Escuela de Doctorado de la Universitat Jaume I

An Internet-delivered treatment for Flying Phobia using 360º images: a feasibility study

Sonia Mor Rodríguez

Directoras

Dra. Soledad Quero Castellano
Dra. Cristina Botella Arbona

Castelló de la Plana, Febrero 2022

Programa de Doctorado en Psicología

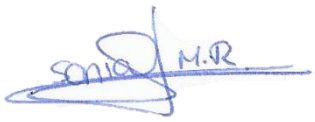
Escuela de Doctorado de la Universitat Jaume I

Un tratamiento a través de Internet para la Fobia a Volar usando imágenes 360º: Un estudio de viabilidad

An Internet-delivered treatment for Flying Phobia using 360º images: a feasibility study

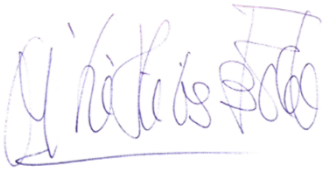
Memoria presentada por Sonia Mor Rodríguez para optar al grado de doctora por la Universitat Jaume I

Sonia Mor Rodríguez



Dra. Soledad Quero Castellano

Dra. Cristina Botella Arbona



Castellón de la Plana, diciembre de 2021

FINANCIACIÓN RECIBIDA/ FUNDING

La realización de la presente tesis doctoral ha sido posible gracias a la beca concedida por el programa VALi+d para investigadores en formación de la Generalitat Valenciana (ACIF/2018/191). Además, se ha contado con la ayuda del Ministerio de Ciencia, Innovación y Universidades (Programa Estatal I + D + i. RTI2018-100993-B-100) y el Plan 2018 de Promoción de la Investigación de la Universitat Jaume I (UJI-2018-57) para la publicación de los artículos de la presente tesis doctoral, la asistencia a congresos, comunicación de los resultados y la difusión del proyecto.

PRESENTATION

The present doctoral thesis is a compendium of four publications. Two of these publications have already been published in an indexed journal. A third one has been submitted for its publication in an indexed journal as well. The last publication is currently in preparation. Additionally, a general introduction and a general discussion of the results will be found in this thesis. The following table includes the complete references for the four publications.

Chapter 1	Mor, S., Grimaldos, J., Tur, C., Miguel, C., Cuijpers, P., Botella, C., & Quero, S. (2021). Internet-and mobile-based interventions for the treatment of specific phobia: A systematic review and preliminary meta-analysis. *Internet Interventions, 26*, 100462.
Chapter 2	Mor, S., Botella, C., Campos, D., Tur, C., Castilla, D., Soler, C., & Quero, S. (2021). An Internet-based treatment for Flying Phobia using 360° images: Study protocol for a feasibility pilot study. *Internet Interventions, 24*, 100387.
Chapter 3	Mor, S., Botella, C., Campos, D., Carlbring, P., Tur, C. & Quero, S. (2021). An Internet-based treatment for Flying Phobia using 360° images: A feasibility pilot study. *Internet Interventions* [Manuscript submitted for publication]
Chapter 4	Mor, S., Botella, C., Quero, S. (2021). Dropping out of NO-FEAR Airlines: A qualitative study. [Manuscript in preparation]

A mis padres y a mi hermana.

Por su apoyo y su confianza plena en mí.

AGRADECIMIENTOS/ACKNOWLEDGMENTS

Se me hace extraño estar escribiendo estas palabras porque era un momento que parecía que nunca llegaba y, al mismo tiempo, se ha pasado volando. Muchas personas han contribuido durante estos cinco años, consciente o inconscientemente, a que esta tesis llegara hasta el final, y me gustaría aprovechar las últimas palabras que escribo de este trabajo para darles las gracias.

En primer lugar, a mis directoras, Soledad Quero y Cristina Botella, por ofrecerme esta oportunidad y por enseñarme durante todo este proceso. A Sole quiero agradecerle en especial que siempre escuchara y considerara mis propuestas, y que tuviera en cuenta mis palabras a la hora de tomar decisiones. A Cristina, agradecerle el entusiasmo por su trabajo que contagia a las personas de su alrededor, y toda la sabiduría que transmite siempre.

A mis compañeras y compañeros de Labpsitec por acompañarme día a día y por las risas en la sala grande. A Irina y a Alba, por ser compañeras y amigas, por toda su ayuda, y por hacer los días complicados en el laboratorio algo más fáciles después de nuestras sesiones de desahogo. A Cintia por estar dispuesta siempre a echar una mano, por ser tan organizada y echarme una mano cuando yo no lo era, y por los ratos en cualquiera de nuestros despachos poniéndonos al día. A Beatriz y a Carla, por acogerme cuando llegué y por su paciencia para explicarme cómo funcionaban las cosas cuando yo estaba perdida.

A mis amigas, por todo su cariño y por creer en mí en los momentos en los que yo no lo hacía, incluso en la distancia y en diferentes puntos del planeta. A Sandra, Isabel, y Cristina, por estar ahí desde hace más de 10 años, por nuestras sesiones por Skype y porque da igual el tiempo que pase, cuando nos volvemos a ver sigue todo igual. A Julieta y a Al, por los audios hablando de cualquier cosa cuando ninguna quería trabajar y por sacarme de los bucles. A Alba, por estar siempre dispuesta a escucharme. A Aino y a Tania, por ser tan atentas y porque nunca les faltaban unas palabras de ánimo. A Nico, por sus consejos y por los bubble teas. A Fraser y a Alex, por hacer mi estancia en Suecia tan especial.

Gracias infinitas a mi familia. A mis padres y a mi hermana, porque siempre han confiado en mí, porque nunca han cuestionado mis decisiones, porque siempre me han dado libertad para hacer lo que creyera que era lo mejor, y por hacerme sentir que era capaz de conseguir todo lo que me propusiera. A Juan, que ya es parte también de la familia, por siempre ofrecerse a ayudar de forma genuina.

Finalmente, me gustaría agradecer a todas las personas que han participado en este estudio y, sin las cuales, esto no hubiera sido posible. He aprendido de cada una de ellas y espero que pronto puedan volar muy lejos.

Without even thinking about it, I used to be able to fly. Now I'm trying to look inside myself and find out how I did it.

(Kiki's Delivery Service)

INDEX

INDEX OF TABLES

INDEX OF FIGURES

ABSTRACT

Specific Phobia (SP) is under the category of anxiety disorders in the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-5*) and it is defined as a disproportionate fear or anxiety reaction about a specific object or situation. Flying Phobia (FP) is a situational subtype of this problem. FP can cause serious interference in the person's life, affecting personal relationships, leisure time, professional opportunities or, overall, having an impact in different important life areas. A considerable proportion of the general adult population report a clinical or subclinical fear of flying.

Exposure to the phobic stimuli has been long established as the treatment of choice for SP but, in the case of FP, it is not always a feasible option for the patient or the therapist. Alternative procedures to carry out the exposure and reach more people in need of help have been explored. In this regard, Internet-delivered Cognitive Behavioural Treatments (ICBTs) might play a fundamental role. Research on ICBTs has been conducted for a wide range of disorders, but in the case of SP, research has been scarce in comparison to other anxiety disorders and there is still more to be explored regarding the characteristics of exposure scenarios, such as the role of sense of presence and reality judgment.

The aim of the present thesis is to contribute to the knowledge of ICBTs for SP. The thesis consists of four chapters. In *Chapter 1*, a systematic review and preliminary meta-analysis of ICBTs and mobile-delivered interventions for SP is presented. *Chapter 2* presents the study protocol of the feasibility study to include 360º images in the online exposure scenarios of NO-FEAR Airlines, an ICBT for FP. *Chapter 3* presents results for the feasibility study as well as potential effectiveness of the intervention and sense of presence and reality judgment results of the different type of images. Finally, *Chapter 4* consists of a qualitative study about participants' reasons for dropping out of NO-FEAR Airlines intervention.

First, results of the systematic review and preliminary meta-analysis show that there are effective ICBT and mobile-delivered interventions to reduce the symptoms of

FP. Second, results of the feasibility study show that participants' opinion and acceptance of 360º images in the exposure scenarios is positive and that they prefer them over still images. Additionally, potential effectiveness results show that NO-FEAR Airlines reduces clinical symptomatology compared to a waiting list control group. Finally, participants who dropped out of the intervention reported the lack of emotional arousal as the most common reason and referred that they would have liked to see more immersive scenarios.

RESUMEN

La Fobia Específica (FE) se incluye en la categoría de trastornos de ansiedad en la quinta edición del Manual Diagnóstico y Estadístico de los Trastornos Mentales (DSM-5), y se define como una reacción desproporcionada de miedo o ansiedad relacionada con un objeto o situación específicos. La Fobia a Volar (FV) se clasifica como un subtipo situacional de este trastorno. La FV puede causar graves interferencia en la vida de la persona, afectando a las relaciones personales, el tiempo libre, las oportunidades profesionales o, en general, teniendo un impacto en diferentes áreas importantes de la vida de la persona. Una proporción considerable de la población general adulta informa de miedo clínico o subclínico a volar.

La exposición al estímulo fóbico se ha establecido desde hace mucho tiempo como el tratamiento de elección para la FE pero, en el caso de la FV, no siempre es una opción viable para el paciente o el terapeuta. Se han explorado opciones alternativas para llevar a cabo la exposición y llegar también a más personas que necesitan ayuda psicológica. En este sentido, los Tratamientos Cognitivos Conductuales a través de Internet (ICBT en sus siglas en inglés) podrían jugar un papel fundamental en esta tarea. Se ha estudiado la efectividad de los ICBT en una amplia gama de trastornos, pero en el caso de FE, la investigación ha sido escasa en comparación con otros trastornos de ansiedad y aún queda mucho que investigar sobre las características que tienen que presentar los escenarios de exposición, así como el papel del sentido de presencia y juicio de realidad.

El objetivo de la presente tesis es contribuir al conocimiento de las ICBT para FE. La tesis consta de cuatro capítulos. En el *Capítulo 1*, se presenta una revisión sistemática y un metaanálisis preliminar de las ICBT y las intervenciones a través de dispositivos móviles para la FE. El *Capítulo 2* presenta el protocolo de estudio de viabilidad para incluir imágenes de 360º en los escenarios de exposición *online* de SIN MIEDO Airlines, un ICBT para la FV. El *Capítulo 3* presenta los resultados del estudio de viabilidad, así como la efectividad potencial de la intervención y los resultados de sentido de presencia y juicio de realidad de los diferentes tipos de imágenes. Finalmente, el *Capítulo 4* consiste en un estudio cualitativo sobre las razones de los participantes para abandonar la intervención de SIN MIEDO Airlines.

En primer lugar, los resultados de la revisión sistemática y el metaanálisis preliminar muestran que existen intervenciones ICBT y a través de dispositivos móviles efectivas para reducir los síntomas de la FE. En segundo lugar, los resultados del estudio de viabilidad muestran que la opinión y aceptación de los participantes de las imágenes de 360º en los escenarios de exposición es positiva, y que las prefieren a las imágenes fijas. Además, los resultados de eficacia potencial muestran que SIN MIEDO Airlines reduce la sintomatología clínica en comparación con un grupo de control lista de espera. Por último, los participantes que abandonaron la intervención informaron la falta de arousal emocional como la razón más común para el abandono, y refirieron que les hubiera gustado ver escenarios más inmersivos.

GENERAL INTRODUCTION

According to the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (*DSM-5*; American Psychiatric Association, 2013), Specific Phobia (SP) is under the category of anxiety disorders and it is defined as a disproportionate fear or anxiety reaction about a specific object or situation. The core features to establish the diagnosis of SP are: (1) the intense fear/anxiety is always circumscribed to the phobic stimulus; (2) the person avoids the phobic stimulus or experiences great distress when confronted with it; and (3) the fear/anxiety is out of proportion to the actual danger of the phobic object or situation. As other mental disorders, this problem must be maintained over time (more than 6 months) and cause significant impairment in the person's life. The DSM-5 also specifies different subtypes of phobia based on the nature of the phobic stimulus: animal, natural environment, blood-injection-injury, situational or other.

In terms of prevalence, recent epidemiological data including low-, middle- and high-income countries (Wardenaar et al., 2017) show that SP presents an average lifetime prevalence of 7.4%, meaning that a considerable amount of people suffer from this problem. However, some things need to be considered to interpret that number, such as the differences in prevalence among countries, with high-income countries reporting a higher lifetime prevalence of the disorder; and gender, with women presenting higher prevalence than men, a consistent finding over time across different studies (Eaton et al., 2018; Haro et al., 2006; LeBeau et al., 2010). Comorbidity is also relevant in SP since the vast majority of people suffering from this problem reported a lifetime history of two or more fears (Brown et al., 2001; Curtis et al., 1998) and, people with SP are at increased risk of developing other mental disorders (APA, 2013; Trumpf et al., 2010). Furthermore, individuals with SP have been reported to have a higher probability to suffer from physical problems such as heart diseases, respiratory diseases, or gastrointestinal problems among others (Witthauer et al., 2016).

As stated before, the DSM-5 includes a specifier with different SP subtypes depending on the phobic stimulus and, being Flying Phobia (FP) a situational phobia subtype. People suffering from FP have anxiety or fear of stimuli related to flying situation, especially to the possible "external dangers" that can occur in this situation,

such as an accident, a mechanical problem with the airplane or threatening weather conditions, among others (Wilhelm & Roth, 1997). Being inside of an airplane can be a potential problematic situation for other psychological problems as well, but it does not always have to do with FP. For example, someone can be afraid of taking a flight because the airplane is an enclosed space, but this fear is not only limited to flights, and it appears in other enclosed situations as well (claustrophobia); or a flight can be another one of the situations where someone could be afraid of not being able to get help in case that something happened to them (agoraphobia). Therefore, it is important to understand the clinical features of FP to establish a proper diagnosis and administer an adequate psychological treatment.

FP can cause serious interference in a person's life, affecting personal relationships, leisure time, professional opportunities or, overall, having an impact in different important life areas (Foreman et al., 2006; Medialdea & Tejada, 2005). In some cases, the fear of flying can be remarkably incapacitating, causing emotional distress to patients with FP long before they find themselves inside the plane; anticipatory anxiety can play an important role in this problem appearing when patients have to buy a plane ticket, arrange a trip or with the mere thought of flying (Bor, 2007). This negative emotional response leads to a behavioral response of avoidance, that can take the form of not flying at all or flying when required with great distress, using safety behaviors such as choosing a specific seat or asking questions to the airline employees to reduce the anxiety that they experience (Oakes & Bor, 2010). There is also evidence about the use of alcohol or medication to help manage those symptoms when they fly (Wilhelm & Roth, 1997). All of the above contributes to the failure to disconfirm the irrational belief about the danger of the situation and maintain the problem (Clark & Rock, 2016) .

Up to 13% of the general adult population report a subclinical fear of flying (Eaton et al., 2018). Regarding prevalence of people meeting FP diagnosis criteria, the same cross-national epidemiological study cited before (Wardenaar et al., 2017) reports a FP lifetime prevalence of 1.3%, being the phobia subtype with the greatest difference between low- and high-income countries, with a three times higher prevalence in the latter. Interestingly, despite presenting the lowest prevalence compared with other SP subtypes, FP had the highest rate of treatment use, perhaps due to the increased need of taking flights nowadays and the difficulty to avoid this situation in certain cases, which makes clear the need of having evidence-based treatments to help people suffering from this

problem. Even at subclinical levels, this flying anxiety can have an impact in a person's life, which also justifies the need for a psychological intervention (Oakes & Bor, 2010).

Treatment

Exposure to the phobic stimuli has been long established as the treatment of choice for SP (Marks, 1987), and research through the years has supported *in vivo* exposure as the most effective intervention for this disorder (Choy et al., 2007; Wolitzky-Taylor et al., 2008). Although having proved to be the most effective approach, *in vivo* exposure to the phobic stimuli is not always a viable option for the patient or the therapist. That is the case of FP, where taking a flight is not always possible due to economic reasons (plane tickets can be expensive), time reasons (the previous process of taking a flight and the flight itself can entail a considerable amount of time), or availability reasons (some areas do not count with nearby airports), among others.

Alternative procedures to carry out the exposure and overcome these complications have also been explored. For example, imaginal exposure is one of the alternatives that therapists have used to treat phobias when real exposure was not feasible, and it has also shown to produce fear reduction (Baker et al., 1973; Hoppe et al., 2021), including FP symptomatology (Rus-Calafell et al., 2013), however, some people have difficulties picturing certain scenarios or stimuli in their minds, and this complicates the exposure process.

Information and Communications Technology (ICTs) have helped with some of these issues and have offered new possibilities in psychological treatments. Virtual Reality Exposure Therapy (VRET) became another alternative to *in vivo* exposure in the treatment of SP since it offers considerable advantages to the clinician to carry out the exposure therapy such as more control over the phobic stimuli or being able to deliver the treatment in their office, with the benefits on the confidentiality of the patient that this ensues. Many studies have been conducted through the years in this field and VRET has shown comparable results with *in vivo* exposure in the treatment of SP (Botella et al., 2017; Wechsler et al., 2019) and seems to be more accepted by patients than traditional exposure (Garcia-Palacios et al., 2007). This alternative has also been very popular for FP, as a result of the difficulties to access the phobic stimulus previously explained, and results of different studies over the years have shown its effectiveness reducing FP

symptomatology (Botella et al., 2004; Cárdenas et al., 2016; Czerniak et al., 2016; da Costa et al., 2008; Riva et al., 2001; Rothbaum et al., 2006).

Although in recent years VRET equipment has become more affordable, some professionals are still reluctant about its use. A simpler and more economical alternative to deliver exposure therapy can be computer-assisted exposure interventions, in which images and sound related to the phobic stimulus are presented through a computer screen in order to overcome the feared situation. A treatment program with these characteristics exists for FP (Tortella-Feliu et al., 2008) and it has showed similar results to VRET in reducing fear of flying (Tortella-Feliu et al., 2011).

These alternatives to deliver traditional treatment have helped to expand the knowledge of the field of psychological interventions, but they are still heavily based in the dominant face-to-face individual model (Kazdin, 2015) and, taking into consideration the rates of people who do not receive psychological help, the disability caused by mental health conditions, and the raise of psychological problems (World Health Organization, 2017), there is still much that can be done to move forward and reach all people in need.

Internet-delivered interventions

New ways of delivering psychological treatment were proposed a decade ago to reduce the burden of mental illnesses and decrease the treatment gap (Kazdin & Blase, 2011), and, in this task, Internet-delivered Cognitive Behavioural Treatments (ICBTs) might play a fundamental role. It is important to note that there has been a lack of a common terminology for treatments delivered through the Internet, which has had consequences for the research on this field and makes difficult the synthesis of findings (Smoktunowicz et al., 2020). Taking this into consideration, the term "ICBT" will be used in the present thesis since this terminology has been used in recent research (i.e. Karyotaki et al., 2018; Titov et al., 2018).

ICBTs have a great potential in facilitating the access to psychological treatments because they bring the intervention to people's homes, breaking geographical constraints which are a barrier to mental health services accessibility (López-Lara et al., 2012), especially in rural areas (Brenes et al., 2015). Besides the geographical aspect, ICBTs also present other advantages, such as cost-effectiveness, faster therapist support or

enhancing learning and retention in the patients, since they can return to the program at their convenience (Andersson & Titov, 2014).

Research in ICBTs has been conducted for a widely range of disorders, such as depression, PTSD, or somatic disorders, among others (Carlbring et al., 2018; Karyotaki et al., 2017, 2018; Kuester et al., 2016). ICBTs have also been developed and studied for different anxiety disorders, and they have shown acceptance by patients and comparable results to face to face treatments (Andersson & Titov, 2014; Andrews et al., 2018; Arnberg et al., 2014; Olthuis et al., 2016). However, in the case of SP, research in this field has been scarce in comparison to other anxiety disorders, where there are already published systematic reviews and meta-analysis about the effectiveness of these interventions (Domhardt et al., 2020; Kampmann et al., 2016; Richards et al., 2015).

One of the first works in the treatment of SP through ICBTs was a series of cases to treat small animal phobia (Botella et al., 2008). Since it was one of the earlier works, the treatment was delivered using an Intranet, but the patients went to a room with a computer in the clinic and completely self-applied the program, only asking help to the clinician if they had problems. This study showed promising results and participants showed an improvement in all clinical measures with changes that were maintained at 3-month follow-up.

SP has been included along with other disorders in some ICBTs. An early study for phobic and panic disorders (Schneider et al., 2005), a work conducted with a sample of phobic outpatients, including SP, Social Anxiety and Agoraphobia (Kok et al., 2014), or a more recent study of a transdiagnostic intervention for people with panic disorder and phobias (Schröder et al., 2017). Regarding studies conducted only with participants with SP, there are some pre-post studies without a control group delivering ICBT for children with SP (Vigerland et al., 2013), children and adolescents with dental anxiety (Shahnavaz et al., 2018), or spider phobia (Matthews et al., 2011, 2012). As for Randomized Controlled Trials (RCT), two studies were conducted in Sweden for the treatment of spider and snake phobia (Andersson et al., 2009, 2013), both compared with an active treatment control group, and showing in their results an improvement in the clinical measures in the ICBT group.

A third RCT can be found in literature for SP, in this case, an intervention for FP. NO-FEAR Airlines is and ICBT developed by our research group and, to our knowledge,

this is the only ICBT aimed for FP to date. NO-FEAR Airlines is a CBT-based internet intervention delivered through the Internet that includes different images and sounds of situations related to the flying process to help the patient to carry out the exposure in their homes, and where different levels of guidance can be used. This ICBT has shown its effectiveness in a recent published study (Campos et al., 2019) where two experimental conditions, a self-applied group, and a group with therapist support, were compared to a waiting list control group. In this study, the group with therapist support received a brief weekly call encouraging them to continue with the program and checking for any problems but no therapeutic content was provided, while the self-applied group only had contact with the therapist during the assessments before and after completing the program. The results showed an improvement in the clinical measures in both experimental conditions with large effect sizes compared to the control group. No differences were found between the groups with or without therapist support. In this study, only still photographs were used to deliver the exposure, and factors like the role of the degree of immersion these images could produce was not explored.

Sense of presence and reality judgement

Sense of presence is defined as the sense of being in a virtual environment (Steuer, 1992). Sense of presence is an important factor to consider when exposure therapy is delivered using ICTs; as explained before, when the exposure is carried out through a virtual environment, it "replaces" the real situation with the aim to elicit the same or a similar response that the person would have if they did the exposure to the real feared object. For this reason, this construct has been widely studied in the context of VRET (Baños et al., 2000; Diemer et al., 2015; Krijn et al., 2004; Ling et al., 2014; Price & Anderson, 2007; Riva et al., 2007; Robillard et al., 2003).

Immersion is another concept that is related but should not be confused with sense of presence. Immersion has to do with the technology, that is, with the quantity and quality of the sensory data (Slater et al., 1994), while sense of presence is a subjective experience. Although it was suggested that presence increased when technology was more immersive (Slater & Wilbur, 1997), later research proposed that there were more factors to take into consideration in this relationship (Gromer et al., 2019; Kwon et al., 2013; Ling et al., 2014; Riva et al., 2007). Literature suggests that there is a link between presence and emotions, resulting in a bidirectional relationship between the two. That means that, when a VRET scenario engages with emotions, the sense of presence

increases but, at the same time, presence is a significant predictor of emotional responses in virtual scenarios (Gromer et al., 2019; Riva et al., 2007). Furthermore, research with participants suffering clinical symptoms revealed that the level of anxiety that participants experienced with high and medium levels of immersion did not differ (Kwon et al., 2013).

Therefore, the relationship seems to be more complex than it was originally thought but, at least in the case of VRET, it has been suggested that although immersive technology is not the only variable that explains presence, it can reduce the "noise" from other factors (such as individual differences) and help to create a stronger link between presence and anxiety (Ling et al., 2014). In this line, a meta-analysis exploring the effects of immersion in user's presence concluded that factors like user-tracking, stereoscopic visuals, and wider fields of view of visual displays had more impact in presence than having higher quality of visual and auditory stimuli (Cummings & Bailenson, 2016). Other authors have also put emphasis on the importance of wider field of views (Zikic, 2007), and 360º panoramas could be useful since, compared to still images, they can evoke more similar cognitive and emotional responses to the ones experienced in the real physical environment that they recreate (Higuera-Trujillo et al., 2017). Lastly, a direct relationship between sense of presence and treatment outcomes has not been found (Price et al., 2011; Price & Anderson, 2007; Tardif et al., 2019).

On the other hand, reality judgment, defined as the extent to which an experience is acknowledged as real in terms of the willingness to interpret the virtual experience as veridical (Baños et al., 2000), has been poorly studied so far. One of the reasons for this could be that sense of presence and reality judgment are very closed and related concepts, but differences between the two exist. Baños et al. (2000) also propose that the difference between these two constructs is clear when we consider that both of them are not necessary in every virtual scenario. For example, in a virtual environment designed to give distraction to burned patients, presence is needed but an experience of reality might not be as important. However, in virtual environments designed for the treatment of phobias, both variables might be important. It has been suggested that reality judgment is a multidimensional construct that could not only be influenced by the characteristics of the virtual environment or the technology, but also by psychological factors (Baños et al., 1999) but, as previously said, the research on this field has been very scarce.

Studies about sense of presence and reality judgment have been conducted in VRET (i.e., Tardif et al., 2019; Cummings & Bailenson, 2016; Ling et al., 2014; Baños

et al., 2000) but, to the best of our knowledge, these variables have not been studied in exposure scenarios delivered through ICBTs.

AIMS OF THE THESIS

General aims

The present doctoral thesis has several main objectives. The first is to conduct a systematic review and preliminary meta-analysis of the published works about Internet- and mobile delivered interventions for the treatment of SP. The second is to conduct a feasibility pilot study with NO-FEAR Airlines ICBT using two types of images in the exposure scenarios (still images vs 360◦ navigable images) in order to explore the acceptance of the different images by patients with FP and the impact that these images may have, expanding the knowledge about exposure scenarios in ICBTs. Finally, as a third aim, a qualitative study about participants' reasons for dropouts will also be conducted.

Specific aims:

I. To conduct a systematic review and preliminary meta-analysis on Internet- and mobile delivered interventions for the treatment of SP, providing a synthesis of the characteristics of the available interventions to date and conducting a preliminary analysis of their effectiveness.

II. To assess participants' opinions, satisfaction, preference, and acceptance of navigable and still images in the exposure scenarios.

III. To assess the potential effectiveness of two experimental groups (NO-FEAR Airlines with still images and NO-FEAR Airlines with still and navigable images) compared to a waiting list control group in clinical measures of FP.

IV. To evaluate if the changes after the treatment are maintained in the follow-up periods (3 and 12 months).

V. To explore the role of navigable images compared to the still images in the level of anxiety, sense of presence, and reality judgement in the exposure scenarios and whether the aforementioned variables mediate in treatment efficacy.

VI. To analyze the reasons for dropouts from the study among participants who withdraw from it.

HYPOTHESES OF THE THESIS

The main hypothesis of the thesis states that both treatment conditions will be well accepted by the participants, but participants will prefer 360◦ images over still images.

Since this is a feasibility study, hypotheses for specific aims III, IV and V are not appropriate. For the rest of specific aims (I and VI), no hypotheses are established since they are exploratory objectives.

CHAPTER 1

SYSTEMATIC REVIEW AND PRELIMINARY META-ANALYSIS

This chapter has been published as:

Mor, S., Grimaldos, J., Tur, C., Miguel, C., Cuijpers, P., Botella, C., & Quero, S. (2021). Internet-and mobile-based interventions for the treatment of specific phobia: A systematic review and preliminary meta-analysis. *Internet Interventions*, *26*, 100462.

Internet- and mobile-based interventions for the treatment of Specific Phobia: A systematic review and preliminary meta-analysis

Sonia Mor[1], Jorge Grimaldos[1], Cintia Tur[1], Clara Miguel[2], Pim Cuijpers[2], Cristina Botella[1,3], & Soledad Quero[1,3]

[1]Department of Basic, Clinical Psychology and Psychobiology, Universitat Jaume I, Castellón, Spain.

[2]Department of Clinical, Neuro and Developmental Psychology, Amsterdam Public Health Research Institute, Vrije Universiteit Amsterdam, the Netherlands

[3]CIBER de Fisiopatología de la Obesidad y Nutrición (CIBEROBN), Carlos III Institute of Health, Madrid, Spain.

ABSTRACT

Internet- and mobile-based interventions (IMIs) are being developed for a wide range of psychological disorders and they showed their effectiveness in multiple studies. Specific phobia (SP) is one of the most common anxiety disorders, and research about IMIs for SP treatment has also been conducted in recent years. The aim of this paper was to conduct a systematic review and preliminary meta-analysis exploring IMIs for the treatment of SP. A comprehensive search conducted in five different databases identified 9 studies (4 pre-post studies, 5 randomized controlled trials) with 7 Internet-based interventions and 2 mobile-based interventions. Results showed that exposure was the main component of all interventions, and that animal phobia was the most common subtype. Samples included children, adolescents, and adults. A preliminary meta-analysis of the included studies showed that participants receiving IMIs experienced a significant reduction of SP symptoms from pre- to post-treatment (g= 1.15). This systematic review found that there is already some evidence in the literature supporting the potential benefits of IMIs for SP. However, the number of studies included is small and more research should be carried out in the field.

Keywords: Specific phobia; Internet-based treatments; Mobile-based treatments; Systematic review; Meta-analysis

1. INTRODUCTION

Specific Phobia (SP) is one of the most common anxiety disorders, with an estimated lifetime prevalence of up to 7% (Eaton et al., 2018). Although it can be considered a less severe problem compared to some other psychological disorders, people suffering from SP report severe impairment in different domains of their lives (Wardenaar et al., 2017). It has also been associated with a higher probability of developing another anxiety disorder (Trumpf et al., 2010) and physical problems, such as cardiac, respiratory, or gastrointestinal diseases (Witthauer et al., 2016). Taking all of this into consideration, there is a clear need to offer evidence-based psychological treatments for this problem.

Fortunately, the treatment of choice for SP, exposure therapy, has been well-established for decades (Marks, 1987). Furthermore, its mechanisms and how to improve its effectiveness have been studied and discussed over the years (Böhnlein et al., 2020; Craske et al., 2014; Sewart and Craske, 2019). Traditionally, *in vivo* exposure was the approach clinicians used to deliver treatment for SP, but as technology advanced, research explored other ways to carry out exposure therapy. This is the case of Virtual Reality Exposure Therapy (VRET), which rapidly became a popular alternative for treating SP because it helped to overcome some of the limitations of *in vivo* exposure. VRET also presents some advantages for both the patient and the clinician, such as being able to deliver the treatment in the clinician's office. Many studies have been conducted in this field, and VRET has shown comparable results to *in vivo* exposure (Botella et al., 2017; Wechsler et al., 2019).

Despite the evidence supporting exposure-based treatments, there are still barriers to their dissemination (Neudeck and Einsle, 2012). Following the guidelines for new ways to provide treatment to those in need of psychological help (Kazdin and Blase, 2011), the Internet became a new alternative to traditional face-to-face treatments. Internet-based interventions have been created, and their effectiveness has been shown for a wide range of psychological disorders, such as depression (Karyotaki et al., 2018, 2017), PTSD (Kuester et al., 2016; Lewis et al., 2018), or even somatic disorders (Carlbring et al., 2018; van Beugen et al., 2014) among others. Internet interventions for the treatment of anxiety disorders have also been widely studied, showing comparable results to face-to-face treatment and acceptance by patients (Andersson and Titov, 2014; Andrews et al., 2018; Arnberg et al., 2014; Kelson et al., 2019; Olthuis et al., 2016). In the case of SP, a self-

help treatment with virtual reality components using the Intranet was used to treat animal phobia and showed promising results (Botella et al., 2008).

In recent years, with the further development of technologies, new options have been suggested to deliver psychological treatments in people's homes. This is the case of mobile-based interventions, which have shown evidence of reducing anxiety symptoms (Firth et al., 2017) and have been found to be well-accepted by patients (Menon et al., 2017). These new options have also made VRET more accessible by developing, for example, affordable head-mounted displays to use with smartphones (Kato and Miyashita, 2015), providing the opportunity to deliver mobile-based treatments using virtual reality in people's homes (Stupar-Rutenfrans et al., 2017). However, there is a lack of research and validation of many mental health apps, with only a limited number being evidence-based interventions (Miralles et al., 2020), and so there is a clear need for further research in this field.

Although still scarce, some research has been carried out in the field of Internet- and mobile-based interventions (IMIs) for SP. The aim of this paper is to conduct the first systematic review exploring IMIs in the field of SP, synthesizing the characteristics of the different interventions and their treatment outcomes.

2. METHOD

The present study was carried out following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Moher et al., 2009), was registered in the Open Science Framework (OSF) and was made public with the following ID: osf.io/g5x6y.

2.1. Inclusion and exclusion criteria

Studies were included if they met the following criteria: (1) Participants in the study were children, adolescents, or adults who had a diagnosis of SP or presented high scores on self-report measures for phobia; (2) The intervention was focused on SP, or SP was one of the disorders treated in the study, but specific data for SP were reported; (3) The psychological intervention was delivered through the Internet or mobile phone. The intervention could include virtual reality components; (4) Studies had to contain at least

pre- and post-treatment measures of phobic symptomatology (randomized and non-randomized).

Studies where the sample had a diagnosis of social anxiety or agoraphobia and studies with a face-to-face component of the intervention were excluded from this review.

2.2. Information sources and searches

Searches were conducted in PubMed, PsycINFO, Web of Science, SCOPUS, and Cochrane to identify relevant studies published prior to December 2020. There were no exclusion criteria regarding the year of publication of the study or the language in which it was written. Due to the different terminology used in publications, variations of the terms "Internet-based treatment", "mobile-based treatment", and "phobia" were included in the search, combined with Boolean operators using "AND" and "OR". In addition, we included some common terms related to phobia, such as "dental anxiety", "claustrophobia", and "acrophobia" because we are aware that they are used in some papers in the field of SP. The complete search strings are included in the Appendix A. The references of included studies and similar recent systematic reviews were also inspected to identify additional studies that might have been missed in the search.

2.3. Study selection

After carrying out the searches in the different databases and removing duplicates, two independent researchers (SM and JG) examined the titles and abstracts of the studies to select the records that potentially met the inclusion criteria. Differences in the selected studies and doubts were discussed with a third reviewer (SQ). Full texts of the selected studies that appeared to meet the inclusion criteria and those that were in doubt due to insufficient information in the title or abstract were retrieved and reviewed independently by two researchers (SM and JG) to confirm that they were suitable for the current review.

2.4. Study quality assessment

The quality of the studies included in this review was assessed using The Study Quality Assessment Tools from the National Heart Lung and Blood Institute (NHLBI; https://www.nhlbi.nih.gov/health-topics/study-quality-assessment-tools). This tool was chosen because the present systematic review aimed to explore any type of study that has been published for the treatment of SP using IMIs. The NHLBI includes specific criteria

to assess six types of study designs. The studies' quality can be rated as "good", "fair", or "poor" after answering the different questions established depending on the study design. Two reviewers (SM and CT) independently rated the studies included in this paper using the assessment for "controlled intervention studies" and "before and after studies with no control group". Disagreements were discussed with a third reviewer (SQ).

2.5. Data synthesis

Firstly, for all the included studies, data about the study design, sample, characteristics of the intervention, and treatment effects in terms of SP symptom reduction were independently extracted from the publications and narratively synthesized. The data extracted by the researchers were compared and discussed with a third researcher if discrepancies were found.

For all the included studies (randomized and pre-post studies), within-group effect sizes were calculated to estimate symptom reduction from pre- to post-treatment. These effect sizes were computed as Hedges' *g*, assuming a pre-post correlation of 0.7. Sensitivity analyses using alternative pre-post correlations were conducted. A preliminary meta-analysis was conducted by pooling within-group effect sizes with a random-effects model, using a restricted maximum-likelihood estimator (Viechtbauer, 2005) and the Hartung-Knapp-Sidik-Jonkman (HKSJ) method (IntHout et al., 2014). Heterogeneity was explored with the I^2 statistic and its 95% confidence interval. We conducted subgroup analyses based on type of design (randomized vs pre-post studies) with a mixed-effects model. Publication bias was explored through Egger's test of the intercept and a funnel plot. Because the number of studies was too small, we did not conduct additional analyses.

Additionally, for the subset of randomized controlled trials (RCTs), we computed between-group effect sizes as standardized mean differences (Hedges' *g*) at post-test. We pooled these effect sizes using the same meta-analytical procedures.

3. RESULTS

3.1. Search results

Figure 1 shows the Flow diagram for the study. Initially, 819 studies were identified upon completion of the search in the different electronic databases. Duplicates were removed, leaving a total of 421 papers that were examined. Finally, 29 full-text papers were retrieved and, after reading them independently and excluding studies that did not meet the inclusion criteria, a total of nine studies were included in the current systematic review. Reasons for exclusion after reading the full text articles were: participants not having diagnosis or elevated symptoms of SP (n=4), face-to-face component was present in the intervention (n=2), no treatment outcomes reported for SP (n=8), not a treatment study (n=2), and other type of publication (n=4).

