time:T1	0.13	0.24	26.95	-0.28	0.54	0.54	0.5912
Testing_Time:T2	-0.24	0.24	26.95	-0.65	0.17	-1.01	0.3217
Noun_Type:Count	0.37	0.24	26.95	-0.04	0.78	1.55	0.1321
Noun_Type:Substance	0.22	0.24	26.95	-0.19	0.63	0.93	0.3597
Learner_Type:LING*Testing_Time:T1	0.25	0.15	1648.00	-0.05	0.54	1.64	0.1022
Learner_Type:NOEX*Testing_Time:T1	0.07	0.17	1648.00	-0.27	0.40	0.39	0.6996
Learner_Type:LING*Testing_Time:T2	0.26	0.15	1648.00	-0.03	0.56	1.73	0.0833
Learner_Type:NOEX*Testing_Time:T2	0.12	0.17	1648.00	-0.21	0.46	0.72	0.4747
Learner_Type:LING*Noun_Type:Count	0.13	0.15	1648.00	-0.17	0.43	0.85	0.3932
Learner_Type:NOEX*Noun_Type:Count	-0.12	0.17	1648.00	-0.45	0.22	-0.67	0.5025
Learner_Type:LING*Noun_Type:Substance	0.08	0.15	1648.00	-0.22	0.37	0.51	0.6084
Learner_Type:NOEX*Noun_Type:Substance	0.13	0.17	1648.00	-0.21	0.47	0.76	0.4478
Testing_Time:T1*Noun_Type:Count	-0.48	0.34	26.95	-1.06	0.10	-1.43	0.1649
Testing_Time:T2*Noun_Type:Count	-0.04	0.34	26.95	-0.61	0.54	-0.11	0.9134
Testing_Time:T1*Noun_Type:Substance	-0.44	0.34	26.95	-1.02	0.13	-1.32	0.1986
Testing_Time:T2*Noun_Type:Substance	0.07	0.34	26.95	-0.50	0.65	0.22	0.8278
Learner_Type:LING*Testing_Time:T1*Noun_Type:Count	-0.06	0.21	1648.00	-0.48	0.36	-0.29	0.7693
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Count	0.13	0.24	1648.00	-0.35	0.60	0.53	0.5976
Learner_Type:LING*Testing_Time:T2*Noun_Type:Count	-0.10	0.21	1648.00	-0.52	0.32	-0.45	0.6537
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Count	0.02	0.24	1648.00	-0.46	0.49	0.07	0.9429
Learner_Type:LING*Testing_Time:T1*Noun_Type:Substance	0.17	0.21	1648.00	-0.25	0.59	0.78	0.4375
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Substance	-0.18	0.24	1648.00	-0.66	0.29	-0.75	0.4524
Learner_Type:LING*Testing_Time:T2*Noun_Type:Substance	-0.15	0.21	1648.00	-0.57	0.27	-0.71	0.4794
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	-0.35	0.24	1648.00	-0.82	0.13	-1.43	0.1524

Table K.48. LMER output for FCET – RQ3, definite-singular context (Intercept: Learner_Type:TRAD, Testing_Time:T1, Noun_Type:Object)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept	1.46	0.18	32.22	1.16	1.77	8.28	0.0000
Learner_Type:LING	-0.03	0.13	433.27	-0.28	0.22	-0.24	0.8140
Learner_Type:NOEX	-0.13	0.14	433.27	-0.41	0.15	-0.91	0.3660
Testing_Time:T0	-0.13	0.24	26.95	-0.54	0.28	-0.54	0.5910
Testing_Time:T2	-0.37	0.24	26.95	-0.78	0.04	-1.55	0.1320
Noun_Type:Count	-0.11	0.24	26.95	-0.52	0.30	-0.47	0.6450
Noun_Type:Substance	-0.22	0.24	26.95	-0.63	0.19	-0.93	0.3600
Learner_Type:LING*Testing_Time:T0	-0.25	0.15	1648.00	-0.54	0.05	-1.64	0.1020
Learner_Type:NOEX*Testing_Time:T0	-0.07	0.17	1648.00	-0.40	0.27	-0.39	0.7000
Learner_Type:LING*Testing_Time:T2	0.01	0.15	1648.00	-0.28	0.31	0.10	0.9220
Learner_Type:NOEX*Testing_Time:T2	0.06	0.17	1648.00	-0.28	0.39	0.33	0.7420
Learner_Type:LING*Noun_Type:Count	0.07	0.15	1648.00	-0.23	0.36	0.44	0.6610
Learner_Type:NOEX*Noun_Type:Count	0.01	0.17	1648.00	-0.32	0.35	0.08	0.9390
Learner_Type:LING*Noun_Type:Substance	0.24	0.15	1648.00	-0.05	0.54	1.61	0.1070
Learner_Type:NOEX*Noun_Type:Substance	-0.05	0.17	1648.00	-0.39	0.28	-0.30	0.7610
Testing_Time:T0*Noun_Type:Count	0.48	0.34	26.95	-0.10	1.06	1.43	0.1650
Testing_Time:T2*Noun_Type:Count	0.44	0.34	26.95	-0.13	1.02	1.32	0.1990
Testing_Time:T0*Noun_Type:Substance	0.44	0.34	26.95	-0.13	1.02	1.32	0.1990
Testing_Time:T2*Noun_Type:Substance	0.52	0.34	26.95	-0.06	1.10	1.54	0.1360
Learner_Type:LING*Testing_Time:T0*Noun_Type:Count	0.06	0.21	1648.00	-0.36	0.48	0.29	0.7690
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Count	-0.13	0.24	1648.00	-0.60	0.35	-0.53	0.5980
Learner_Type:LING*Testing_Time:T2*Noun_Type:Count	-0.03	0.21	1648.00	-0.45	0.39	-0.16	0.8770
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Count	-0.11	0.24	1648.00	-0.59	0.36	-0.46	0.6480
Learner_Type:LING*Testing_Time:T0*Noun_Type:Substance	-0.17	0.21	1648.00	-0.59	0.25	-0.78	0.4380
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Substance	0.18	0.24	1648.00	-0.29	0.66	0.75	0.4520
Learner_Type:LING*Testing_Time:T2*Noun_Type:Substance	-0.32	0.21	1648.00	-0.74	0.10	-1.48	0.1380
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	-0.17	0.24	1648.00	-0.64	0.31	-0.68	0.4970

Table K.49. LMER output for FCET – RQ3, indefinite-singular context (Intercept: Learner_Type:LING, Testing_Time:T0, Noun_Type:Count)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	1.22	0.19	9.41	0.89	1.56	6.60	0.0001
Learner_Type:NOEX	0.09	0.16	170.68	-0.23	0.41	0.56	0.5790
Learner_Type:TRAD	-0.04	0.16	170.68	-0.35	0.28	-0.23	0.8190
Testing_Time:T1	-0.19	0.25	7.53	-0.64	0.26	-0.76	0.4680
Testing_Time:T2	0.41	0.25	7.53	-0.04	0.86	1.66	0.1370
Learner_Type:NOEX*Testing_Time:T1	-0.34	0.18	508.00	-0.70	0.02	-1.86	0.0640
Learner_Type:TRAD*Testing_Time:T1	-0.11	0.18	508.00	-0.46	0.25	-0.60	0.5510
Learner_Type:NOEX*Testing_Time:T2	-0.27	0.18	508.00	-0.63	0.08	-1.49	0.1360
Learner_Type:TRAD*Testing_Time:T2	0.26	0.18	508.00	-0.10	0.61	1.42	0.1570