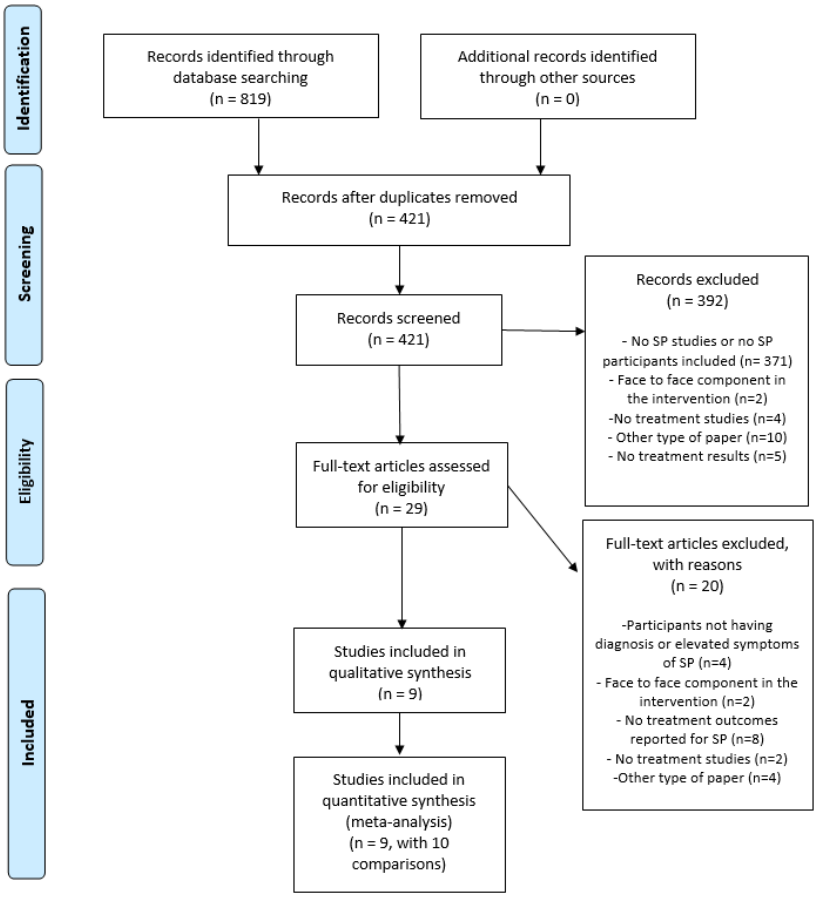


Fig. 1. Flow diagram for the systematic review

3.2. Participants

Table 1 shows selected characteristics of the participants in each study. Overall, participants' mean ages ranged from 9.9 to 41.3 years, with a mean age of 33.58 years across the studies, except for one study (Matthews et al., 2012) where the mean age was not reported. Six studies (66.7%) involved adults suffering from SP, two studies included

children or adolescents (22.2%), and one study admitted participants of any age. Almost all the studies had a majority of women participants, and one of them (Matthews et al., 2011) only included female participants in its sample.

Table 1. Participant and study characteristics.

Study	Country	Study type	Population	N	Age M (SD)	Women (%)	Phobia subtype
Donker et al. (2019)	The Netherlands	RCT	Adults	Total: 193 IG: 96 CG: 97	41.32 (13.67)	65.83	Acrophobia
Campos et al. (2019)	Spain	RCT	Adults	Total: 69 IG 1: 23 IG 2: 23 CG: 23	36.43 (10.23)	72.47	Flying Phobia
Andersson et al. (2009)	Sweden	RCT	Adults	Total: 27 IG: 13 CG: 14	25.6 (4.1)	84.8	Spider phobia
Shahnavaz et al. (2018)	Sweden	Pre-post	Children and adolescents	Total: 18 IG: 18	11 (2)	61	Dental phobia
Andersson et al. (2013)	Sweden	RCT	Adults	Total: 26 IG: 13 CG: 13	27.2 (8.1)	84.6	Snake phobia
Vigerland et al. (2013)	Sweden	Pre-post	Children	Total: 30 IG: 30	9.9 (1.4)	57	Specific phobia (various types)
Matthews et al. (2011)	Australia	Pre-post	Adults	Total: 17 IG: 17	38 (12)	100	Spider phobia
Matthews et al. (2012)	Australia	Pre-post	All ages	Total: 351 IG 1: 176 IG 2: 124	Not referred.	53	Spider phobia
Arias et al. (2020)	USA	RCT	Adults	Total: 36 IG 1: 18 CG 2: 18	26.15 (11.25)	61.1	Dental phobia

RCT: Randomized Controlled Trial; IG: Intervention Group; CG: Control Group

As for participants' diagnosis, the studies usually addressed one type of SP, and only one study (Vigerland et al., 2013) accepted participants with different types of fears

as long as they met the diagnostic criteria for SP. Related to this, the recruitment method in 66.7% (n =6) of the papers was a diagnostic interview, whereas the remaining studies recruited participants based on questionnaire scores. The subtypes of SP were animal phobia (spider phobia n=3; snake phobia n=1), situational phobia (flying phobia n=1; dental phobia n=2), and natural environment phobia (acrophobia n=1). In the study by Vigerland et al. (2013), which included children with various types of phobias, the sample presented claustrophobia (23%), darkness phobia (40%), acrophobia (13%), animal phobia (47%), and blood injury and injection phobia (10%). Comorbidity with other disorders was only mentioned in three papers (Campos et al., 2019; Shahnavaz et al., 2018; Vigerland et al., 2013), which meant that participants could present other types of phobias, anxiety problems, or psychological problems in general, as long as they were not severe psychological disorders and the principal diagnosis was SP. Sample sizes in the studies ranged from 13 to 351.

3.3. Study design and characteristics

Five of the included studies were RCTs (Andersson et al., 2009, 2013; Arias & McNeil, 2020; Campos et al., 2019; Donker et al., 2019), and the four remaining studies were pre-post investigations with no control group (Matthews et al., 2011, 2012; Shahnavaz et al., 2018; Vigerland et al., 2013). Regarding the comparators used in the RCTs, three studies had a waitlist control group, and two studies had another SP treatment. The studies were conducted in five different countries: the Netherlands (n=1), Spain (n=1), Australia (n=2), the USA (n=1), and Sweden (n=4). The papers included were published between 2009 and 2020. Detailed study information is shown in Table 1.

3.4. Intervention characteristics

Of the nine studies, seven carried out an Internet-based intervention, and the other two used an app to deliver the treatment through the participant's mobile phone. Table 2 shows the intervention characteristics for each study.

Table 2. Characteristics of the intervention, outcome measures, attrition, and follow-up data.

Reference	Format	Intervention program characteristics	Length	Comparator	Outcome measures	Attrition (%)	Follow-up
Donker et al. (2019)	App	Six animated modules, 360º videos and a gamified immersive VR environment covering the entire exposure spectrum	3 weeks	Waitlist	AQ	Post: 41 F-U: 59	Exploratory results showed that changes were maintained at 3-month follow-up
Campos et al. (2019)	Internet	Six exposure scenarios with real photographs and sounds related to different parts of the flying process	6 weeks (maximum)	Waitlist	FFQ-II FFS	Post: 28.26 F-U: 52.2 (3 months) and 71 (1 year)	Maintenance of changes at 3- and 12-month follow ups with larger effect sizes than those obtained for pre-to-post change
Andersson et al. (2009)	Internet	Five text modules with psychoeducational information and images, and videos with instructions to carry out the exposure in real life	4 weeks	One-session treatment face-to-face	BAT SPQ	Post: 0 F-U: 7.7	Changes maintained at 1-year f-u, with equal results than the ones obtained with the OST condition
Shahnavaz et al. (2018)	Internet	Twelve modules of guiding text for parents and children, exposure to dentistry-related video clips and audio files and a package with different dental material sent at their homes for exposure purposes	12 weeks	NA	PG-BAT (child and parental version)	Post: 11.1 F-U: 16.7	Clinical changes in the primary outcome measure were maintained at 1-year f-u
Andersson et al. (2013)	Internet	Four text modules with psychoeducational information and images, and videos with instructions to carry out the exposure in real life	4 weeks	One-session treatment face-to-face	BAT SNAQ	Post: 0 F-U: 23.1	There was an improvement in BAT from post-treatment to 1-year f-u and a maintenance of changes in SNAQ
Vigerland et al. (2013)	Internet	Eleven modules for parent and children with psychoeducation about SP and exposure tasks for children to carry out in real life guided by their parents	6 weeks	NA	CSR	Post: 3 F-U: 0	Improvement was maintained at 3-month f-u, with even an additional decrease in the CSR

Matthews et al. (2011)	Internet	Six-stage hierarchy of images presented for exposure purposes. Images appeared on screen when participants followed a moving circle with their mouse pointer	30 days	NA	SUDS FSQ SPQ	Post: 64.7	NA
Matthews et al. (2012)	Internet	Ten stages of moving or static images presented for exposure purposes. Images appeared on screen when participants followed a moving circle with their mouse pointer	4 months	NA	FSQ SUDS	Post: 98.2	NA
Arias et al. (2020)	App	Exposure video displaying a preventive dental visit that participants had to watch at least once per day	7 days	Waitlist	SUDS during BAT	Post: 0	NA

AQ: Acrophobia Questionnaire; FFQ-II: Fear of Flying Questionnaire-II; FFS: Fear of Flying Scale; BAT: Behavioral Avoidance Test; SPQ: Spider Phobia Questionnaire; PG-BAT: Picture Guided Behavioral Avoidance Test; SNAQ: Snake Phobia Questionnaire; CSR: Clinician Severity Rating; SUDS: Subjective Units of Distress; FSQ: Fear of Spiders Questionnaire; F-U: Follow-up; NA: Not Applicable

3.4.1. Internet-based interventions

Exposure was the main treatment component of the seven studies on Internet-based interventions, and all of them except one (Vigerland et al., 2013) included images, videos, or audios of the phobic situation or stimuli in the program. However, only three intervention programs (Campos et al., 2019; Matthews et al., 2011, 2012) carried out the entire exposure to the phobic object within the program using this media content; that is, participants could do the exposure sessions in the intervention webpage confronting these images or videos. In these studies, after the exposure scenarios were presented, participants were asked to rate their anxiety level in order to continue with the next scenarios. Although most of the other studies also included some kind of media content related to the feared object or situation, the main focus was on encouraging participants to do the exposure exercises in the real world. This is the case of the two Andersson et al. (2009; 2013) interventions, which included videos to show the participants how to carry out the exposure to spiders or snakes in a real environment; Vigerland et al., (2013), who included written instructions for parents to help their children to establish and work towards the most feared level together in their everyday life; or Shahvanaz et al. (2018), who sent a practice package of dental tools to participants' homes so that parents and children could do the exposure tasks together.

Psychoeducation about the problem and other related important information was also included in most of the interventions (Andersson et al., 2009, 2013; Campos et al., 2019; Shahnavaz et al., 2018). The time required for the interventions ranged from one to four months. It is important to note that the study with the longest time requirement (Matthews et al., 2012a) only asked participants to log in at least once before a four-month period had ended, but the intervention did not last the whole time. The most common intervention length was four to six weeks.

Regarding therapist support, all the studies except Matthews et al (2011, 2012) included this component. Therapist guidance was delivered by phone or e-mail, depending on the intervention. In four studies (Andersson et al., 2009, 2013; Shahnavaz et al., 2018; Vigerland et al., 2013), participants had to send the homework exercises to the therapist by email or write them on the web platform, and in two of these studies, the therapist provided feedback about the homework (Shahnavaz et al., 2018; Vigerland et al., 2013). Campos et al. (2019) included two experimental conditions in this line: one

condition with therapist support consisting of a brief weekly phone call to encourage participants to continue the intervention or resolve doubts, and a completely self-applied condition where participants did not talk with the therapist until they finished the intervention. Campos et al. (2019) is the only study in this review that presents results for therapist guidance, and the data show both conditions appeared to have comparable efficacy on the phobic outcome measures.

3.4.2. Mobile-based interventions

Two of the studies included in this review were mobile-based interventions, and the main component was also the exposure technique. Both studies used videos related to the phobic situation that the participant had to watch, but one of them (Donker et al., 2019) included a Virtual Reality approach using 360º videos. This study was also the only one of the two that intended to deliver a traditional intervention over the phone, that is, by including different modules the participant had to complete with psychoeducation and CBT components. The other intervention (Arias and McNeil, 2020) only relied on the participant watching the videos for exposure purposes.

The time required for the interventions ranged from seven days to three weeks. Therapist support was included in both studies, via e-mail, in the form of daily or weekly encouragement.

3.5. Narrative synthesis of treatment outcomes

Outcome measures were different in the included studies, given that they were directed towards different types of SP, but overall the results of the interventions were assessed with specific questionnaires for the subtype of SP being investigated, or with other general assessment tools commonly used for phobic disorders, such as the Behavioral Avoidance Test (BAT; Öst et al., 1991), an analogous picture-guided version (PG-BAT; Shahnavaz et al., 2016), the Subjective Units of Distress Scale (SUDS; Wolpe, 1990), or the Clinician Severity Rating (CSR; Silverman & Albano, 1996). The questionnaires that assessed the different types of phobic symptomatology in the studies included in this review were the following: Acrophobia Questionnaire (AQ; Cohen, 1977), Fear of Flying Questionnaire-II (FFQ-II; Bornas et al., 1999), Fear of Flying Scale (FFS; Haug et al., 1987), Spider Phobia Questionnaire (SPQ; Klorman et al., 1974), Fear of Spiders Questionnaire (FSQ; Szymanski & O'Donohue, 1995), and the Snake Phobia

Questionnaire (SNAQ; Fredrikson, 1983). Table 2 shows the corresponding assessment tools for each study.

Regarding the effectiveness of the interventions, in the RCTs that used a waitlist as a comparator, the intervention condition showed significant reductions in the phobic symptomatology compared to the control group (Arias & McNeil, 2020; Campos et al., 2019; Donker et al., 2019). In the two RCTs that had an active control condition (Andersson 2009; 2013), in this case a treatment for specific phobia whose effectiveness had already been established (Öst, 1989), the Internet condition also showed a significant improvement in the phobic symptoms. Four of these studies reported large within-group effect sizes for the IMI condition (Andersson et al., 2009, 2013; Campos et al., 2019; Donker et al., 2019).

Two of the studies that did not have a control condition also showed significant improvements in the outcome measures, with large within-group effect sizes (Shahnavaz et al., 2018; Vigerland et al., 2013). The remaining two studies without comparators, both by the same author (Matthews et al., 2011, 2012), showed a decrease on the SUDS over time, but only one study showed significant differences on one of the questionnaires after the intervention (Matthews et al., 2011).

3.6. Preliminary meta-analysis of treatment outcomes

A preliminary meta-analysis of the nine included studies, with 10 intervention groups, showed that participants receiving IMIs experienced a significant reduction of phobic symptomatology from pre- to post-treatment. The pooled within-group effect size for IMIs was g= 1.15 (95% CI 0.81 to 1.49), with high heterogeneity (I^2= 79%; 95% CI 62 to 89). The forest plot summarizing the results of the meta-analysis is presented in Figure 2. In sensitivity analyses, the pooled effect size ranged between g= 1.26 (95% CI 0.87 to 1.65) and g= 1.22 (95% CI 0.85 to 1.59), assuming pre-post correlations of 0.25 and 0.5, respectively, and decreased to g= 0.77 (95% CI 0.54 to 1.01) when assuming a correlation of 0.95. Egger's test did not detect significant asymmetry in the funnel plot (funnel plot is provided in the Appendix B). Subgroup analyses revealed significant differences based on type of design (Q= 43.19, df=9, p<0.0001), with RCTs showing significantly larger within-group effects (g= 1.40; 95% CI 0.98 to 1.83) than pre-post designs (g= 0.80; 95% CI 0.32 to 1.27).

For the subgroup of RCTs, between-group effect sizes were computed and pooled separately for those with active and inactive comparators. The three trials (with four intervention groups) that compared IMIs to waitlist control conditions yielded a pooled effect of g= 1.07 (95% CI 0.51 to 1.62; I^2= 29.2%, 95% CI 0 to 74). However, no evidence of a significant effect was obtained in two trials comparing IMIs against a face-to-face well-established SP treatment (g= 0.02; 95% CI -1.50 to 1.54; I^2= 0%).

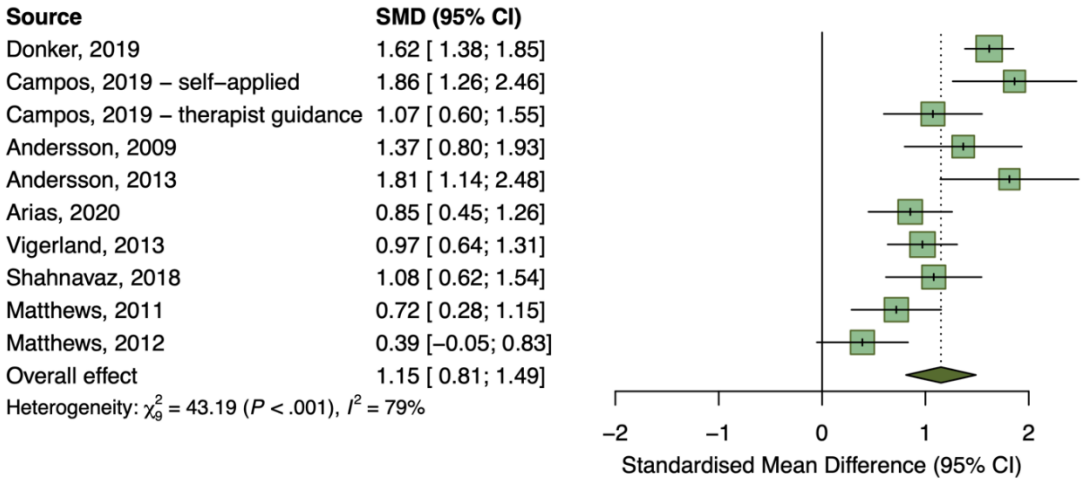


Figure 2. Meta-analysis on Internet- and mobile-based interventions for Specific Phobia, based on within-group effect sizes

3.7. Follow-ups

Seven of the nine studies had at least one follow-up, but one of them (Matthews et al., 2012) was not included in these results because the study presented large drop-out rates and the follow-up was only completed by three participants. Regarding the rest of the studies, three of them carried out a three-month follow up (Campos et al., 2019; Donker et al., 2019; Vigerland et al., 2013) where clinical outcomes for the intervention seemed to be maintained. Four studies had a follow-up after one year (Andersson et al., 2009, 2013; Campos et al., 2019; Shahnavaz et al., 2018), and they also showed maintenance or improvement on some of the measures. The study by Campos et al. (2019) was the only one that included two follow-ups, at three and 12 months, and they found larger within-group effect sizes than the ones obtained for pre-to-post change.

3.8. Satisfaction and attrition

Four of the studies presented data about patients' satisfaction with the intervention, and all of them reported high satisfaction (Arias & McNeil, 2020; Donker et al., 2019; Shahnavaz et al., 2018; Vigerland et al., 2013). Although in one of the parent-child interventions (Vigerland et al., 2013) the parent satisfaction was much lower, the results showed that they would still recommend the treatment to a friend.

The attrition rates for the studies ranged from low (0%) to very high (98%), as reported in Table 2. The highest drop-out rate was found in the study by Matthews et al. (2012), where 351 participants were enrolled but only six completed all the intervention stages. However, this study was an exception, and most of the other studies had low or moderate attrition rates at post-treatment. The attrition rates in the follow-ups were higher overall than at post-treatment in the studies that included them, with up to 71% dropping out at the one-year follow-up, as Table 2 shows.

3.9. Study quality assessment

Tables 3 and 4 show the results of the study quality assessment carried out with the NHLBI tool. Two of the categories were used for the studies in this review, specifically, the categories of controlled intervention studies and before-after studies. The RCTs included in this review (Andersson et al., 2009, 2013; Arias & McNeil, 2020; Campos et al., 2019; Donker et al., 2019) were assessed in the category of controlled intervention studies. Three of them were rated "good", and the other two were rated "fair". The reason for rating the two Andersson studies (2009, 2013) "fair" was that they did not include power calculations for the sample size, and they did not conduct intent-to-treat analyses. Apart from that, the only issue with the studies in this category was the moderate drop-out rate in two of the papers (Campos et al., 2019; Donker et al., 2019), but overall, they met the quality criteria.

Table 3. Quality assessment for controlled studies

	Donker et al. (2019)	Campos et al. (2019)	Andersson et al. (2009)	Andersson et al. (2013)	Arias et al. (2020)
1. Was the study described as randomized, a randomized trial, a randomized clinical trial, or an RCT?	Yes	Yes	Yes	Yes	Yes
2. Was the method of randomization adequate (i.e., use of randomly generated assignment)?	Yes	Yes	Yes	Yes	Yes

3. Was the treatment allocation concealed (so that assignments could not be predicted)?	Yes	Yes	Yes	Yes	Yes
4. Were study participants and providers blinded to treatment group assignment?	No	No	No	No	NR
5. Were the people assessing the outcomes blinded to the participants' group assignments?	No	No	NR	NR	No
6. Were the groups similar at baseline on important characteristics that could affect outcomes (e.g., demographics, risk factors, co-morbid conditions)?	Yes	Yes	NR	NR	Yes
7. Was the overall drop-out rate from the study at endpoint 20% or lower of the number allocated to treatment?	No	No	Yes	Yes	Yes
8. Was the differential drop-out rate (between treatment groups) at endpoint 15 percentage points or lower?	No	Yes	Yes	Yes	Yes
9. Was there high adherence to the intervention protocols for each treatment group?	Yes	Yes	Yes	Yes	Yes
10. Were other interventions avoided or similar in the groups (e.g., similar background treatments)?	Yes	Yes	Yes	Yes	No
11. Were outcomes assessed using valid and reliable measures, implemented consistently across all study participants?	Yes	Yes	Yes	Yes	Yes
12. Did the authors report that the sample size was sufficiently large to be able to detect a difference in the main outcome between groups with at least 80% power?	Yes	Yes	No	No	Yes
13. Were outcomes reported or subgroups analyzed prespecified (i.e., identified before analyses were conducted)?	Yes	Yes	Yes	Yes	Yes
14. Were all randomized participants analyzed in the group to which they were originally assigned, i.e., did they use an intention-to-treat analysis?	Yes	Yes	No	No	Yes
Quality rating	Good	Good	Fair	Fair	Good

NR: Not Reported

In the case of the uncontrolled studies, two of them were rated "good" (Shahnavaz et al., 2018; Vigerland et al., 2013) , and the other two were rated "poor" (Matthews et al., 2011, 2012). In the latter studies, there was no power calculation for the sample size, they had a high or very high drop-out rate, or the inclusion criteria were vague. Therefore, two studies were rated as having a high risk of bias.

Table 4. Quality assessment for before and after studies.

	Shahnavaz et al. (2018)	Vigerland et al. (2013)	Matthews et al. (2011)	Matthews et al. (2012)
1. Was the study question or objective clearly stated?	Yes	Yes	Yes	Yes
2. Were eligibility/selection criteria for the study population prespecified and clearly described?	Yes	Yes	Yes	No
3. Were the participants in the study representative of those who would be eligible for the test/service/intervention in the general or clinical population of interest?	Yes	Yes	Yes	Yes
4. Were all eligible participants that met the prespecified entry criteria enrolled?	Yes	Yes	NR	No
5. Was the sample size sufficiently large to provide confidence in the findings?	Yes	Yes	No	No
6. Was the test/service/intervention clearly described and delivered consistently across the study population?	Yes	Yes	Yes	No
7. Were the outcome measures prespecified, clearly defined, valid, reliable, and assessed consistently across all study participants?	Yes	Yes	Yes	Yes
8. Were the people assessing the outcomes blinded to the participants' exposures/interventions?	No	No	No	NR
9. Was the loss to follow-up after baseline 20% or less? Were those lost to follow-up accounted for in the analysis?	Yes	Yes	No	No
10. Did the statistical methods examine changes in outcome measures from before to after the intervention? Were statistical tests done that provided p values for the pre-to-post changes?	Yes	Yes	Yes	Yes
11. Were outcome measures of interest taken multiple times before the intervention and multiple times after the intervention (i.e., did they use an interrupted time-series design)?	No	Yes	No	No

12. If the intervention was conducted at a group level (e.g., a whole hospital, a community, etc.) did the statistical analysis take into account the use of individual-level data to determine effects at the group level?	NA	NA	NA	NA
Quality Rating	Good	Good	Poor	Poor

NR: Not Reported; NA: Not Applicable

The criterion of blinded assessment of the treatment outcomes was not met by any of the studies, but this can be difficult in psychological interventions. However, this was also taken into consideration in the assessment of the quality of the studies for the final quality rating as a source of potential bias.

4. DISCUSSION

The aim of the present study was to summarize the characteristics and treatment outcomes of IMIs for SP in a systematic review. To the best of our knowledge, this is the first review to address this topic.

As previously stated, research in this field has been scarce so far, which was reflected in the number of papers included in this review. Only nine papers met the inclusion criteria, seven Internet-based interventions and two mobile-based interventions. Therefore, the following conclusions should be interpreted with caution. However, despite the small number of studies, the results seem promising. The results of the majority of the studies included in the current review indicate that significant improvements in phobic symptoms can be achieved with IMIs. These promising results are also supported by a meta-analysis of the nine included studies, where a large effect size for IMIs was observed.

Regarding the characteristics of the samples included, there were more women than men, which coincides with epidemiological studies suggesting that there is a higher prevalence of SP among females (Wardenaar et al., 2017). The most common subtype of SP in the studies was animal phobia; four of the studies included treated this type of phobia, and even in the study that included different subtypes of SP in the sample (Vigerland et al, 2013), animal phobia was the most frequent one. Animal phobia is also the subtype with the highest prevalence in epidemiological studies (Eaton et al., 2018; Wardenaar et al., 2017). Additionally, the different interventions show that it is possible

to have IMIs for the treatment of SP in different populations because interventions for children, adolescents, and adults have been developed and used. However, no studies were found for older people, and this could be a field in need of more research because some data show a peak in the incidence of phobias in this age group (Eaton et al., 2018).

Exposure was the main component of all the intervention programs included, which was expected because exposure-based treatments for SP are well known in the literature as the best approach to treat this problem in adults (Wolitzky-Taylor et al., 2008) and children (Ollendick and Davis, 2013). In all the studies, the exposure was delivered from a traditional habituation perspective, that is, by presenting the phobic stimulus and waiting until the anxiety levels decreased, and studies did include more contemporary approaches such as inhibitory learning (Craske et al., 2014). Images, audios, and videos of the phobic stimuli were also an important component of the intervention programs, with five of the studies (Arias & McNeil, 2020; Campos et al., 2019; Donker et al., 2019; Matthews et al., 2011, 2012) carrying out the exposure inside the program or app with these media resources. Representations of the phobic stimuli, such as pictures, elicit fear reactions in phobic patients. For this reason, therapists also use them in their clinical settings to start exposure therapy or when the feared situation is difficult to access. Thus, IMIs have the potential of delivering interventions for phobias if they have an adequate structure and clear guidelines for patients.

Overall, treatment outcomes for phobic symptomatology were positive in most of the studies, reporting significant pre-to-post treatment changes in participants and, in some cases, large effect sizes. A preliminary meta-analysis of the nine included studies suggested that IMIs contributed to a significant reduction of SP symptoms from pre- to post-treatment, showing a large pooled effect size. When we adjusted the analyses using the most conservative level of pre-post correlation, the pooled effect size was considerably reduced, although it remained around the range of large effects. Heterogeneity between effect sizes was high, and it might be indicative of differences in effects between different profiles of patients, types of interventions, number of sessions, or other relevant characteristics of the studies. However, it was not possible to explore it further due to the small number of included studies. Nevertheless, one relevant variable that explained part of the variation in the effects was the type of design, with significant differences between RCTs and pre-post studies in the within-group effect sizes. We observed larger reductions of symptoms in participants allocated to IMI groups in RCTs,

compared to participants taking part in pre-post studies. This could suggest that RCTs might optimize treatment effects, as compared to the effects observed in more naturalistic designs that might be closer to routine care. However, the small number of studies hinders the interpretation of these differences, and some issues must be taken into consideration regarding these results. Firstly, two out of the four pre-post studies were rated as "poor" in the study quality assessment, meaning that these results could be highly biased and that could be affecting the analyses. Secondly, another problem found in the study quality assessment was that none of the studies included in this review had a post-treatment blinded assessment. This could also be a potential issue that could affect the current results. Although, as we mentioned before, blinded assessment of treatment outcomes can be difficult in psychological interventions, future IMI designs could explore this issue (i.e., including the post-treatment assessment in the IMI platform could offer a possibility for outcome assessors to be blinded to participants' group assignments).

Given that RCTs are the gold-standard design to examine treatment effects, we further estimated the efficacy of IMIs by focusing only on between-group effect sizes derived from RCTs. Compared to participants allocated to waiting list control groups, participants receiving IMIs experienced significantly lower SP symptoms at post-treatment. A large pooled effect size was observed for IMIs, although only three RCTs were available in this analysis. On the other hand, no significant effects were observed when comparing IMIs against a face-to-face well-established SP treatment. Nevertheless, only two trials with small sample sizes were included in this comparison, which limits considerably the statistical power that is needed for detecting differences between two effective treatments.

Regarding the maintenance of the clinical changes over time, the studies also reported some promising evidence (Andersson et al., 2009, 2013; Campos et al., 2019; Donker et al., 2019; Shahnavaz et al., 2018; Vigerland et al., 2013). The only study that did not report significant changes after the intervention on the outcome measures was the one by Matthews et al. (2012). However, this study has the largest drop-out rate (98%), and, therefore, these results are probably biased, given that the study was also rated as having "poor" quality. A possible explanation for this would be that therapeutic support, one of the factors that has been related to better treatment outcomes and higher adherence rates (Domhardt et al., 2019), was not included in the treatment. Additionally, this was the study that gave participants the most time to complete the treatment, even though the

treatment only consisted of 10 stages. Participants in the other interventions included in this review also had flexibility and freedom to access the program, as is common in self-help interventions, but the time span to complete the intervention was significantly shorter, and they also had more specific instructions (i.e. to complete one module each week). This aspect should be taken into consideration in future research, where it should be explored if this specific characteristic has influence in high drop-out rates.

The study by Campos et al. (2019) explored the role of therapist support and did not find significant differences between the completely self-applied group and the one that received weekly calls. Nevertheless, no conclusions can be drawn because most of the other programs had some type of therapist support, and those that did not (Matthews et al., 2011, 2012) were rated as having insufficient quality. However, previous research on Internet-based interventions for anxiety also suggests that there are no differences between guided and unguided interventions in terms of treatment outcomes (Olthuis et al., 2016), and that even though guided interventions might be more beneficial, the differences might be smaller than previously thought (Baumeister et al., 2014). As mentioned above, mobile-based interventions are still a relatively new field, and evidence about the role of guidance is still scarce.

Finally, the mean drop-out rate in the studies in this review at post-test was 27.36%, and 29.58% at follow-up, which is lower than the drop-out rate found in IMIs for other emotional disorders such as depression (Josephine et al., 2017). However, the attrition rates varied across the different studies, and so this result must be interpreted with caution. Furthermore, it is also important to note that the follow-up periods were also different in the studies, with some of them including follow-ups after three months and others after one year.

Some limitations of this review should be acknowledged. First, the important heterogeneity in the studies included, in terms of sample size, study design, and outcome measures, makes it difficult to generalize the results. Second, the small number of studies included does not allow us to draw firm conclusions. Specifically, the results of the preliminary meta-analysis should be viewed with caution. Related to this point, the number of mobile-based interventions was very low, with only two studies included, and it was not compensated by the number of Internet-based interventions. Third, this review only included published studies, which can lead to an overestimation of treatment results

due to publication bias. Although we did not observe a significant indication of publication bias, the sample size was too small, and this finding should be considered with caution. Finally, the interpretation of the results is limited to the authors who conducted this systematic review.

5. CONCLUSIONS

This systematic review found that interventions for the treatment of SP through IMIs have been developed, and there is already some evidence in the literature supporting the potential benefits of these treatments. However, the number of studies is still small, and firm conclusions cannot be drawn. There is still a need to explore the specific components an IMI for SP should have, use active comparators with larger sample sizes, examine the role of therapeutic guidance and to what degree it is necessary in these interventions, and determine what factors should be considered to improve adherence to these treatments.

Although relatively few studies have been conducted, we aimed to summarize what researchers have found so far, in order to create more interest in this field and guide future research.

DECLARATION OF INTEREST

None

ACKNOWLEDGEMENTS

This work was supported by Spanish Ministerio de Ciencia, Innovación y Universidades (Programa Estatal I+D+i. RTI2018-100993-B-100), 2018 Research Promotion Plan at Universitat Jaume I (UJI-2018-57), CIBEROBN, an initiative of the ISCIII (ISC III CB06 03/0052), and PhD grant from Generalitat Valenciana (ACIF/2017/191).

6. REFERENCES

Andersson, G., Titov, N., 2014. Advantages and limitations of Internet-based interventions for common mental disorders. World Psychiatry 13, 4–11. https://doi.org/10.1002/wps.20083

Andersson, G., Waara, J., Jonsson, U., Malmaeus, F., Carlbring, P., Öst, L.G., 2013. Internet-Based Exposure Treatment Versus One-Session Exposure Treatment of Snake Phobia: A Randomized Controlled Trial. Cognitive Behaviour Therapy 42, 284–291. https://doi.org/10.1080/16506073.2013.844202

Andersson, G., Waara, J., Jonsson, U., Malmaeus, F., Carlbring, P., Öst, L.G., 2009. Internet-based self-help versus one-session exposure in the treatment of spider phobia: A randomized controlled trial. Cognitive Behaviour Therapy 38, 114–120. https://doi.org/10.1080/16506070902931326

Andrews, G., Basu, A., Cuijpers, P., Craske, M.G., McEvoy, P., English, C.L., Newby, J.M., 2018. Computer therapy for the anxiety and depression disorders is effective, acceptable and practical health care: An updated meta-analysis. Journal of Anxiety Disorders. https://doi.org/10.1016/j.janxdis.2018.01.001

Arias, M.C., McNeil, D.W., 2020. Smartphone-based exposure treatment for dental phobia: a pilot randomized clinical trial. Journal of Public Health Dentistry 80, 23–30. https://doi.org/10.1111/jphd.12340

Arnberg, F.K., Linton, S.J., Hultcrantz, M., Heintz, E., Jonsson, U., 2014. Internet-delivered psychological treatments for mood and anxiety disorders: A systematic review of their efficacy, safety, and cost-effectiveness. PLoS ONE. https://doi.org/10.1371/journal.pone.0098118

Baumeister, H., Reichler, L., Munzinger, M., Lin, J., 2014. The impact of guidance on Internet-based mental health interventions - A systematic review. Internet Interventions. https://doi.org/10.1016/j.invent.2014.08.003

Böhnlein, J., Altegoer, L., Muck, N.K., Roesmann, K., Redlich, R., Dannlowski, U., Leehr, E.J., 2020. Factors influencing the success of exposure therapy for specific phobia: A systematic review. Neuroscience and Biobehavioral Reviews. https://doi.org/10.1016/j.neubiorev.2019.12.009

Bornas, F.X., Tortella-Feliu, M., García de la Banda García, G., Fullana Rivas, M.Á., Llabrés, J., 1999. Validación factorial del cuestionario de miedo a volar. Análisis y modificación de conducta.

Botella, C., Fernández-Álvarez, J., Guillén, V., García-Palacios, A., Baños, R., 2017. Recent Progress in Virtual Reality Exposure Therapy for Phobias: A Systematic Review. Current Psychiatry Reports 19. https://doi.org/10.1007/s11920-017-0788-4

Botella, C., Quero, S., Banos, R.M., Garcia-Palacios, A., Breton-Lopez, J., Alcaniz, M., Fabregat, S., 2008. Telepsychology and self-help: The treatment of phobias using the internet. Cyberpsychology and Behavior 11, 659–664. https://doi.org/10.1089/cpb.2008.0012

Campos, D., Bretón-López, J., Botella, C., Mira, A., Castilla, D., Mor, S., Baños, R., Quero, S., 2019. Efficacy of an internet-based exposure treatment for flying phobia (NO-FEAR Airlines) with and without therapist guidance: A randomized controlled trial. BMC Psychiatry 19, 1–16. https://doi.org/10.1186/s12888-019-2060-4

Carlbring, P., Andersson, G., Cuijpers, P., Riper, H., Hedman-Lagerlöf, E., 2018. Internet-based vs. face-to-face cognitive behavior therapy for psychiatric and somatic disorders: an updated systematic review and meta-analysis. Cognitive Behaviour Therapy. https://doi.org/10.1080/16506073.2017.1401115

Cohen, D.C., 1977. Comparison of self-report and overt-behavioral procedures for assessing acrophobia. Behavior Therapy 8, 17–23. https://doi.org/10.1016/S0005-7894(77)80116-0

Craske, M.G., Treanor, M., Conway, C.C., Zbozinek, T., Vervliet, B., 2014. Maximizing exposure therapy: An inhibitory learning approach. Behaviour Research and Therapy 58, 10–23. https://doi.org/10.1016/j.brat.2014.04.006

Domhardt, M., Geßlein, H., von Rezori, R.E., Baumeister, H., 2019. Internet- and mobile-based interventions for anxiety disorders: A meta-analytic review of intervention components. Depression and Anxiety. https://doi.org/10.1002/da.22860

Donker, T., Cornelisz, I., van Klaveren, C., van Straten, A., Carlbring, P., Cuijpers, P., van Gelder, J.L., 2019. Effectiveness of Self-guided App-Based Virtual Reality Cognitive Behavior Therapy for Acrophobia: A Randomized Clinical Trial. JAMA Psychiatry 76, 682–690. https://doi.org/10.1001/jamapsychiatry.2019.0219

Eaton, W.W., Bienvenu, O.J., Miloyan, B., 2018. Specific phobias. The Lancet Psychiatry. https://doi.org/10.1016/S2215-0366(18)30169-X

Egger, M., Smith, G.D., Schneider, M., Minder, C., 1997. Bias in meta-analysis detected by a simple, graphical test. BMJ 315, 629–634. https://doi.org/10.1136/BMJ.315.7109.629

Firth, J., Torous, J., Nicholas, J., Carney, R., Rosenbaum, S., Sarris, J., 2017. Can smartphone mental health interventions reduce symptoms of anxiety? A meta-analysis of randomized controlled trials. Journal of Affective Disorders. https://doi.org/10.1016/j.jad.2017.04.046

Fredrikson, M., 1983. Reliability and validity of some specific fear questionnaires. Scandinavian Journal of Psychology 24. https://doi.org/10.1111/j.1467-9450.1983.tb00507.x

Haug, T., Berntzen, D., Götestam, K.G., Brenne, L., Johnsen, B.H., Hugdahl, K., 1987. A three-systems analysis of fear of flying: A comparison of a consonant vs a non-consonant treatment method. Behaviour Research and Therapy 25. https://doi.org/10.1016/0005-7967(87)90045-3

IntHout, J., Ioannidis, J.P., Borm, G.F., 2014. The Hartung-Knapp-Sidik-Jonkman method for random effects meta-analysis is straightforward and considerably outperforms the standard DerSimonian-Laird method. BMC Medical Research Methodology 2014 14:1 14, 1–12. https://doi.org/10.1186/1471-2288-14-25

Josephine, K., Josefine, L., Philipp, D., David, E., Harald, B., 2017. Internet- and mobile-based depression interventions for people with diagnosed depression: A systematic review and meta-analysis. Journal of Affective Disorders. https://doi.org/10.1016/j.jad.2017.07.021

Karyotaki, E., Ebert, D.D., Donkin, L., Riper, H., Twisk, J., Burger, S., Rozental, A., Lange, A., Williams, A.D., Zarski, A.C., Geraedts, A., van Straten, A., Kleiboer, A., Meyer, B., Ünlü Ince, B.B., Buntrock, C., Lehr, D., Snoek, F.J., Andrews, G., Andersson, G., Choi, I., Ruwaard, J., Klein, J.P., Newby, J.M., Schröder, J., Laferton, J.A.C., van Bastelaar, K., Imamura, K., Vernmark, K., Boß, L., Sheeber, L.B., Kivi, M., Berking, M., Titov, N., Carlbring, P., Johansson, R., Kenter, R., Perini, S., Moritz, S., Nobis, S., Berger, T., Kaldo, V., Forsell, Y., Lindefors, N., Kraepelien, M., Björkelund, C., Kawakami, N., Cuijpers, P., 2018. Do guided internet-based interventions result in clinically relevant changes for patients with depression? An individual participant data meta-analysis. Clinical Psychology Review. https://doi.org/10.1016/j.cpr.2018.06.007

Karyotaki, E., Riper, H., Twisk, J., Hoogendoorn, A., Kleiboer, A., Mira, A., MacKinnon, A., Meyer, B., Botella, C., Littlewood, E., Andersson, G., Christensen, H., Klein, J.P., Schröder, J., Bretón-López, J., Scheider, J., Griffiths, K., Farrer, L., Huibers, M.J.H., Phillips, R., Gilbody, S., Moritz, S., Berger, T., Pop, V., Spek, V., Cuijpers, P., 2017. Efficacy of self-guided internet-based cognitive behavioral therapy in the treatment of depressive symptoms a meta-analysis of individual participant data. JAMA Psychiatry 74, 351–359. https://doi.org/10.1001/jamapsychiatry.2017.0044

Kato, K., Miyashita, H., 2015. Creating a mobile head-mounted display with proprietary controllers for interactive virtual reality content, in: UIST 2015 - Adjunct Publication of the 28th Annual ACM Symposium on User Interface Software and Technology. Association for Computing Machinery, Inc, pp. 35–36. https://doi.org/10.1145/2815585.2817776

Kazdin, A.E., Blase, S.L., 2011. Rebooting psychotherapy research and practice to reduce the burden of mental illness. Perspectives on Psychological Science 6, 21–37. https://doi.org/10.1177/1745691610393527

Kelson, J., Rollin, A., Ridout, B., Campbell, A., 2019. Internet-delivered acceptance and commitment therapy for anxiety treatment: Systematic review. Journal of Medical Internet Research 21. https://doi.org/10.2196/12530

Klorman, R., Weerts, T.C., Hastings, J.E., Melamed, B.G., Lang, P.J., 1974. Psychometric description of some specific-fear questionnaires. Behavior Therapy 5. https://doi.org/10.1016/S0005-7894(74)80008-0

Kuester, A., Niemeyer, H., Knaevelsrud, C., 2016. Internet-based interventions for posttraumatic stress: A meta-analysis of randomized controlled trials. Clinical Psychology Review. https://doi.org/10.1016/j.cpr.2015.11.004

Lewis, C., Roberts, N.P., Bethell, A., Robertson, L., Bisson, J.I., 2018. Internet-based cognitive and behavioural therapies for posttraumatic stress disorder (PTSD) in adults. Cochrane Database of Systematic Reviews. https://doi.org/10.1002/14651858.CD011710.pub2

Marks, I.M., 1987. Fears, Phobias, and Rituals: Panic, Anxiety, and Their Disorders. Oxford University Press.

Matthews, A.J., Scanlan, J.D., Kirkby, K.C., 2012. Online exposure treatment for spider fear: The effects of moving versus static images on treatment adherence, fear elicitation and habituation. Behaviour Change 29, 15–24. https://doi.org/10.1017/bec.2012.7

Matthews, A.J., Wong, Z.H., Scanlan, J.D., Kirkby, K.C., 2011. Online exposure for spider phobia: Continuous versus intermittent exposure. Behaviour Change 28, 143–155. https://doi.org/10.1375/bech.28.3.143

Menon, V., Rajan, T.M., Sarkar, S., 2017. Psychotherapeutic Applications of Mobile Phone-based Technologies: A Systematic Review of Current Research and Trends. https://doi.org/10.4103/0253-7176.198956

Miralles, I., Granell, C., Díaz-Sanahuja, L., van Woensel, W., Bretón-López, J., Mira, A., Castilla, D., Casteleyn, S., 2020. Smartphone apps for the treatment of mental disorders: Systematic review. JMIR mHealth and uHealth. https://doi.org/10.2196/14897

Moher, D., Liberati, A., Tetzlaff, J., Altman, D.G., Altman, D., Antes, G., Atkins, D., Barbour, V., Barrowman, N., Berlin, J.A., Clark, J., Clarke, M., Cook, D., D'Amico, R., Deeks, J.J., Devereaux, P.J., Dickersin, K., Egger, M., Ernst, E., Gøtzsche, P.C., Grimshaw, J., Guyatt, G., Higgins, J., Ioannidis, J.P.A., Kleijnen, J., Lang, T., Magrini, N., McNamee, D., Moja, L., Mulrow, C., Napoli, M.,

Oxman, A., Pham, B., Rennie, D., Sampson, M., Schulz, K.F., Shekelle, P.G., Tovey, D., Tugwell, P., 2009. Preferred reporting items for systematic reviews and meta-analyses: The PRISMA statement. PLoS Medicine. https://doi.org/10.1371/journal.pmed.1000097

Neudeck, P., Einsle, F., 2012. Dissemination of exposure therapy in clinical practice: How to handle the barriers?, in: Exposure Therapy: Rethinking the Model - Refining the Method. Springer New York, pp. 23–34. https://doi.org/10.1007/978-1-4614-3342-2_3

Ollendick, T.H., Davis, T.E., 2013. One-Session Treatment for Specific Phobias: A Review of Öst's Single-Session Exposure with Children and Adolescents. Cognitive Behaviour Therapy 42, 275–283. https://doi.org/10.1080/16506073.2013.773062

Olthuis, J. v., Watt, M.C., Bailey, K., Hayden, J.A., Stewart, S.H., 2016. Therapist-supported Internet cognitive behavioural therapy for anxiety disorders in adults. The Cochrane database of systematic reviews 3, CD011565. https://doi.org/10.1002/14651858.CD011565.pub2

Öst, L.G., 1989. One-session treatment for specific phobias. Behaviour Research and Therapy 27, 1–7. https://doi.org/10.1016/0005-7967(89)90113-7

Öst, L.G., Salkovskis, P.M., Hellström, K., 1991. One-session therapist-directed exposure vs. self-exposure in the treatment of spider phobia. Behavior Therapy 22, 407–422. https://doi.org/10.1016/S0005-7894(05)80374-0

Sewart, A.R., Craske, M.G., 2019. Inhibitory learning., in: Clinical Handbook of Fear and Anxiety: Maintenance Processes and Treatment Mechanisms. American Psychological Association, pp. 265–285. https://doi.org/10.1037/0000150-015

Shahnavaz, S., Hedman, E., Grindefjord, M., Reuterskiöld, L., Dahllöf, G., 2016. Cognitive Behavioral Therapy for Children with Dental Anxiety: A Randomized Controlled Trial. JDR Clinical & Translational Research 1, 234–243. https://doi.org/10.1177/2380084416661473

Shahnavaz, S., Hedman-Lagerlöf, E., Hasselblad, T., Reuterskiöld, L., Kaldo, V., Dahllöf, G., 2018. Internet-based cognitive behavioral therapy for children and adolescents with dental anxiety: Open trial. Journal of Medical Internet Research 20. https://doi.org/10.2196/jmir.7803

Silverman, W.K., Albano, A.M., 1996. Anxiety Disorders Interview Schedule for DSM-IV.: Child interview schedule. Oxford University Press.

Stupar-Rutenfrans, S., Ketelaars, L.E.H., van Gisbergen, M.S., 2017. Beat the Fear of Public Speaking: Mobile 360° Video Virtual Reality Exposure Training in Home

Environment Reduces Public Speaking Anxiety. Cyberpsychology, Behavior, and Social Networking 20, 624–633. https://doi.org/10.1089/cyber.2017.0174

Szymanski, J., O'Donohue, W., 1995. Fear of Spiders Questionnaire. Journal of Behavior Therapy and Experimental Psychiatry 26. https://doi.org/10.1016/0005-7916(94)00072-T

Trumpf, J., Margraf, J., Vriends, N., Meyer, A.H., Becker, E.S., 2010. Specific phobia predicts psychopathology in young women. Social Psychiatry and Psychiatric Epidemiology 45, 1161–1166. https://doi.org/10.1007/s00127-009-0159-5

van Beugen, S., Ferwerda, M., Hoeve, D., Rovers, M.M., Spillekom-Van Koulil, S., van Middendorp, H., Evers, A.W.M., 2014. Internet-based cognitive behavioral therapy for patients with chronic somatic conditions: A meta-analytic review. Journal of Medical Internet Research 16. https://doi.org/10.2196/jmir.2777

Viechtbauer, W., 2016. Bias and Efficiency of Meta-Analytic Variance Estimators in the Random-Effects Model: http://dx.doi.org/10.3102/10769986030003261 30, 261–293. https://doi.org/10.3102/10769986030003261

Vigerland, S., Thulin, U., Ljótsson, B., Svirsky, L., Öst, L.G., Lindefors, N., Andersson, G., Serlachius, E., 2013. Internet-Delivered CBT for Children with Specific Phobia: A Pilot Study. Cognitive Behaviour Therapy 42, 303–314. https://doi.org/10.1080/16506073.2013.844201

Wardenaar, K.J., Lim, C.C.W., Al-Hamzawi, A.O., Alonso, J., Andrade, L.H., Benjet, C., Bunting, B., de Girolamo, G., Demyttenaere, K., Florescu, S.E., Gureje, O., Hisateru, T., Hu, C., Huang, Y., Karam, E., Kiejna, A., Lepine, J.P., Navarro-Mateu, F., Oakley Browne, M., Piazza, M., Posada-Villa, J., ten Have, M.L., Torres, Y., Xavier, M., Zarkov, Z., Kessler, R.C., Scott, K.M., de Jonge, P., 2017. The cross-national epidemiology of specific phobia in the World Mental Health Surveys. Psychological medicine 47, 1744–1760. https://doi.org/10.1017/S0033291717000174

Wechsler, T.F., Mühlberger, A., Kümpers, F., 2019. Inferiority or even superiority of virtual reality exposure therapy in phobias? - A systematic review and quantitative meta-analysis on randomized controlled trials specifically comparing the efficacy of virtual reality exposure to gold standard in vivo exposure in Agoraphobia, Specific Phobia and Social Phobia. Frontiers in Psychology. https://doi.org/10.3389/fpsyg.2019.01758

Witthauer, C., Ajdacic-Gross, V., Meyer, A.H., Vollenweider, P., Waeber, G., Preisig, M., Lieb, R., 2016. Associations of specific phobia and its subtypes with physical diseases: An adult community study. BMC Psychiatry 16. https://doi.org/10.1186/s12888-016-0863-0

Wolitzky-Taylor, K.B., Horowitz, J.D., Powers, M.B., Telch, M.J., 2008. Psychological approaches in the treatment of specific phobias: A meta-analysis. Clinical Psychology Review 28, 1021–1037. https://doi.org/10.1016/J.CPR.2008.02.007

Wolpe, J., 1990. The practice of behavior therapy. Pergamon Press, New York, USA.

APPENDIX A

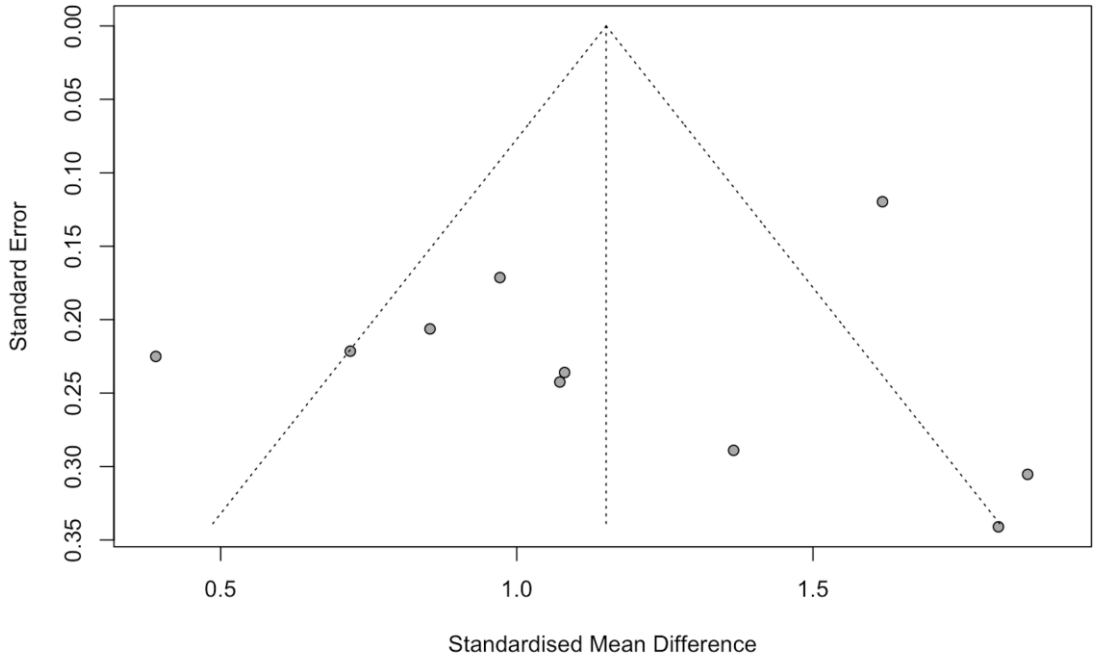
Search strings used in the systematic review.

Phobia block	Phobi* OR “Phobic Disorders” OR “Specific Phobia” OR “Dental Anxiety” OR “Acrophobia” OR “Claustrophobia”
Intervention block	“Internet-based intervention” OR “Internet-based treatment” OR “Internet-delivered treatment” OR “Internet-delivered intervention” OR “online treatment” OR "Mobile App* OR “mhealth” OR “android” OR “iphone” OR “Smartphone” OR “mobile-based” OR “App” OR “Cell phone” OR “Web-based intervention” OR “Web-based treatment” OR “internet intervention”
Word combination for search in databases	(“Phobi*” AND “Internet-based intervention”) OR (“Phobi*” AND “Internet-based treatment”) OR (“Phobi*” AND “Internet-delivered treatment”) OR (“Phobi*” AND “Internet-delivered intervention”) OR (“Phobi*” AND “online treatment”) OR ("Phobi*" AND "online intervention") OR (“Phobi*” AND “mobile app*”) OR (“Phobi*” AND “mhealth”) OR (“Phobi*” AND “android”) OR (“Phobi*” AND “iphone”) OR (“Phobi*” AND “smartphone”) OR (“Phobi*” AND “mobile-based”) OR (“Phobi*” AND “app”) OR (“Phobi*” AND “cell phone”) OR (“Phobi*” AND “web-based intervention”) OR (“Phobi*” AND “web-based treatment”) OR (“Phobi*” AND “Internet intervention”) OR ("Phobi*" AND "Internet treatment") OR (“phobic disorder” AND “Internet-based intervention”) OR (“phobic disorder” AND “internet-based treatment”) OR (“phobic disorder” AND “internet-delivered treatment”) OR (“phobic disorder” AND “internet-delivered intervention”) OR (“phobic disorder” AND “online treatment”) OR (“phobic disorder” AND “online intervention”) OR (“phobic disorder” AND “mobile app*”) OR (“phobic disorder” AND “mhealth”) OR (“phobic disorder” AND “android”) OR (“phobic disorder” AND “iphone”) OR (“phobic disorder” AND “smartphone”) OR (“phobic disorder” AND “mobile-based”) OR (“phobic disorder” AND “app”) OR (“phobic disorder” AND “cell phone”) OR (“phobic disorder” AND “web-based intervention”) OR (“phobic disorder” AND “web-based treatment”) OR (“phobic disorder” AND “internet intervention”) OR (“phobic disorder” AND “internet treatment”) OR (“Specific phobia” AND “Internet-based intervention”) OR (“Specific phobia” AND “internet-based treatment”) OR (“Specific phobia” AND “internet-delivered treatment”) OR (“Specific phobia” AND “internet-delivered intervention”) OR (“Specific phobia” AND “online treatment”) OR (“Specific phobia” AND “online intervention”) OR (“Specific phobia” AND “mobile app*”) OR (“Specific phobia” AND “mhealth”) OR (“Specific phobia” AND “android”) OR (“Specific phobia” AND “iphone”) OR (“Specific phobia” AND “smartphone”) OR (“Specific phobia” AND “mobile-based”) OR (“Specific phobia” AND “app”) OR (“Specific phobia” AND “cell phone”) OR (“Specific phobia” AND “web-based intervention”) OR (“Specific phobia” AND “web-based treatment”) OR (“Specific phobia” AND “internet Intervention”) OR (“Specific phobia” AND “internet treatment”) OR (“Dental Anxiety” AND “Internet-based intervention”) OR (“Dental Anxiety” AND “internet-based treatment”) OR

	(“Dental Anxiety” AND “internet-delivered treatment”) OR (“Dental Anxiety” AND “internet-delivered intervention”) OR (“Dental Anxiety” AND “online treatment”) OR (“Dental Anxiety” AND “online intervention”) OR (“Dental Anxiety” AND “mobile app*”) OR (“Dental Anxiety” AND “mhealth”) OR (“Dental Anxiety” AND “android”) OR (“Dental Anxiety” AND “iphone”) OR (“Dental Anxiety” AND “smartphone”) OR (“Dental Anxiety” AND “mobile-based”) OR (“Dental Anxiety” AND “app”) OR (“Dental Anxiety” AND “cell phone”) OR (“Dental Anxiety” AND “web-based intervention”) OR (“Dental Anxiety” AND “web-based treatment”) OR (“Dental Anxiety” AND “Internet Intervention”) OR (“Dental Anxiety” AND “Internet treatment”) OR (“Acrophob*” AND “internet-delivered intervention”) OR (“Acrophob*” AND “online treatment”) OR (“Acrophob*” AND “online intervention”) OR (“Acrophob*” AND “mobile app*”) OR (“Acrophob*” AND “mhealth”) OR (“Acrophob*” AND “android”) OR (“Acrophob*” AND “iphone”) OR (“Acrophob*” AND “smartphone”) OR (“Acrophob*” AND “mobile-based”) OR (“Acrophob*” AND “app”) OR (“Acrophob*” AND “cell phone”) OR (“Acrophob*” AND “web-based intervention”) OR (“Acrophob*” AND “web-based treatment”) OR (“Acrophob*” AND “Internet Intervention”) OR (“Acrophob*” AND “Internet treatment”) OR (“Claustrophob*” AND “Internet-based intervention”) OR (“Claustrophob*” AND “Internet-based treatment”) OR (“Claustrophob*” AND “Internet-delivered treatment”) OR (“Claustrophob*” AND “Internet-delivered intervention”) OR (“Claustrophob*” AND “online treatment”) OR ("Claustrophob*" AND "online intervention") OR (“Claustrophob*” AND “mobile app*”) OR (“Claustrophob*” AND “mhealth”) OR (“Claustrophob*” AND “android”) OR (“Claustrophob*” AND “iphone”) OR (“Claustrophob*” AND “smartphone”) OR (“Claustrophob*” AND “mobile-based”) OR (“Claustrophob*” AND “app”) OR (“Claustrophob*” AND “cell phone”) OR (“Claustrophob*” AND “web-based intervention”) OR (“Claustrophob*” AND “web-based treatment”) OR (“Claustrophob*” AND “Internet intervention”) OR ("Claustrophob*" AND "Internet treatment")

APPENDIX B

Funnel plot



CHAPTER 2

STUDY PROTOCOL

This chapter has been published as:

Mor, S., Botella, C., Campos, D., Tur, C., Castilla, D., Soler, C., & Quero, S. (2021). An Internet-based treatment for Flying Phobia using 360° images: Study protocol for a feasibility pilot study. *Internet Interventions, 24*, 100387.

An Internet-based treatment for Flying Phobia using 360º images: Study protocol for a feasibility pilot study

Sonia Mor[a], Cristina Botella[a, b], Daniel Campos[c, d], Cintia Tur[a], Diana Castilla[e], Carla Soler[f], & Soledad Quero[a, b,*]

[a] Department of Basic, Clinical Psychology and Psychobiology, Universitat Jaume I, Castellón, Spain

[b] CIBER de Fisiopatología de la Obesidad y Nutrición (CIBEROBN), Carlos III Institute of Health, Madrid, Spain

[c]Department of Psychology and Sociology, University of Zaragoza, Huesca, Spain

[d]Instituto de Investigación Sanitaria Aragón (IISAragon), Zaragoza, Spain

[e]Universitat de València, Valencia, Spain

[f]Centro Clínico PREVI, Valencia, Spain

ABSTRACT

Background: Flying Phobia (FP) is a prevalent disorder that can cause serious interference in a person's life. ICBT interventions have already shown their efficacy in several studies, but studies in the field of specific phobias are still scarce. Moreover, few studies have investigated the feasibility of using different types of images in exposure scenarios in ICBTs and no studies have been carried out on the role of sense of presence and reality judgement. The aim of the present study is to explore the feasibility of an ICBT for FP (NO-FEAR Airlines) using two types of images with different levels of immersion (still and navigable images). A secondary aim is to explore the potential effectiveness of the two experimental conditions using two types of images compared to a waiting list control group. Finally, the role of navigable images compared to the still images in the level of anxiety, sense of presence, and reality judgement will also be explored. This paper presents the study protocol.

Methods: This study is a three-armed feasibility pilot study with the following conditions: NO-FEAR Airlines with navigable images, NO-FEAR Airlines with still images, and a waiting list group. A minimum of 60 participants will be recruited. The intervention will have a maximum duration of 6 weeks. Measurements will be taken at four different moments: baseline, post-intervention, and two follow-ups (3- and 12-

month). Participants' opinions, preference, satisfaction and acceptance regarding the images used in the exposure scenarios will be assessed. FP symptomatology outcomes will also be considered for secondary analyses. The anxiety, sense of presence, and reality judgement in the exposure scenarios will also be analysed.

Discussion: This study will conduct a pilot study on the feasibility of an ICBT for FP and it is the first one to explore the evaluation of patients of the two types of images (still and navigable) and the role of presence and reality judgement in exposure scenarios delivered through the Internet. Research in this field can have an impact on the way these scenarios are designed and developed, as well as helping to explore whether they have any effect on adherence.

Trial registration: NCT03900559. Trial Registration date 3 April 2019, retrospectively registered.

Keywords: Flying Phobia, Internet-based intervention, Exposure therapy, Treatment preferences, Sense of presence, Reality Judgement

1. **INTRODUCTION**

According to the Diagnostic and Statistical Manual of Mental Disorders Fifth Edition (American Psychiatric Association, 2013), Flying Phobia (FP) is considered a situational specific phobia. The person suffering from this problem might take medication or alcohol in order to cope with the emotional distress (Foreman et al., 2006), or avoid flying in general. FP can cause serious interference in daily life, social functioning, relationships, and the professional field (Busscher et al., 2013; Oakes and Bor, 2010). In terms of its prevalence, up to 13% of the general adult population report fear related to the flying situation, and around 2–5% of the population could meet the criteria for specific phobia (Eaton et al., 2018). Compared to other specific phobias, FP presents the highest rates of treatment-seeking (Wardenaar et al., 2017), which makes it clear that there is a need for well-established evidence- based treatments for this problem.

Research establishes that in vivo exposure is the most effective intervention for specific phobias (Choy et al., 2007; Wolitzky-Taylor et al., 2008). However, in the case of FP, it can be difficult and expensive to access the phobic situation but the incorporation of Virtual Reality Exposure Therapy (VRET) has helped with this matter. Furthermore, VRET seems to be more accepted by patients than traditional exposure (Garcia-Palacios et al., 2007), and it has shown its efficacy for treating specific phobias (including FP) in several studies (Botella et al., 2017; Parsons and Rizzo, 2008) and results seem to be comparable to the ones found in in vivo exposure (Wechsler et al., 2019). However, VRET is an expensive tool that still does not reach the majority of the people in need of help. In this line, a more affordable way of delivering exposure treatment can be exposure through images related to the phobic object, in which the patient views photographs of the phobic stimuli in order to overcome the feared situation. This method of exposure therapy has already proved its efficacy in FP in a previous study (Tortella-Feliu et al., 2011) showing no significant differences compared to VRET.

It has been established that there is a clear need for new ways to deliver psychological interventions, and the Internet and self-help treatments might play a fundamental role in this endeavour (Kazdin and Blase, 2011). In recent years, the efficacy and acceptability of Internet-based Cognitive Behavioural Therapy (ICBTs) for anxiety disorders has been demonstrated in several studies (Andersson, 2016; Andrews et al., 2018; Andrews et al., 2010; Cuijpers, 2003; Olthuis Janine et al., 2015). However, in the particular case of specific phobias, the research in the field of ICBTs has been scarce.

Some non-randomized controlled studies with specific phobias have been conducted, like a series of case studies in adults with small animal phobia (Botella et al., 2008), an open trial in children and adolescents with dental anxiety (Shahnavaz et al., 2018), and a pilot study in children with specific phobias whose parents helped with the intervention (Vigerland et al., 2013). Other controlled studies have included specific phobias along with other disorders in their ICBTs. This is the case of a transdiagnostic intervention for people with panic and phobias (Schröder et al., 2017), a study conducted in a sample of outpatients with specific phobia, agoraphobia, or social phobia (Kok et al., 2014), or the self-help program used in the context of mental health services in panic and phobias (Schneider et al., 2005). Regarding studies focused only on specific phobias, two Randomized Controlled Trials (RCT) were conducted in Sweden for animal phobia (Andersson et al., 2009, 2013). In them, in vivo exposure was compared to a self-help ICBT with text modules and videos with guidelines to carry out the exposure therapy in their daily lives.

In the case of FP, to our knowledge, there is only one ICBT for this problem (NO-FEAR Airlines), and it was developed by our research group. This is a self-help program delivered through the Internet that has already shown its efficacy in a recent RCT comparing the online intervention with or without therapist support to a waiting list control group (Campos et al., 2019). However, in this study, the role of the degree of immersion of the images used for the exposure tasks in the program was not explored.

Sense of presence, described as the sense of being in a virtual environment (Steuer, 1992), has been widely studied in the context of VRET (Baños et al., 2000; Diemer et al., 2015; Krijn et al., 2004; Ling et al., 2014; Price and Anderson, 2007; Riva et al., 2007; Robillard et al., 2003). Although the first research findings in this field were contradictory, the literature indicates that emotions and presence are associated. Results show that when a VRET scenario engages emotions, the sense of presence immediately increases. Furthermore, this relationship appears to be bidirectional (Riva et al., 2007), which means that emotions increase the sense of presence, and presence is also a significant predictor of the emotional responses in virtual environments. The relationship between fear and presence has been recently studied (Gromer et al., 2019), confirming this bidirectional relationship and concluding that although presence did not have a direct causal relationship with fear, interpersonal variability of users in presence was linked to it and predicted later fear responses. In terms of treatment efficacy, research has also

suggested that, although presence is linked to the anxiety experienced during the exposure, there is no direct relationship between sense of presence and treatment outcomes (Price et al., 2011; Price and Anderson, 2007; Tardif et al., 2019).

The immersion level of the technology is not the only variable that explains the subjective sense of presence, but it does play a role in this relationship. Immersive technology can reduce the "noise" of other individual or real-world factors in an exposure scenario, and, therefore, it can increase the presence and anxiety experienced in these virtual environments (Ling et al., 2014). In this line, it has been suggested that 360◦ panoramas could be useful because they can evoke more similar psychological responses (in terms of cognitive and emotional factors) to the ones experienced in the real physical environment that they recreate, and in comparison to still images (Higuera-Trujillo et al., 2017).

Reality judgement is another important construct to consider in virtual stimuli. Reality judgement is defined as the extent to which the experience is acknowledged as real, not in terms of the realism of the virtual world, but in terms of the willingness to interpret the whole virtual experience as veridical (Baños et al., 2000). Research on this construct has been scarce so far.

As mentioned above, the previous study using NO-FEAR Airlines was composed exclusively of still images. The aim of the present study is to conduct a feasibility pilot study with NO-FEAR Airlines ICBT (Campos et al., 2016) using two types of images in the exposure scenarios (still images vs 360◦ navigable images) in order to explore the feasibility and evaluation of the patients of the two active treatments arms. Participants' opinions, satisfaction, preference and acceptance of the different images will be assessed. A secondary aim is to explore the potential effectiveness of the two active treatment arms compared to a waiting list control group. Finally, we will explore the role of navigable images compared to the still images in the level of anxiety, sense of presence, and reality judgement in the exposure scenarios and whether the aforementioned variables mediate in treatment efficacy. If a mediation effect is found, we will also analyse the potential effectiveness of the navigable images versus the still images. Regarding the main aim of this study, we hypothesize that both treatment conditions will be well accepted by the participants, but participants will prefer 360º images over still images.

2. METHOD

2.1. Study design

In this investigation we will carry out a pilot study on the feasibility of an ICBT intervention for FP using two types of images. Participants will be randomly allocated to one of three conditions: NO-FEAR Airlines with navigable images, NO-FEAR Airlines with still images, and a Waiting List (WL) Control Group. For ethical reasons, participants in the WL group will be offered treatment when they complete the post-waiting list assessment after a period of 6 weeks, which is the maximum period of time that participants in the experimental condition will have to complete the program. Assessments will be conducted at pre-treatment, post-treatment, and 3- and 12-month follow-ups. An online informed consent form will be signed by participants before randomization.

The trial has been registered at clinicaltrials.gov as NCT03900559 and will be conducted following the CONSORT (Consolidated Standards of Reporting Trials) statement for pilot and feasibility studies (Eldridge et al., 2016), the CONSORT-EHEALTH guidelines (Eysenbach, 2011) and the SPIRIT guidelines (Standard Protocol Items: Recommendations for Interventional Trials) (Chan et al., 2013). Fig. 1 shows the study flowchart.

2.2. Participants, recruitment, and eligibility criteria

Participants in this trial will be community sample adult patients who meet DSM-5 criteria for FP and volunteer to engage in the study via email, by making contact through the research website (http://fobiavolar.labpsitec.es) or by calling the emotional disorders university clinic. To reach more potential participants, the study will be announced on local media, social networks, and on the university website. Information brochures will also be placed at nearby universities and towns. Participants from any part of the world can benefit from the intervention, as long as they understand Spanish.

The clinical team involved in the study (composed of trained psychologists) will explain the study conditions and clarify any doubts the participant may have. The team will arrange a telephone interview with people interested in receiving the treatment. In the interview, they will assess the participant's symptomatology and ensure that the patient fulfils the study inclusion criteria. This call will last approximately 30–45 min.

Participants must meet the following inclusion criteria to be included in the present study: (1) be at least 18 years old; (2) meet diagnostic criteria for FP; (3) be able to use a computer and have Internet connection; (4) have an e-mail address; and (5) be able to understand and read Spanish. On the other hand, exclusion criteria for the study will be as follows: (1) currently receiving psychological treatment for FP; (2) meeting the criteria for another severe mental disorder: abuse/dependence of alcohol or other substances, psychotic disorder, dementia, bipolar disorder; (3) severe personality disorder; (4) presence of depressive symptomatology, suicidal ideation or plan; (5) presence of heart disease; (6) pregnant women (from the fourth month).

The clinical team will discuss the inclusion or exclusion of each participant assessed in the study to ensure a more reliable diagnosis. If the team decides that the participant meets the FP diagnosis, the participant will be randomly allocated to one of the study conditions after signing the informed consent form.

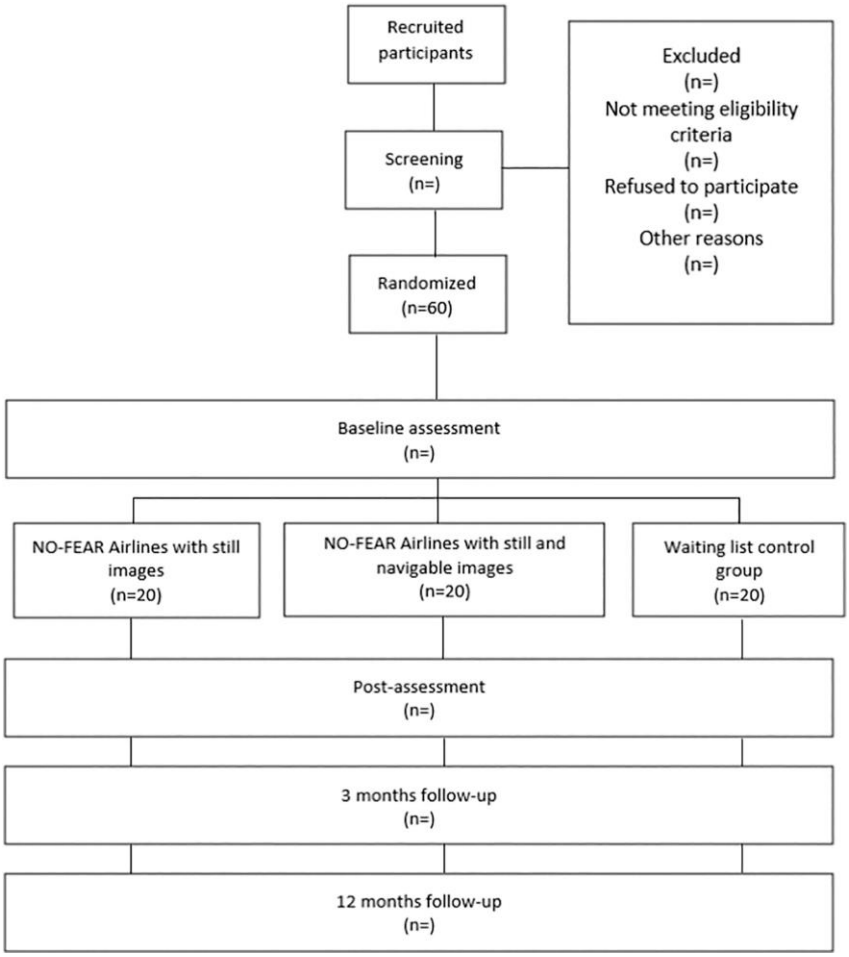


Fig. 1. Flowchart of participants.