Table K.50. LMER output for FCET – RQ3, indefinite-singular context (Intercept: Learner_Type:LING, Testing_Time:T1, Noun_Type:Count)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	1.03	0.19	9.41	0.70	1.37	5.58	0.0003
Learner_Type:NOEX	-0.25	0.16	170.68	-0.57	0.07	-1.52	0.1317
Learner_Type:TRAD	-0.14	0.16	170.68	-0.46	0.17	-0.90	0.3723
Testing_Time:T0	0.19	0.25	7.53	-0.26	0.64	0.76	0.4682
Testing_Time:T2	0.60	0.25	7.53	0.15	1.05	2.43	0.0433
Learner_Type:NOEX*Testing_Time:T0	0.34	0.18	508.00	-0.02	0.70	1.86	0.0640
Learner_Type:TRAD*Testing_Time:T0	0.11	0.18	508.00	-0.25	0.46	0.60	0.5513
Learner_Type:NOEX*Testing_Time:T2	0.07	0.18	508.00	-0.29	0.43	0.36	0.7164
Learner_Type:TRAD*Testing_Time:T2	0.36	0.18	508.00	0.01	0.72	2.02	0.0445

Table K.51. LMER output for FCET – RQ3, indefinite-singular context (Intercept: Learner_Type:TRAD, Testing_Time:T0, Noun_Type:Count)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	1.19	0.20	13.24	0.82	1.55	5.87	0.0001
Learner_Type:LING	0.04	0.16	170.68	-0.28	0.35	0.23	0.8188
Learner_Type:NOEX	0.13	0.18	170.68	-0.23	0.49	0.70	0.4838
Testing_Time:T1	-0.30	0.26	9.65	-0.77	0.18	-1.13	0.2874
Testing_Time:T2	0.67	0.26	9.65	0.19	1.14	2.53	0.0305
Learner_Type:LING*Testing_Time:T1	0.11	0.18	508.00	-0.25	0.46	0.60	0.5513
Learner_Type:NOEX*Testing_Time:T1	-0.23	0.20	508.00	-0.63	0.17	-1.14	0.2545
Learner_Type:LING*Testing_Time:T2	-0.26	0.18	508.00	-0.61	0.10	-1.42	0.1566
Learner_Type:NOEX*Testing_Time:T2	-0.53	0.20	508.00	-0.93	-0.13	-2.59	0.0099

Table K.52. LMER output for FCET – RQ3, indefinite-singular context (Intercept: Learner_Type:TRAD, Testing_Time:T1, Noun_Type:Count)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	0.89	0.20	13.24	0.52	1.25	4.40	0.0007
Learner_Type:LING	0.14	0.16	170.68	-0.17	0.46	0.90	0.3723
Learner_Type:NOEX	-0.10	0.18	170.68	-0.46	0.25	-0.57	0.5688
Testing_Time:T0	0.30	0.26	9.65	-0.18	0.77	1.13	0.2874
Testing_Time:T2	0.96	0.26	9.65	0.49	1.44	3.66	0.0047
Learner_Type:LING*Testing_Time:T0	-0.11	0.18	508.00	-0.46	0.25	-0.60	0.5513
Learner_Type:NOEX*Testing_Time:T0	0.23	0.20	508.00	-0.17	0.63	1.14	0.2545
Learner_Type:LING*Testing_Time:T2	-0.36	0.18	508.00	-0.72	-0.01	-2.02	0.0445
Learner_Type:NOEX*Testing_Time:T2	-0.30	0.20	508.00	-0.70	0.10	-1.45	0.1477

Table K.52. LMER output for FCET – RQ3, zero-plural context (Intercept: Learner_Type:LING, Testing_Time:T0, Noun_Type:Count)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	1.44	0.21	7.83	1.06	1.83	6.77	0.0002
Learner_Type:NOEX	-0.03	0.15	177.74	-0.32	0.26	-0.22	0.8276
Learner_Type:TRAD	0.04	0.15	177.74	-0.25	0.32	0.25	0.8016
Testing_Time:T1	0.03	0.29	6.88	-0.49	0.56	0.11	0.9123
Testing_Time:T2	-0.28	0.29	6.88	-0.80	0.25	-0.95	0.3735
Learner_Type:NOEX*Testing_Time:T1	-0.19	0.17	508.00	-0.52	0.14	-1.12	0.2635
Learner_Type:TRAD*Testing_Time:T1	0.02	0.17	508.00	-0.30	0.35	0.13	0.8941
Learner_Type:NOEX*Testing_Time:T2	0.24	0.17	508.00	-0.09	0.57	1.40	0.1609
Learner_Type:TRAD*Testing_Time:T2	0.19	0.17	508.00	-0.14	0.51	1.11	0.2676

Table K.54. LMER output for FCET – RQ3, zero-plural context (Intercept: Learner_Type:LING, Testing_Time:T1, Noun_Type:Count)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	1.48	0.21	7.83	1.09	1.86	6.93	0.0001
Learner_Type:NOEX	-0.22	0.15	177.74	-0.51	0.07	-1.49	0.1386
Learner_Type:TRAD	0.06	0.15	177.74	-0.23	0.35	0.40	0.6876
Testing_Time:T0	-0.03	0.29	6.88	-0.56	0.49	-0.11	0.9123
Testing_Time:T2	-0.31	0.29	6.88	-0.84	0.21	-1.07	0.3224
Learner_Type:NOEX*Testing_Time:T0	0.19	0.17	508.00	-0.14	0.52	1.12	0.2635
Learner_Type:TRAD*Testing_Time:T0	-0.02	0.17	508.00	-0.35	0.30	-0.13	0.8941
Learner_Type:NOEX*Testing_Time:T2	0.43	0.17	508.00	0.10	0.76	2.52	0.0119
Learner_Type:TRAD*Testing_Time:T2	0.1630	0.1669	508.0029	-0.1634	0.4894	0.9770	0.3292

Table K.55. LMER output for FCET – RQ3, zero-plural context (Intercept: Learner_Type:TRAD, Testing_Time:T0, Noun_Type:Count)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	1.48	0.23	9.79	1.08	1.89	6.57	0.0001
Learner_Type:LING	-0.04	0.15	177.74	-0.32	0.25	-0.25	0.8020
Learner_Type:NOEX	-0.07	0.17	177.74	-0.39	0.26	-0.42	0.6770
Testing_Time:T1	0.06	0.30	8.04	-0.49	0.60	0.18	0.8590
Testing_Time:T2	-0.09	0.30	8.04	-0.64	0.45	-0.31	0.7680
Learner_Type:LING*Testing_Time:T1	-0.02	0.17	508.00	-0.35	0.30	-0.13	0.8940
Learner_Type:NOEX*Testing_Time:T1	-0.21	0.19	508.00	-0.58	0.16	-1.12	0.2620
Learner_Type:LING*Testing_Time:T2	-0.19	0.17	508.00	-0.51	0.14	-1.11	0.2680
Learner_Type:NOEX*Testing_Time:T2	0.05	0.19	508.00	-0.32	0.42	0.28	0.7780

Table K.56. LMER output for FCET – RQ3, zero-plural context (Intercept: Learner_Type:TRAD, Testing_Time:T1, Noun_Type:Count)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	1.54	0.23	9.79	1.13	1.94	6.81	0.0001
Learner_Type:LING	-0.06	0.15	177.74	-0.35	0.23	-0.40	0.6876
Learner_Type:NOEX	-0.28	0.17	177.74	-0.61	0.04	-1.69	0.0927
Testing_Time:T0	-0.06	0.30	8.04	-0.60	0.49	-0.18	0.8593
Testing_Time:T2	-0.15	0.30	8.04	-0.69	0.40	-0.49	0.6385
Learner_Type:LING*Testing_Time:T0	0.02	0.17	508.00	-0.30	0.35	0.13	0.8941
Learner_Type:NOEX*Testing_Time:T0	0.21	0.19	508.00	-0.16	0.58	1.12	0.2623
Learner_Type:LING*Testing_Time:T2	-0.16	0.17	508.00	-0.49	0.16	-0.98	0.3292
Learner_Type:NOEX*Testing_Time:T2	0.27	0.19	508.00	-0.10	0.64	1.40	0.1609

Table K.57. LMER output for FCET – RQ3, zero-singular context (Intercept: Learner_Type:LING, Testing_Time:T0, Noun_Type:Object)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	0.87	0.12	22.21	0.66	1.07	7.31	0.0000
Learner_Type:NOEX	-0.06	0.12	192.29	-0.29	0.17	-0.53	0.5953
Learner_Type:TRAD	0.11	0.12	192.29	-0.11	0.34	0.99	0.3228
Testing_Time:T1	0.52	0.15	15.59	0.26	0.79	3.42	0.0037
Testing_Time:T2	0.46	0.15	15.59	0.19	0.72	2.98	0.0091
Noun_Type:Substance	0.36	0.15	15.59	0.09	0.62	2.33	0.0339
Learner_Type:NOEX*Testing_Time:T1	-0.35	0.12	1078.00	-0.58	-0.11	-2.85	0.0045
Learner_Type:TRAD*Testing_Time:T1	-0.23	0.12	1078.00	-0.46	0.01	-1.89	0.0586
Learner_Type:NOEX*Testing_Time:T2	0.07	0.12	1078.00	-0.16	0.31	0.61	0.5434
Learner_Type:TRAD*Testing_Time:T2	-0.05	0.12	1078.00	-0.28	0.18	-0.40	0.6866
Learner_Type:NOEX*Noun_Type:Substance	0.10	0.12	1078.00	-0.14	0.33	0.79	0.4324
Learner_Type:TRAD*Noun_Type:Substance	0.01	0.12	1078.00	-0.22	0.25	0.12	0.9012
Testing_Time:T1*Noun_Type:Substance	-0.19	0.22	15.59	-0.56	0.19	-0.87	0.3957
Testing_Time:T2*Noun_Type:Substance	-0.24	0.22	15.59	-0.62	0.13	-1.13	0.2755
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Substance	-0.22	0.17	1078.00	-0.56	0.11	-1.30	0.1949
Learner_Type:TRAD*Testing_Time:T1*Noun_Type:Substance	-0.03	0.17	1078.00	-0.36	0.30	-0.20	0.8434
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	-0.36	0.17	1078.00	-0.70	-0.03	-2.12	0.0347
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Substance	0.08	0.17	1078.00	-0.25	0.41	0.46	0.6449

Table K.58. LMER output for FCET – RQ3, zero-singular context (Intercept: Learner_Type:LING, Testing_Time:T1, Noun_Type:Object)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	1.39	0.12	22.21	1.18	1.60	11.72	0.0000
Learner_Type:NOEX	-0.41	0.12	192.29	-0.64	-0.18	-3.46	0.0007
Learner_Type:TRAD	-0.11	0.12	192.29	-0.34	0.11	-0.96	0.3386
Testing_Time:T0	-0.52	0.15	15.59	-0.79	-0.26	-3.42	0.0037
Testing_Time:T2	-0.07	0.15	15.59	-0.33	0.20	-0.44	0.6689
Noun_Type:Substance	0.17	0.15	15.59	-0.10	0.43	1.09	0.2924
Learner_Type:NOEX*Testing_Time:T0	0.35	0.12	1078.00	0.11	0.58	2.85	0.0045
Learner_Type:TRAD*Testing_Time:T0	0.23	0.12	1078.00	-0.01	0.46	1.89	0.0586
Learner_Type:NOEX*Testing_Time:T2	0.42	0.12	1078.00	0.18	0.66	3.45	0.0006
Learner_Type:TRAD*Testing_Time:T2	0.18	0.12	1078.00	-0.06	0.41	1.49	0.1365
Learner_Type:NOEX*Noun_Type:Substance	-0.13	0.12	1078.00	-0.36	0.11	-1.05	0.2944
Learner_Type:TRAD*Noun_Type:Substance	-0.02	0.12	1078.00	-0.25	0.21	-0.16	0.8767
Testing_Time:T0*Noun_Type:Substance	0.19	0.22	15.59	-0.19	0.56	0.87	0.3957
Testing_Time:T2*Noun_Type:Substance	-0.06	0.22	15.59	-0.43	0.32	-0.26	0.8006
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Substance	0.22	0.17	1078.00	-0.11	0.56	1.30	0.1948
Learner_Type:TRAD*Testing_Time:T0*Noun_Type:Substance	0.03	0.17	1078.00	-0.30	0.36	0.20	0.8434
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	-0.14	0.17	1078.00	-0.48	0.19	-0.82	0.4136
Learner_Type:TRAD*Testing_Time:T2*Noun_Type:Substance	0.11	0.17	1078.00	-0.22	0.44	0.66	0.5104

Table K.59. LMER output for FCET – RQ3, zero-singular context (Intercept: Learner_Type:TRAD, Testing_Time:T0, Noun_Type:Object)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	0.98	0.13	33.21	0.75	1.22	7.44	0.0000
Learner_Type:LING	-0.11	0.12	192.29	-0.34	0.11	-0.99	0.3228
Learner_Type:NOEX	-0.18	0.13	192.29	-0.43	0.08	-1.35	0.1782
Testing_Time:T1	0.30	0.16	20.68	0.01	0.58	1.81	0.0857
Testing_Time:T2	0.41	0.16	20.68	0.12	0.70	2.48	0.0218
Noun_Type:Substance	0.37	0.16	20.68	0.08	0.66	2.26	0.0350
Learner_Type:LING*Testing_Time:T1	0.23	0.12	1078.00	-0.01	0.46	1.89	0.0586
Learner_Type:NOEX*Testing_Time:T1	-0.12	0.14	1078.00	-0.38	0.14	-0.89	0.3762
Learner_Type:LING*Testing_Time:T2	0.05	0.12	1078.00	-0.18	0.28	0.40	0.6866
Learner_Type:NOEX*Testing_Time:T2	0.12	0.14	1078.00	-0.14	0.39	0.90	0.3676
Learner_Type:LING*Noun_Type:Substance	-0.01	0.12	1078.00	-0.25	0.22	-0.12	0.9012
Learner_Type:NOEX*Noun_Type:Substance	0.08	0.14	1078.00	-0.18	0.34	0.60	0.5516
Testing_Time:T1*Noun_Type:Substance	-0.22	0.23	20.68	-0.63	0.18	-0.96	0.3495
Testing_Time:T2*Noun_Type:Substance	-0.17	0.23	20.68	-0.57	0.24	-0.72	0.4808
Learner_Type:LING*Testing_Time:T1*Noun_Type:Substance	0.03	0.17	1078.00	-0.30	0.36	0.20	0.8434
Learner_Type:NOEX*Testing_Time:T1*Noun_Type:Substance	-0.19	0.19	1078.00	-0.56	0.18	-0.99	0.3223
Learner_Type:LING*Testing_Time:T2*Noun_Type:Substance	-0.08	0.17	1078.00	-0.41	0.25	-0.46	0.6449
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	-0.44	0.19	1078.00	-0.81	-0.07	-2.31	0.0214