2.3. Randomization and blinding

Participants will have to agree to participate in the study without knowing to which condition they will be allocated. The randomization will be conducted by an independent researcher who will be unaware of the characteristics and will not be involved in the study. This independent researcher will not have information about the participants, apart from the ID code number assigned to each of them to protect their confidentiality. Participants will be allocated to one of the three conditions using a computer-generated random number sequence originated with https://www.randomizer.org/ in a 1:1:1 ratio. Study researchers will also be blind to the condition to which the participants are allocated. Randomization will be conducted in the order of the participants' signing of the informed consent form. Participants will know the condition in which they are allocated after signing consent form and randomization, and they will be given a brief explanation of the characteristics of their condition before beginning the treatment or waiting period.

2.4. Sample size

Considering the main aim of this feasibility study, the sample size was based on practical considerations and our previous study (Campos et al., 2016) including participants seeking help for FP at our emotional disorders university clinic. The expected dropout rate in internet-based internet interventions has also been considered (around 20%; Carlbring et al., 2018). Therefore, the number of participants needed to reasonably evaluate feasibility goals is 60 (20 participants per condition). In addition, this sample size coincides with the recommendation proposed by Viechtbauer et al. (2015).

2.5. Ethics

This study will follow the international standards of the Declaration of Helsinki and good clinical practice. The study will also be carried out following Spanish and European Union guidelines and legislation on data protection and privacy. The study has been approved by the Ethics Committee of Universitat Jaume I (Castellón, Spain) (7/2017). Participation will be completely voluntary, and participants will be able to leave the study at any time. Participants in the WL condition will also have the opportunity to access the intervention program once the waiting period ends. All the participants will have to sign an informed consent form before randomization. Each participant will have a unique username and password to access the Internet platform, and data from their

outcome measures will be secured via the Advanced Encryption Standard (AES-256). Each participant will also be assigned an ID code for the project. Participants' personal data will be stored separately from other data, and they will only be available to the researcher responsible for their supervision.

2. 6. Interventions

NO-FEAR Airlines is an ICBT for the treatment of FP hosted on a web platform (http://fobiavolar.labpsitec.es). The program has six different scenarios related to the flying process, with real images and sounds so that the patient can carry out the exposure. The intervention has three main components: psychoeducation, exposure, and overlearning.

In the psychoeducation component, the FP symptomatology and characteristics are explained, as well as some other information that can help the participants to understand their problem.

The exposure component is the main component of this intervention. This component consists of videos where different images are presented to the patient. The six exposure scenarios included in the program are:

Flight preparation: Images about the preparation process for taking a flight such as pictures of preparing clothes, packing everything in the suitcase, the plane ticket, and getting ready to leave for the airport are presented.

Airport: Images of the check in process at the airport are presented in this scenario.

Boarding and take off: Images of the different stages of the boarding and taking off process are displayed, such as the flight attendant helping everyone sitting down, the safety instructions or the view from the window.

Flight: Images of the flying process (understood as the time where the plane is in the air) are presented.

Landing: Pictures of the plane preparing to land, and different stages of the landing process are presented.

News related to plane accidents: Different reports about plane accidents are presented. It is important to note that not all of the news showed here are bad news. For example, there are reports about difficulties experienced by planes where the flying crew

was able to handle the situation and passengers were safe. Although the rest of scenarios can vary in the order they appear, this scenario is always the last one to be presented.

The order of appearance of the exposure scenarios will change depending on the participant. Before starting the intervention, the program assesses the level of anxiety of the different flight situations and arranges the exposure scenarios that will be shown later in the intervention so that the patient can start with the scenario that has the lowest level of anxiety and end with the scenario that causes the highest level of anxiety, thus building a personalised exposure hierarchy. The exposure scenarios are composed of cycles; one cycle consists of 3 min of images and sounds, and each exposure scenario contains a maximum of twenty cycles. After each cycle in each scenario, the program asks the patient about the level of anxiety experienced during the situation. If the anxiety is moderate or high (3 or more on a scale from 0 to 10), the program will show the same cycle of that scenario again until the anxiety level de- creases. The participant can take a break from the exposure scenarios after a cycle finishes, but the next scenario in the hierarchy will not be shown until the anxiety level decreases (under 3). Participants will be given the recommendation to do two exposure scenarios per week, but they will be reminded that, because this is a self-applied program, they are free to advance at their own pace. Also, before each exposure scenario, participants will be given the instruction to imagine that the situation that they are going to face is real.

After all six exposure scenarios are completed, the program gives the participant the option to do an "overlearning" module where they can choose to repeat any of the exposure scenarios or even add more difficult.

conditions (for example, bad weather conditions or turbulences). For a more detailed description of the program, see Campos et al. (2016).

Participants will have a maximum period of 6 weeks to complete the Internet program, but because this is a self-applied treatment, they can finish it sooner. Therapist support will not be provided in this study, based on previous results showing no differences in treatment efficacy with or without therapist support (Campos et al., 2019). However, participants in the two treatment conditions will receive emails every two weeks reminding them to log into the program to ensure adherence, and they will be able to contact the therapist via mail if they have any problems or questions about the program.

In this study, the exposure scenarios will be implemented in two formats:

1) NO-FEAR Airlines with still images

In this condition, the images shown in the exposure scenarios will be a succession of different still pictures related to the scenario on display, along with sounds, depending on the situation. The images will be shown for a full cycle (3 min), and then the patient will have to report the maximum level of anxiety they experienced during the exposure. In one cycle, 25 photographs will be shown to the patient, each one appearing on screen for around 7s. The participant has no control over these images.

2) NO-FEAR Airlines with still and navigable images

In this condition, two out of the six exposure scenarios will present "navigable" images, that is, 360° panoramic images. The two exposure scenarios where these images will be displayed are the airport scenario and the flight scenario. Navigable images allow the participant to look at the surroundings of the scenario in all directions (up, down, right, and left), broadening the field of view. The participant will be in control of rotating the image with the keyboard or the mouse, choosing the pace and direction for looking around the scene. Only one image will be shown for the full cycle (3 min), and the patient can look around while hearing sounds related to the exposure scenario, thus, having control of what is appearing on the screen. The sounds in the two conditions will be the same.

For more details about the intervention program, see Campos et al., 2016, Campos et al., 2018, and Campos et al., 2019. A sample of the flight exposure scenario in both still and navigable images conditions is available online: (http://repositori.uji.es/xmlui/bitstream/handle/10234/189216/Navegables%20avio%CC%81n.mp4?sequence=2&isAllowed=y).

2.7. Waiting list control group

Participants in this group will be assessed before and after the six-week waiting period. After completing a post-waiting period assessment, they will be offered NO-FEAR Airlines treatment in the navigable images condition.

2.8. Assessment

The participants will be assessed at four different times during the study: baseline, post-treatment, and 3- and 12-month follow-ups. The diagnostic interview will be administered by a trained clinician via phone, and self-report questionnaires will be administered online on the program web page or, in the case of the WL group, via

SurveyMonkey (https://es.surveymonkey.com/). All assessment instruments and periods in this study can be found in Table 1.

Table 1. Study measures and assessment times.

Pre-treatment	Time of assessment	Source of assessment
Sociodemographic data	BL	Phone call
ADIS-IV	BL, Post-T, FU	Phone call
Preferences Scale	BL, Post-T, FU	Phone call
Treatment's Opinion	Post-T	Phone call
Qualitative interview	Post-T	Phone call
FFQ-II	BL, Post-T, FU	NO-FEAR Airlines/SurveyMonkey
FFS	BL, Post-T, FU	Phone call
Fear and Avoidance Scales	BL, Post-T, FU	Phone call
Clinician Severity Scale	BL, Post-T, FU	Phone call
Expectations Scale/Satisfaction Scale	BL, Post-T, FU	Phone call
FP particularities	BL, Post-T, FU	NO-FEAR Airlines
Anxiety during exposure	During exposure scenarios	NO-FEAR Airlines
Sense of presence and reality judgment	After exposure scenarios	NO-FEAR Airlines
Exposure cycles	After exposure scenarios	NO-FEAR Airlines
Patient's Improvement Scale	Post-T, FU	Phone call
RJPQ	Post-T	NO-FEAR Airlines

ADIS-IV: Anxiety Disorders Interview Schedule; *FFQ-II*: Fear of Flying Questionnaire; *FFS*: Fear of Flying Scale; *FP*: Flying Phobia; *RJPQ*: Reality Judgement and Presence Questionnaire

2.8.1. Diagnostic Interview and participants' characteristics

2.8.1.1. Sociodemographic variables

The gender, age, marital status, work status, and educational level of each participant will be registered.

2.8.1.2. Anxiety Disorders Interview Schedule (ADIS-IV; Brown et al., 1994)

This interview will be administered via phone to diagnose FP and check the fulfilment of the inclusion/exclusion criteria. The same interview will be administered at pre-, post-treatment and follow-ups. DSM-5 criteria will also be considered. This semi-structured interview will help with the differential diagnosis of other phobias or anxiety-related disorders because it has shown adequate psychometric properties and good to excellent reliability for the majority of the anxiety disorders (Antony et al., 2001).

2.8.2. Primary outcome measures of feasibility

2.8.2.1. Participant adherence

Participant adherence (i.e., attrition and dropout percentages) will be assessed in the two iCBT groups. Moreover, the number of exposure scenarios completed will be counted.

2.8.2.2. Expectations Scale and Satisfaction Scale (adapted from Borkovec and Nau, 1972)

This self-report inventory measures the patients' expectations before they start the treatment and after they receive a brief explanation about the intervention and their experimental condition. The same questions have to be answered when the patient completes the treatment in order to assess satisfaction. The 6 items are rated from 1 (“Not at all”) to 10 (“Highly”), and they provide information about the extent to which: 1) the treatment is perceived as logical; 2) patients are satisfied with the treatment; 3) they would recommend the treatment to a friend with the same problem; 4) the treatment would be useful to treat other psychological problems; 5) patients perceive the treatment as useful for their particular problem; and 6) the treatment is perceived as aversive.

2.8.2.3. Preferences questionnaire

This questionnaire collects the patient's preferences regarding the two types of images included in this study (navigable and still images) through 5 dichotomous questions where they have to choose one of the two conditions. The questions are: (1) Preference (“If you could choose between the two images, which one would you choose?”); (2) Subjective effectiveness (“Which of these two images do you think would be more effective in helping you to overcome your problem?”); (3) Logic (“Which of these two images do you think would be more logical to help you overcome your

problem"); (4) Subjective aversion ("Which of these two images do you think would be more aversive?"); and (5) Recommendation ("Which of these two images would you recommend to a friend with the same problem?"). Participants will answer these questions before the treatment and before knowing the condition to which they are allocated (after the characteristics of each type of image are explained) and after they have completed the treatment (and after seeing a short video showing the image condition they did not receive).

2.8.2.4. Qualitative interview

This interview assesses the participant's opinion of the intervention program after finishing it. The interview contains 13 items that the patient has to rate on a scale ranging from 1 ("very little") to 5 ("very much") and explain the reasons for their rating on each question. There are also two open questions where the participants have to give their overall opinion about the intervention program and the program images. In this interview, the perceived sense of presence and reality judgement in each scenario will also be assessed.

2.8.3. FP symptomatology outcomes

2.8.3.1. Fear of Flying Questionnaire (FFQ-II; Bornas et al., 1999)

The FFQ is a 30-item self-report questionnaire that assesses the anxiety the person feels in different situations of the flight process: anxiety during the flight, anxiety experienced getting on the plane, and anxiety experienced due to the observation of neutral or unpleasant flying-related situations. For each item, respondents rate their degree of discomfort associated with the situation on a scale from 1 to 9 (1 = not at all, 9 = very much). Scores range from 30 to 270. Internal consistency was $\alpha = 0.97$, and test-retest reliability (15-day retest period) was $r = 0.92$ (Bornas et al., 1999).

2.8.3.2. Fear of Flying Scale (FFS; Haug et al., 1987)

The FFS is a 21-item self-report measure to assess fear in different flying situations. Fear elicited by each situation was rated on a 4-point scale (1 = not at all, 4 = very much), with scores ranging from 21 to 84. The original FFS reported a Cronbach's alpha of 0.94 and retest reliability (after a three-month period) of 0.86 (Haug et al., 1987).

2.8.3.3. Measures related to FP recorded by the system

The program assesses information related to the history of the problem, such as the duration, safety behaviours, the number of times the patient has taken a flight, or if they have ever had any negative experiences with flying.

2.8.3.4. Fear and Avoidance Scales (adapted from Marks and Mathews, 1979)

Fear and avoidance of the flight situation will be measured on a scale ranging from 0 ("No fear at all," "I never avoid it") to 10 ("Severe fear," "I always avoid it"). The degree of belief in catastrophic thoughts is also assessed on a scale from 0 to 10. This scale has shown good reliability and sensitivity to change (Marks and Mathews, 1979).

2.8.3.5. The Clinician Severity Scale (adapted from Di Nardo et al., 1994)

The clinician rates the severity of the patient's symptomatology on a scale from 0 to 8, where 0 is symptom-free and 8 is extremely severe.

2.8.3.6. Patient's Improvement Scale (adapted from the Clinical Global Impression scale, CGI; Guy, 1976).

One item on the CGI scale was adapted in order to assess the participant's degree of improvement (compared to baseline) on a 7-point scale (1 "much worse" to 7 "much better"). This scale is answered by the patient.

2.8.4. Sense of presence and reality judgement measures

2.8.4.1. Sense of presence and reality judgement

When the exposure scenario is completed (anxiety level less than 3), the program will assess, on scales from 0 to 10, the extent to which the patients feel present in the situation and the extent to which they feel the situation is real.

2.8.4.2. Reality Judgement and Presence Questionnaire (RJPQ) (adapted from Baños et al., 2005)

The original questionnaire showed a three-factor solution, and in this adapted version of 18 items, the questions assessing reality judgement and sense will be administered. A 0–10 Likert scale is used to respond to all items.

2.8.5. Other measures recorded by the system

2.8.5.1. Anxiety level after the scenario

After each exposure cycle, the program will ask the patient to rate the maximum level of anxiety experienced during the exposure situation on a scale ranging from 0 (“no anxiety”) to 10 (“maximum level of anxiety”). If the anxiety level is not less than 3, another cycle of the same scenario will be repeated until the anxiety level is low enough.

2.8.5.2. Cycles in each exposure scenario

The program will record the number of cycles each participant performs in each exposure scenario. Each cycle is 3 min long.

2.9. Data analysis

Descriptive statistics will be conducted in order to examine participants' satisfaction, preferences, opinion and acceptance in both experimental conditions. Dropout rates and attrition will also be calculated.

Analyses of the sociodemographic and baseline measures will be conducted to verify that there are no significant differences between the groups. For this purpose, one-way ANOVAs for continuous data and chi-square tests for categorical variables will be used.

Mixed-model analysis will be conducted to test the potential effectiveness of the intervention for the FP symptomatology outcomes measures at post-treatment and the 3- and 12-month follow-ups in order to handle missing data (Salim et al., 2008). The results will be reported following CONSORT recommendations and SPIRIT guidelines (Chan et al., 2013; Eysenbach, 2011). Effect sizes will be calculated using Cohen's d to assess between- and within-group changes. Chi-square tests will also be calculated to assess group differences in behavioural outcomes (number of flights taken after treatment and safety behaviours) at post-treatment and follow-ups.

Furthermore, Bootstrap regression analysis will be carried out using PROCESS approach (https://afhayes.com/) (Preacher and Hayes, 2004), in order to explore the relationship between the group condition and the FP symptomatology outcome measures, considering the sense of presence and reality judgement at post-treatment as the proposed mediator. In addition, separate mediation and moderation analyses will be conducted to

explore the association between the experimental condition and the sense of presence and reality judgement assessed at post-treatment, and test whether the questions on sense of presence and reality judgement assessed after each exposure scenario would be significant mediators/moderators in this relationship.

Statistical analyses will be conducted with the IBM SPSS version 26.0 and with process PROGRAM.

3. **DISCUSSION**

FP is a prevalent disorder, but people suffering from it do not always seek help due to rejection of in vivo exposure. Based on the guidelines to find new ways to deliver psychological treatments, NO-FEAR Airlines can be a useful tool. The program has already demonstrated its efficacy in reducing phobic symptoms in a previous study, and there are data showing that it is a well-accepted program (Campos et al., 2018). However, more of the program variables can be explored and improved. This study protocol describes a pilot study on the feasibility of an ICBT for FP, but using two types of images with different degrees of immersion in order to explore feasibility and patients' satisfaction, acceptance and opinion and evaluate if a change in the exposure images used in the program will be feasible in a future RCT. Secondary goals are to explore the potential effectiveness of both treatment conditions compared to a WL control group, and the role of sense of presence and reality judgement in the exposure scenarios and their possible relationship with FP symptomatology outcomes.

The acceptability data of the previous study (Campos et al., 2018) showed that participants rated still images as less useful than psychoeducation and overlearning, and referred that they would prefer 360° images or short videos with movement. As still images have already shown its efficacy in NO-FEAR Airlines (Campos et al., 2019), we want to explore the participants' opinion and preferences about navigable images before changing them all. This is the reason why only two of the six scenarios are navigable in one of the conditions.

To our knowledge, there are no previous studies on the role of 360° images versus still images, or presence and reality judgement, in exposure scenarios delivered through the Internet, and their impact on anxiety. As mentioned before, still images have already

shown their efficacy (Campos et al., 2019), but whether the sense of presence and reality judgement increase with a wider field of view and mediate in the treatment outcome remains unexplored. There is evidence of the efficacy of online image-based exposure therapy (Matthews et al., 2015), but the level of immersion needed in these images has yet to be explored in these interventions. In the case of VRET, there is a positive correlation between immersive technology and presence and anxiety (Ling et al., 2014), but research with participants with clinical symptoms also suggests that, although some level of presence is needed, higher levels of immersion do not lead to higher levels of anxiety than medium levels of immersion (Kwon et al., 2013). There is also evidence that visual realism is not an important factor in presence (Gromer et al., 2019), but a wide field of view is (Zikic, 2007). Whether a similar process occurs in online exposure is still unknown.

This study has some strengths: as mentioned above, this is the first study to explore the feasibility, acceptance and satisfaction with different type of images used in an ICBT for FP and continues to be one of the few interventions where the exposure technique is directly delivered through the Internet. Additionally, this is also the first study to analyse the role of presence and reality judgement in an ICBT and explore the role of 360-degree images in exposure scenarios delivered through the Internet. In this line, the literature on reality judgement is still scarce, even in VRET, and so this study will contribute to the knowledge in this field as well. The program is based on two previous studies in the field of computer-based interventions that have already demonstrated their efficacy (Campos et al., 2019; Tortella-Feliu et al., 2008). This study aims to keep improving the intervention offered to people suffering from FP in order to increase their satisfaction with the program.

Some limitations of this study should be acknowledged. In this study, telephone support will not be used, based on the results related to weekly support in the previous study using NO-FEAR Airlines, where therapist support did not show better treatment efficacy than the totally self-applied condition. However, encouraging messages will be sent to participants by email every two weeks. Second, not all the exposure scenarios in the navigable image condition will be 360° photographs. However, this means that participants in this condition will see both types of images, which will help to explore their preferences. Third, FP presents high comorbidity with other phobic and anxiety disorders, and this can interfere with the outcome measures. Lastly, COVID-19 may

impact in the results of this study as flights have been restricted in some countries. This will be taken into consideration on the patients' assessments and, if they have not flied, they will be asked whether the reason has to do with flight restrictions due to COVID-19 or to any other reason derived from the pandemic.

4. CONCLUSION

Despite its limitations, this study is the first one to explore the use of 360° images in a treatment for FP delivered through the Internet. If this type of images is found to be useful, this study will contribute to the way ICBT programs are designed and developed, and, specifically, it will help with the way exposure scenarios are delivered in ICBTs. As a secondary aim, it will also contribute to explore the potential effectiveness of an image-based exposure therapy through the Internet using two types of images, and to the knowledge about the role of sense of presence and reality judgement in an ICBT. The use of more immersive images might help to enhance adherence to the program. This study will also add more evidence about the use of self-applied ICBTs that employ the exposure technique for specific phobias in a field where studies have been scarce.

ABBREVIATIONS

FP: Flying Phobia; VRET: Virtual Reality Exposure Therapy; ICBT: Internet-based Cognitive Behavioural Therapy; RCT: Randomized Controlled Trial; WL: Waiting List

DECLARATION OF COMPETING INTEREST

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

ACKNOWLEDGEMENTS

This work was supported by Spanish Ministerio de Ciencia Innovación y Universidades (Programa Estatal I + D + i. RTI2018-100993-B-100), Personal

Technologies for Affective Health (AffecTech. H2020-MSCA-ITN-2016 722022. Excellence Research Program PROMETEO ("INTERSABIAS" project-PROMETEO/2018/110/ Conselleria d'Educació, Investigació, Cultura i Esport, Generalitat Valenciana), CIBEROBN, an initiative of the ISCIII (ISC III CB06 03/ 0052), and Plan 2018 de Promoción de la Investigación de la Universitat Jaume I (UJI-2018-57).

FUNDING

This research is supported by Generalitat Valenciana through a pre-doctoral grant (VALi+d) (ACIF/2017/191) provided to one of the authors. The funding body did not play any role in the design of the study, nor will it play any role in data collection, analysis, interpretation of data or the writing of manuscripts.

5. REFERENCES

American Psychiatric Association, 2013. Diagnostic and Statistical Manual of Mental Disorders (DSM-5). Author, Washington, DC.

Andersson, G., 2016. Internet-delivered psychological treatments. Annu. Rev. Clin. Psychol. 12 (1), 157–179. https://doi.org/10.1146/annurev-clinpsy-021815-093006.

Andersson, G., Waara, J., Jonsson, U., Malmaeus, F., Carlbring, P., Öst, L.G., 2009. Internet-based self-help versus one-session exposure in the treatment of spider phobia: a randomized controlled trial. Cogn. Behav. Ther. 38 (2), 114–120. https://doi.org/ 10.1080/16506070902931326

Andersson, G., Waara, J., Jonsson, U., Malmaeus, F., Carlbring, P., Öst, L.G., 2013. Internet-based exposure treatment versus one-session exposure treatment of snake phobia: a randomized controlled trial. Cogn. Behav. Ther. 42 (4), 284–291. https:// doi.org/10.1080/16506073.2013.844202.

Andrews, Gavin, Cuijpers, P., Craske, M.G., McEvoy, P., Titov, N., 2010. Computer therapy for the anxiety and depressive disorders is effective, acceptable and practical health care: a meta-analysis. PLoS One 5 (10). https://doi.org/10.1371/journal. pone.0013196.

Andrews, G., Basu, A., Cuijpers, P., Craske, M.G., McEvoy, P., English, C.L., Newby, J.M., 2018. Computer therapy for the anxiety and depression disorders is effective, acceptable and practical health care: an updated meta-analysis. J. Anxiety Disorders 55, 70–78. https://doi.org/10.1016/j.janxdis.2018.01.001.

Antony, M.M., Orsillo, S.M., Roemer, L. (Eds.), 2001. Practitioner's Guide to Empirically Based Measures of Anxiety. Springer Science & Business Media. Baños, R.M., Botella, C., García-Palacios, A., Villa, H., Perpiñá, C., Alcañiz, M., 2000. Presence and reality judgment in virtual environments: a unitary construct? CyberPsychol. Behav. 3 (3), 327–335. https://doi.org/10.1089/10949310050078760.

Baños, R., Quero, S., Salvador, S., Botella, C., 2005. The role of presence and reality judgement in virtual environments in clinical psychology. Cyberpsych. Behav. 8 (4), 303–304.

Borkovec, T.D., Nau, S.D., 1972. Credibility of analogue therapy rationales. J. Behav. Ther. Exp. Psychiatry 3 (4), 257–260. https://doi.org/10.1016/0005-7916(72)90045-6.

Bornas, X., Tortella-Feliu, M., De la Banda, G., 1999. Factor validity of the fear of flying questionnaire. Anal. Modification Conducta 25, 885–907.

Botella, C., Quero, S., Baños, R.M., García-Palacios, A., Breton-López, J., Alcañiz, M., Fabregat, S., 2008. Telepsychology and self-help: the treatment of phobias using the internet. CyberPsychol. Behav. 11 (6), 659–664. https://doi.org/10.1089/cpb.2008.0012.

Botella, C., Fernández-Álvarez, J., Guillén, V., García-Palacios, A., Baños, R., 2017. Recent progress in virtual reality exposure therapy for phobias: a systematic review. Curr. Psychiatry Rep. 19 (7) https://doi.org/10.1007/s11920-017-0788-4.

Brown, T.A., Di Nardo, P.A., Barlow, D.H., 1994. Anxiety disorders interview schedule for DSM - IV (ADIS - IV). In: Clinician's Manual. Graywind Publications.

Busscher, B., Spinhoven, P., van Gerwen, L.J., de Geus, E.J.C., 2013. Anxiety sensitivity moderates the relationship of changes in physiological arousal with flight anxiety during in vivo exposure therapy. Behav. Res. Ther. 51 (2), 98–105. https://doi.org/10.1016/J.BRAT.2012.10.009.

Campos, D., Bretón-López, J., Botella, C., Mira, A., Castilla, D., Baños, R., Tortella-Feliu, M., Quero, S., 2016. An internet-based treatment for flying phobia (NO-FEAR Airlines): study protocol for a randomized controlled trial. BMC Psychiatry 16 (1), 1–11. https://doi.org/10.1186/s12888-016-0996-1.

Campos, D., Mira, A., Bretón-López, J., Castilla, D., Botella, C., Baños, R.M., Quero, S., 2018. The acceptability of an internet-based exposure treatment for flying phobia with and without therapist guidance: patients' expectations, satisfaction, treatment preferences, and usability. Neuropsychiatr. Dis. Treat. 14, 879–892. https://doi.org/ 10.2147/NDT.S153041.

Campos, D., Bretón-López, J., Botella, C., Mira, A., Castilla, D., Mor, S., Baños, R., Quero, S., 2019. Efficacy of an internet-based exposure treatment for flying phobia (NO-FEAR Airlines) with and without therapist guidance: a randomized

controlled trial. BMC Psychiatry 19 (1), 1–16. https://doi.org/10.1186/s12888-019-2060-4.

Carlbring, P., Andersson, G., Cuijpers, P., Riper, H., Hedman-Lagerlöf, E., 2018. Internet- based vs. face-to-face cognitive behavior therapy for psychiatric and somatic disorders: an updated systematic review and meta-analysis. Cogn. Behav. Ther. 47 (1), 1–18. https://doi.org/10.1080/16506073.2017.1401115.

Chan, A.-W., Tetzlaff, J.M., Gotzsche, P.C., Altman, D.G., Mann, H., Berlin, J.A., Dickersin, K., Hrobjartsson, A., Schulz, K.F., Parulekar, W.R., Krleza-Jeric, K., Laupacis, A., Moher, D., 2013. SPIRIT 2013 explanation and elaboration: guidance for protocols of clinical trials. BMJ 346 (jan08 15), e7586. https://doi.org/10.1136/ bmj.e7586.

Choy, Y., Fyer, A.J., Lipsitz, J.D., 2007. Treatment of specific phobia in adults. Clin. Psychol. Rev. 27 (3), 266–286. https://doi.org/10.1016/J.CPR.2006.10.002.

Cuijpers, 2003. Examining the effects of prevention programs on the incidence of new cases of mental disorders: the lack of statistical power. Am. J. Psychiatr. 160 (8), 1385–1391. https://doi.org/10.1176/appi.ajp.160.8.1385.

Di Nardo, P., Brown, T., Barlow, D., 1994. Anxiety Disorders Interview Schedule for DSM-IV: Lifetime Version (ADIS-IV-L). Graywind Publications Inc, New York.

Diemer, J., Alpers, G.W., Peperkorn, H.M., Shiban, Y., Mühlberger, A., 2015. The impact of perception and presence on emotional reactions: a review of research in virtual reality. Front. Psychol. 6 https://doi.org/10.3389/fpsyg.2015.00026.

Eaton, W.W., Bienvenu, O.J., Miloyan, B., 2018. Specific phobias. Lancet Psychiatry 5 (8), 678–686. https://doi.org/10.1016/S2215-0366(18)30169-X.

Eldridge, S.M., Chan, C.L., Campbell, M.J., Bond, C.M., Hopewell, S., Thabane, L., Lancaster, G.A., 2016. CONSORT 2010 Statement: Extension to Randomised Pilot and Feasibility Trials. https://doi.org/10.1136/bmj.i5239.

Eysenbach, G., 2011. CONSORT-EHEALTH: improving and standardizing evaluation reports of web-based and mobile health interventions. J. Med. Internet Res. 13 (4), e126 https://doi.org/10.2196/jmir.1923.

Foreman, E.I., Bor, R., van Gerwen, L., 2006. The nature, characteristics, impact and personal implications of fear of flying. In: Bor, R., Hubbard, T. (Eds.), Aviation Mental Health: Psychological Implications for Air Transportation. Ashgate, Aldershot, pp. 53–68.

García-Palacios, A., Botella, C., Hoffman, H., Fabregat, S., 2007. Comparing acceptance and refusal rates of virtual reality exposure vs. in vivo exposure by patients with specific phobias. CyberPsychol. Behav. 10 (5), 722–724. https://doi.org/10.1089/ cpb.2007.9962.

Gromer, D., Reinke, M., Christner, I., Pauli, P., 2019. Causal interactive links between presence and fear in virtual reality height exposure. Front. Psychol. 10 (JAN), 141. https://doi.org/10.3389/fpsyg.2019.00141.

Guy, W.B., 1976. Clinical global impression. In: Assessment Manual for Psychopharmacology, pp. 217–222.

Haug, T., Berntzen, D., Götestam, K.G., Brenne, L., Johnsen, B.H., Hugdahl, K., 1987. A three-systems analysis of fear of flying: a comparison of a consonant vs a non-consonant treatment method. Behav. Res. Ther. 25 (3), 187–194. https://doi.org/ 10.1016/0005-7967(87)90045-3.

Higuera-Trujillo, J.L., López-Tarruella Maldonado, J., Llinares Millán, C., 2017. Psychological and physiological human responses to simulated and real environments: a comparison between photographs, 360◦ panoramas, and virtual reality. Appl. Ergon. 65, 398–409. https://doi.org/10.1016/j.apergo.2017.05.006.

Kazdin, A.E., Blase, S.L., 2011. Rebooting psychotherapy research and practice to reduce

the burden of mental illness. Perspect. Psychol. Sci. 6 (1), 21–37. https://doi.org/ 10.1177/1745691610393527.

Kok, R.N., van Straten, A., Beekman, A.T.F., Cuijpers, P., 2014. Short-term effectiveness of web-based guided self-help for phobic outpatients: randomized controlled trial. J. Med. Internet Res. 16 (9), e226 https://doi.org/10.2196/jmir.3429.

Krijn, M., Emmelkamp, P.M., Biemond, R., de Wilde de Ligny, C., Schuemie, M.J., van der Mast, C.A.P., 2004. Treatment of acrophobia in virtual reality: the role of immersion and presence. Behav. Res. Ther. 42 (2), 229–239. https://doi.org/10.1016/S0005-7967(03)00139-6.

Kwon, J.H., Powell, J., Chalmers, A., 2013. How level of realism influences anxiety in virtual reality environments for a job interview. Int. J. Hum. Comput. Stud. 71 (10), 978–987. https://doi.org/10.1016/j.ijhcs.2013.07.003.

Ling, Y., Nefs, H.T., Morina, N., Heynderickx, I., Brinkman, W.-P., 2014. A meta-analysis on the relationship between self-reported presence and anxiety in virtual reality exposure therapy for anxiety disorders. PLoS One 9 (5), e96144. https://doi.org/ 10.1371/journal.pone.0096144.

Marks, I.M., Mathews, A.M., 1979. Brief standard self-rating for phobic patients. Behav. Res. Ther. 17 (3), 263–267. https://doi.org/10.1016/0005-7967(79)90041-X.

Matthews, A., Naran, N., Kirkby, K.C., 2015. Symbolic online exposure for spider fear: habituation of fear, disgust and physiological arousal and predictors of symptom improvement. J. Behav. Ther. Exp. Psychiatry. https://doi.org/10.1016/j. jbtep.2014.12.003.

Oakes, M., Bor, R., 2010. The psychology of fear of flying (part I): a critical evaluation of current perspectives on the nature, prevalence and etiology of fear of flying.

Travel Med. Infect. Dis. 8 (6), 339–363. https://doi.org/10.1016/j.tmaid.2010.10.002.

Olthuis Janine, V., Watt Margo, C., Bailey, K., Hayden Jill, A., Stewart Sherry, H., 2015. Therapist-supported Internet cognitive behavioural therapy for anxiety disorders in adults. Cochrane Database Syst. Rev. 3 https://doi.org/10.1002/14651858.CD011565.

Parsons, T.D., Rizzo, A.A., 2008. Affective outcomes of virtual reality exposure therapy for anxiety and specific phobias: a meta-analysis. J. Behav. Ther. Exp. Psychiatry 39 (3), 250–261. https://doi.org/10.1016/J.JBTEP.2007.07.007.

Preacher, K.J., Hayes, A.F., 2004. SPSS and SAS procedures for estimating indirect effects in simple mediation models. Behav. Res. Methods Instrum. Comput. 36 (4), 717–731. https://doi.org/10.3758/BF03206553.

Price, M., Anderson, P., 2007. The role of presence in virtual reality exposure therapy. J. Anxiety Disorders 21 (5), 742–751. https://doi.org/10.1016/J. JANXDIS.2006.11.002.

Price, M., Mehta, N., Tone, E.B., Anderson, P.L., 2011. Does engagement with exposure yield better outcomes? Components of presence as a predictor of treatment response for virtual reality exposure therapy for social phobia. J. Anxiety Disorders 25 (6), 763–770. https://doi.org/10.1016/j.janxdis.2011.03.004.

Riva, G., Mantovani, F., Capideville, C.S., Preziosa, A., Morganti, F., Villani, D., Gaggioli, A., Botella, C., Alcan˜iz, M., 2007. Affective interactions using virtual reality: the link between presence and emotions. CyberPsychol. Behav. 10 (1), 45–56. https://doi.org/10.1089/cpb.2006.9993.

Robillard, G., Bouchard, S., Fournier, T., Renaud, P., 2003. Anxiety and presence during VR immersion: a comparative study of the reactions of phobic and non-phobic participants in therapeutic virtual environments derived from computer games. CyberPsychol. Behav. 6 (5), 467–476. https://doi.org/10.1089/109493103769710497.

Salim, A., Mackinnon, A., Christensen, H., Griffiths, K., 2008. Comparison of data analysis strategies for intent-to-treat analysis in pre-test–post-test designs with substantial dropout rates. Psychiatry Res. 160 (3), 335–345.

Schneider, A.J., Mataix-Cols, D., Marks, I.M., Bachofen, M., 2005. Internet-guided self-help with or without exposure therapy for phobic and panic disorders: a randomised controlled trial. Psychother. Psychosom. 74 (3), 154–164. https://doi.org/10.1159/000084000.

Schröder, J., Jelinek, L., Moritz, S., 2017. A randomized controlled trial of a transdiagnostic Internet intervention for individuals with panic and phobias – one size fits all. J. Behav. Ther. Exp. Psychiatry 54, 17–24. https://doi.org/10.1016/J. JBTEP.2016.05.002.

Shahnavaz, S., Hedman-Lagerlöf, E., Hasselblad, T., Reuterskiöld, L., Kaldo, V., Dahllöf, G., 2018. Internet-based cognitive behavioral therapy for children and adolescents with dental anxiety: open trial. J. Med. Internet Res. 20 (1) https://doi.org/10.2196/jmir.7803.

Steuer, J., 1992. Defining virtual reality: characteristics determining telepresence. J. Commun. 42 (4), 73–94.

Tardif, N., Therrien, C.-E´., Bouchard, S., 2019. Re-examining psychological mechanisms underlying virtual reality-based exposure for spider phobia. Cyberpsychol. Behav. Soc. Netw. 22 (1), 39–45. https://doi.org/10.1089/cyber.2017.0711.

Tortella-Feliu, M., Bornas, X., Llabres, J., 2008. Computer-assisted exposure treatment for flight phobia. Int. J. Behav. Consult. Ther. 4 (2), 158–171. https://doi.org/10.1037/h0100840.

Tortella-Feliu, M., Botella, C., Llabr´es, J., Bretón-López, J.M., del Amo, A.R., Ban˜os, R.M., Gelabert, J.M., 2011. Virtual reality versus computer-aided exposure treatments for fear of flying. Behav. Modif. 35 (1), 3–30. https://doi.org/10.1177/0145445510390801.

Viechtbauer, W., Smits, L., Kotz, D., Budé, L., Spigt, M., Serroyen, J., Crutzen, R., 2015. A simple formula for the calculation of sample size in pilot studies. J. Clin. Epidem. 68 (11), 1375–1379. https://doi.org/10.1016/j.jclinepi.2015.04.014.

Vigerland, S., Thulin, U., Ljótsson, B., Svirsky, L., O¨ st, L.G., Lindefors, N., Andersson, G., Serlachius, E., 2013. Internet-delivered CBT for children with specific phobia: a pilot study. Cogn. Behav. Ther. 42 (4), 303–314. https://doi.org/10.1080/16506073.2013.844201.