Table K.60. LMER output for FCET – RQ3, zero-singular context (Intercept: Learner_Type:TRAD, Testing_Time:T1, Noun_Type:Object)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	1.28	0.13	33.21	1.04	1.51	9.68	0.0000
Learner_Type:LING	0.11	0.12	192.29	-0.11	0.34	0.96	0.3386
Learner_Type:NOEX	-0.30	0.13	192.29	-0.55	-0.04	-2.26	0.0247
Testing_Time:T0	-0.30	0.16	20.68	-0.58	-0.01	-1.81	0.0857
Testing_Time:T2	0.11	0.16	20.68	-0.18	0.40	0.68	0.5060
Noun_Type:Substance	0.15	0.16	20.68	-0.14	0.44	0.90	0.3772
Learner_Type:LING*Testing_Time:T0	-0.23	0.12	1078.00	-0.46	0.01	-1.89	0.0586
Learner_Type:NOEX*Testing_Time:T0	0.12	0.14	1078.00	-0.14	0.38	0.89	0.3762
Learner_Type:LING*Testing_Time:T2	-0.18	0.12	1078.00	-0.41	0.06	-1.49	0.1365
Learner_Type:NOEX*Testing_Time:T2	0.24	0.14	1078.00	-0.02	0.51	1.79	0.0743
Learner_Type:LING*Noun_Type:Substance	0.02	0.12	1078.00	-0.21	0.25	0.16	0.8767
Learner_Type:NOEX*Noun_Type:Substance	-0.11	0.14	1078.00	-0.37	0.16	-0.81	0.4211
Testing_Time:T0*Noun_Type:Substance	0.22	0.23	20.68	-0.18	0.63	0.96	0.3495
Testing_Time:T2*Noun_Type:Substance	0.06	0.23	20.68	-0.35	0.46	0.24	0.8132
Learner_Type:LING*Testing_Time:T0*Noun_Type:Substance	-0.03	0.17	1078.00	-0.36	0.30	-0.20	0.8434
Learner_Type:NOEX*Testing_Time:T0*Noun_Type:Substance	0.19	0.19	1078.00	-0.18	0.56	0.99	0.3223
Learner_Type:LING*Testing_Time:T2*Noun_Type:Substance	-0.11	0.17	1078.00	-0.44	0.22	-0.66	0.5104
Learner_Type:NOEX*Testing_Time:T2*Noun_Type:Substance	-0.25	0.19	1078.00	-0.63	0.12	-1.32	0.1889

Appendix L: Statistical Models for Research Question 4

Table L.1. LMER output for T0-T1 – RQ4 (Intercept: Learner_Type:LING, Task:ESIT)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept	10.49	1.77	44.16	3.35	10.28	5.93	0.0000
Learner_Type:NOEX	-7.45	2.14	214.09	-11.62	-3.29	-3.49	0.0006
Learner_Type:TRAD	-7.92	2.11	201.83	-12.03	-3.80	-3.75	0.0002
Task:AJT	-3.68	1.61	2385.32	-6.82	-0.53	-2.29	0.0222
Task:FCET	-5.69	1.98	2389.19	-9.56	-1.80	-2.87	0.0041
Learner_Type:NOEX*Task:AJT	1.38	2.67	2385.32	-3.85	6.61	0.52	0.6044
Learner_Type:TRAD*Task:AJT	0.18	2.62	2385.32	-4.95	5.32	0.07	0.9448
Learner_Type:NOEX*Task:FCET	-5.98	3.20	2385.32	-12.25	0.29	-1.87	0.0618
Learner_Type:TRAD*Task:FCET	-1.02	3.14	2385.32	-7.18	5.14	-0.33	0.7453

Table L.2. LMER output for T0-T1 – RQ4 (Intercept: Learner_Type:LING, Task:AJT)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept	6.81	1.77	44.16	3.35	10.28	3.85	0.0004
Learner_Type:NOEX	-6.07	2.14	214.09	-10.23	-1.90	-2.84	0.0050
Learner_Type:TRAD	-7.73	2.11	201.83	-11.85	-3.62	-3.66	0.0003
Task:ESIT	3.68	1.61	2385.32	0.53	6.82	2.29	0.0222
Task:FCET	-2.01	1.98	2389.19	-5.89	1.87	-1.02	0.3095
Learner_Type:NOEX*Task:ESIT	-1.38	2.67	2385.32	-6.61	3.85	-0.52	0.6044
Learner_Type:TRAD*Task:ESIT	-0.18	2.62	2385.32	-5.32	4.95	-0.07	0.9448
Learner_Type:NOEX*Task:FCET	-7.37	3.20	2385.32	-13.64	-1.10	-2.30	0.0215
Learner_Type:TRAD*Task:FCET	-1.20	3.14	2385.32	-7.36	4.95	-0.38	0.7020

Table L.3. LMER output for T0-T1 – RQ4 (Intercept: Learner_Type:LING, Task:FCET)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	4.80	2.12	85.67	0.67	8.92	2.27	0.0258
Learner_Type:NOEX	-13.44	2.77	551.39	-18.84	-8.03	-4.85	0.0000
Learner_Type:TRAD	-8.94	2.73	519.45	-14.27	-3.61	-3.27	0.0012
Task:ESIT	5.69	1.98	2389.19	1.80	9.56	2.87	0.0041
Task:AJT	2.01	1.98	2389.19	-1.87	5.89	1.02	0.3095
Learner_Type:NOEX*Task:ESIT	5.98	3.20	2385.32	-0.29	12.25	1.87	0.0618
Learner_Type:TRAD*Task:ESIT	1.02	3.14	2385.32	-5.14	7.18	0.33	0.7453
Learner_Type:NOEX*Task:AJT	7.37	3.20	2385.32	1.10	13.64	2.30	0.0215
Learner_Type:TRAD*Task:AJT	1.20	3.14	2385.32	-4.95	7.36	0.38	0.7020

Table L.4. LMER output for T0-T1 – RQ4 (Intercept: Learner_Type:TRAD, Task:ESIT)