Wardenaar, K.J., Lim, C.C.W., Al-Hamzawi, A.O., Alonso, J., Andrade, L.H., Benjet, C., Bunting, B., de Girolamo, G., Demyttenaere, K., Florescu, S.E., Gureje, O., Hisateru, T., Hu, C., Huang, Y., Karam, E., Kiejna, A., Lepine, J.P., Navarro-Mateu, F., Oakley Browne, M., de Jonge, P., 2017. The cross-national epidemiology of specific phobia in the World Mental Health Surveys. Psychol. Med. 47 (10), 1744–1760. https://doi.org/10.1017/S0033291717000174.

Wechsler, T.F., Mühlberger, A., Kümpers, F., 2019. Inferiority or even superiority of virtual reality exposure therapy in phobias? - a systematic review and quantitative meta-analysis on randomized controlled trials specifically comparing the efficacy of virtual reality exposure to gold standard in vivo exposure in agoraphobia, specific phobia and social phobia. In: Frontiers in Psychology, Vol. 10. Frontiers Media S.A., p. 1758. https://doi.org/10.3389/fpsyg.2019.01758. Issue JULY.

Wolitzky-Taylor, K.B., Horowitz, J.D., Powers, M.B., Telch, M.J., 2008. Psychological approaches in the treatment of specific phobias: a meta-analysis. Clin. Psychol. Rev. 28 (6), 1021–1037. https://doi.org/10.1016/J.CPR.2008.02.007.

Zikic, N., 2007. Evaluating Relative Impact of VR Components Screen Size, Stereoscopy and Field of View on Spatial Comprehension and Presence in Architecture (Doctoral dissertation). Pennsylvania State University.

CHAPTER 3

STUDY RESULTS

This chapter has been submitted as:

Mor, S., Botella, C., Campos, D., Carlbring, P., Tur, C. & Quero, S. (2021). An Internet-based treatment for Flying Phobia using 360° images: A feasibility pilot study.[*Submitted to Internet Interventions*]

An Internet-based treatment for Flying Phobia using 360° images: A feasibility pilot study

Sonia Mor[1], Cristina Botella[1,2], Daniel Campos[3,4], Per Carlbring[5], Cintia Tur[1], & Soledad Quero[1,2]

[1]Universitat Jaume I, Castellón, Spain.

[2]CIBER de Fisiopatología de la Obesidad y Nutrición (CIBEROBN), Carlos III Institute of Health, Madrid, Spain.

[3]Department of Psychology and Sociology, University of Zaragoza, Huesca, Spain

[4]Instituto de Investigación Sanitaria Aragón (IISAragon), Zaragoza, Spain

[5]Department of Psychology, Stockholm University, Stockholm, Sweden

ABSTRACT

Background: More research is needed in the field of Internet-delivered Cognitive Behavioral Treatments (ICBTs) for specific phobia in order to understand which characteristics are important in online exposure scenarios. The aim of the present work was to conduct a feasibility pilot study to explore participants' opinions, preferences, and acceptability ratings of two types of images (still images vs 360º navigable images) in an ICBT for Flying Phobia (FP). A secondary aim was to test the potential effectiveness of the two active treatment arms compared to a waiting list control group. An exploratory aim was to compare the role of navigable images vs. still images in the level of sense of presence and reality judgment and explore their possible mediation in treatment effectiveness.

Methods: Participants were randomly allocated to three conditions: NO-FEAR Airlines with still images (n=26), NO-FEAR Airlines with still and navigable images (n=26), and a waiting list group (n=26). Primary outcome measures were participants' opinions, preferences, satisfaction, and acceptance regarding the images used in the exposure scenarios. Secondary outcome measures included FP symptomatology outcomes and measures of sense of presence and reality judgment. Participants in the study preferred navigable images over still images before and after treatment (over 84%), and they considered them more effective and logical for the treatment of their problem. However, adherence in the experimental conditions was low (42.3% dropout rate), and more participants withdrew from the group that included navigable images compared to the group that only included still images (14 vs. 8), with no statistical differences in attrition between the two conditions. NO-FEAR Airlines proved to be effective in reducing FP symptomatology compared to the control group, with large between-group effect sizes on all FP measures (ranging from 0.76 to 2.79). No significant mediation effect was found for sense of presence or reality judgment in treatment effectiveness.

Discussion: The results of the current study suggest that participants prefer more immersive images in exposure scenarios, providing data that can help to design useful

exposure scenarios to treat specific phobias in the future. They also provide evidence supporting the effectiveness of an ICBT for FP.

Trial registration: Registered at Clinicaltrials.gov (NCT03900559) on April 9, 2019. Retrospectively registered.

Keywords: Internet-based intervention, Exposure therapy, Treatment preferences, Sense of presence, Reality judgment.

1. INTRODUCTION

Flying phobia (FP) is a situational specific phobia (SP) classified as an anxiety disorder in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association, 2013). It can cause serious interference in people's lives and have an impact on important life events, personal relationships, professional opportunities, and leisure time (Foreman et al., 2006; Medialdea & Tejada, 2005). Fear related to flying is present in up to 13% of adults in the general population according to epidemiological data (Eaton et al., 2018), but only about 1.3% meet the diagnostic criteria for FP (Wardenaar et al., 2017). People suffering from FP use different safety behaviors when a flight cannot be avoided (Oakes & Bor, 2010), including the use of alcohol or anxiolytics (Wilhelm & Roth, 1997), which contributes to the maintenance of the problem (Clark & Rock, 2016).

In vivo exposure is the treatment of choice for SP, and it has been established as the most effective intervention for this disorder (Choy et al., 2007; Wolitzky-Taylor et al., 2008). However, access to the phobic stimulus can be difficult and expensive, as in the case of FP. Virtual reality exposure therapy (VRET) has become a popular alternative for *in vivo* exposure, and its effectiveness for the treatment of FP has been demonstrated (Botella et al., 2004; Cárdenas et al., 2016; Czerniak et al., 2016; da Costa et al., 2008; Riva et al., 2001; Rothbaum et al., 2006). There is a need to develop interventions that are not based on the dominant face-to-face individual model (Kazdin, 2015).

Internet-delivered cognitive behavioral treatments (ICBTs) have great potential for facilitating access to psychological treatments (Andersson et al., 2019). They also have other advantages, such as cost-effectiveness, enhanced learning and retention for patients, and faster therapist support (Andersson & Titov, 2014). The effectiveness of ICBTs has been shown for a wide range of disorders, including anxiety disorders (Andersson, 2016; Andrews et al., 2018), but research on the treatment of SP is still scarce in this field. Two randomized controlled trials (RCT) for the treatment of animal phobias can be found in the literature (Andersson et al., 2009, 2013), in which an ICBT was compared to an active treatment control group condition. Other non-randomized studies have been conducted, including a study for children with several SP (Vigerland et al., 2016), a study for children and adolescents with dental anxiety (Shahnavaz et al., 2018), a series of case studies for small animal phobia (Botella et al., 2008), and two studies with arachnophobic participants (Matthews et al., 2011, 2012). A more detailed description of

these studies and a synthesis of the findings on ICBT for SP to date can be found in a recent systematic review (Mor et al., 2021) that can be found in Chapter 1 of the present thesis.

To the best of our knowledge, only one ICBT has targeted FP. NO-FEAR Airlines is a self-help Internet intervention developed by our research group that includes different images related to flying so that the patient can carry out exposure tasks online. This program demonstrated its effectiveness in a recent RCT (Campos et al., 2019), where two experimental conditions (a group with therapist guidance and a completely self-administered condition) were compared to a waiting list control group. Both experimental groups showed reductions in FP symptomatology, with no differences found between them. However, only still photographs were used in the exposure scenarios, and although the program was well accepted, patients rated the usefulness of the images lower than other components and indicated that they would prefer other types of images, such as 360º photographs or short videos with movement (Campos et al., 2018).

Immersive technology can help to increase the sense of presence, defined as the sense of being in a virtual environment (Steuer, 1992), as well as the emotional response experienced in a virtual scenario (Ling et al., 2014). Immersion is not the only factor that influences the sense of presence. The studies carried out in this field with VRET showed that, when a scenario engaged with the emotions, the sense of presence increased, and at the same time, presence was a significant predictor of emotional responses (Gromer et al., 2019; Riva et al., 2007). It has been suggested that, although high levels of immersion might not be necessary with clinical participants (Kwon et al., 2013), some immersive factors, such as a wider field of view, have an impact on presence (Cummings & Bailenson, 2016). Thus, 360º panoramas could have potential because they can evoke similar cognitive and emotional responses to the ones experienced in a real physical environment, and they are more realistic than still images (Minns et al., 2018; Higuera-Trujillo et al., 2017). Another factor that might be important to consider in virtual environments is reality judgment, defined as the extent to which an experience is acknowledged as real in terms of willingness to interpret the virtual experience as veridical (Baños et al., 2000). However, this construct has been poorly studied to date.

Research on the sense of presence and reality judgments has been conducted in VRET (Groemer et al., 2019; Cummings & Bailenson, 2016, Price & Andersson, 2007; Baños et al, 2000), but no studies have been found in the literature on these topics in

ICBTs. As previously mentioned, NO-FEAR Airlines only included still images in the exposure scenarios in the previous study (Campos et al., 2016, 2019). The aim of the present work is to report the results of a feasibility pilot study conducted to explore participants' opinions, preferences, and acceptance of two types of images in the exposure scenarios of the program (still images vs 360º navigable images). As a secondary aim, the results on the potential effectiveness of the two active treatment arms compared to a waiting list control group will be reported. Finally, the results of an exploratory study comparing navigable images and still images on their level of sense of presence and reality judgment and whether these variables mediate treatment efficacy will also be described.

2. METHOD

2.1. Study design

A pilot study on the feasibility of an ICBT intervention for FP using two types of images was conducted. Participants were randomly allocated to three conditions: NO-FEAR Airlines with still images (NFA), NO-FEAR Airlines with still and navigable images (NFA+NI), and a waiting list (WL) control group. Participants agreed to participate in the study without knowing to which condition they would be allocated, and the randomization was conducted by an independent researcher who was not involved in the study. Assessments were carried out at pretreatment, posttreatment, and 3- and 12-month follow-ups. For ethical reasons, participants in the WL control group were offered treatment when they completed the assessment after the 6-week waiting period, and so data from the follow-ups were not available for this group. An online informed consent form was signed by participants before randomization. Participation was completely voluntary, and participants were able to leave the study at any time.

The sample size was based on practical considerations and the previous study using NO-FEAR Airlines (Campos et al., 2016), as well as the expected dropout rate in ICBTs (around 20% according to recent studies; Carlbring et al., 2018). Therefore, the number of participants needed to reasonably evaluate the feasibility goals was 60 (20 participants per condition), in line with the recommendation proposed by Viechtbauer et al. (2015).

The study was registered at clinicaltrials.gov (NCT03900559) on April 9, 2019. Further details about the intervention and the study can be found in the study protocol published elsewhere (Mor et al., 2021).

The study was approved by the Ethics Committee of Universitat Jaume I (Castellón, Spain; 7/2017) and conducted following the international standards of the Declaration of Helsinki and good clinical practice.

2.2. Participants, recruitment, and eligibility criteria

Participants made contact to engage in the study via email, through the intervention website (https://fobiavolar.labpsitec.es), or by calling the emotional disorders university clinic. A 30–45 min telephone interview was arranged with people interested in receiving treatment to explain the study conditions and ensure that they fulfilled the inclusion criteria. Participants from any part of the world could participate in and benefit from the intervention, as long as they understood Spanish.

Inclusion criteria were as follows: (1) at least 18 years old; (2) meet diagnostic criteria for FP; (3) able to use a computer and have an Internet connection; (4) have an email address; and (5) able to understand and read Spanish. Exclusion criteria were: (1) currently receiving psychological treatment for FP; (2) meeting the criteria for another severe mental disorder, including alcohol or other substance abuse or dependence, psychotic disorder, dementia, and bipolar disorder; (3) diagnosed with a severe personality disorder; (4) presence of depressive symptomatology or suicidal ideation; (5) presence of heart disease; and (6) pregnancy (from the fourth month).

A psychologist with a Master's Degree in Clinical Psychology was in charge of conducting the telephone interview at pretreatment, posttreatment, and follow-up. The clinical team discussed the inclusion or exclusion of each participant assessed to ensure a reliable diagnosis. Participants were randomly allocated to one of the study conditions after signing the informed consent form.

2.3. Measures

There was no face-to-face contact with the therapist during the study; therefore, all outcome measures were completed online or by telephone. A more detailed description of the assessment can be found in the study protocol (Mor et al., 2021).

Diagnostic interview: Anxiety Disorders Interview Schedule (ADIS-IV; Brown et al., 1994). This interview was administered to ensure that participants met the criteria for FP.

Primary outcome measures of feasibility: Participants' adherence to the program; Expectations Scale and Satisfaction Scale (adapted from Borkovec and Nau, 1972), administered before and after the treatment on a scale from 0 to 10; and preferences questionnaire to assess the user's preferences for the two types of images (assessed before and after completing the program). Participants in the NFA condition were shown a short video of the navigable images, and then a qualitative interview was conducted to assess their opinions of the intervention program after finishing it. This interview had questions that could be answered on a scale ranging from 1 ("very little") to 5 ("very much"), with the option to explain their answers, as well as open questions about the program and images. Participants in the NFA+NI group had additional questions about the two types of images because they saw both during the intervention.

FP symptomatology outcomes: Fear of Flying Questionnaire (FFQ-II; Bornas et al., 1999); Fear of Flying Scale (FFS; Haug et al., 1987); Fear and Avoidance Scales (adapted from Marks and Mathews, 1979); The Clinician Severity Scale (adapted from Di Nardo et al., 1994); Patient's Improvement Scale (adapted from the Clinical Global Impression scale, CGI; Guy, 1976); Behavioral outcomes such as whether participants took a flight at post-assessment, number of flights taken, and use of safety behaviors.

Sense of presence and reality judgment measures: Reality Judgment and Presence Questionnaire (RJPQ; adapted from Baños et al., 2005), administered during and after the intervention; questions about sense of presence and reality judgment after the exposure scenario were answered on scales ranging from 0–10.

2.4. Intervention

NO-FEAR Airlines is an ICBT for the treatment of FP that includes exposure scenarios with real images and sounds related to flying. The program's graphics were designed using airline motifs, and they are presented in a linear navigation mode to make the experience easier for users (see Figure 1). The intervention has three main components: psychoeducation, which includes information related to FP with the aim of helping the participants to understand their problem; exposure, which is the main component of the intervention and consists of videos of six different scenarios (flight preparation, airport,

boarding and take off, flight, landing, and news related to plane accidents); and overlearning, an optional final module where participants can choose to repeat any of the exposure scenarios or even add more difficult conditions, such as bad weather or turbulence.

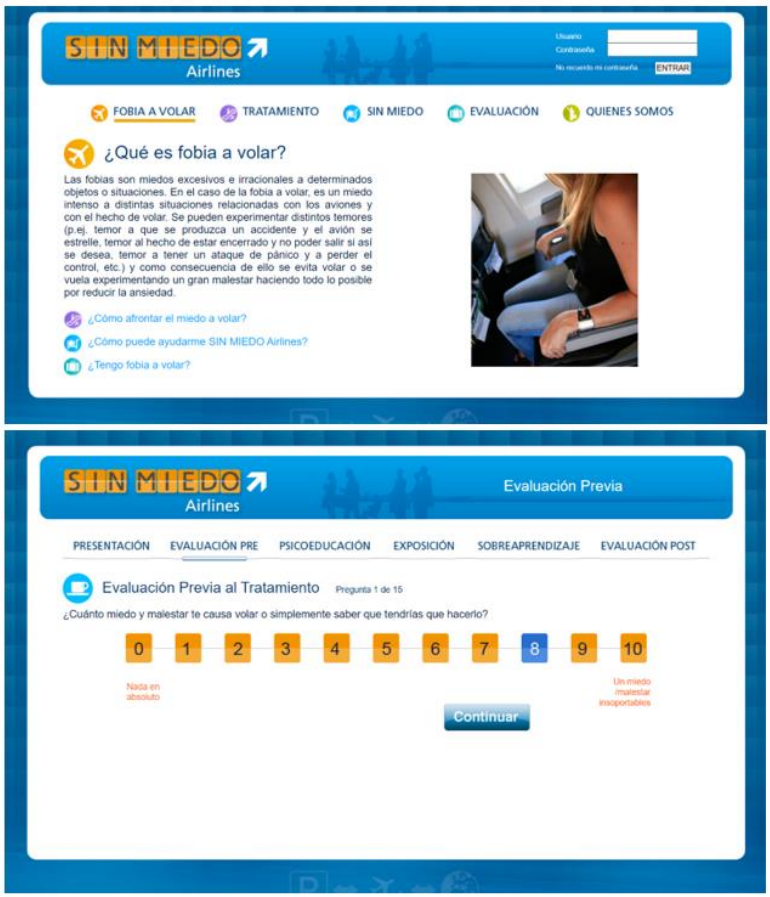


Fig. 1. NO-FEAR Airlines screenshots

The order of appearance of the exposure scenarios changes depending on participants' responses to one of the measures in pretreatment (FFQ-II; Bornas et al., 1999). The program builds a personalized exposure hierarchy for each user, except in the case of the scenario about news related to plane accidents, which is always the last one presented. The level of anxiety after each exposure scenario is recorded by the program, and if anxiety is moderate or high (3 or more on a scale from 0 to 10), the system repeats that same scenario until the anxiety level decreases.

Participants were recommended to do two exposure scenarios per week, although they were free to advance at their own pace because this was a self-paced program. They

were given a maximum period of six weeks to complete the intervention, but they could finish it sooner depending on the pace at which they moved through the program. Therapist support was not provided in this study, based on previous results with this program showing no differences in treatment efficacy (Campos et al., 2019). However, an email was sent every two weeks reminding them to log on to the platform. Participants were encouraged to take a flight within two weeks after finishing the intervention, but they could book it at another time if it worked better for them. Taking the flight was not mandatory because the costs were not covered by the study, but it was highly recommended by the program and therapists.

Two types of images were used in the exposure scenarios: 1) Still images, shown in the exposure scenarios as a string of different still photographs related to the scenario on display; and 2) Navigable images, shown in the exposure scenarios as 360º panoramic photographs that allowed participants to look at their surroundings in all directions, controlling the image rotation using a keyboard or mouse. The two formats in which the program was implemented were: a) NO-FEAR Airlines with still images (NFA) and b) NO-FEAR Airlines with still and navigable images (NFA+NI).

A sample of the flight exposure scenario for the still (http://repositori.uji.es/xmlui/bitstream/handle/10234/189216/Fijas%20avio%cc%81n.mp4?sequence=1&isAllowed=y) and navigable images (http://repositori.uji.es/xmlui/bitstream/handle/10234/189216/Navegables%20avio%cc%81n.mp4?sequence=2&isAllowed=y) presented in each condition is available online.

Because still images had already demonstrated their efficacy in reducing FP symptomatology in a previous study (Campos et al., 2019), and we aimed to assess the participants' acceptance, opinions, and preferences for the two types of images before changing them all, only two of the exposure scenarios in one of the experimental conditions consisted of 360º navigable images. Thus, participants in this experimental condition were able to see the two types of images.

2.5. Statistical analyses

Analyses of the sociodemographic and baseline measures were conducted to verify that there were no significant differences between the groups. For this purpose, one-way ANOVAs for continuous data and chi-square tests for categorical variables were

used. Shapiro-Wilk tests were conducted for all variables to check the normality of the sample distribution and select the appropriate tests for each.

To examine participants' satisfaction, preferences, opinion, and acceptance, means, standard deviations, ranges (minimum-maximum), and percentages/frequencies were calculated for each feasibility measure. Mann-Whitney's U tests were conducted to explore whether there were differences between the groups with regard to treatment expectations at pretreatment, treatment satisfaction at posttreatment, and the quantitative questions from the qualitative interview. Wilcoxon tests were performed to explore significant changes between the expectations at pretreatment and satisfaction at posttreatment in the experimental conditions, and significant differences on the specific questions for the NFA+NI group in the qualitative interview. Percentages of dropout rates and attrition were calculated. Percentages for the preference questions at pre- and posttreatment were also calculated.

Intent-to-treat (ITT) mixed-model analyses were conducted to test the potential effectiveness of the intervention for each FP symptomatology outcome measure in order to handle missing data (Salim et al., 2008). The assessment moment was used as a within-group factor, and the experimental condition as a between-group factor. Significance effects were corrected using Bonferroni tests. Little's MCAR tests were conducted to verify that data were missing at random. Between- and within-group effect sizes were calculated using Cohen's *d* (Cohen, 1988). Chi-square tests were also calculated to assess group differences in behavioral outcomes (whether a flight was taken and safety behaviors used) at posttreatment. To explore maintenance at 3- and 12-month follow-ups, *t*-tests were conducted.

Bootstrap regression analyses were carried out using the PROCESS approach (https://afhayes.com/; Preacher & Hayes, 2004) to explore the relationship between the group condition and the FP symptomatology outcome measures, considering sense of presence and reality judgment at posttreatment as proposed mediators. Separate mediation and moderation analyses were conducted to explore the association between the experimental condition and the sense of presence and reality judgment assessed at posttreatment, and to test whether the questions on sense of presence and reality judgment after each exposure scenario indicated significant mediation/moderation in this relationship.

All statistical analyses were performed using IBM SPSS version 26.0 and the jAMM program from Jamovi interference (Galluci, 2019).

3. RESULTS

3.1. Baseline data and participant characteristics

Participants' characteristics and clinical data related to their FP history are presented in Table 1, divided by group. No significant differences were found in any of the sociodemographic variables or FP outcome measures at baseline. Overall, the sample consisted of 56 women (71.8%) and 22 men (28.2%) between 19 and 66 years of age (M = 37.99, SD = 9.99). The majority of the participants were from Spain (93.6%, n = 73), but there were also participants from Argentina (3.8%, n = 3), Mexico (1.3%, n = 1), and Costa Rica (1.3%, n = 1). Only three participants were taking anxiolytics at the time of assessment. Only one of the three reported changes (increase) at post-assessment, and all three were from the WL condition. One participant in the navigable condition who was not taking any medication at pretreatment reported taking anxiolytics at posttreatment for another anxiety problem.

Table 1. Participants' sociodemographic and clinical data

	NFA (n=26)	NFA+NI (n=26)	WL (n=26)	Between-group comparison
Gender (n, %)				
Female	19 (73.1%)	17 (65.4%)	20 (76.9%)	$\chi^2(2) = 0.886$, p=.642
Male	7 (26.9%)	9 (34.6%)	6 (23.1%)	
Age mean (SD)	35.54 (10.02)	38.65 (7.88)	39.77 (11.60)	F (2,75) = 1.262, p= .289
Marital status (n, %)				
Married/in a relationship	19 (73.1%)	23 (88.5%)	22 (84.6%)	
Single	6 (23.1%)	3 (11.5%)	3 (11.5%)	$\chi^2(6) = .5.906$, p=.434
Divorced/separated	1 (3.8%)	-	-	
Widowed	-	-	1 (3.8%)	
Education level (n, %)				
Elementary education	1 (3.8%)	-	1 (3.8%)	$\chi^2(4) = 2.241$, p=.691
Secondary education	4 (15.4%)	7 (26.9%)	7 (26.9%)	
Higher education	21 (80.8%)	19 (73.1%)	18 (69.2%)	
Employment status (n, %)				
Student	3 (11.5%)	-	2 (7.7%)	
Employed	21 (80.8%)	26 (100%)	23 (88.5%)	$\chi^2(8) = 13.543$, p=.094
Unemployed	1 (3.8%)	-	-	
Work leave	-	-	1 (3.8%)	
Retired	1 (3.8%)	-	-	

Medication (n, %)				
No	25 (96.2%)	25 (96.2%)	25 (96.2%)	$\chi^2(2) = 0.000$, p>.999
Yes	1 (3.8%)	1 (3.8%)	1 (3.8%)	
Experience flying (n, %)				
No	2 (8%)	-	-	$\chi^2(2) = 3.948$, p=.139
Yes	24 (92%)	24 (100%)	24 (100%)	
FP duration (n, %)				
< 6 months	1 (3.8%)	-	-	$\chi^2(8) = 6.002$, p=.647
6-12 months	1 (3.8%)	-	-	
1-5 years	3 (11.5%)	5 (19.2%)	6 (23.1%)	
5-11 years	5 (19.2%)	7 (26.9 %)	7 (26.9%)	
> 11 years	15 (57.7%)	12 (46.2%)	11 (45.8%)	

3.2. Feasibility results

3.2.1. Participant flow and attrition

Participant recruitment was carried out between January 2018 and April 2020. As the flow diagram shows in Figure 2, 172 people were initially interested in the study, and 108 were assessed for eligibility criteria. After excluding 30 participants who did not meet inclusion criteria, 78 participants were included in the study and randomly allocated to one of the three conditions: NFA (n = 26), NFA+NI (n = 26), and WL (n = 26). Of those who started the program, 22 participants (42.3%) withdrew from the experimental conditions, and 4 (15.4%) did not complete the assessment after WL. Although dropouts were higher in the NFA+NI group, no significant differences in attrition rates were found at posttreatment between the two treatment groups ($\chi2$ (1) = 2.836, p = .092). Following ITT analyses, 26 participants in each condition were included for the potential effectiveness analyses. At the 3-month follow-up, 11 participants completed the assessment (21.2%), with no significant differences between the groups ($\chi2$ (1) = 2.882, p = .090), and 13 participants (25%) completed the final follow-up after 12 months, also with no significant differences in attrition rates ($\chi2$ (1) = 2.564, p = .109). Little's MCAR test showed that the missing data were random (p >.05). Due to the small number of participants at follow-up, these were not included in the ITT analyses.

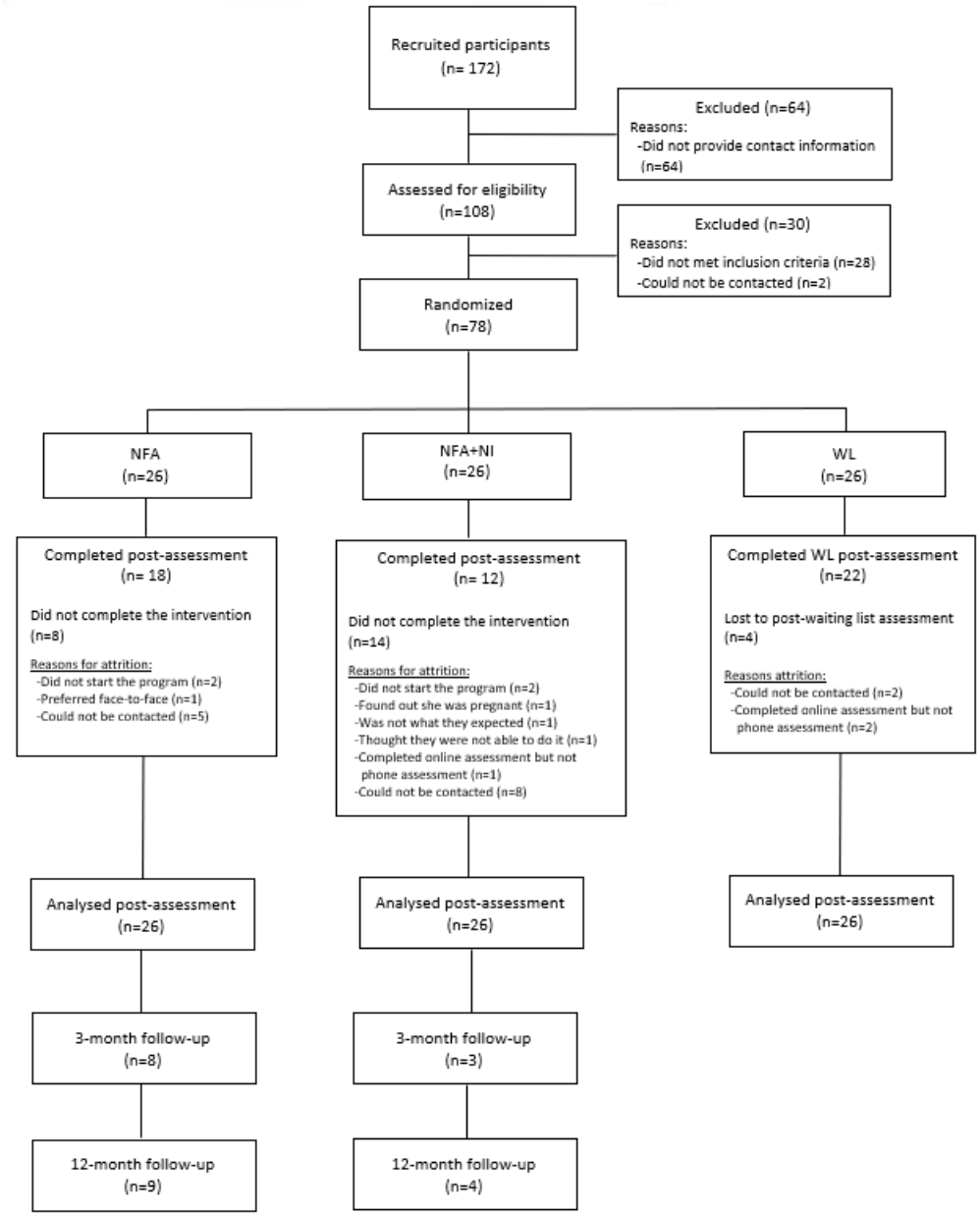


Fig. 2. Flow diagram of the study

Table 2 shows the number of exposure scenarios completed by the 22 participants who dropped out of the experimental conditions. Because this was a self-applied intervention and participants had the "overlearning" module to repeat any of the exposure scenarios if they wanted to before finishing the program, participants who did not complete the post-assessment on the webpage were considered dropouts. For this reason, some of the people who withdrew from the intervention had already completed the six exposure scenarios, as Table 2 shows. A scenario was considered complete by the program when the participants answered the question about their anxiety level after the

scenario with a rating of less than 3. Of those who did not complete any scenario, four participants did not even access the first one.

Table 2. Number of scenarios completed by participants who withdrew from the intervention

Number of scenarios completed	NFA	NFA+NI	Both conditions
0	3 (37.5%)	8 (57.1%)	11 (50%)
2	1 (12.5%)	-	1 (4.5%)
3	-	2 (14.3%)	2 (9.1%)
4	-	1 (7.1%)	1 (4.5%)
5	-	1 (7.1%)	1 (4.5%)
6	4 (50%)	2 (14.3%)	6 (27.3%)

NFA: NO-FEAR Airlines with still images; NFA+NI: NO-FEAR Airlines with still and navigable images

3.2.2. Preferences

Table 3 shows participants' preferences in both experimental conditions regarding the type of images they would like to see in the exposure scenarios, assessed before and after completing the program. Only the experimental groups were included in the analysis.

Table 3. Participants' preferences about the type of images before and after treatment

	Before treatment (n= 52)		After treatment (n= 25)	
	NFA (n=26)	NFA+NI (n=26)	NFA (n=13)	NFA+NI (n=12)
Preference				
Navigable images	92.3% (n=24)	96.2% (n=25)	84.6% (n=11)	91.7% (n=11)
Still images	7.7% (n= 2)	3.8% (n=1)	15.4% (n=2)	8.3% (n=1)
Subjective effectiveness				
Navigable images	100% (n=26)	100% (n=26)	84.6% (n=11)	91.7% (n=11)
Still images	-	-	15.4% (n=2)	8.3% (n=1)
Logic				
Navigable images	96.2% (n=25)	100% (n=26)	84.6% (n=11)	91.7% (n=11)
Still images	3.8% (n=1)	-	15.4% (n=2)	8.3% (n=1)
Subjective aversiveness				
Navigable images	88.5% (n=23)	92.3% (n=24)	84.6% (n=11)	45.5% (n=5)
Still images	11.5% (n=3)	7.7% (n=2)	15.4% (n=2)	54.5% (n=6)
Recommendation				
Navigable images	100% (n=26)	96.2% (n=25)	69.2% (n=9)	91.7% (n=11)
Still images	-	3.8% (n=1)	30.8% (n=4)	8.3% (n=1)

NFA: NO-FEAR Airlines with still images; NFA+NI: NO-FEAR Airlines with still and navigable images

Overall, participants preferred navigable images, believing that they would be more likely to help them overcome their fear and more logical for treating FP. A high proportion said they would recommend them to a friend before and after the treatment. Navigable images were considered more aversive than still images at pretreatment. However, after the intervention, this impression decreased significantly in the NFA+NI condition compared to the NFA condition ($\chi 2$ (1) = 4.112, p = .043). Despite the higher aversiveness ratings, navigable images were still preferred by participants. No significant differences were found between the two groups on the other items before or after treatment.

3.2.3. Expectations and satisfaction

Ratings of participants' expectations before they started the treatment and participant satisfaction after they finished the treatment are presented in Table 4, divided by group.

Table 4. Participants' expectations and satisfaction with the intervention

	NFA		**NFA+NI**	
	Pretreatment expectations M (SD) (n= 26)	*Post-treatment Satisfaction M (SD) (n=18)*	*Pretreatment expectations M (SD) (n= 26)*	*Post-treatment Satisfaction M (SD) (n=12)*
Intervention logic	8.04 (1.56)	7.94 (1.70)	8.65 (1.23)	8.50 (1.31)
Treatment satisfaction	8.42 (1.36)	7.50 (1.76)	8.65 (1.41)	7.0 (2.34)
Treatment recommendation	8.77 (1.68)	8.39 (1.72)	9.04 (1.22)	8.0 (2.49)
Useful to treat other problems	7.31 (1.89)	7.33 (2.17)	7.65 (1.67)	7.08 (1.83)
Useful for themselves	7.77 (1.70)	7.11 (1.94)	8.31 (1.60)	6.92 (2.07)
Aversiveness	3.96 (3.08)	2.56 (2.45)	4.08 (3.08)	2.17 (2.52)

NFA: NO-FEAR Airlines with still images; NFA+NI: NO-FEAR Airlines with still and navigable images

Results showed high expectations and satisfaction scores on all the items before and after the treatment, except on the item related to "Aversiveness," which showed low mean scores. Shapiro-Wilk tests revealed that none of the variables followed a normal distribution ($p < .05$ in all variables). No significant differences were found between the

means of the two experimental conditions on either of the scales at the two assessment times (Mann-Whitney's U, p >.05 in all comparisons).

A general reduction in means from pretreatment to posttreatment was found in both groups. Wilcoxon tests showed that this difference was statistically significant for treatment satisfaction in the NFA group (z = -2.03, p = .42) and the NFA+NI group (z = -2.20, p = .028), and for usefulness for themselves in the NFA+NI group (z = -2.27, p = .24).

3.2.4. Qualitative interview

Results show that, on average, participants in both conditions rated the exposure scenarios and the psychoeducation and overlearning component as "useful." Including real images and sounds was rated as "very useful," with the usefulness of sounds showing the highest means of all the variables in both conditions. Results also showed that participants rated the exposure scenarios as "somewhat realistic", and they felt "somewhat present" in them. No significant differences were found in any of the means between the two experimental conditions.

Table 5. Participants' ratings on questions from the qualitative interview

	NFA (n=18) **M (SD)**	**NFA+NI (n=12)** **M (SD)**
Usefulness of exposure scenarios	3.17 (0.92)	3.25 (0.97)
Usefulness of real images in exposure scenarios	4.00 (0.84)	4.17 (0.83)
Usefulness of real sounds	4.67 (0.48)	4.59 (0.67)
Usefulness of psychoeducation	3.83 (1.04)	3.67 (0.89)
Usefulness of overlearning	3.72 (1.23)	3.83 (1.11)
Sense of presence in exposure scenarios	3.28 (0.83)	2.92 (1.00)
Realism of exposure scenarios	3.67 (1.08)	3.33 (0.89)
Usefulness of navigable images	-	3.92 (1.00)
Usefulness of still images	-	2.67 (1.00)
Presence in navigable scenarios	-	3.44 (1.13)
Presence in still scenarios	-	2.33 (1.00)

NFA: NO-FEAR Airlines with still images; NFA+NI: NO-FEAR Airlines with still and navigable images

Participants in the navigable condition were asked about the usefulness and sense of presence in both types of images. Results showed that the means for usefulness and presence were higher in navigable scenarios than in still scenarios. Wilcoxon tests showed that these differences were statistically significant ($p < .05$). Specifically, the proportion of participants who rated the usefulness of navigable images with a 4 or 5 (on a scale from 1 "very little" to 5 "very much") was 91.7%, whereas for still images, this percentage was 5.8%. For presence, 44% of participants rated navigable images with a 4 or 5, and 11% gave these high ratings for still images. Additionally, participants in this condition were asked what type of image they would have liked to have seen in all the exposure scenarios, and 91.7% (n = 11) chose "navigable images," whereas only 8.3% (n = 1) chose "indifferent."

Regarding the qualitative data obtained in this interview, some participants reported that they had to try to feel like they were in the situation (*"Sometimes you are very aware that you are in front of a computer and the situation is not real"*), and that they would like to see images with better quality and more variety in the scenarios. A number of participants said they would prefer images with movement or videos. Qualitative responses about the two types of images from participants in the NFA+NI condition highlighted their preference for navigable images over still images because "*they offered more possibilities. You could see images with more perspective*."

3.3. Potential effectiveness results

3.3.1. Changes in FP measures from pre- to posttreatment

Within-group comparisons showed a significant reduction from pre- to posttreatment in the experimental conditions on all the FP measures, with large effect sizes, and no significant intragroup changes were found for the WL group (see Table 6 for more details). A significant interaction effect of time (pretreatment and posttreatment) and experimental condition (NFA, NFA+NI, or WL) was also found for all the measures: FFS ($F(2, 61.37) = 24.904$, $p < .001$), FFQ-II ($F(2, 62.43) = 17.098$, $p < .001$), Fear ($F(2, 62.28) = 39.385$, $p < .001$), Avoidance ($F(2, 61.94) = 44.396$, $p < .001$), Belief ($F(2, 68.33) = 31.751$, $p < .001$), Interference ($F(2, 55.91) = 17.545$, $p < .001$), and Severity ($F(2, 55.65) = 27.189$, $p < .001$). Compared to the WL condition, both experimental conditions showed an improvement in all the measures assessing FP symptomatology, with large effect sizes ranging from Cohen´s d 0.76 to 2.79 (see Table 7). No significant differences were found

in the comparisons of the two experimental conditions except for the belief in catastrophic thoughts, where the navigable-image condition showed a significantly lower mean at posttreatment than the still-image condition ($p = .016$).

Regarding the behavioral outcomes assessed at posttreatment, 10 participants from the NFA condition took a flight after the intervention (55.6%), with a mean of 3.1 flights, five participants from the NFA+NI condition (41.7%), with a mean of 2.4 flights, and six participants from the WL condition (27.3%), with a mean of 3.0 flights. No significant differences were found between conditions ($\chi2(2) = 3.300$, $p = .192$). Of those who took a flight at posttreatment, one participant used safety behaviors in the NFA condition (10%), two in the NFA+NI condition (40%), and six in the WL condition (100%), with significant differences ($\chi2(2) = 12.425$, $p = .002$). These differences were found between the NFA condition and the WL condition ($\chi2(1) = 12.343$, $p <.001$) and between the NFA+NI condition and the WL condition ($\chi2(1) = 4.950$, $p = .026$).

The patients' improvement at posttreatment was assessed on a scale that ranged from 1 ("a lot worse") to 7 ("a lot better"). No comparisons with pretreatment could be made because this measure only assesses patients' level of improvement in their FP after the intervention or WL. Means for participants' perceived improvement in the experimental conditions were significantly higher than for participants in the WL group, with 5.61 (SD = 0.21) for the NFA group and 5.66 (SD = 0.26) for the NFA+NI group, compared to 3.96 (SD = .19) for the WL group.

Table 6. Treatment outcomes and within-group effect sizes

	NFA				NFA+NI				WL			
	Pre M (SD)	*Post (estimated) M (SE)*	*F (df)*	*d (95% CI)*	*Pre M (SD)*	*Post (estimated) M (SE)*	*F (df)*	*d (95% CI)*	*Pre M (SD)*	*Post (estimated) M (SE)*	*F (df)*	*d (95% CI)*
FFS	64.81 (7.73)	45.47 (2.05)	97.73 (1, 60.16)***	2.43 (3.24, 1.61)	63.88 (6.98)	43.16 (2.41)	79.19 (1, 66.43)***	2.88 (3.78, 1.98)	65.62 (8.20)	62.20 (1.90)	3.59 (1, 56.65)	0.40 (0.63, 0.17)
FFQ-II	209.25 (30.73)	144.46 (8.20)	59.25 (1, 63.98)***	2.04 (2.86, 1.22)	206.58 (31.44)	151.62 (9.44)	32.51 (1, 67.62)***	1.69 (2.31, 1.07)	212.04 (27.20)	208.38 (7.32)	.234 (1, 54.94)	0.13 (0.30, -0.03)
Fear	8.96 (1.18)	4.95 (.34)	120.0 (1, 60.52)***	3.29 (4.35, 2.22)	8.46 (1.33)	5.06 (.40)	60.73 (1, 70.04)***	2.47 (3.31, 1.63)	8.77 (1.34)	8.87 (.31)	.118 (1, 55.59)	-0.07 (0.27, -0.41)
Avoidance	8.04 (1.96)	3.80 (.48)	79.08 (1, 60.57)***	2.44 (3.22, 1.66)	8.65 (1.62)	3.24 (.56)	91.48 (1, 67.91)***	3.23 (4.32, 2.14)	7.92 (2.06)	8.51 (.44)	1.77 (1, 56.56)	-0.28 (-0.01, -0.55)
Belief	8.65 (1.60)	5.34 (.40)	54.82 (1, 66.47)***	2.01 (2.77, 1.25)	8.69 (1.38)	3.81 (.48)	87.05 (1, 76.45)***	3.43 (4.51, 2.35)	8.54 (1.42)	8.67 (.37)	.92 (1, 61.26)	-0.09 (0.21, -0.39)
Interference	5.65 (1.55)	3.03 (.43)	47.70 (1, 55.01)***	1.64 (2.28, 0.99)	5.81 (2.38)	3.93 (.50)	17.13 (1, 59.84)***	0.78 (1.18, 0.39)	5.19 (2.04)	5.50 (.41)	.80 (1, 52.23)	-0.15 (0.10, -0.04)
Severity	5.85 (1.43)	3.57 (.35)	46.73 (1, 55.36)***	1.54 (2.19. 0.89)	6.15 (1.49)	3.29 (.40)	54.76 (1, 60.69)***	1.87 (2.51, 1.23)	5.40 (1.50)	5.73 (.32)	1.23 (1, 50.25)	-0.21 (0.04, -0.46)

FFS: Fear of Flying Scale; FFQ-II: Fear of Flying Questionnaire

Table 7. Between-group effect sizes at posttreatment

	NFA vs. WL, *d* (95% CI)	NFA+NI vs. WL, *d* (95% CI)	NFA vs. NFA+NI, *d* (95% CI)
FFS	-1.52 (-2.23, -0.82)	-2.03 (-2.88, -1.18)	-0.20 (-0.93, 0.53)
FFQ-II	-1.58 (-2.28, -0.88)	-1.48 (-2.23, -0.72)	0.08 (-0.63, 0.80)
Fear	-2.38 (-3.19, -1.56)	-2.79 (-3.75, -1.82)	-0.01 (-0.74, 0.72)
Avoidance	-2.02 (-2.79, -1.26)	-2.42 (-3.33, -1.51)	-0.12 (-0.85, 0.61)
Belief	-1.76 (-2.49, -1.03)	-2.75 (-3.71, -1.79)	-0.60 (-1.35, 0.14)
Interference	-1.26 (-1.94, -0.58)	-0.76 (-1.48, -0.03)	0.37 (-0.37, 1.11)
Severity	-1.41 (-2.10, -0.71)	-1.77 (-2.58, -0.95)	-0.20 (-0.94, 0.53)
Improvement	2.17 (1.39, 2.96)	2.25 (1.37, 3.14)	0.05 (-0.68, 0.78)

FFS: Fear of Flying Scale; FFQ-II: Fear of Flying Questionnaire

3.3.2. Maintenance of treatment changes at follow-up

Due to the small number of participants who were assessed at follow-ups (n = 11 at 3-month follow-up and n = 12 at 12-month follow-up), these data were not included in the ITT mixed-model analysis. Shapiro-Wilk tests revealed that data from the follow-ups were normally distributed ($p > .05$); therefore, preliminary *t*-test comparisons were conducted to compare pretreatment scores with 3-month and 12-month follow-up scores. Results showed a significant reduction in symptomatology based on the means of all the FP measures at the follow-ups compared to pretreatment ($p < .05$). Because of the small sample, both groups were included together in the analyses. For the FFQ-II, a few more participants could be included in the analysis because they answered the questions on the webpage but could not be contacted by phone. Table 8 shows descriptive data and statistics for these analyses.

Means for patient's improvement were 5.91 (SD = 0.94) at the 3-month follow-up and 5.84 (SD = 1.14) at the 12-month follow-up, showing that participants continued to feel "much better" about their FP at follow-up. No significant differences were found in the *t*-test comparisons of improvement between the two follow-up periods compared to posttreatment.

Table 8. Data from follow-ups and comparisons with pretreatment scores

	M (SD)	Pre- and follow-up comparisons
FFS		
Pre (n=52)	64.34 (7.31)	
3m f-u (n=11)	42.00 (8.10)	$t(10)= 6.516$, $p<.01$
12m f-u (n=13)	43.46 (14.42)	$t(12)= 6.352$, $p<.01$
FFQ-II		
Pre (n=48)	207.92 (30.79)	
3m f-u (n=14)	106.14 (41.91)	$t(13)= 7.791$, $p<.01$
12m f-u (n=12)	119.50 (64.46)	$t(11)= 5.196$, $p<.01$
Fear		
Pre (n=52)	8.71 (1.27)	
3m f-u (n=11)	4.1 (1.58)	$t(10)= 4.524$, $p<.05$
12m f-u (n=13)	4.54 (2.33)	$t(12)= 5.326$, $p<.01$
Avoidance		
Pre (n=52)	8.35 (1.67)	
3m f-u (n=11)	2.10 (2.07)	$t(10)= 11.209$, $p<.01$
12m f-u (n=13)	1.92 (2.99)	$t(12)= 7.019$, $p<.01$
Belief		
Pre (n=52)	8.67 (1.48)	
3m f-u (n=11)	4.18 (2.52)	$t(10)= 4.978$, $p<.05$
12m f-u (n=13)	5.00 (2.55)	$t(12)= 4.954$, $p<.01$
Interference		
Pre (n=52)	5.73 (2)	
3m f-u (n=11)	1.36 (1.50)	$t(10)= 5.068$, $p<.01$
12m f-u (n=13)	2.00 (1.68)	$t(12)= 5.448$, $p<.01$
Severity		
Pre (n=52)	6 (1.46)	
3m f-u (n=11)	2.64 (1.12)	$t(10)= 5.590$, $p<.01$
12m f-u (n=13)	2.69 (1.89)	$t(12)= 7.229$, $p<.01$

FFS: Fear of Flying Scale; FFQ-II: Fear of Flying Questionnaire

3.4. Sense of presence and reality judgment

3.4.1. Descriptive measures

Scores on the RJPQ during the intervention (after half of the scenarios had been presented to the patient) were M =107.69 (SD = 30.79) for the NFA condition and M = 116.18 (SD = 16.19) for the NFA+NI condition. The scores on the RJPQ at post-

assessment were M = 114.41 (SD = 23.70) for the NFA condition and M = 106.73 (SD = 21.83) for the NFA+NI condition. No significant differences were found between the means.

The means for the sense of presence and reality judgment questions presented after the two navigable scenarios were calculated in the NFA+NI group and compared with the same two still scenarios in the NFA condition. Results for the NFA+NI condition showed a mean of 6.12 (SD = 2.23) for presence and 6.06 (SD = 2.46) for reality judgment for the airport scenario (n = 17), and 5.64 (SD = 2.68) for presence and 5.69 (SD = 2.81) for reality judgment for the plane scenario. Results for the NFA condition showed a mean of 6.33 (SD = 2.39) for presence and 5.86 (SD = 2.65) for reality judgment for the airport scenario, and 5.57 (SD = 2.76) for presence and 5.19 (SD = 2.77) for reality judgment for the plane scenario. Mann-Whitney's U tests showed no significant differences.

3.4.2. Mediation effects

Mediation effects of sense of presence and reality judgment between the use of navigable images and the change on the FFS and FFQ-II did not show statistical significance in any of the mediation models proposed. The only significant result found in these analyses was in the relationship between the sense of presence and the change in the FFQ-II once the treatment condition was controlled, b = 7.28 (95% CI: 1.06, 13.32; z = 2.33, p = .020). See Figure 3 for the proposed model. The sample size for the mediation analyses was n = 26 for the FFQ-II and n = 24 for the FFS.

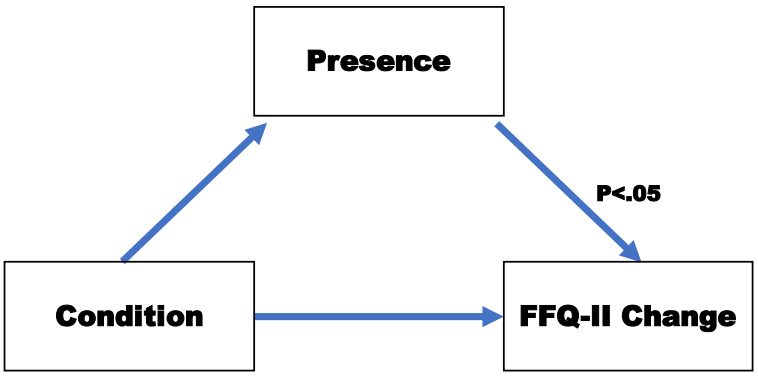


Fig. 3. Proposed mediation model of sense of presence between the use of navigable images and the improvement on the FFQ-II

4. DISCUSSION

The present study aimed to assess the feasibility of including navigable images in the exposure scenarios in an ICBT for FP. For this purpose, participants' preferences, opinions, and acceptance of this type of image were analyzed. A secondary aim was to explore the potential effectiveness of two experimental conditions (NO-FEAR Airlines with still images and NO-FEAR Airlines with still and navigable images) compared with a WL group. Third, an exploratory aim was to compare the role of sense of presence and reality judgment in navigable images and observe possible mediation effects on treatment efficacy.

Adherence to the experimental conditions was lower than expected, based on more recent data suggesting dropout rates of less than 20% in ICBTs (Carlbring et al., 2018), with 42.3% of participants withdrawing from our intervention. This was a higher rate than the previous study using NO-FEAR Airlines (Campos et al., 2019), but it is similar to dropout rates traditionally proposed in the literature, where an average dropout rate of 31% has been reported (Melville et al., 2010), and similar to previous studies carried out with phobic patients, which report a 40.8% dropout rate (Kok et al., 2014). In our study, a participant was considered to have dropped out when the post-assessment was not completed. Some participants completed the six exposure scenarios but did not finish the overlearning module and, therefore, did not complete the post-assessment, which means they could also have withdrawn from the program because they felt better. Because this is a self-applied program, we do not have data on the evolution of their symptomatology. In addition, the outbreak of COVID-19 while this study was taking place could have produced a loss of interest as well, given that flying was very limited or almost impossible in several countries.

Criteria for dropout in other studies could differ from those used in the current study. In a recent systematic review, a 27.3% dropout mean was reported in ICBT and mobile-based interventions for SP (Mor et al., 2021). However, it is important to note that, in this review, both guided interventions and self-applied interventions were included, and this could be an important issue to consider regarding dropout from ICBTs. Other self-applied Internet-based interventions that have used images of phobic stimuli for exposure purposes presented high dropout rates ranging from 64 to 98% (Matthews et al., 2011, 2012).

Although more participants withdrew from the NFA+NI condition than from the NFA condition (14 vs. 8), no statistical differences were found in attrition between the two conditions, and tests showed that missing data were random. However, this is something that should be taken into consideration because the aim of the study was to explore the feasibility of this type of image with the future aim of changing all the exposure scenarios if they were more readily accepted. A possible explanation would be that participants perceived navigable images as more aversive than still images. The rate was lower at posttreatment, but 68% of participants still considered navigable images to be more aversive, in line with previous research about more realistic exposure scenarios (Bretón-López et al., 2015).

The high dropout rates could also be related to the lack of therapist support. In this study, therapist support was not provided, based on the results of a previous study where no differences in efficacy and attrition rates were found between a totally self-applied condition and a condition with weekly support calls (Campos et al., 2019). Instead, e-mails were sent to participants every two weeks to remind them to log onto the program. There are still mixed findings on this topic in the literature, with some studies suggesting that therapist support might not be as important as originally thought (Berger et al., 2011; Karyotaki et al., 2017; Titov et al., 2016), and other studies showing that guided ICBTs are linked to better outcomes and lower dropout rates (Furukawa et al., 2021; Andersson et al., 2015; Baumeister et al., 2014; Mewton et al., 2014; Richards & Richardson, 2012). Avoidance is a key clinical feature of SP, and perhaps therapist support would help patients to continue with the exposure and ensure that the scenarios in the program are not just one more situation they might avoid. The role of the therapist in offering support, guidance, and reinforcement during exposure could be important (Bretón-López et al., 2015).

One intermediate solution could be to offer support on demand (Zetterberg et al., 2019). Another important result related to adherence is that 50% of the participants in the two experimental groups did not complete the first scenario, which means that they did not answer the assessment questions after that scenario. Although some participants did not start the exposure component (n = 4), others participated in the scenarios but left the program before completing it. Some possible reasons might be that participants did not like the characteristics of the exposure scenarios or thought they would not be useful to them, they did not feel anything when viewing the scenarios, or the scenarios caused them

more anxiety than they could deal with. Studying the real reasons for dropout in participants would help to improve the program.

Participants in the study preferred navigable images over still images before and after treatment. Specifically, the posttreatment preference and opinion results are interesting because participants responded after having seen both types of images, and they still preferred navigable images. They considered them more effective and logical, and they would be more likely to recommend them to a friend. In addition, participants in the NFA+NI condition, who experienced the two types of exposure scenarios during their intervention, gave statistically significant higher ratings to the usefulness of the navigable images. At posttreatment, when asked in the qualitative interview how present they felt with each type of image, participants in the NFA+NI gave significantly higher ratings to the navigable images.

When comparing the means for the sense of presence and reality judgment questions after the exposure scenarios in the NFA+NI and NFA groups, in the scenarios where they differed (that is, the scenarios where the NFA+NI condition had navigable images and the NFA condition had still images), no significant differences were found. Navigable images seem to be preferred, but more could be done to improve the program, given that satisfaction with the treatment after completing the intervention was significantly lower than the expectation before the treatment, as were the ratings for the usefulness of the intervention in the NFA+NI group. One possible explanation for the decrease in the usefulness ratings in the NFA+NI condition is that, because only two of the six scenarios were navigable, participants had the impression that the program was "incomplete" or unpolished, which could have influenced results. This result, together with the ratings for the usefulness of the exposure scenarios in the qualitative interview, shows that, although still effective, some characteristics of the program could be improved and should be further explored.

Some suggestions made by participants in the qualitative interview were the use of videos or images with movement in exposure scenarios. Videos have been shown to elicit more fearful reactions in phobic patients than real still images (Courtney et al., 2010). In addition, Matthews et al. (2012) found that moving images led to greater completion rates of exposure scenarios than static images, although in some participants with high levels of phobic symptoms, the moving images made them drop out of the program. In a recent study in which images and videos were shown to a sample of people

with SP (Ruiz-García & Valero-Aguayo, 2020), both types of multimedia stimuli were linked to clinical improvements in anxiety symptomatology. However, whether there were differences between them or whether one was more accepted than the other was not explored, which highlights the importance of conducting more research on this topic because the data are still unclear.

With regard to the secondary aim of the study, NO-FEAR Airlines was effective in reducing symptoms of FP symptomatology compared with a WL control group, with large within- and between-group effect sizes on all the FP measures, supporting the results of the previous study with this program (Campos et al., 2019). No differences were found between the two experimental conditions, except for the belief in catastrophic thoughts, which was significantly lower in the NFA+NI group at posttreatment. Due to the high attrition rates, follow-up results should be interpreted with caution, but the clinical changes seemed to be maintained after 3 and 12 months. This is in line with previous findings that ICBTs can be effective for the treatment of SP (Andersson et al., 2009, 2013; Shahnavaz et al., 2018; Vigerland et al., 2013). Furthermore, although it was not statistically significant, the proportion of participants who took a flight after the intervention was higher in the experimental conditions, and they used safety behaviors significantly less than those in the control group. This is a positive result because the program seems to reduce avoidance and encourage people to face the phobic situation in real-life scenarios. Finally, participants who finished the program referred to feeling "much better" with regard to their FP after the intervention, and this was maintained at follow-ups.

For the exploratory aim of the study about the mediation effect of sense of presence and reality judgment in changes in the two questionnaires assessing FP symptomatology at posttreatment, none of the models were significant, meaning that no mediation effect was found for either variable in treatment effectiveness. This is in line with findings for VRET, where presence does not seem to be related to treatment outcomes (Tardif et al., 2019). However, a significant relationship was found between sense of presence and clinical change on the FFQ-II (with no effect in the intervention group). This is an interesting result. Given the small sample size and the other results for presence found in this study, no conclusions can be drawn, but this relationship should be explored in future research.

The present study has some limitations that have to be acknowledged. First, there was a high dropout rate at posttreatment, and even higher at follow-ups, and for this reason, the results presented here could be biased and should be interpreted with caution. Second, only two exposure scenarios had navigable images in one of the experimental conditions, and although this study aimed to explore the feasibility of using these images, they might not have been sufficient to observe significant differences. Third, some participants experienced technical problems with the program, which might have influenced their experience with the intervention and their adherence. Fourth, most of the sample included in the study had a high educational level, which might affect the generalizability of the results. Another limitation is that the questions about sense of presence and reality judgment after the exposure scenario were presented when the level of anxiety was less than 3. This means that some participants could have answered these questions after several repetitions of the scenario, which could have had an impact on their responses.

4.1. Future perspectives

The results of the current study indicate several questions that need further exploration in future research to extend the knowledge in this field. First, because the navigable images appeared to be well accepted, a future study where all the exposure scenarios are navigable should be conducted. It would be useful to explore what types of images work best in eliciting anxiety, sense of presence, and reality judgment without being aversive enough to lead to dropout. For this purpose, a study that is not focused on the treatment of the problem, but instead on the sense of presence and reality judgment, could be conducted with different types of images for participants with FP. Another possibility would be to combine different types of images in the program, including less immersive images in the first stages of exposure and more immersive exposure scenarios as the user makes progress. It is important to take into consideration the severity of the phobia and how it influences what type of stimuli to use. Presenting the images in virtual reality with an inexpensive head mounted display might increase the immersion (Ma et al, 2021).

The role of therapist support in NO-FEAR Airlines should also be explored further to analyze whether this factor influences attrition and satisfaction with the program. Finally, mediation effects between sense of presence, reality judgment, and change at

posttreatment should be explored with a larger sample size to see whether the significant relationship found in the current study is maintained.

5. REFERENCES

Andersson, G., 2016. Internet-Delivered Psychological Treatments. Annual Review of Clinical Psychology 12 (1), 157–179. https://doi.org/10.1146/annurev-clinpsy-021815-093006

Andersson, G., Carlbring, P., Titov, N., & Lindefors, N., 2019. Internet interventions for adults with anxiety and mood disorders: A narrative umbrella review of recent meta-analyses. Canadian Journal of Psychiatry 64, 465-470. https://doi:10.1177/0706743719839381

Andersson, G., Rozental, A., Rück, C., & Carlbring, P. 2015. Guided Internet-delivered CBT: Can it really be as good as seeing a therapist? Behavior Therapist 38(5), 123–126.

Andersson, G., Titov, N., 2014. Advantages and limitations of Internet-based interventions for common mental disorders. World Psychiatry 13 (1), 4–11. https://doi.org/10.1002/wps.20083

Andersson, G., Waara, J., Jonsson, U., Malmaeus, F., Carlbring, P., Öst, L.G., 2013. Internet-Based Exposure Treatment Versus One-Session Exposure Treatment of Snake Phobia: A Randomized Controlled Trial. Cognitive Behaviour Therapy 42 (4), 284–291. https://doi.org/10.1080/16506073.2013.844202

Andersson, G., Waara, J., Jonsson, U., Malmaeus, F., Carlbring, P., Öst, L.G., 2009. Internet-based self-help versus one-session exposure in the treatment of spider phobia: A randomized controlled trial. Cognitive Behaviour Therapy 38 (2), 114–120. https://doi.org/10.1080/16506070902931326

Andrews, G., Basu, A., Cuijpers, P., Craske, M.G., McEvoy, P., English, C.L., Newby, J.M., 2018. Computer therapy for the anxiety and depression disorders is effective, acceptable and practical health care: An updated meta-analysis. Journal of Anxiety Disorders 55, 70–78. https://doi.org/10.1016/j.janxdis.2018.01.001

Baños, R. M., Quero, S., Salvador, S., & Botella, C. 2005. The role of presence and reality judgement in virtual environments in clinical psychology. Cyberpsych. Behav. 8(4), 303–304.

Baños, R.M., Botella, C., García-Palacios, A., Villa, H., Perpiña, C., Alcañiz, M., 2000. Presence and Reality Judgment in Virtual Environments: A Unitary Construct? CyberPsychology & Behavior 3, 327–335. https://doi.org/10.1089/10949310050078760

Baumeister, H., Reichler, L., Munzinger, M., Lin, J., 2014. The impact of guidance on Internet-based mental health interventions - A systematic review. Internet Interventions. https://doi.org/10.1016/j.invent.2014.08.003

Berger, T., Hämmerli, K., Gubser, N., Andersson, G., Caspar, F., 2011. Internet-Based Treatment of Depression: A Randomized Controlled Trial Comparing Guided with Unguided Self-Help. Cognitive Behaviour Therapy 40, 251–266. https://doi.org/10.1080/16506073.2011.616531

Borkovec, T. D., & Nau, S. D. 1972. Credibility of analogue therapy rationales. Journal of Behavior Therapy and Experimental Psychiatry 3(4), 257–260. https://doi.org/10.1016/0005-7916(72)90045-6

Bornas, F. X., Tortella-Feliu, M., García de la Banda García, G., Fullana Rivas, M. Á., & Llabrés, J. 1999. Validación factorial del cuestionario de miedo a volar. Análisis y Modificación de Conducta, 25(104), 885-908.

Botella, C., Osma, J., García-Palacios, A., Quero, S., Baños, R.M., 2004. Treatment of flying phobia using virtual reality: Data from a 1-year follow-up using a multiple baseline design. Clinical Psychology and Psychotherapy 11, 311–323. https://doi.org/10.1002/cpp.404

Botella, C., Quero, S., Baños, R.M., García-Palacios, A., Breton-López, J., Alcañiz, M., Fabregat, S., 2008. Telepsychology and self-help: The treatment of phobias using the internet. Cyberpsychology and Behavior 11, 659–664. https://doi.org/10.1089/cpb.2008.0012

Bretón-López, J., Tortella-Feliu, M., Riera Del Amo, A., Baños, R., Llabrés, J., Gelabert, J.M., Botella, C., 2015. Patients' preferences regarding three computer-based exposure treatments for fear of flying. Behavioral Psychology / Psicología Conductual 23(2), 265-285.

Brown, T. A., Di Nardo, P. A., & Barlow, D. H. 1994. Anxiety disorders interview schedule for DSM - IV (ADIS - IV). In: Clinician's manual. Graywind Publications.

Campos, D., Bretón-López, J., Botella, C., Mira, A., Castilla, D., Baños, R., Tortella-Feliu, M., Quero, S., 2016. An Internet-based treatment for flying phobia (NO-FEAR Airlines): Study protocol for a randomized controlled trial. BMC Psychiatry 16 (1), 1–11. https://doi.org/10.1186/s12888-016-0996-1

Campos, D., Bretón-López, J., Botella, C., Mira, A., Castilla, D., Mor, S., Baños, R., Quero, S., 2019. Efficacy of an internet-based exposure treatment for flying phobia (NO-FEAR Airlines) with and without therapist guidance: A randomized controlled trial. BMC Psychiatry 19 (1), 1–16. https://doi.org/10.1186/s12888-019-2060-4

Campos, D., Mira, A., Bretón-López, J., Castilla, D., Botella, C., Baños, R.M., Quero, S., 2018. The acceptability of an internet-based exposure treatment for flying phobia

with and without therapist guidance: Patients' expectations, satisfaction, treatment preferences, and usability. Neuropsychiatric Disease and Treatment 14, 879–892. https://doi.org/10.2147/NDT.S153041

Cárdenas, G., Botella, C., Quero, S., Baños, R., Durán, X., Rosa, A. de la, Flores, L., Molés, M., 2016. Efectividad del programa de tratamiento virtual flight con población mexicana. Revista Argentina de Clínica Psicológica 25 (2), 145–156.

Carlbring, P., Andersson, G., Cuijpers, P., Riper, H., Hedman-Lagerlöf, E., 2018. Internet-based vs. face-to-face cognitive behavior therapy for psychiatric and somatic disorders: an updated systematic review and meta-analysis. Cognitive Behaviour Therapy 47 (1), 1-18. https://doi.org/10.1080/16506073.2017.1401115

Choy, Y., Fyer, A.J., Lipsitz, J.D., 2007. Treatment of specific phobia in adults. Clinical Psychology Review 27 (3), 266–286. https://doi.org/10.1016/J.CPR.2006.10.002

Clark, G.I., Rock, A.J., 2016. Processes contributing to the maintenance of flying phobia: A narrative review. Frontiers in Psychology 7. https://doi.org/10.3389/fpsyg.2016.00754

Cohen, J. 1988. Statistical power analysis for the behavioral sciences–second edition. 12 Lawrence Erlbaum Associates Inc. Hillsdale, New Jersey, 13.

Courtney, C.G., Dawson, M.E., Schell, A.M., Iyer, A., Parsons, T.D., 2010. Better than the real thing: Eliciting fear with moving and static computer-generated stimuli. International Journal of Psychophysiology 78 (2), 107–114. https://doi.org/10.1016/j.ijpsycho.2010.06.028

Cummings, J.J., Bailenson, J.N., 2016. How Immersive Is Enough? A Meta-Analysis of the Effect of Immersive Technology on User Presence. Media Psychology 19 (2), 272–309. https://doi.org/10.1080/15213269.2015.1015740

Czerniak, E., Caspi, A., Litvin, M., Amiaz, R., Bahat, Y., Baransi, H., Sharon, H., Noy, S., Plotnik, M., 2016. A novel treatment of fear of flying using a large virtual reality system. Aerospace Medicine and Human Performance 87 (4), 411–416. https://doi.org/10.3357/AMHP.4485.2016

da Costa, R.T., Sardinha, A., Nardi, A.E., 2008. Virtual reality exposure in the treatment of fear of flying. Aviation Space and Environmental Medicine 79 (9), 899-903. https://doi.org/10.3357/ASEM.2277.2008

Eaton, W.W., Bienvenu, O.J., Miloyan, B., 2018. Specific phobias. The Lancet Psychiatry 5 (8), 678-686. https://doi.org/10.1016/S2215-0366(18)30169-X

Foreman, E. I., Bor, R., & Van Gerwen, L. J. 2006. The nature, characteristics, impact, and personal implications of fear of flying. Aviation Mental Health: Psychological implications for Air Transportation, 53-68

Furukawa, T. A., Suganuma, A., Ostinelli, E. G., Andersson, G., Beevers, C. G., Shumake, J., Berger, T., Boele, F. W., Buntrock, C., Carlbring, P., Choi, I., Christensen, H., Mackinnon, A., Dahne, J., Huibers, M., Ebert, D. D., Farrer, L., Forand, N. R., Strunk, D. R., Ezawa, I. D., … Cuijpers, P. 2021. Dismantling, optimising, and personalising internet cognitive behavioural therapy for depression: a systematic review and component network meta-analysis using individual participant data. The Lancet. Psychiatry 8(6), 500–511. doi:10.1016/S2215-0366(21)00077-8

Gallucci, M. 2019. jAMM: jamovi Advanced Mediation Models. [jamovi module].

Gromer, D., Reinke, M., Christner, I., Pauli, P., 2019. Causal Interactive Links Between Presence and Fear in Virtual Reality Height Exposure. Frontiers in Psychology 10, 141. https://doi.org/10.3389/fpsyg.2019.00141

Guy, W. 1976. Clinical Global Impression. Assessment Manual for Psychopharmacology, 217–222.

Haug, T., Berntzen, D., Götestam, K. G., Brenne, L., Johnsen, B. H., & Hugdahl, K. 1987. A three-systems analysis of fear of flying: A comparison of a consonant vs a non-consonant treatment method. Behaviour Research and Therapy 25(3). https://doi.org/10.1016/0005-7967(87)90045-3

Higuera-Trujillo, J.L., López-Tarruella Maldonado, J., Llinares Millán, C., 2017. Psychological and physiological human responses to simulated and real environments: A comparison between Photographs, 360° Panoramas, and Virtual Reality. Applied Ergonomics 65, 398–409. https://doi.org/10.1016/j.apergo.2017.05.006

Karyotaki, E., Riper, H., Twisk, J., Hoogendoorn, A., Kleiboer, A., Mira, A., MacKinnon, A., Meyer, B., Botella, C., Littlewood, E., Andersson, G., Christensen, H., Klein, J.P., Schröder, J., Bretón-López, J., Scheider, J., Griffiths, K., Farrer, L., Huibers, M.J.H., Phillips, R., Gilbody, S., Moritz, S., Berger, T., Pop, V., Spek, V., Cuijpers, P., 2017. Efficacy of self-guided internet-based cognitive behavioral therapy in the treatment of depressive symptoms a meta-analysis of individual participant data. JAMA Psychiatry 74 (4), 351–359. https://doi.org/10.1001/jamapsychiatry.2017.0044

Kazdin, A.E., 2015. Technology-Based Interventions and Reducing the Burdens of Mental Illness: Perspectives and Comments on the Special Series. Cognitive and Behavioral Practice 22 (3), 359–366. https://doi.org/10.1016/j.cbpra.2015.04.004

Kok, R.N., van Straten, A.B.A.T.F.; C.P., Beekman, A.T.F.F., Cuijpers, P., 2014. Short-term effectiveness of web-based guided self-help for phobic outpatients: Randomized controlled trial. Journal of Medical Internet Research 16 (9), 85–100. https://doi.org/10.2196/jmir.3429

Kwon, J.H., Powell, J., Chalmers, A., 2013. How level of realism influences anxiety in virtual reality environments for a job interview. International Journal of Human Computer Studies 71 (10), 978–987. https://doi.org/10.1016/j.ijhcs.2013.07.003

Ling, Y., Nefs, H.T., Morina, N., Heynderickx, I., Brinkman, W.-P.P., 2014. A meta-analysis on the relationship between self-reported presence and anxiety in virtual reality exposure therapy for anxiety disorders. PLoS ONE 9 (5), e96144. https://doi.org/10.1371/journal.pone.0096144

Ma, L., Mor, S., Anderson, P. L., Baños, R. M., Botella, C., Bouchard, S., Cárdenas-López, G., Donker, T., Fernández-Álvarez, J., Lindner, P., Mühlberger, A., Powers, M. B., Quero, S., Rothbaum, B., Wiederhold, B. K., & Carlbring, P., 2021. Integrating virtual realities and psychotherapy: SWOT analysis on VR and MR based treatments of anxiety and stress-related disorders. Cogn. Behav. Ther. 50(6), 509-526. https://doi:10.1080/16506073.2021.1939410

Matthews, A.J., Scanlan, J.D., Kirkby, K.C., 2012. Online exposure treatment for spider fear: The effects of moving versus static images on treatment adherence, fear elicitation and habituation. Behaviour Change 29 (1), 15–24. https://doi.org/10.1017/bec.2012.7

Matthews, A.J., Wong, Z.H., Scanlan, J.D., Kirkby, K.C., 2011. Online exposure for spider phobia: Continuous versus intermittent exposure. Behaviour Change 28 (3), 143–155. https://doi.org/10.1375/bech.28.3.143

Medialdea, J., Tejada, F.R., 2005. Phobic fear of flying in aircrews: Epidemiological aspects and comorbidity. Aviation Space and Environmental Medicine 76 (6).

Melville, K.M., Casey, L.M., Kavanagh, D.J., 2010. Dropout from internet-based treatment for psychological disorders. British Journal of Clinical Psychology 49 (4), 455–471. https://doi.org/10.1348/014466509X472138

Mewton, L., Smith, J., Rossouw, P., Andrews, G., 2014. Current perspectives on internet-delivered cognitive behavioral therapy for adults with anxiety and related disorders. Psychology Research and Behavior Management 7, 37–46. https://doi.org/10.2147/PRBM.S40879

Minns, S., Levihn-Coon, A., Carl, E., Smits, J. A. J., Miller, W., Howard, D., Papini, S., Quiroz, S., Lee-Furman, E., Telch, M., Carlbring, P., Xanthopoulos, D., & Powers, M. B., 2018. Immersive 3D exposure-based treatment for spider fear: A randomized controlled trial. Journal of Anxiety Disorders 58, 1-7. https://doi:10.1016/j.janxdis.2018.05.006

Mor, S., Botella, C., Campos, D., Tur, C., Castilla, D., Soler, C., Quero, S., 2021. An Internet-based treatment for Flying Phobia using 360° images: Study protocol for a feasibility pilot study. Internet Interventions 24, 100387. https://doi.org/10.1016/j.invent.2021.100387

Mor, S., Grimaldos, J., Tur, C., Miguel, C., Cuijpers, P., Botella, C., & Quero, S. 2021. Internet-and mobile-based interventions for the treatment of specific phobia: A systematic review and preliminary meta-analysis. Internet Interventions, 100462.