	Estimate	**Std. Error**	**df**			**t value**	**Pr(>|t|)**
Intercept	2.58	2.07	73.48	-1.45	6.60	1.24	0.2175
Learner_Type:LING	7.92	2.11	201.83	3.80	12.03	3.75	0.0002
Learner_Type:NOEX	0.46	2.39	204.45	-4.20	5.13	0.19	0.8465
Task:AJT	-3.49	2.07	2385.32	-7.55	0.57	-1.69	0.0921
Task:FCET	-6.71	2.53	2398.85	-11.66	-1.75	-2.65	0.0080
Learner_Type:LING*Task:AJT	-0.18	2.62	2385.32	-5.32	4.95	-0.07	0.9448
Learner_Type:NOEX*Task:AJT	1.20	2.98	2385.32	-4.62	7.03	0.40	0.6862
Learner_Type:LING*Task:FCET	1.02	3.14	2385.32	-5.14	7.18	0.33	0.7453
Learner_Type:NOEX*Task:FCET	-4.96	3.57	2385.32	-11.95	2.02	-1.39	0.1643

Table L.5. LMER output for T0-T1 – RQ4 (Intercept: Learner_Type:TRAD, Task:AJT)

	Estimate	**Std. Error**	**df**			**t value**	**Pr(>|t|)**
Intercept	-0.92	2.07	73.48	-4.95	3.11	-0.44	0.6585
Learner_Type:LING	7.73	2.11	201.83	3.62	11.85	3.66	0.0003
Learner_Type:NOEX	1.67	2.39	204.45	-3.00	6.33	0.70	0.4870
Task:FCET	-3.22	2.53	2398.85	-8.16	1.74	-1.27	0.2035
Task:ESIT	3.49	2.07	2385.32	-0.57	7.55	1.69	0.0921
Learner_Type:LING*Task:FCET	1.20	3.14	2385.32	-4.95	7.36	0.38	0.7020
Learner_Type:NOEX*Task:FCET	-6.16	3.57	2385.32	-13.15	0.82	-1.73	0.0841
Learner_Type:LING*Task:ESIT	0.18	2.62	2385.32	-4.95	5.32	0.07	0.9448
Learner_Type:NOEX*Task:ESIT	-1.20	2.98	2385.32	-7.03	4.62	-0.40	0.6862

Table L.6. LMER output for T0-T1 – RQ4 (Intercept: Learner_Type:TRAD, Task:FCET)

	Estimate	**Std. Error**	**df**			**t value**	**Pr(>|t|)**
Intercept	-4.14	2.53	154.38	-9.05	0.78	-1.64	0.1037
Learner_Type:LING	8.94	2.73	519.45	3.61	14.27	3.27	0.0012
Learner_Type:NOEX	-4.50	3.10	526.31	-10.54	1.54	-1.45	0.1470
Task:ESIT	6.71	2.53	2398.85	1.75	11.66	2.65	0.0080
Task:AJT	3.22	2.53	2398.85	-1.74	8.16	1.27	0.2035
Learner_Type:LING*Task:ESIT	-1.02	3.14	2385.32	-7.18	5.14	-0.33	0.7453
Learner_Type:NOEX*Task:ESIT	4.96	3.57	2385.32	-2.02	11.95	1.39	0.1643
Learner_Type:LING*Task:AJT	-1.20	3.14	2385.32	-7.36	4.95	-0.38	0.7020
Learner_Type:NOEX*Task:AJT	6.16	3.57	2385.32	-0.82	13.15	1.73	0.0841

Table L.7. LMER output for T0-T1 – RQ4 (Intercept: Learner_Type:NOEX, Task:ESIT)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	3.04	2.10	77.58	-1.04	7.12	1.45	0.1514
Learner_TypeTRAD	-0.46	2.39	204.45	-5.13	4.20	-0.19	0.8465
Learner_TypeLING	7.45	2.14	214.09	3.29	11.62	3.49	0.0006
TaskAJT	-2.29	2.13	2385.32	-6.47	1.89	-1.07	0.2828
TaskFCET	-11.67	2.60	2399.02	-16.76	-6.58	-4.49	0.0000
Learner_TypeTRAD:TaskAJT	-1.20	2.98	2385.32	-7.03	4.62	-0.40	0.6862
Learner_TypeLING:TaskAJT	-1.38	2.67	2385.32	-6.61	3.85	-0.52	0.6044
Learner_TypeTRAD:TaskFCET	4.96	3.57	2385.32	-2.02	11.95	1.39	0.1643
Learner_TypeLING:TaskFCET	5.98	3.20	2385.32	-0.29	12.25	1.87	0.0618

Table L.8. LMER output for T0-T1 – RQ4 (Intercept: Learner_Type:NOEX, Task:AJT)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	0.75	2.10	77.58	-3.33	4.83	0.36	0.7227
Learner_TypeTRAD	-1.67	2.39	204.45	-6.33	3.00	-0.70	0.4870
Learner_TypeLING	6.07	2.14	214.09	1.90	10.23	2.84	0.0050
TaskFCET	-9.38	2.60	2399.02	-14.47	-4.28	-3.61	0.0003
TaskESIT	2.29	2.13	2385.32	-1.89	6.47	1.07	0.2828
Learner_TypeTRAD:TaskFCET	6.16	3.57	2385.32	-0.82	13.15	1.73	0.0841
Learner_TypeLING:TaskFCET	7.37	3.20	2385.32	1.10	13.64	2.30	0.0215
Learner_TypeTRAD:TaskESIT	1.20	2.98	2385.32	-4.62	7.03	0.40	0.6862
Learner_TypeLING:TaskESIT	1.38	2.67	2385.32	-3.85	6.61	0.52	0.6044

Table L.9. LMER output for T0-T1 – RQ4 (Intercept: Learner_Type:NOEX, Task:FCET)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	-8.63	2.57	165.43	-13.63	-3.64	-3.36	0.0010
Learner_TypeTRAD	4.50	3.10	526.31	-1.54	10.54	1.45	0.1470
Learner_TypeLING	13.44	2.77	551.39	8.03	18.84	4.85	0.0000
TaskESIT	11.67	2.60	2399.02	6.58	16.76	4.49	0.0000
TaskAJT	9.38	2.60	2399.02	4.28	14.47	3.61	0.0003
Learner_TypeTRAD:TaskESIT	-4.96	3.57	2385.32	-11.95	2.02	-1.39	0.1643
Learner_TypeLING:TaskESIT	-5.98	3.20	2385.32	-12.25	0.29	-1.87	0.0618
Learner_TypeTRAD:TaskAJT	-6.16	3.57	2385.32	-13.15	0.82	-1.73	0.0841
Learner_TypeLING:TaskAJT	-7.37	3.20	2385.32	-13.64	-1.10	-2.30	0.0215

Table L.10. LMER output for T0-T2 – RQ4 (Intercept: Learner_Type:LING, Task:ESIT)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	7.23	2.28	36.61	2.75	11.71	3.17	0.0031
Learner_Type:NOEX	-16.22	2.53	144.81	-21.16	-11.28	-6.40	0.0000
Learner_Type:TRAD	-10.77	2.75	185.23	-16.13	-5.42	-3.92	0.0001
Task:AJT	-3.90	1.66	2302.80	-7.14	-0.66	-2.35	0.0186
Task:FCET	-5.41	2.05	2316.46	-9.42	-1.40	-2.64	0.0083
Learner_Type:NOEX*Task:AJT	13.93	2.75	2302.80	8.54	19.32	5.06	0.0000
Learner_Type:TRAD*Task:AJT	7.27	2.93	2356.26	1.55	13.00	2.48	0.0131
Learner_Type:NOEX*Task:FCET	11.95	3.30	2302.80	5.48	18.41	3.62	0.0003
Learner_Type:TRAD*Task:FCET	10.75	3.43	2346.38	4.05	17.48	3.14	0.0017

Table L.11. LMER output for T0-T2 – RQ4 (Intercept: Learner_Type:LING, Task:AJT)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	3.33	2.28	36.61	-1.15	7.81	1.46	0.1524
Learner_Type:NOEX	-2.29	2.53	144.81	-7.23	2.65	-0.90	0.3680
Learner_Type:TRAD	-3.51	2.51	139.28	-8.40	1.39	-1.40	0.1648
Task:ESIT	3.90	1.66	2302.80	0.66	7.14	2.35	0.0186
Task:FCET	-1.51	2.05	2316.46	-5.52	2.50	-0.74	0.4606
Learner_Type:NOEX*Task:ESIT	-13.93	2.75	2302.80	-19.32	-8.54	-5.06	0.0000
Learner_Type:TRAD*Task:ESIT	-7.27	2.93	2356.26	-13.00	-1.55	-2.48	0.0131
Learner_Type:NOEX*Task:FCET	-1.99	3.30	2302.80	-8.45	4.48	-0.60	0.5476
Learner_Type:TRAD*Task:FCET	3.49	3.24	2302.80	-2.86	9.84	1.08	0.2821

Table L.12. LMER output for T0-T2 – RQ4 (Intercept: Learner_Type:LING, Task:FCET)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	1.82	2.58	58.86	-3.22	6.86	0.71	0.4833
Learner_Type:NOEX	-4.27	3.12	320.31	-10.35	1.81	-1.37	0.1718
Learner_Type:TRAD	-0.02	3.08	305.24	-6.03	5.99	-0.01	0.9950
Task:ESIT	5.41	2.05	2316.46	1.40	9.42	2.64	0.0083
Task:AJT	1.51	2.05	2316.46	-2.50	5.52	0.74	0.4606
Learner_Type:NOEX*Task:ESIT	-11.95	3.30	2302.80	-18.41	-5.48	-3.62	0.0003
Learner_Type:TRAD*Task:ESIT	-10.75	3.43	2346.38	-17.48	-4.05	-3.14	0.0017
Learner_Type:NOEX*Task:AJT	1.99	3.30	2302.80	-4.48	8.45	0.60	0.5476
Learner_Type:TRAD*Task:AJT	-3.49	3.24	2302.80	-9.84	2.86	-1.08	0.2821

Table L.13. LMER output for T0-T2 – RQ4 (Intercept: Learner_Type:TRAD, Task:ESIT)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	-3.54	2.85	78.85	-9.09	2.00	-1.24	0.2172
Learner_Type:LING	10.77	2.75	185.23	5.42	16.13	3.92	0.0001
Learner_Type:NOEX	-5.45	3.05	176.35	-11.40	0.50	-1.78	0.0762
Task:AJT	3.37	2.41	2364.71	-1.35	8.10	1.40	0.1628
Task:FCET	5.34	2.86	2371.59	-0.24	10.94	1.87	0.0615
Learner_Type:LING*Task:AJT	-7.27	2.93	2356.26	-13.00	-1.55	-2.48	0.0131
Learner_Type:NOEX*Task:AJT	6.67	3.27	2349.48	0.26	13.05	2.04	0.0413
Learner_Type:LING*Task:FCET	-10.75	3.43	2346.38	-17.48	-4.05	-3.14	0.0017
Learner_Type:NOEX*Task:FCET	1.19	3.84	2339.48	-6.34	8.71	0.31	0.7565

Table L.14. LMER output for T0-T2 – RQ4 (Intercept: Learner_Type:TRAD, Task:AJT)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	-0.17	2.62	57.59	-5.28	4.94	-0.07	0.9474
Learner_Type:LING	3.51	2.51	139.28	-1.39	8.40	1.40	0.1648
Learner_Type:NOEX	1.22	2.84	140.47	-4.32	6.76	0.43	0.6687
Task:FCET	1.98	2.61	2315.57	-3.14	7.09	0.76	0.4499
Task:ESIT	-3.37	2.41	2364.70	-8.10	1.35	-1.40	0.1628
Learner_Type:LING*Task:FCET	-3.49	3.24	2302.80	-9.84	2.86	-1.08	0.2821
Learner_Type:NOEX*Task:FCET	-5.47	3.68	2302.80	-12.67	1.73	-1.49	0.1368
Learner_Type:LING*Task:ESIT	7.27	2.93	2356.26	1.55	13.00	2.48	0.0131
Learner_Type:NOEX*Task:ESIT	-6.66	3.26	2349.48	-13.05	-0.26	-2.04	0.0413

Table L.15. LMER output for T0-T2 – RQ4 (Intercept: Learner_Type:TRAD, Task:FCET)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept	1.80	3.02	99.62	-4.08	7.68	0.60	0.5522
Learner_Type:LING	0.02	3.08	305.24	-5.99	6.03	0.01	0.9951
Learner_Type:NOEX	-4.25	3.49	308.48	-11.06	2.55	-1.22	0.2242
Task:ESIT	-5.34	2.86	2371.59	-10.94	0.24	-1.87	0.0615
Task:AJT	-1.97	2.61	2315.57	-7.09	3.14	-0.76	0.4499
Learner_Type:LING*Task:ESIT	10.75	3.43	2346.38	4.05	17.48	3.14	0.0017
Learner_Type:NOEX*Task:ESIT	-1.19	3.84	2339.48	-8.71	6.34	-0.31	0.7565
Learner_Type:LING*Task:AJT	3.49	3.24	2302.80	-2.86	9.84	1.08	0.2821
Learner_Type:NOEX*Task:AJT	5.47	3.68	2302.80	-1.73	12.67	1.49	0.1368

Table L.16. LMER output for T0-T2 – RQ4 (Intercept: Learner_Type:NOEX, Task:ESIT)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept	-8.99	2.64	59.54	-14.14	-3.84	-3.40	0.0012
Learner_Type:TRAD	5.45	3.05	176.35	-0.50	11.40	1.78	0.0762
Learner_Type:LING	16.22	2.53	144.81	11.28	21.16	6.40	0.0000
Task:AJT	10.03	2.20	2302.80	5.73	14.34	4.56	0.0000
Task:FCET	6.54	2.69	2315.24	1.28	11.80	2.43	0.0151
Learner_Type:TRAD*Task:AJT	-6.67	3.27	2349.48	-13.05	-0.26	-2.04	0.0413
Learner_Type:LING*Task:AJT	-13.93	2.75	2302.80	-19.32	-8.54	-5.06	0.0000
Learner_Type:TRAD*Task:FCET	-1.19	3.84	2339.48	-8.71	6.34	-0.31	0.7565
Learner_Type:LING*Task:FCET	-11.95	3.30	2302.80	-18.41	-5.48	-3.62	0.0003