Oakes, M., Bor, R., 2010. The psychology of fear of flying (part I): A critical evaluation of current perspectives on approaches to treatment. Travel Medicine and Infectious Disease 8 (6), 327–338. https://doi.org/10.1016/j.tmaid.2010.10.001

Richards, D., Richardson, T., 2012. Computer-based psychological treatments for depression: A systematic review and meta-analysis. Clinical Psychology Review 32 (4), 389–342. https://doi.org/10.1016/j.cpr.2012.02.004

Riva, G., Galimberti, C., Wiederhold, B.K., Gevirtz, R.N., Spira, J.L., 2001. 4 Virtual Reality Exposure Therapy vs. Imagery Desensitization Therapy in the Treatment of Flying Phobia. IOS Press.

Riva, G., Mantovani, F., Capideville, C.S., Preziosa, A., Morganti, F., Villani, D., Gaggioli, A., Botella, C., Alcañiz, M., 2007. Affective interactions using virtual reality: The link between presence and emotions. Cyberpsychology and Behavior 10 (1), 45–56. https://doi.org/10.1089/cpb.2006.9993

Rothbaum, B.O., Anderson, P., Zimand, E., Hodges, L., Lang, D., Wilson, J., 2006. Virtual Reality Exposure Therapy and Standard (in Vivo) Exposure Therapy in the Treatment of Fear of Flying. Behavior Therapy 37 (1), 80–90. https://doi.org/10.1016/j.beth.2005.04.004

Ruiz-García, A., Valero-Aguayo, L., 2020. Multimedia intervention for specific phobias: A clinical and experimental study. Psicothema 32 (3), 298–306. https://doi.org/10.7334/psicothema2020.87

Salim, A., Mackinnon, A., Christensen, H., & Griffiths, K. 2008. Comparison of data analysis strategies for intent-to-treat analysis in pre-test-post-test designs with substantial dropout rates. Psychiatry Research, 160 (3), 335–345. https://doi.org/10.1016/j.psychres.2007.08.005

Shahnavaz, S., Hedman-Lagerlöf, E., Hasselblad, T., Reuterskiöld, L., Kaldo, V., Dahllöf, G., 2018. Internet-based cognitive behavioral therapy for children and adolescents with dental anxiety: Open trial. Journal of Medical Internet Research 20 (1). https://doi.org/10.2196/jmir.7803

Steuer, J., 1992. Defining Virtual Reality: Characteristics Determining Telepresence. Journal of Communication 42 (4), 73–94.

Tardif, N., Therrien, C.-É., Bouchard, S., 2019. Re-Examining Psychological Mechanisms Underlying Virtual Reality-Based Exposure for Spider Phobia. Cyberpsychology, Behavior, and Social Networking 22 (1), 39–45. https://doi.org/10.1089/cyber.2017.0711

Titov, N., Fogliati, V.J., Staples, L.G., Gandy, M., Johnston, L., Wootton, B., Nielssen, O., Dear, B.F., 2016. Treating anxiety and depression in older adults: randomised controlled trial comparing guided V. self-guided internet-delivered cognitive–behavioural therapy . BJPsych Open 2 (1), 50–58. https://doi.org/10.1192/bjpo.bp.115.002139

Viechtbauer, W., Smits, L., Kotz, D., Budé, L., Spigt, M., Serroyen, J., & Crutzen, R. 2015. A simple formula for the calculation of sample size in pilot studies. Journal of Clinical Epidemiology 68 (11), 1375–1379. https://doi.org/10.1016/J.JCLINEPI.2015.04.014

Vigerland, S., Ljótsson, B., Thulin, U., Öst, L.G., Andersson, G., Serlachius, E., 2016. Internet-delivered cognitive behavioural therapy for children with anxiety disorders: A randomised controlled trial. Behaviour Research and Therapy 76, 47–56. https://doi.org/10.1016/j.brat.2015.11.006

Vigerland, S., Thulin, U., Ljótsson, B., Svirsky, L., Öst, L.G., Lindefors, N., Andersson, G., Serlachius, E., 2013. Internet-Delivered CBT for Children with Specific Phobia: A Pilot Study. Cognitive Behaviour Therapy 42 (4), 303–314. https://doi.org/10.1080/16506073.2013.844201

Wardenaar, K.J., Lim, C.C.W., Al-Hamzawi, A.O., Alonso, J., Andrade, L.H., Benjet, C., Bunting, B., de Girolamo, G., Demyttenaere, K., Florescu, S.E., Gureje, O., Hisateru, T., Hu, C., Huang, Y., Karam, E., Kiejna, A., Lepine, J.P., Navarro-Mateu, F., Oakley Browne, M., Piazza, M., Posada-Villa, J., ten Have, M.L., Torres, Y., Xavier, M., Zarkov, Z., Kessler, R.C., Scott, K.M., de Jonge, P., 2017. The cross-national epidemiology of specific phobia in the World Mental Health Surveys. Psychological medicine 47 (10), 1744–1760. https://doi.org/10.1017/S0033291717000174

Wilhelm, F.H., Roth, W.T., 1997. Clinical characteristics of flight phobia. Journal of Anxiety Disorders 11 (3), 241–261. https://doi.org/10.1016/S0887-6185(97)00009-1

Wolitzky-Taylor, K.B., Horowitz, J.D., Powers, M.B., Telch, M.J., 2008. Psychological approaches in the treatment of specific phobias: A meta-analysis. Clinical Psychology Review 28 (6), 1021–1037. https://doi.org/10.1016/J.CPR.2008.02.007

Zetterberg, M., Carlbring, P., Andersson, G., Berg, M., Shafran, R., Rozental, A., 2019. Internet-based cognitive behavioral therapy of perfectionism: Comparing regular therapist support and support upon request. Internet Interventions 17, 100237. https://doi.org/10.1016/j.invent.2019.02.001

CHAPTER 4

QUALITATIVE STUDY OF DROPOUTS

This chapter is currently in preparation as:

Mor, S., Botella, C & Quero, S. (2021). Dropping out of NO-FEAR Airlines: A qualitative study.

Dropping out of NO-FEAR Airlines: A qualitative study

Sonia Mor[1], Cristina Botella[1,2], & Soledad Quero[1,2]

[1]Universitat Jaume I, Castellón, Spain.

[2]CIBER de Fisiopatología de la Obesidad y Nutrición (CIBEROBN), Carlos III Institute of Health, Madrid, Spain.

ABSTRACT

Internet-delivered Cognitive Behavioural Therapy (ICBT) interventions have been developed for a wide range of psychological disorders and have shown to be effective improving clinical symptoms. However, the high attrition rates in these interventions are still a major concern and more research needs to be done to overcome this problem. The aim of the present study was to conduct a qualitative analysis to explore the subjective experience of a sample of participants who dropped out of a feasibility study using an ICBT for Flying phobia (FP). The sample included 9 participants (8 women, 1 man) with a mean age of 37.33 years (SD = 10.06). The intervention was NO-FEAR Airlines, an ICBT for FP with online exposure scenarios. An independent researcher contacted participants who had not finished the intervention. Consensual Qualitative Research (CQR) methodology was followed. Two judges established domains, categories, and core ideas with participant responses and discussed them with an auditor to reach a consensus. Results showed that the most frequent problems referred by participants with the intervention program were the absence of emotional arousal and the low immersion of the exposure scenarios. The most requested change to improve the program was to include more immersive exposure scenarios such as videos. The data of the present study is relevant to improve NO-FEAR Airlines ICBT and to enhance adherence to the program, helping to expand the knowledge in this field with the opinion of a clinical sample regarding the level of immersion of online exposure scenarios.

Keywords: Internet-delivered treatment, Flying phobia, Dropout, Consensual Qualitative Research

1. INTRODUCTION

In recent years, Internet-based Cognitive Behavioural Therapy (ICBT) has introduced new ways of delivering psychological interventions. They suppose an alternative to the dominant face-to-face model, that presents problems reaching all the people in need of help (Kazdin, 2015; Kazdin & Blase, 2011), since they can bring the intervention to people's homes, helping with some of the barriers to psychotherapy such as geographical aspects (López-Lara et al., 2012). They also overcome some of the limitations found in face-to-face therapy and present multiple advantages, including faster therapist support, enhancing learning and retention in users or improving the cost-effectiveness of the psychological intervention (Andersson & Titov, 2014). In the specific case of exposure therapy, they can help with fundamental aspects like the difficulties to access the phobic stimulus, giving therapists the possibility to select and include relevant stimuli and scenarios for the problem during the intervention, reduce costs and increase confidentiality.

ICBTs have been developed for a wide range of psychological disorders. They have shown its effectiveness improving clinical symptoms and seem to be well-accepted among participants (Andrews et al., 2018; Carlbring et al., 2018; Domhardt et al., 2019; Kampmann et al., 2016; Kuester et al., 2016; Richards & Richardson, 2012). However, although ICBTs overcome some of the problems of traditional therapy, they also present some barriers for the treatment of psychological disorders. To add to general barriers to psychotherapy like the low perceived need for treatment, structural barriers, or sociodemographic factors (Andrade et al., 2014; Karyotaki et al., 2015), there are specific barriers perceived for mental health cliniciansregarding ICBT, like negative beliefs about these interventions, low adaptability, problems to address additional clinical concerns, or lower priority by clinicians compared to face-to-face therapy (Hadjistavropoulos et al., 2017). There has also been found a correlation between perceived computer self-efficacy and computer anxiety with interest in ICBTs (Schneider & Hadjistavropoulos, 2014). Additionally, despite ICBTs helping with social stigma, self-stigma can also suppose an attitudinal barrier (Moskalenko et al., 2020).

Besides the aforementioned barriers, one of the main concerns regarding ICBT is the high attrition rates found in these interventions. Meta-analytic studies of ICBTs for different problems have reported a mean dropout rate between 15% and 57% (Carlbring et al., 2018; Richards & Richardson, 2012). In the case of specific phobia, the attrition

rates found in a recent systematic review (Mor et al., 2021) ranged from 0 to 98.2%, with a mean percentage of 27.36% in the studies included, where some self-applied programs were included, but most of the studies included had therapist support. Because the research on ICBTs for specific phobia is still scarce, the characteristics of the intervention programs addressed to these problems need further research.

Results in our study using NO-FEAR Airlines for the treatment of Flying Phobia (FP) without therapist support showed that 42.3% of participants withdrew from one of the experimental conditions, that is, these participants did not complete the post-assessment. The aim of this study was to conduct a qualitative analysis to explore the subjective experience of a sample of participants who dropped out of NO-FEAR Airlines.

2. METHOD

2.1. Sample

The sample for this qualitative study included 9 participants (8 women, 1 man) who had dropped out of the feasibility study using NO-FEAR Airlines ICBT (Mor et al., 2021). The mean age of the sample was 37.33 years (SD=10.06), ranging from 20 to 52 years. Demographical and clinical characteristics of each participant are shown in Table 1. FFQ score is missing for participant 8 because she did not complete the questionnaire.

Table 1. Participants' sociodemographic and clinical characteristics.

Participant	Gender	Age	Marital status	Education level	Years with FP	FFS[a]	FFQ[b]
1	F	34	Divorced	HE	1-5 years	61	207
2	F	31	Single	HE	6-10 years	67	211
3	F	27	Relationship	HE	>11 years	82	276
4	F	52	Relationship	HE	>11 years	70	231
5	M	42	Relationship	SE	>11 years	53	146
6	F	20	Relationship	SE	>11 years	71	209
7	F	44	Relationship	SE	6-10 years	63	172
8	F	43	Single	HE	1-5 years	66	-
9	F	43	Relationship	SE	>11 years	61	208

F: Female; M: Male; SE: Secondary Education; HE: Higher Education
[a] Fear of Flying Scale (FFS; Haug et al., 1987)
[b] Fear of Flying Questionnaire (FFQ-II; Bornas et al., 1999)

2.2. Treatment

NO-FEAR Airlines is an ICBT addressed to people with FP. The treatment has three components: psychoeducation, exposure, and overlearning. The main component of the treatment is the exposure to scenarios related to the flying process using real images and sounds. There are six scenarios that the participant has to complete (flight preparation, airport, boarding and take off, flight, landing and news related to plane accidents) and the order of appearance of these scenarios depends on participants' responses in the FFQ-II questionnaire (Bornas et al., 1999). Each exposure scenario is composed by cycles with a duration of 3 minutes in which the images and sounds are delivered to the participant. After those 3 minutes, the program asks the participants their anxiety level and the next scenario is not shown until the anxiety level is low (less than 3 on a scale from 0 to 10).

Participants of the current study formed part of a feasibility study in which NO-FEAR Airlines was delivered using two types of images in the exposure scenarios: still images or 360º navigable images. The intervention had a duration of 6 weeks maximum, and no therapist support was provided based on findings from a previous study (Campos et al., 2019). For more details about the treatment and the study, see the study protocol published elsewhere (Mor et al., 2021).

2.3. Procedure

An independent researcher (MPGC) who was not part of the feasibility study contacted by phone 19 participants who had dropped out. Out of those 19 participants, 9 agreed to participate. The remaining 10 participants that were not included were unable to contact even after several calls (n=8) or did not want to participate in the qualitative study (n=2). If the person agreed to participate, the interview was carried out in the same call and had a duration of 5-6 min approximately. The interview included one multiple choice question and six open questions about the reasons why they decided to not continue with the treatment. They were also asked about aspects that they would like to change from the program or things that would have helped them to finish the treatment (See Appendix for the full interview). All interviews were audio-recorded and later transcribed.

In this qualitative study, the Consensual Qualitative Research (CQR) methodology was followed (Hill et al., 2005), which establishes a process to collect, code and analyze qualitative data. For this reason, two researchers, a PhD student (SM) and an

undergraduate student (MP), read independently the interview transcriptions and served as judges. Then, they discussed their conclusions with a third researcher (SQ), who is an associated professor with experience in the field of ICBT and served as an auditor. This team was formed following CQR guidelines.

2.4. Data analysis

Following CQR guidelines, domains, categories, and core ideas were established by the two judges and discussed later with the auditor to reach a consensus. A cross-analysis was used to construct the categories, and they were labeled as *general* if they applied to all cases (n=9), *typical* if they applied to at least half of the cases (5 to 8), and *variant* if they applied to less than half of the cases (4 or less).

Differences in the domains and categories assigned by each judge were solved with the help of the auditor until consensus was reached. Finally, the names for each domain and category were also discussed in the meetings.

3. RESULTS

After analysing participants' responses and reaching consensus, 12 categories were established and classified under 3 main domains. Out of the 12 categories, 2 were labelled as typical and 10 as variant. No general categories were found. Table 2 shows the summarized results of the CQR.

Table 2. Domains, categories, and illustrative core ideas.

Domains	Categories (frequency) *Label*	Illustrative core ideas
Problems with the ICBT program	Absence of emotional arousal (7) *Typical*	P does not feel the same sensations than when facing a real plane
	Lack of time (3) *Variant*	P did not have the time to complete the intervention
	Lack of therapist support (2) *Variant*	P wanted a therapist to help them through the treatment
	Low immersion in the exposure scenarios (4) *Variant*	P refers that the images had a poor quality
	Technical difficulties (3) *Variant*	P had several problems with the webpage

Preference for traditional face-to-face therapy	Yes (4) *Variant*	P said that they searched for this alternative
	No (2) *Variant*	P does not think that they would have completed the treatment either
	Not sure (3) *Variant*	P did not know for sure if they would have continued in face-to-face
Strategies to improve the ICBT program	More immersive exposure scenarios (5) *Typical*	P suggested the use of videos in the exposure scenarios
	Feedback and therapist support (2) *Variant*	P asked for a therapist to guide them during the intervention and give them feedback of their progress.
	Solve technical problems (1) *Variant*	P said that if the webpage did not have technical problems, it would have been easier to complete the program
	Less assessment (1) *Variant*	P suggested less assessment questions during the program

3.1. Problems with the ICBT program

The most frequent problem with the intervention referred by participants was the absence of emotional arousal, with 7 out of the 9 participants reporting it, and labelling this category as *typical*. This category includes all the answers that referred not feeling anything during the exposure scenarios where images and sounds of the phobic situation were presented, or not feeling the same sensations that they feel when they are inside a real plane.

Participant 4 expressed: "*I did not feel like I was in that situation. The images did not rouse anything in me. I did not feel the anxiety or the fear that I experience when I have to take a real flight*". Participant 5 referred: "*You do not feel a real sensation, the panic, the fear, as when you are inside a real plane*".

The next most frequent category was the low immersion in the exposure scenarios, with 4 participants reporting this issue. It is important to note that we differentiated between the subjective experiences of the participants during the scenarios (included in the previous category) and the problems that referred to the characteristics of the exposure scenarios (immersion). In this category, we included responses that were related to the quality of the images or the problems with the levels of realism of the scenarios.

Participant 2 expressed this with the following words: "*The pictures had a very poor quality that could be improved*". Participant 1 expressed: "*The still pictures did not feel real to me*".

Lack of time to complete the intervention was another one of the reasons that 3 participants referred for dropping out. Participant 3 said: "*I liked the program and I thought that the sounds and images were good, but it was a very complicated time in my life, and I did not have the time to complete it*".

Technical difficulties with the ICBT were also brought up by another 3 participants. In this category were included all answers related with problems to log into the program or viewing the exposure scenarios and the contents of the program. In words of participant 6: "*I could not complete the ICBT through my phone and I had to use a computer. Then I could not see the exposure scenarios, I could not hear the sounds. Sometimes the webpage crashed… I decided to not continue*".

The last category included in this domain was the lack of therapist support, that was referred by 2 participants, expressing their need to be in contact with a therapist during the process. "*I think I needed a basic weekly follow-up by a therapist so it could have guided me to solve the problems or tell me if there was anything that I could do to feel more present in the scenarios*".

Finally, there were two more reasons that participants brought up during their interview but that were not included in a category because we considered that they were specific circumstances in these participants, and they were not directly related to the intervention program, and each one was only mentioned by one participant. One of them was the impossibility to take a flight after the intervention, since the program and the therapists highly recommended it, and the other one was the lack of compromise because the intervention was free, since it was a research study.

3.2. Preference for traditional face-to-face therapy

During the interview, participants were asked if they would have continued the program if the intervention was in a traditional face-to-face modality. The responses showed that 4 participants were positive that they would have continued the intervention, 2 said that they would not have finished the intervention even if it was face-to-face, and 3 participants were not sure. Some of their answers will be described below.

Participant 2 said that she would have continued if the intervention was face-to-face: "*Yes, in fact I searched for face-to-face options after dropping out of the intervention*". Participant 5 would not have continued even with face-to-face sessions: "*No. In fact, I already tried a face-to-face approach and happened the same*". Finally, some participants were not sure of their answer, like participant 1 who said: "*I don't know, maybe I would have felt more compromised with face-to-face sessions and I would have continued, but I am not 100% sure*".

3.3. Strategies to improve the ICBT program

Participants were asked what would have helped them to continue the program and what strategies they thought that could work to improve adherence to NO-FEAR Airlines. With their responses, 4 categories were included in this domain.

The first one was the request of more immersive scenarios, with 5 participants under this category (*typical*). Participants asked for a change in the images of the exposure scenarios, referring that they would want videos to make the experience more real, or something that felt like a plane simulator. Participant 1 expressed: "*I think that making the situation more real would be beneficial, using videos for example*". Participant 5 said: "*The more real it could be, the better. Something that makes the person feel more inside the environment, I do not know, more like a simulator. More immersive*".

Feedback and therapist support were something that 2 of the participants also suggested to improve the ICBT program. They referred that they would have liked the help of a therapist during the process who monitored their progress and gave some feedback after the exposure scenarios. Participant 4 suggested: "*Maybe having more monitoring of the patients could help so you would not be so alone while doing the intervention. Someone that tells you if you have to repeat something, gives you advice, or tells you if you are going in the right path*".

Two other categories were included in this domain although they only were referred by one participant each since they were considered relevant as the study conducted used NO-FEAR Airlines was a feasibility study and we considered that they should also be taken into consideration to improve the intervention program. The first one suggested by participant 6 was to solve the technical problems with the webpage: "*If the webpage had not crashed and I would not have had to contact the therapist to solve it, it might have been easier to continue*". On the other hand, participant 2 suggested to include

less assessment inside the webpage: "*The questions were too repetitive. I understand that you need to do it to check people's progress, but it felt like the time to answer the questions was too long and the time for the exposure scenarios was too short*".

Lastly, another participant suggested to do group therapy to improve the intervention. This suggestion was not included in a category since it was considered to not be related with the current intervention format.

4. DISCUSSION

The aim of this study was to analyse the possible reasons why participants dropped out of an ICBT for FP using CQR methodology. ICBT interventions have shown to present high attrition rates in some studies (Richards & Richardson, 2012), making evident the need to explore the causes to improve these interventions. Some studies have been carried out with this aim (Arndt et al., 2020; Edmonds et al., 2018; Schmidt et al., 2019) and, taking into consideration the aim of our feasibility study, we considered relevant exploring and analysing participants' experiences who have not completed NO-FEAR Airlines ICBT.

The most frequent problems referred by participants with the intervention program were the absence of emotional arousal and the low immersion of the exposure scenarios and, in line with these reported problems, the most requested change to improve the program was to include more immersive exposure scenarios. When participants referred to the lack of emotions in the scenarios, most of them said that they did not feel "inside" the situation, and that they did not experience the same feelings as when they are in a real plane. The experience of feeling "inside" the virtual environment is called sense of presence (Steuer, 1992) and is a construct that has been studied in Virtual Reality Exposure Therapy (VRET). There is a correlation between fear and presence (Gromer et al., 2019; Ling et al., 2014), so when participants refer that they do not feel the same fear than in the real airplane, the sense of presence variable could be playing a role. An environment that engages emotions increases the sense of presence, in this case, viewing and hearing the phobic situation in the program probably produces an emotional reaction in the user and leads to a sense of being "inside" the scenario and judging the scenario as "real". However, this relationship appears to be bidirectional, meaning that a certain degree of presence is also necessary to engage an emotional reaction (Bouchard et al.,

2008). Diemer et al. (2015) proposed that two main factors influence presence: arousal and immersion. The most requested strategy to improve the program in the current study was the inclusion of more immersive scenarios, a large majority asked for the inclusion of videos, so participants' requests go in line with this proposed model. Another important construct to be taken into consideration is reality judgment, defined as the extent to which a virtual experience is acknowledged as real (Baños et al., 2000). However, research in this construct has been scarce so far, even in VRET. Participants in this study also referred that the exposure scenarios did not feel "real", showing the importance of this factor during exposure as well. Unfortunately, to our knowledge, no studies have been carried out about sense of presence and reality judgment in ICBT interventions, and more research needs to be done in this field to understand if the same findings in VRET can be applied to ICBTs when the exposure technique is being implemented using certain scenarios. In VRET, more immersive scenarios are presented, helping to make the virtual environments more similar to the phobic situation in the real world, and helping to increase the sense of presence and reality judgment as well. However, in the current study, only two out of the six exposure scenarios were 360º panoramic and, therefore, more immersive. As participants in this study suggested, improving NO-FEAR Airlines with videos could be an opportunity to explore immersion, sense of presence, and reality judgment in ICBT, since it has been suggested that videos produce more fearful reaction than still images (Courtney et al., 2010), and how this affects adherence to the program.

Lack of time was another one of the problems that participants reported to complete the ICBT and this has also been a frequently reported reason to dropout from internet interventions (Donkin & Glozier, 2012). Although ICBTs can help with time constraints because the patient can choose when to log into the program in their own homes, sometimes it can be difficult to find a space to work with the program due to other aspects in life. Technical difficulties were another one of the problems that some participants mentioned. In some cases, participants had trouble viewing the exposure scenarios and had to contact the team to solve the problem. In most of the cases, these problems were solved rapidly after the participant contacted the team, but it seems that this was a difficulty to continue for some people. This is consistent with previous findings that report that technical difficulties are a robust predictor of dropout in ICBT (Schmidt et al., 2019).

Lastly, the lack of therapist support was also addressed as a problem. In the feasibility study carried out with NO-FEAR Airlines, no therapist support was included based on findings of a previous study (Campos et al., 2019), however, some research suggests that guided ICBTs help with adherence to the treatment (Baumeister et al., 2014; Mewton et al., 2014). In another qualitative study exploring participants' experiences dropping out of an ICBT intervention for emotional disorders, the absence of a therapist was one of the most frequent barriers identified by participants (Fernández-Álvarez et al., 2017). In the current study, suggestions to improve the program in this regard were the inclusion of monitoring and feedback with the aim of informing the person if they are doing well in the exposure scenarios or to help with any possible difficulties. Guidance and reinforcement during exposure might be an aspect of great importance that should be taken into consideration (Bretón-López et al., 2015), and therefore, including it in NO-FEAR Airlines could be helpful in reducing attrition rates and improving satisfaction with the program. If we also attend to other findings where therapist guidance does not seem to be as important as previously thought in ICBTs (Karyotaki et al., 2017), this could lead to explore which users need therapist support, progressing in the personalised treatments research field, and helping to provide a more individualised experience in participants to avoid dropouts.

Finally, participants were asked if they would have continued the program if it was delivered face-to-face. When asked about their preference comparing face-to-face interventions to ICBT, the number of people who state a preference for the latter was low (Wallin et al., 2016). In our study, some participants referred that they would have continued the intervention if it were delivered face-to-face, or said that there was a possibility that they would have, and only 2 participants of this sample stated that they would not have continued it even if it was delivered traditionally. This is a factor that it might be also taken into account considering the role of expectations on psychotherapy (Constantino et al., 2011), and investing some time to inform the client about the characteristics of ICBT interventions could be beneficial (Soucy et al., 2016).

Regarding the study limitations, the main one is the sample size. This study only included a small sample that agreed to participate, and it might be possible than those who did not participate would have expressed different ideas. Another issue could be that the interviews were short and were carried out through a phone call, so important information might be missing. Finally, participants' answers were retrospective, so some

time had passed when they were contacted to participate in the study since they dropped out, with the possibility of inaccuracies in their answers. Future research should explore participants' experiences with more extensive interviews, so participants have more time to express their ideas. Also, it might be interesting to contact the patient right after they abandon the treatment to have more accurate responses. Finally, in addition to participants' subjective experiences, an analysis of all users' characteristics that did not finish the intervention could help to expand the knowledge about adherence problems in ICBTs.

5. REFERENCES

Andersson, G., & Titov, N. (2014). Advantages and limitations of Internet-based interventions for common mental disorders. *World Psychiatry*, *13*(1), 4–11. https://doi.org/10.1002/wps.20083

Andrade, L. H., Alonso, J., Mneimneh, Z., Wells, J. E., Al-Hamzawi, A., Borges, G., Bromet, E., Bruffaerts, R., de Girolamo, G., de Graaf, R., Florescu, S., Gureje, O., Hinkov, H. R., Hu, C., Huang, Y., Hwang, I., Jin, R., Karam, E. G., Kovess-Masfety, V., … Kessler, R. C. (2014). Barriers to mental health treatment: Results from the WHO World Mental Health surveys. *Psychological Medicine*, *44*(6), 1303–1317. https://doi.org/10.1017/S0033291713001943

Andrews, G., Basu, A., Cuijpers, P., Craske, M. G., McEvoy, P., English, C. L., & Newby, J. M. (2018). Computer therapy for the anxiety and depression disorders is effective, acceptable and practical health care: An updated meta-analysis. *Journal of Anxiety Disorders*, *55*(August 2017), 70–78. https://doi.org/10.1016/j.janxdis.2018.01.001

Arndt, A., Lutz, W., Rubel, J., Berger, T., Meyer, B., Schröder, J., Späth, C., Hautzinger, M., Fuhr, K., Rose, M., Hohagen, F., Klein, J. P., & Moritz, S. (2020). Identifying change-dropout patterns during an Internet-based intervention for depression by applying the Muthen-Roy model. *Cognitive Behaviour Therapy*, *49*(1), 22–40. https://doi.org/10.1080/16506073.2018.1556331

Baumeister, H., Reichler, L., Munzinger, M., & Lin, J. (2014). The impact of guidance on Internet-based mental health interventions - A systematic review. *Internet Interventions*, *1*(4), 205–215. Elsevier. https://doi.org/10.1016/j.invent.2014.08.003

Bornas, F. X., Tortella-Feliu, M., García de la Banda García, G., Fullana Rivas, M. Á., & Llabrés, J. (1999). Validación factorial del cuestionario de miedo a volar. *Análisis y Modificación de Conducta, 25*(104), 885-908.

Bouchard, S., St-Jacques, J., Robillard, G., & Renaud, P. (2008). Anxiety increases the feeling of presence in virtual reality. *Presence: Teleoperators and Virtual Environments*, *17*(4), 376–391. https://doi.org/10.1162/pres.17.4.376

Bretón-López, J., Tortella-Feliu, M., Riera Del Amo, A., Baños, R., Llabrés, J., Gelabert, J. M., & Botella, C. (2015). Patients' preferences regarding three computer-based exposure treatments for fear of flying. *Behavioral Psychology / Psicología Conductual, 23*(2), 265-285.

Campos, D., Bretón-López, J., Botella, C., Mira, A., Castilla, D., Mor, S., Baños, R., & Quero, S. (2019). Efficacy of an internet-based exposure treatment for flying phobia (NO-FEAR Airlines) with and without therapist guidance: A randomized controlled trial. *BMC Psychiatry*, *19*(1), 1–16. https://doi.org/10.1186/s12888-019-2060-4

Carlbring, P., Andersson, G., Cuijpers, P., Riper, H., & Hedman-Lagerlöf, E. (2018). Internet-based vs. face-to-face cognitive behavior therapy for psychiatric and somatic disorders: an updated systematic review and meta-analysis. *Cognitive Behaviour Therapy*, *47*(1), 1–18. Routledge. https://doi.org/10.1080/16506073.2017.1401115

Constantino, M. J., Arnkoff, D. B., Glass, C. R., Ametrano, R. M., & Smith, J. A. Z. (2011). Expectations. *Journal of Clinical Psychology*, *67*(2), 184–192. https://doi.org/10.1002/jclp.20754

Courtney, C. G., Dawson, M. E., Schell, A. M., Iyer, A., & Parsons, T. D. (2010). Better than the real thing: Eliciting fear with moving and static computer-generated stimuli. *International Journal of Psychophysiology*, *78*(2), 107–114. https://doi.org/10.1016/j.ijpsycho.2010.06.028

Diemer, J., Alpers, G. W., Peperkorn, H. M., Shiban, Y., & Mühlberger, A. (2015). The impact of perception and presence on emotional reactions: A review of research in virtual reality. *Frontiers in Psychology*, *6*, 26. Frontiers Research Foundation. https://doi.org/10.3389/fpsyg.2015.00026

Domhardt, M., Geßlein, H., von Rezori, R. E., & Baumeister, H. (2019). Internet- and mobile-based interventions for anxiety disorders: A meta-analytic review of intervention components. In *Depression and Anxiety*, *36*(3), 213–224. Blackwell Publishing Inc. https://doi.org/10.1002/da.22860

Donkin, L., & Glozier, N. (2012). Motivators and motivations to persist with online psychological interventions: A qualitative study of treatment completers. *Journal of Medical Internet Research*, *14*(3). https://doi.org/10.2196/jmir.2100

Edmonds, M., Hadjistavropoulos, H. D., Schneider, L. H., Dear, B. F., & Titov, N. (2018). Who benefits most from therapist-assisted internet-delivered cognitive behaviour therapy in clinical practice? Predictors of symptom change and dropout. *Journal of Anxiety Disorders*, *54*, 24–32. https://doi.org/10.1016/j.janxdis.2018.01.003

Fernández-Álvarez, J., Díaz-García, A., González-Robles, A., Baños, R., García-Palacios, A., & Botella, C. (2017). Dropping out of a transdiagnostic online intervention: A qualitative analysis of client's experiences. *Internet Interventions*, *10*, 29–38. https://doi.org/10.1016/j.invent.2017.09.001

Gromer, D., Reinke, M., Christner, I., & Pauli, P. (2019). Causal Interactive Links Between Presence and Fear in Virtual Reality Height Exposure. *Frontiers in Psychology*, *10*, 141. https://doi.org/10.3389/fpsyg.2019.00141

Hadjistavropoulos, H. D., Nugent, M. M., Dirkse, D., & Pugh, N. (2017). Implementation of internet-delivered cognitive behavior therapy within community mental health clinics: A process evaluation using the consolidated framework for implementation research. *BMC Psychiatry*, *17*(1), 1–15. https://doi.org/10.1186/s12888-017-1496-7

Haug, T., Berntzen, D., Götestam, K. G., Brenne, L., Johnsen, B. H., & Hugdahl, K. (1987). A three-systems analysis of fear of flying: A comparison of a consonant vs a non-consonant treatment method. Behaviour Research and Therapy, 25(3). https://doi.org/10.1016/0005-7967(87)90045-3

Hill, C. E. (2015). Consensual Qualitative Research (CQR): Methods for Conducting Psychotherapy Research. Psychotherapy Research: Foundations, Process, and Outcome, 485–499. https://doi.org/10.1007/978-3-7091-1382-0_23

Kampmann, I. L., Emmelkamp, P. M. G., & Morina, N. (2016). Meta-analysis of technology-assisted interventions for social anxiety disorder. In *Journal of Anxiety Disorders*, *42*, 71–84. Elsevier Ltd. https://doi.org/10.1016/j.janxdis.2016.06.007

Karyotaki, E., Kleiboer, A., Smit, F., Turner, D. T., Pastor, A. M., Andersson, G., Berger, T., Botella, C., Breton, J. M., Carlbring, P., Christensen, H., de Graaf, E., Griffiths, K., Donker, T., Farrer, L., Huibers, M. J. H., Lenndin, J., Mackinnon, A., Meyer, B., … Cuijpers, P. (2015). Predictors of treatment dropout in self-guided web-based interventions for depression: An "individual patient data" meta-analysis. *Psychological Medicine*, *45*(13), 2717–2726. https://doi.org/10.1017/S0033291715000665

Karyotaki, E., Riper, H., Twisk, J., Hoogendoorn, A., Kleiboer, A., Mira, A., MacKinnon, A., Meyer, B., Botella, C., Littlewood, E., Andersson, G., Christensen, H., Klein, J. P., Schröder, J., Bretón-López, J., Scheider, J., Griffiths, K., Farrer, L., Huibers, M. J. H., … Cuijpers, P. (2017). Efficacy of self-guided internet-based cognitive behavioral therapy in the treatment of depressive symptoms a meta-analysis of individual participant data. *JAMA Psychiatry*, *74*(4), 351–359. https://doi.org/10.1001/jamapsychiatry.2017.0044

Kazdin, A. E. (2015). Technology-Based Interventions and Reducing the Burdens of Mental Illness: Perspectives and Comments on the Special Series. *Cognitive and Behavioral Practice*, *22*(3), 359–366. Elsevier Inc. https://doi.org/10.1016/j.cbpra.2015.04.004

Kazdin, A. E., & Blase, S. L. (2011). Rebooting Psychotherapy Research and Practice to Reduce the Burden of Mental Illness. *Perspectives on Psychological Science*, *6*(1), 21–37. https://doi.org/10.1177/1745691610393527

Kuester, A., Niemeyer, H., & Knaevelsrud, C. (2016). Internet-based interventions for posttraumatic stress: A meta-analysis of randomized controlled trials. *Clinical Psychology Review*, *43*, 1–16. Elsevier Inc. https://doi.org/10.1016/j.cpr.2015.11.004

Ling, Y., Nefs, H. T., Morina, N., Heynderickx, I., & Brinkman, W.-P. P. (2014). A meta-analysis on the relationship between self-reported presence and anxiety in virtual reality exposure therapy for anxiety disorders. *PLoS ONE*, *9*(5), e96144. https://doi.org/10.1371/journal.pone.0096144

López-Lara, E., Garrido-Cumbrera, M., & Díaz-Cuevas, M. P. (2012). Improving territorial accessibility of mental health services: The case of spain. *European Journal of Psychiatry*, *26*(4), 227–235. https://doi.org/10.4321/S0213-61632012000400002

Mewton, L., Smith, J., Rossouw, P., & Andrews, G. (2014). Current perspectives on internet-delivered cognitive behavioral therapy for adults with anxiety and related disorders. In *Psychology Research and Behavior Management*, *7*, 37–46. Dove Press. https://doi.org/10.2147/PRBM.S40879

Mor, S., Botella, C., Campos, D., Carlbring, P., Tur, C. & Quero, S. (2021). An Internet-based treatment for Flying Phobia using 360° images: A feasibility pilot study. Internet Interventions [Manuscript submitted for publication]

Mor, S., Botella, C., Campos, D., Tur, C., Castilla, D., Soler, C., & Quero, S. (2021). An Internet-based treatment for Flying Phobia using 360° images: Study protocol for a feasibility pilot study. *Internet Interventions*, *24*, 100387. https://doi.org/10.1016/j.invent.2021.100387

Mor, S., Grimaldos, J., Tur, C., Miguel, C., Cuijpers, P., Botella, C., & Quero, S. (2021). Internet-and mobile-based interventions for the treatment of specific phobia: A systematic review and preliminary meta-analysis. Internet Interventions, 100462.