Table L.17. LMER output for T0-T2 – RQ4 (Intercept: Learner_Type:NOEX, Task:AJT)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept	1.05	2.64	59.54	-4.10	6.20	0.40	0.6936
Learner_Type:TRAD	-1.22	2.84	140.47	-6.76	4.32	-0.43	0.6687
Learner_Type:LING	2.29	2.53	144.81	-2.65	7.23	0.90	0.3680
Task:FCET	-3.50	2.69	2315.24	-8.76	1.76	-1.30	0.1930
Task:ESIT	-10.03	2.20	2302.80	-14.34	-5.73	-4.56	0.0000
Learner_Type:TRAD*Task:FCET	5.47	3.68	2302.80	-1.73	12.67	1.49	0.1368
Learner_Type:LING*Task:FCET	1.99	3.30	2302.80	-4.48	8.45	0.60	0.5476
Learner_Type:TRAD*Task:ESIT	6.67	3.27	2349.48	0.26	13.05	2.04	0.0413
Learner_Type:LING*Task:ESIT	13.93	2.75	2302.80	8.54	19.32	5.06	0.0000

Table L.18. LMER output for T0-T2 – RQ4 (Intercept: Learner_Type:NOEX, Task:FCET)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	-2.45	3.06	104.71	-8.40	3.50	-0.80	0.4245
Learner_Type:TRAD	4.25	3.49	308.48	-2.55	11.06	1.22	0.2242
Learner_Type:LING	4.27	3.12	320.31	-1.81	10.35	1.37	0.1718
Task:ESIT	-6.54	2.69	2315.24	-11.80	-1.28	-2.43	0.0151
Task:AJT	3.50	2.69	2315.24	-1.76	8.76	1.30	0.1930
Learner_Type:TRAD*Task:ESIT	1.19	3.84	2339.48	-6.34	8.71	0.31	0.7565
Learner_Type:LING*Task:ESIT	11.95	3.30	2302.80	5.48	18.41	3.62	0.0003
Learner_Type:TRAD*Task:AJT	-5.47	3.68	2302.80	-12.67	1.73	-1.49	0.1368
Learner_Type:LING*Task:AJT	-1.99	3.30	2302.80	-8.45	4.48	-0.60	0.5476

Table L.19. LMER output for T1-T2 – RQ4 (Intercept: Learner_Type:LING, Task:ESIT)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	-3.26	2.00	46.25	-7.17	0.65	-1.63	0.1094
Learner_Type:NOEX	-8.77	2.43	143.02	-13.49	-4.04	-3.62	0.0004
Learner_Type:TRAD	-2.04	2.63	182.83	-7.16	3.08	-0.78	0.4384
Task:AJT	-0.22	1.58	2302.89	-3.31	2.86	-0.14	0.8878
Task:FCET	0.31	1.95	2312.65	-3.51	4.12	0.16	0.8738
Learner_Type:NOEX*Task:AJT	12.55	2.62	2302.89	7.42	17.68	4.79	0.0000
Learner_Type:TRAD*Task:AJT	6.28	2.78	2356.26	0.83	11.73	2.26	0.0241
Learner_Type:NOEX*Task:FCET	17.93	3.14	2302.89	11.78	24.08	5.71	0.0000
Learner_Type:TRAD*Task:FCET	10.97	3.26	2346.26	4.59	17.36	3.36	0.0008

Table L.20. LMER output for T1-T2 – RQ4 (Intercept: Learner_Type:LING, Task:AJT)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	-3.48	2.00	46.25	-7.39	0.43	-1.74	0.0879
Learner_Type:NOEX	3.78	2.43	143.02	-0.95	8.51	1.56	0.1213
Learner_Type:TRAD	4.24	2.40	137.65	-0.44	8.93	1.77	0.0798
Task:ESIT	0.22	1.58	2302.89	-2.86	3.31	0.14	0.8878
Task:FCET	0.53	1.95	2312.65	-3.29	4.34	0.27	0.7849
Learner_Type:NOEX*Task:ESIT	-12.55	2.62	2302.89	-17.68	-7.42	-4.79	0.0000
Learner_Type:TRAD*Task:ESIT	-6.28	2.78	2356.26	-11.73	-0.83	-2.26	0.0241
Learner_Type:NOEX*Task:FCET	5.38	3.14	2302.89	-0.77	11.53	1.71	0.0867
Learner_Type:TRAD*Task:FCET	4.69	3.08	2302.89	-1.35	10.73	1.52	0.1284

Table L.21. LMER output for T1-T2 – RQ4 (Intercept: Learner_Type:LING, Task:FCET)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	-2.95	2.30	78.94	-7.44	1.54	-1.28	0.2038
Learner_Type:NOEX	9.16	2.98	314.15	3.35	14.97	3.07	0.0023
Learner_Type:TRAD	8.93	2.95	299.51	3.19	14.67	3.03	0.0026
Task:ESIT	-0.31	1.95	2312.65	-4.12	3.51	-0.16	0.8738
Task:AJT	-0.53	1.95	2312.65	-4.34	3.29	-0.27	0.7849
Learner_Type:NOEX*Task:ESIT	-17.93	3.14	2302.89	-24.08	-11.78	-5.71	0.0000
Learner_Type:TRAD*Task:ESIT	-10.97	3.26	2346.26	-17.36	-4.59	-3.36	0.0008
Learner_Type:NOEX*Task:AJT	-5.38	3.14	2302.89	-11.53	0.77	-1.71	0.0867
Learner_Type:TRAD*Task:AJT	-4.69	3.08	2302.89	-10.73	1.35	-1.52	0.1284

Table L.22. LMER output for T1-T2 – RQ4 (Intercept: Learner_Type:TRAD, Task:ESIT)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	-5.30	2.58	104.05	-10.31	-0.29	-2.06	0.0422
Learner_Type:LING	2.04	2.63	182.83	-3.08	7.16	0.78	0.4384
Learner_Type:NOEX	-6.73	2.92	174.08	-12.42	-1.04	-2.30	0.0225
Task:AJT	6.06	2.30	2365.21	1.57	10.56	2.64	0.0083
Task:FCET	11.28	2.72	2371.39	5.97	16.60	4.16	0.0000
Learner_Type:LING*Task:AJT	-6.28	2.78	2356.27	-11.73	-0.83	-2.26	0.0241
Learner_Type:NOEX*Task:AJT	6.26	3.11	2349.38	0.18	12.34	2.02	0.0439
Learner_Type:LING*Task:FCET	-10.97	3.26	2346.26	-17.36	-4.59	-3.36	0.0008
Learner_Type:NOEX*Task:FCET	6.96	3.66	2339.34	-0.21	14.11	1.90	0.0573

Table L.23. LMER output for T1-T2 – RQ4 (Intercept: Learner_Type:TRAD, Task:AJT)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept	0.76	2.35	73.92	-3.81	5.33	0.32	0.7467
Learner_Type:LING	-4.24	2.40	137.65	-8.93	0.44	-1.77	0.0798
Learner_Type:NOEX	-0.46	2.72	138.80	-5.77	4.84	-0.17	0.8654
Task:FCET	5.22	2.48	2316.72	0.35	10.08	2.10	0.0356
Task:ESIT	-6.06	2.30	2365.21	-10.56	-1.57	-2.64	0.0083
Learner_Type:LING*Task:FCET	-4.69	3.08	2302.89	-10.73	1.35	-1.52	0.1284
Learner_Type:NOEX*Task:FCET	0.69	3.50	2302.89	-6.16	7.54	0.20	0.8434
Learner_Type:LING*Task:ESIT	6.28	2.78	2356.26	0.83	11.73	2.26	0.0241
Learner_Type:NOEX*Task:ESIT	-6.26	3.11	2349.38	-12.34	-0.18	-2.02	0.0439

Table L.24. LMER output for T1-T2 – RQ4 (Intercept: Learner_Type:TRAD, Task:FCET)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept	5.98	2.75	134.00	0.64	11.33	2.18	0.0312
Learner_Type:LING	-8.93	2.95	299.51	-14.67	-3.19	-3.03	0.0026
Learner_Type:NOEX	0.23	3.34	302.66	-6.27	6.73	0.07	0.9453
Task:ESIT	-11.28	2.72	2371.39	-16.60	-5.97	-4.16	0.0000
Task:AJT	-5.22	2.48	2316.72	-10.08	-0.35	-2.10	0.0356
Learner_Type:LING*Task:ESIT	10.97	3.26	2346.26	4.59	17.36	3.36	0.0008
Learner_Type:NOEX*Task:ESIT	-6.96	3.66	2339.34	-14.11	0.21	-1.90	0.0573
Learner_Type:LING*Task:AJT	4.69	3.08	2302.89	-1.35	10.73	1.52	0.1284
Learner_Type:NOEX*Task:AJT	-0.69	3.50	2302.89	-7.54	6.16	-0.20	0.8434

Table L.25. LMER output for T1-T2 – RQ4 (Intercept: Learner_Type:NOEX, Task:ESIT)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept	-12.03	2.37	76.78	-16.64	-7.41	-5.08	0.0000
Learner_Type:TRAD	6.73	2.92	174.08	1.04	12.42	2.30	0.0225
Learner_Type:LING	8.77	2.43	143.02	4.04	13.49	3.62	0.0004
Task:AJT	12.33	2.09	2302.89	8.23	16.42	5.89	0.0000
Task:FCET	18.24	2.55	2316.61	13.23	23.24	7.14	0.0000
Learner_Type:TRAD*Task:AJT	-6.26	3.11	2349.38	-12.34	-0.18	-2.02	0.0439
Learner_Type:LING*Task:AJT	-12.55	2.62	2302.89	-17.68	-7.42	-4.79	0.0000
Learner_Type:TRAD*Task:FCET	-6.96	3.66	2339.34	-14.11	0.21	-1.90	0.0573
Learner_Type:LING*Task:FCET	-17.93	3.14	2302.89	-24.08	-11.78	-5.71	0.0000

Table L.26. LMER output for T1-T2 – RQ4 (Intercept: Learner_Type:NOEX, Task:AJT)

	Estimate	Std. Error	df	CI:lower	CI:upper	t value	Pr(>|t|)
Intercept	0.30	2.37	76.78	-4.31	4.91	0.13	0.9000
Learner_Type:TRAD	0.46	2.72	138.80	-4.84	5.77	0.17	0.8654
Learner_Type:LING	-3.78	2.43	143.02	-8.51	0.95	-1.56	0.1213
Task:FCET	5.91	2.55	2316.61	0.91	10.91	2.32	0.0207
Task:ESIT	-12.32	2.09	2302.89	-16.42	-8.23	-5.89	0.0000
Learner_Type:TRAD*Task:FCET	-0.69	3.50	2302.89	-7.54	6.16	-0.20	0.8434
Learner_Type:LING*Task:FCET	-5.38	3.14	2302.89	-11.53	0.77	-1.71	0.0867
Learner_Type:TRAD*Task:ESIT	6.26	3.11	2349.38	0.18	12.34	2.02	0.0439
Learner_Type:LING*Task:ESIT	12.55	2.62	2302.89	7.42	17.68	4.79	0.0000

Table L.27. LMER output for T1-T2 – RQ4 (Intercept: Learner_Type:NOEX, Task:FCET)

	Estimate	**Std. Error**	**df**	**CI:lower**	**CI:upper**	**t value**	**Pr(>|t|)**
Intercept	6.21	2.79	141.51	0.80	11.63	2.23	0.0273
Learner_Type:TRAD	-0.23	3.34	302.66	-6.73	6.27	-0.07	0.9453
Learner_Type:LING	-9.16	2.98	314.15	-14.97	-3.35	-3.07	0.0023
Task:ESIT	-18.24	2.55	2316.61	-23.24	-13.23	-7.14	0.0000
Task:AJT	-5.91	2.55	2316.61	-10.91	-0.91	-2.32	0.0207
Learner_Type:TRAD*Task:ESIT	6.96	3.66	2339.34	-0.21	14.11	1.90	0.0573
Learner_Type:LING*Task:ESIT	17.93	3.14	2302.89	11.78	24.08	5.71	0.0000
Learner_Type:TRAD*Task:AJT	0.69	3.50	2302.89	-6.16	7.54	0.20	0.8434
Learner_Type:LING*Task:AJT	5.38	3.14	2302.89	-0.77	11.53	1.71	0.0867

Appendix M: List of Presentations

M.1 | Conference Presentations[27]

2020 EuroSLA 30 – Barcelona, Spain
Applying GenSLA to the Classroom: Teaching L2-English Articles and Noun Types (poster)

2020 TESOL 2020 International Convention & Language Expo – Denver, Colorado
When research meets instruction: Teaching L2 English articles and noun-types

2020 AAAL 2020 Conference – Denver, Colorado
The Intersection of ISLA & GenSLA: Accelerating Feature Acquisition & (Re)Assembly in the L2 Classroom

2019 TESOL 2019 International Convention & Language Expo – Atlanta, Georgia
Instructed SLA & Universal Grammar: Acquiring Articles & Noun Types

2019 AAAL 2019 Conference – Atlanta, Georgia
Instructed SLA of L2-English Articles & Noun Types by L1-Chinese Learners

2018 30th International Conference on Foreign/Second Language Acquisition – Szczyrk, Poland
Exploring the effects of explicit instruction on the L2 acquisition of English article and noun types

2018 Northwest Linguistics Conference 2018 – Vancouver, Canada
Instructed SLA of English articles and noun types by L1 Chinese international students

2017 MIDTESOL 2017 – Kansas City, Missouri
Linguistic Theory in the ESL Grammar Classroom

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[27] AAAL 2020, TESOL 2020, and EuroSLA 30 were all cancelled due to the COVID-19/Coronavirus pandemic. Therefore, these presentations were accepted by not presented.

2017 29th International Conference on Foreign/Second Language Acquisition – Szczyrk, Poland
Developing linguistically-informed materials for the acquisition of ESL articles & noun type distinctions

M.2 | Seminar & Roundtable Presentations

2019 5th Annual Spring Research Seminar: Research Update on Teaching & Learning in Multilingual Contexts – Universitat Internacional de Catalunya, Barcelona, Spain
Bridging the Gap: Universal Grammar in the L2 Classroom

2019 World Languages Graduate Organization's Brown Bag Lunch – University of Iowa, Iowa City, Iowa
Conducting Research in an Instructed Second Language Acquisition Environment

2018 Ongoing Research in Experimental Linguistics – University of Illinois at Urbana-Champaign, Urbana, Illinois
Instructed acquisition of L2 English articles and noun types by L1 Chinese international students

Universitat Autònoma de Barcelona