Moskalenko, M. Y., Hadjistavropoulos, H. D., & Katapally, T. R. (2020). The complex association of barriers and interest in internet-delivered cognitive behavior therapy for depression and anxiety: informing e-health policies through exploratory path analysis. *Journal of Mental Health*. https://doi.org/10.1080/09638237.2020.1793125

Richards, D., & Richardson, T. (2012). Computer-based psychological treatments for depression: A systematic review and meta-analysis. *Clinical Psychology Review*, *32*(4), 329–342. Pergamon. https://doi.org/10.1016/j.cpr.2012.02.004

Schmidt, I. D., Forand, N. R., & Strunk, D. R. (2019). Predictors of Dropout in Internet-Based Cognitive Behavioral Therapy for Depression. *Cognitive Therapy and Research*, *43*(3), 620–630. https://doi.org/10.1007/s10608-018-9979-5

Schneider, L. H., & Hadjistavropoulos, H. D. (2014). When in doubt, ask the audience: Potential users' perceptions of internet-delivered cognitive behavioural therapy for

chronic pain. *Pain Research and Management*, *19*(4), 173–178. https://doi.org/10.1155/2014/451373

Soucy, J. N., Owens, V. A. M., Hadjistavropoulos, H. D., Dirkse, D. A., & Dear, B. F. (2016). Educating patients about Internet-delivered cognitive behaviour therapy: Perceptions among treatment seekers and non-treatment seekers before and after viewing an educational video. *Internet Interventions*, *6*, 57–63. https://doi.org/10.1016/j.invent.2016.09.003

Steuer, J. (1992). Defining Virtual Reality: Characteristics Determining Telepresence. *Journal of Communication*, *42*(4), 73–94.

Wallin, E. E. K., Mattsson, S., & Olsson, E. M. G. (2016). The preference for internet-based psychological interventions by individuals without past or current use of mental health treatment delivered online: A survey study with mixed-methods analysis. In *JMIR Mental Health*, *3*(2), e5324. JMIR Publications Inc. https://doi.org/10.2196/mental.5324

APPENDIX: Qualitative interview questions

Please, check the reason(s) why you decided to not finish NO-FEAR Airlines. During your response, you can tell us everything that you consider important and that can help us understand the reasons for your decision.

- o Lack of time
- o Program difficulty
- o Lack of therapist support
- o I did not experience any emotional reaction with the images
- o I did not like the program structure
- o It was not what I expected
- o I felt better and I did not need the intervention anymore
- o I felt that it was not working for me
- o I found a better option
- o Other: _____

1. What would you have liked to be different in NO-FEAR Airlines?
2. Which components do you consider that NO-FEAR Airlines should include to be effective and help to finish the program?
3. Would you have continued if the program was different?
4. What are, in your opinion, NO-FEAR Airlines main problems/barriers?
5. Would you have continued if the intervention would have been face-to-face instead?
6. Can you think of any strategy to improve adherence in NO-FEAR Airline and reduce intervention dropout rates?

GENERAL DISCUSSION

The present doctoral thesis wanted to contribute to the knowledge of ICBTs for the treatment of SP. Different general aims were established with this purpose.

The first main was to conduct a systematic review and preliminary meta-analysis of the published works about Internet- and mobile delivered interventions (IMIs) for the treatment of SP (Chapter 1). To the best of our knowledge, no systematic review or meta-analysis has been conducted on this topic and we believe that this might benefit research on this field. The use of IMIs broadens the possibilities to offer psychological treatments to people that need them and, although studies for SP are scarce compared to other anxiety disorders, especially on ICBTs where there are already published systematic reviews and meta-analysis (Kampmann et al., 2016; Richards et al., 2015), synthesizing the findings to date could help researchers to conduct new studies, and to establish new goals and questions in this field. The development of mobile-delivered interventions is more recent but, still, our systematic search showed that there are already some published works using IMIs for animal phobia (Andersson et al., 2009, 2013; Matthews et al., 2011; 2012), dental phobia (Arias & McNeil, 2020; Shahnavaz et al., 2016), flying phobia (Campos et al., 2019), acrophobia (Donker et al., 2019), and various types of SP (Vigerland et al., 2013). These IMIs were aimed for the treatment of SP for children, adolescents, and adults, using exposure as the main treatment component, and they showed good results in reducing phobic symptomatology with promising results in the maintenance of the clinical changes. This was also supported by the meta-analysis conducted, where large effect sizes were found in some cases. Compared to participants of waiting list groups, participants in IMI groups showed a reduction in phobic symptomatology at post-treatment and, in those studies where IMIs were compared to a face-to-face treatment group, no significant effects were observed. These studies show that exposure therapy can also be delivered at peoples' homes and be an alternative for the traditional face-to-face intervention model. Systematic reviews and meta-analysis about the effectiveness of IMIs have been carried out in other disorders as well, and they have also shown to work

in reducing symptoms for depression (Josephine et al., 2017) and in other anxiety problems like panic disorder and agoraphobia (Domhardt et al., 2019).

The second main aim of this thesis was to conduct a feasibility pilot study with NO-FEAR Airlines ICBT using two types of images in the exposure scenarios (still images vs 360◦ navigable images) to explore the acceptance of the different images by patients with FP. For this purpose, 360º navigable exposure scenarios were included in the program (Chapter 2). Since the program had shown effectiveness in reducing FP symptomatology and maintaining these changes over time using still images in every scenario (Campos et al., 2019), as well as being already well-accepted by participants (Campos et al., 2018), navigable images were only included in two exposure scenarios. Our hypothesis was that both types of images would be well-accepted by participants, but that they would prefer 360º images. This hypothesis was confirmed by the results of the feasibility study (Chapter 3) that showed that most of participants preferred navigable images over still images and thought that they were more effective, logic, and the ones that they would recommend before and after the treatment. An even more interesting finding was found in the results of the experimental group that viewed both types of images during the exposure component in the intervention. These participants gave statistically higher ratings to 360º images for their usefulness and sense of presence compared with still images, and when they were asked how they would like all images in the program to be, the large majority chose navigable images. These results suggest that participants are in favor of including more immersive scenarios in the program, and they even suggested in their answers in the qualitative interview to include videos to help them to feel more present in the situation and have a more similar emotional experience to the one they have in the real situation. This suggestion referred by participants is in line with research that shows that videos produce more fearful reactions than still images (Courtney et al., 2010).

However, some aspects should be considered before including more immersive scenarios in NO-FEAR Airlines. Participants in the study preferred navigable images, but they also perceived them as more aversive before and after the treatment, in line with previous findings where more realistic stimuli were also perceived as more aversive (Bretón-López et al., 2015). This could have implications in the adherence and satisfaction of clients with ICBTs including exposure scenarios, and this could suggest that when more immersive and, therefore, realistic images are included, the more therapist

support might be needed. In any case, this is an open question that can only be resolved with research data.

In this regard, our feasibility study presented high dropout rates and, although literature shows that high attrition rates can be a possibility in ICBTs (Richards & Richardson, 2012), we wanted to explore the reasons with the aim of improving the program and offer better interventions to future users. Thus, a third main objective was to conduct a qualitative study on the reasons to drop out of NO-FEAR Airlines (Chapter 4). The main reason that most of participants repeated for having interrupted the intervention was the absence of an emotional reaction during the exposure scenarios. They reported that they did not experience the same emotions than the ones they feel in a real plane, and that they did not feel "inside" the situation. It is important to note that this was not an exclusive experience of participants who dropped out, since some participants that finished the intervention also referred having difficulties in this regard at the post-treatment interview. The main suggestion to improve the ICBT program was related to this as participants asked for more immersive scenarios, like videos. These findings, together with the results of the feasibility study, suggest that immersion and sense of presence may have an important role in ICBT interventions with an exposure component, like it does in VRET. Presence is the result of immersion and arousal (Diemer et al., 2015), and if participants have to experience the same emotions than they do in the real situation, that is, fear, in order to carry out the exposure, they need to feel present (Gromer et al., 2019), and perceive the experience as real and similar to the real phobic situation.

Something that could have influenced adherence to the treatment as well and that was also referred by some participants who dropped out, was therapist support, which was also suggested as a component to improve the ICBT. This topic is still open to debate because, although some authors suggest that therapist guidance might not be as crucial as previously thought (Karyotaki et al., 2017), there is also evidence that guided ICBTs present lower dropout rates (Andersson et al., 2015) and that guidance helps with adherence to the treatment (Mewton et al., 2014). Therapeutic alliance is also important in ICBT, and it has been associated with better treatment outcomes (Pihlaja et al., 2018). However, this alliance in ICBTs has not only been explained by the therapist-patient relationship, but it has also been related with the own program, meaning that well designed interventions might promote user participation as well (Cavanagh & Millings, 2013). This is the reason why exploring users' opinions to improve ICBTs is fundamental.

In the previous study (Campos et al., 2019), no differences were found in terms of adherence and effectiveness between the self-applied group and the group with therapist support. However, when asked about their preferences, participants significantly preferred therapist support before and after the treatment. Previous research indicates that participants' preferences have an impact in treatment outcomes and adherence (Delevry & Le, 2019; Kwan et al., 2010), suggesting that not only results about clinical effectiveness might need to be considered. This, together with other resources like educating users about ICBT interventions before the treatment (Soucy et al., 2016) could help to decrease adherence problems.

This thesis also had some more specific aims. Firstly, we wanted to test the potential effectiveness of the intervention groups compared to a waiting list control group (Chapter 3), replicating the previous effectiveness results using NO-FEAR Airlines (Campos et al., 2019). Results showed that both treatment groups improved significantly after the intervention with large effect sizes (ranging from 0.76 to 2.79) in all clinical measures in comparison with the waiting list, who did not show changes in any of the measures after the six weeks period. These results support the findings in our systematic review and preliminary meta-analysis that showed that ICBTs are effective in SP, and also goes in line with previous results using NO-FEAR Airlines (Campos et al., 2019) and previous research about the effectiveness of computerized interventions to treat FP (Tortella-Feliu et al., 2008). No differences were found between the two intervention groups, which could be expected given the similarity between the two conditions and that still images were already effective in the treatment of FP. There was a maintenance of changes over time, also in line with the previous study, although these analyses were exploratory due to the high attrition rates. This is an addition to the large evidence about the effectiveness of ICBTs for the treatment of psychological problems, showing comparable results with face-to-face therapy (Carlbring et al., 2018).

Another specific aim of the thesis was to explore the role of sense of presence and reality judgment in the exposure scenarios and examine whether there was a mediation effect of these variables on treatment changes. First, no significant differences were found after the navigable exposure scenarios compared with the same still exposure scenarios in those two variables, measured after each exposure scenario on 0-10 scales. Also, no differences were found either in the Reality Judgement and Presence Questionnaire (adapted from Baños et al., 2005) at post-treatment. Second, no mediation effect of post-

exposure sense of presence and reality judgment measures was found on treatment changes, in line with findings obtained in VRET (Price & Anderson, 2007; Tardif et al., 2019). However, an interesting result was the significant relationship between sense of presence and the change in the FFQ questionnaire (Chapter 3). The small sample size and the fact that no other significant results were found in these analyses prevent us from making any conclusions, but this is a potential result that shows the need to further research on these variables in ICBTs that include an exposure component.

In summary, it appears that navigable images are preferred by participants, considered more logic to overcome their problem and would be the ones that they would like to view in all exposure scenarios. Qualitative data also suggests that participants would like to see more immersive scenarios. Although there were not differences between the two treatment groups in terms of effectiveness, clients' preferences about the treatment that they receive are something that needs to be considered as well and that it might influence the intervention.

Strengths

The present thesis has several strengths:

- The systematic review was publicly registered at Open Science Framework (osf.io) for transparency and Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines were followed to conduct the review and to report the results.
- Preliminary meta-analyses were performed taking into consideration the presence of a comparator and if this was an active control or waiting list, conducting the adequate analyses in each case.
- The trial using NO-FEAR Airlines was approved by the Universitat Jaume I Ethics Committee
- The clinical trial was registered at clinicaltrials.gov (NCT03900559)
- The study was conducted following the CONSORT (Consolidated Standards of Reporting Trials) statement for pilot and feasibility studies, the CONSORT-EHEALTH guidelines and the SPIRIT guidelines (Standard Protocol Items: Recommendations for International Trials).

- The study protocol was published at *Internet Interventions* to ensure transparency.
- The sample size was calculated beforehand to achieve adequate power to detect clinical significance. Dropout rates reported in recent meta-analysis of ICBTs were taking into consideration for these calculations (Carlbring et al., 2018). Also, the sample sizes coincided with the recommendations by Viechtbauer et al. (2015) for feasibility studies.
- Statistical analyses regarding the potential clinical effectiveness of the intervention were conducted using Intent-to-treat (ITT) analyses to provide a more unbiased estimation of treatment effect. Mixed models analysis without any ad hoc imputation were chosen for this purpose (Salim et al., 2008).
- Effect sizes using Cohen's d were calculated and reported for the clinical measures to provide an estimation of the treatment effect.
- The qualitative study about dropouts was conducted following the Consensual Qualitative Research (CQR) (Hill et al., 2005) to collect, code and analyze qualitative data and to conform the appropriate team to reach consensus.
- The number of participants in this qualitative study was also adequate according to CQR guidelines, which establishes an optimal sample size of 8-15 participants.
- NO-FEAR Airlines proved its effectiveness in a previous RCT (Campos et al., 2019), and strategies to improve the program were applied to enhance patients' satisfaction. The current thesis provides further evidence about the effectiveness of this intervention to treat FP.
- For many participants, NO-FEAR Airlines has been effective in reducing FP symptomatology without therapist support. This shows the potential of ICBTs for SP to reach a great number of people in need of help while reducing costs considerably. However, it is also true that further research is needed to determine which users are better fitted in a completely self-applied format or a therapist support format.
- NO-FEAR Airlines has a linear navigation that helps the user to interact with the program in a simple and easy way. Also, the program was designed to resemble an airline aesthetic so it could look attractive to the user.

Limitations

Some limitations of the studies included in this thesis need to be taken into consideration to interpret the results.

First, the number of studies included in the systematic review and preliminary meta-analysis was small, and only five out of the nine studies were RCTs. Furthermore, only two of the studies were mobile-based interventions and some studies had no control group. This means that the results of the review are not conclusive, and more research should be carried out when more ICBTs for SP are available. The outcome measures also differed among them, some including self-report questionnaires and others clinicians' ratings. Finally, there was a great heterogeneity between the studies in terms of sample size, study design, comparators, and outcome measures.

Regarding the feasibility study, the person who interviewed the participants about their opinion at post-treatment was the same person who also conducted the assessment at pre- and post-treatment, and this could have biased participants responses. Also, since they had to give their answer directly to the researcher through the phone, that could have led to social desirability. Additionally, due to the high attrition rates, the number of people who answered the feasibility measures after the treatment was lower than expected, and only those who had finished the program answered them. Lastly, their opinion was asked retrospectively, and answering right after the exposure scenarios could have result in different responses.

Attrition rates were higher than expected (Carlbring et al., 2018), and although ITT analyses were conducted to handle missing data, this was not possible for the follow-ups due to the low number of participants who answered.

Another limitation could be related to the assessment of sense of presence and reality judgment. There are different assessment tools to measure sense of presence (i.e. Schubert et al., 2001; Slater et al., 1995; Witmer & Singer, 1998) but, to our knowledge, there is no other questionnaire for the assessment of reality judgment. We decided to use our questionnaire since it also assesses reality judgment (Baños et al., 2005), but the results could have differed if we had used another measurement. Furthermore, the level of sense of presence and reality judgment after every exposure scenario was asked when said scenario was completed (anxiety level less than 3) meaning that some participants

could have responded after having seen the same scenario repeated a few times and that could have influenced their responses.

Regarding the study to explore dropouts, there were more participants from the condition that did not include navigable images (6 out of 9 participants) and although the responses of the 3 participants from the navigable images condition were in line with the rest, that might influence the results. Additionally, we only explored those 9 participants subjective experience, but we did not analyze sociodemographic characteristics or other factors of the whole sample who dropped out that could influence attrition in ICBTs (Moskalenko et al., 2020).

Finally, participants participated in the study voluntarily, and that could result in a sample that is already interested in ICBTs and affect their opinion.

More specific limitations of each study are acknowledged in the corresponding study chapter.

Future lines of research

As mentioned before through this thesis, research on ICBTs for SP is still scarce. There is a need of carrying out more studies in this field to understand what characteristics and components are relevant in online interventions for this problem. Specifically, future research should conduct more RCTs regarding this topic so more robust meta-analyses could be done. In the systematic review, all the studies included used exposure as the main component. Future research could also explore whether including strategies to enhance exposure results, such as adding more variations in scenarios or approaching catastrophic thoughts during the exposure for belief disconfirmation as suggested by Craske et al. (2014), can improve the results of ICBTs for SP. ICBTs can be a very fruitful field to develop new strategies for SP treatments if they include recent theorical advances. In the same line, with the new possibilities that smartphones offer, developing mobile-delivered interventions for SP can also help to gain knowledge on the topic and reach more people in need of help, as well as expanding the number of evidence-based interventions delivered through the phone, which is a concerning issue for mobile-based interventions (Miralles et al., 2020). Our systematic review also showed that all IMI interventions for SP, including ours, were based in traditional exposure with the aim of

achieving habituation. Future research could also explore ways of introducing more recent approaches, like inhibitory learning (Craske et al., 2014), to improve exposure results.

The feasibility study revealed that navigable images were preferred over still images, however, participants still asked for more immersive scenarios where videos would be included. Future research could focus on the acceptability of exposure scenarios including videos or images with movement and see if that would help with adherence ratings and increase the satisfaction with the program. This would also help to explore further the role of sense of presence and reality judgment in exposure scenarios in ICBT and see if high immersive scenarios do not increase the level of presence in clinical sample, as it happens in VRET (Kwon et al., 2013). Furthermore, the qualitative interview showed that participants gave the highest ratings to the usefulness of sounds. Future research should explore this factor and see if it also influences sense of presence and reality judgment.

Therapist support has revealed mixed results in the field of ICBT. For our intervention, NO-FEAR Airlines, a previous study did not show differences between a self-applied condition and weekly support in terms of effectiveness or attrition rates. However, following previous research (Andersson et al., 2015), one of the explanations for the high dropout rates of the study of this thesis could be the lack of therapist support during the intervention. More research is needed on ICBTs that focuses specifically on this matter, including ICBTs for SP, where users could need help during the exposure process due to the distress that it causes.

NO-FEAR Airlines has showed potential effectiveness in two studies compared to a waiting list control group. Another question for future research would be to compare this ICBT with an active control group and explore whether these results are maintained or whether it is as effective as traditional face-to-face therapy. A larger sample will also be needed to have more conclusive results and will help to conduct more robust mediation analysis about sense of presence and reality judgment and treatment effects.

Finally, analyzing the characteristics of participants who dropped out and of those who completed the intervention, as well as explore possible moderators, could help to identify what works for whom and offer the right treatment for the right user.

Conclusions

- The systematic review and preliminary meta-analysis showed that there are Internet- and Mobile-based interventions for SP with good results in reducing phobic symptomatology at post-treatment, presenting large effect sizes in some cases.
- The interventions included in the systematic review were aimed at children, adolescents, and adults and used exposure as the main component of the treatment.
- The feasibility study showed that participants preferred navigable images over still images and rated them as more effective and logic to overcome their problem.
- Compared to a waiting list control group, participants in both experimental conditions of NO-FEAR Airlines showed a significant reduction of symptoms in all clinical measures, and they reported a significant improvement of their problem as well. Exploratory analyses showed that clinical changes were maintained over time.
- No differences were found in sense of presence and reality judgment between the two treatment conditions. However, participants still preferred navigable images.
- Attrition in the experimental conditions was high (42.3%), showing the need to further explore this issue in order to offer better interventions for users in the future.
- The most reported reason for dropout was the absence of emotional reaction during the exposure scenarios. The most common suggestion to improve NO-FEAR Airlines was including more immersive scenarios during exposure, like videos.

REFERENCES

Andersson, G., & Titov, N. (2014). Advantages and limitations of Internet-based interventions for common mental disorders. *World Psychiatry*, *13*(1), 4–11. https://doi.org/10.1002/wps.20083

Andersson, G., Rozental, A., Rück, C., & Carlbring, P. (2015). Guided Internet-delivered CBT: Can it really be as good as seeing a therapist? *Behavior Therapist, 38*(5), 123–126.

Andersson, G., Waara, J., Jonsson, U., Malmaeus, F., Carlbring, P., & Öst, L. G. (2009). Internet-based self-help versus one-session exposure in the treatment of spider phobia: A randomized controlled trial. *Cognitive Behaviour Therapy, 38*(2), 114–120. https://doi.org/10.1080/16506070902931326

Andersson, G., Waara, J., Jonsson, U., Malmaeus, F., Carlbring, P., & Öst, L. G. (2013). Internet-Based Exposure Treatment Versus One-Session Exposure Treatment of Snake Phobia: A Randomized Controlled Trial. *Cognitive Behaviour Therapy*, *42*(4), 284–291. https://doi.org/10.1080/16506073.2013.844202

Andrews, G., Basu, A., Cuijpers, P., Craske, M. G., McEvoy, P., English, C. L., & Newby, J. M. (2018). Computer therapy for the anxiety and depression disorders is effective, acceptable and practical health care: An updated meta-analysis. *Journal of Anxiety Disorders*, *55*, 70–78. https://doi.org/10.1016/j.janxdis.2018.01.001

Arias, M. C., & McNeil, D. W. (2020). Smartphone-based exposure treatment for dental phobia: a pilot randomized clinical trial. *Journal of Public Health Dentistry, 80*(1), 23–30. https://doi.org/10.1111/jphd.12340

Arnberg, F. K., Linton, S. J., Hultcrantz, M., Heintz, E., & Jonsson, U. (2014). Internet-delivered psychological treatments for mood and anxiety disorders: A systematic review of their efficacy, safety, and cost-effectiveness. *PLoS ONE, 9*(5). https://doi.org/10.1371/journal.pone.0098118

Baker, B. L., Cohen, D. C., & Saunders, J. T. (1973). Self-directed desensitization for acrophobia. *Behaviour Research and Therapy*, *11*(1), 79–89. https://doi.org/10.1016/0005-7967(73)90071-5

Baños, R. M., Botella, C., Garcia-Palacios, A., Villa, H., Perpiña, C., & Alcañiz, M. (2000). Presence and Reality Judgment in Virtual Environments: A Unitary Construct? *CyberPsychology & Behavior*, *3*(3), 327–335. https://doi.org/10.1089/10949310050078760

Baños, R., Botella, C., García-Palacios, A., Villa, H., Perpiñá, C., & Gallardo, M. (1999). Psychological variables and reality judgment in virtual environments: The roles of absorption and dissociation. *Cyberpsychology and Behavior*, *2*(2), 143–148. https://doi.org/10.1089/cpb.1999.2.143

Baños, R., Quero, S., Salvador, S., & Botella, C. (2005). The role of presence and reality judgement in virtual environments in clinical psychology. *Cyberpsych. Behav. 8*(4), 303–304

Bor, R. (2007). Psychological factors in airline passenger and crew behaviour: A clinical overview. *Travel Medicine and Infectious Disease*, *5*(4), 207–216. https://doi.org/10.1016/j.tmaid.2007.03.003

Botella, C., Fernández-Álvarez, J., Guillén, V., García-Palacios, A., & Baños, R. (2017). Recent Progress in Virtual Reality Exposure Therapy for Phobias: A Systematic Review. *Current Psychiatry Reports*, *19*(7). https://doi.org/10.1007/s11920-017-0788-4

Botella, C., Osma, J., Garcia-Palacios, A., Quero, S., & Baños, R. M. (2004). Treatment of flying phobia using virtual reality: Data from a 1-year follow-up using a multiple baseline design. *Clinical Psychology and Psychotherapy*, *11*(5), 311–323. https://doi.org/10.1002/cpp.404

Botella, C., Quero, S., Banos, R. M., Garcia-Palacios, A., Breton-Lopez, J., Alcaniz, M., & Fabregat, S. (2008). Telepsychology and self-help: The treatment of phobias using the internet. *Cyberpsychology and Behavior*, *11*(6), 659–664. https://doi.org/10.1089/cpb.2008.0012

Brenes, G. A., Danhauer, S. C., Lyles, M. F., Hogan, P. E., & Miller, M. E. (2015). Barriers to Mental Health Treatment in Rural Older Adults HHS Public Access. *Am J Geriatr Psychiatry*, *23*(11), 1172–1178. https://doi.org/10.1016/j.jagp.2015.06.002

Bretón-López, J., Tortella-Feliu, M., Riera Del Amo, A., Baños, R., Llabrés, J., Gelabert, J. M., & Botella, C. (2015). Patients' preferences regarding three computer-based exposure treatments for fear of flying. In *Behavioral Psychology / Psicología Conductual, 23*(2), 265-285.

Brown, T. A., Campbell, L. A., Lehman, C. L., Grisham, J. R., & Mancill, R. B. (2001). Current and lifetime comorbidity of the DSM-IV anxiety and mood disorders in a large clinical sample. *Journal of Abnormal Psychology*, *110*(4), 585–599. https://doi.org/10.1037/0021-843X.110.4.585

Campos, D., Bretón-López, J., Botella, C., Mira, A., Castilla, D., Mor, S., Baños, R., & Quero, S. (2019). Efficacy of an internet-based exposure treatment for flying phobia (NO-FEAR Airlines) with and without therapist guidance: A randomized controlled trial. *BMC Psychiatry*, *19*(1), 1–16. https://doi.org/10.1186/s12888-019-2060-4

Campos, D., Mira, A., Bretón-López, J., Castilla, D., Botella, C., Baños, R. M., & Quero, S. (2018). The acceptability of an internet-based exposure treatment for flying phobia with and without therapist guidance: Patients' expectations, satisfaction, treatment preferences, and usability. *Neuropsychiatric Disease and Treatment*, *14*, 879–892. https://doi.org/10.2147/NDT.S153041

Cárdenas, G., Botella, C., Quero, S., Baños, R., Durán, X., Rosa, A. de la, Flores, L., & Molés, M. (2016). Efectividad del programa de tratamiento virtual flight con población mexicana. *Revista Argentina de Clinica Psicologica*, *25*(2), 145–156.

Carlbring, P., Andersson, G., Cuijpers, P., Riper, H., & Hedman-Lagerlöf, E. (2018). Internet-based vs. face-to-face cognitive behavior therapy for psychiatric and somatic disorders: an updated systematic review and meta-analysis. In *Cognitive Behaviour Therapy, 47*(1), 1-18. https://doi.org/10.1080/16506073.2017.1401115

Cavanagh, K., & Millings, A. (2013). (Inter)personal computing: The role of the therapeutic relationship in E-mental health. *Journal of Contemporary Psychotherapy*, *43*(4), 197–206. https://doi.org/10.1007/s10879-013-9242-z

Choy, Y., Fyer, A. J., & Lipsitz, J. D. (2007). Treatment of specific phobia in adults. *Clinical Psychology Review*, *27*(3), 266–286. https://doi.org/10.1016/J.CPR.2006.10.002

Clark, G. I., & Rock, A. J. (2016). Processes contributing to the maintenance of flying phobia: A narrative review. *Frontiers in Psychology*, *7*, 754. https://doi.org/10.3389/fpsyg.2016.00754

Courtney, C. G., Dawson, M. E., Schell, A. M., Iyer, A., & Parsons, T. D. (2010). Better than the real thing: Eliciting fear with moving and static computer-generated stimuli. *International Journal of Psychophysiology*, *78*(2), 107–114. https://doi.org/10.1016/j.ijpsycho.2010.06.028

Craske, M. G., Treanor, M., Conway, C. C., Zbozinek, T., & Vervliet, B. (2014). Maximizing exposure therapy: An inhibitory learning approach. *Behaviour Research and Therapy*, *58*, 10–23. https://doi.org/10.1016/j.brat.2014.04.006

Cummings, J. J., & Bailenson, J. N. (2016). How Immersive Is Enough? A Meta-Analysis of the Effect of Immersive Technology on User Presence. *Media Psychology*, *19*(2), 272–309. https://doi.org/10.1080/15213269.2015.1015740

Curtis, G. C., Magee, W. J., Eaton, W. W., Wittchen, H. U., & Kessler, R. C. (1998). Specific fears and phobias. Epidemiology and classification. *British Journal of Psychiatry*, *173*, 212–217. https://doi.org/10.1192/bjp.173.3.212

Czerniak, E., Caspi, A., Litvin, M., Amiaz, R., Bahat, Y., Baransi, H., Sharon, H., Noy, S., & Plotnik, M. (2016). A novel treatment of fear of flying using a large virtual reality system. *Aerospace Medicine and Human Performance*, *87*(4), 411–416. https://doi.org/10.3357/AMHP.4485.2016

da Costa, R. T., Sardinha, A., & Nardi, A. E. (2008). Virtual reality exposure in the treatment of fear of flying. In *Aviation Space and Environmental Medicine, 79*(9), 899-903. https://doi.org/10.3357/ASEM.2277.2008

Delevry, D., & Le, Q. A. (2019). Effect of Treatment Preference in Randomized Controlled Trials: Systematic Review of the Literature and Meta-Analysis. In *Patient*, *12*(6), 593–609. Adis. https://doi.org/10.1007/s40271-019-00379-6

Diemer, J., Alpers, G. W., Peperkorn, H. M., Shiban, Y., & Mühlberger, A. (2015). The impact of perception and presence on emotional reactions: A review of research in virtual reality. In *Frontiers in Psychology*, *6*, 26. https://doi.org/10.3389/fpsyg.2015.00026

Domhardt, M., Geßlein, H., von Rezori, R. E., & Baumeister, H. (2019). Internet- and mobile-based interventions for anxiety disorders: A meta-analytic review of intervention components. In *Depression and Anxiety*, *36*(3), 213–224. Blackwell Publishing Inc. https://doi.org/10.1002/da.22860

Domhardt, M., Letsch, J., Kybelka, J., Koenigbauer, J., Doebler, P., & Baumeister, H. (2020). Are Internet- and mobile-based interventions effective in adults with diagnosed panic disorder and/or agoraphobia? A systematic review and meta-analysis. In *Journal of Affective Disorders*, *276*, 169–182. https://doi.org/10.1016/j.jad.2020.06.059

Donker, T., Cornelisz, I., Van Klaveren, C., Van Straten, A., Carlbring, P., Cuijpers, P., & Van Gelder, J. L. (2019). Effectiveness of Self-guided App-Based Virtual Reality Cognitive Behavior Therapy for Acrophobia: A Randomized Clinical Trial. JAMA Psychiatry, 76(7), 682–690. https://doi.org/10.1001/jamapsychiatry.2019.0219

Eaton, W. W., Bienvenu, O. J., & Miloyan, B. (2018). Specific phobias. In *The Lancet Psychiatry*, *5*(18), 678-686. Elsevier Ltd. https://doi.org/10.1016/S2215-0366(18)30169-X

Foreman, E. I., Bor, R., & Van Gerwen, L. J. (2006). The nature, characteristics, impact and personal implications of fear of flying. Aviation Mental Health: Psychological implications for Air Transportation, 53-68

Garcia-Palacios, A., Botella, C., Hoffman, H., & Fabregat, S. (2007). Comparing acceptance and refusal rates of virtual reality exposure vs. in vivo exposure by patients with specific phobias. *Cyberpsychology and Behavior*, *10*(5), 722–724. https://doi.org/10.1089/cpb.2007.9962

Gromer, D., Reinke, M., Christner, I., & Pauli, P. (2019). Causal Interactive Links Between Presence and Fear in Virtual Reality Height Exposure. *Frontiers in Psychology*, *10*, 141. https://doi.org/10.3389/fpsyg.2019.00141

Haro, J. M., Palacín, C., Vilagut, G., Martínez, M., Bernal, M., Luque, I., Codony, M., Dolz, M., & Alonso, J. (2006). Prevalence of mental disorders and associated factors: Results from the ESEMeD-Spain study. *Medicina Clínica*, *126*(12), 445–451. https://doi.org/10.1157/13086324

Higuera-Trujillo, J. L., López-Tarruella Maldonado, J., & Llinares Millán, C. (2017). Psychological and physiological human responses to simulated and real

environments: A comparison between Photographs, 360° Panoramas, and Virtual Reality. *Applied Ergonomics*, *65*, 398–409. https://doi.org/10.1016/j.apergo.2017.05.006

Hill, C. E. (2015). Consensual Qualitative Research (CQR): Methods for Conducting Psychotherapy Research. Psychotherapy Research: Foundations, Process, and Outcome, 485–499. https://doi.org/10.1007/978-3-7091-1382-0_23

Hoppe, J. M., Holmes, E. A., & Agren, T. (2021). Exploring the neural basis of fear produced by mental imagery: imaginal exposure in individuals fearful of spiders. *Philosophical Transactions of the Royal Society B: Biological Sciences*, *376*(1817), 20190690. https://doi.org/10.1098/rstb.2019.0690

Josephine, K., Josefine, L., Philipp, D., David, E., & Harald, B. (2017). Internet- and mobile-based depression interventions for people with diagnosed depression: A systematic review and meta-analysis. In *Journal of Affective Disorders*, *223*, 28–40. Elsevier B.V. https://doi.org/10.1016/j.jad.2017.07.021

Kampmann, I. L., Emmelkamp, P. M. G., & Morina, N. (2016). Meta-analysis of technology-assisted interventions for social anxiety disorder. In *Journal of Anxiety Disorders*, *42*, 71-84. Elsevier Ltd. https://doi.org/10.1016/j.janxdis.2016.06.007

Karyotaki, E., Ebert, D. D., Donkin, L., Riper, H., Twisk, J., Burger, S., Rozental, A., Lange, A., Williams, A. D., Zarski, A. C., Geraedts, A., van Straten, A., Kleiboer, A., Meyer, B., Ünlü Ince, B. B., Buntrock, C., Lehr, D., Snoek, F. J., Andrews, G., … Cuijpers, P. (2018). Do guided internet-based interventions result in clinically relevant changes for patients with depression? An individual participant data meta-analysis. In *Clinical Psychology Review*, *63*, 80-92. Elsevier Inc. https://doi.org/10.1016/j.cpr.2018.06.007

Karyotaki, E., Riper, H., Twisk, J., Hoogendoorn, A., Kleiboer, A., Mira, A., MacKinnon, A., Meyer, B., Botella, C., Littlewood, E., Andersson, G., Christensen, H., Klein, J. P., Schröder, J., Bretón-López, J., Scheider, J., Griffiths, K., Farrer, L., Huibers, M. J. H., … Cuijpers, P. (2017). Efficacy of self-guided internet-based cognitive behavioral therapy in the treatment of depressive symptoms a meta-analysis of individual participant data. *JAMA Psychiatry*, *74*(4), 351–359. https://doi.org/10.1001/jamapsychiatry.2017.0044

Kazdin, A. E. (2015). Technology-Based Interventions and Reducing the Burdens of Mental Illness: Perspectives and Comments on the Special Series. In *Cognitive and Behavioral Practice*, *22*(3), 359-366. Elsevier Inc. https://doi.org/10.1016/j.cbpra.2015.04.004

Kazdin, A. E., & Blase, S. L. (2011). Rebooting Psychotherapy Research and Practice to Reduce the Burden of Mental Illness. *Perspectives on Psychological Science*, *6*(1), 21–37. https://doi.org/10.1177/1745691610393527

Kok, R. N., van Straten, A. B. A. T. F. ; C. P., Beekman, A. T. F. F., & Cuijpers, P. (2014). Short-term effectiveness of web-based guided self-help for phobic outpatients: Randomized controlled trial. *Journal of Medical Internet Research*, *16*(9), 85–100. https://doi.org/10.2196/jmir.3429

Krijn, M., Emmelkamp, P. M. G., Biemond, R., de Wilde de Ligny, C., Schuemie, M. J., & van der Mast, C. A. P. G. (2004). Treatment of acrophobia in virtual reality: The role of immersion and presence. *Behaviour Research and Therapy*, *42*(2), 229–239. https://doi.org/10.1016/S0005-7967(03)00139-6

Kuester, A., Niemeyer, H., & Knaevelsrud, C. (2016). Internet-based interventions for posttraumatic stress: A meta-analysis of randomized controlled trials. In *Clinical Psychology Review*, *43*, 1–16. Elsevier Inc. https://doi.org/10.1016/j.cpr.2015.11.004

Kwan, B. M., Dimidjian, S., & Rizvi, S. L. (2010). Treatment preference, engagement, and clinical improvement in pharmacotherapy versus psychotherapy for depression. *Behaviour Research and Therapy*, *48*(8), 799–804. https://doi.org/10.1016/j.brat.2010.04.003

Kwon, J. H., Powell, J., & Chalmers, A. (2013). How level of realism influences anxiety in virtual reality environments for a job interview. *International Journal of Human Computer Studies*, *71*(10), 978–987. https://doi.org/10.1016/j.ijhcs.2013.07.003

LeBeau, R. T., Glenn, D., Liao, B., Wittchen, H.-U., Beesdo-Baum, K., Ollendick, T., & Craske, M. G. (2010). Specific phobia: a review of DSM-IV specific phobia and preliminary recommendations for DSM-V. *Depression and Anxiety*, *27*(2), 148–167. https://doi.org/10.1002/da.20655

Ling, Y., Nefs, H. T., Morina, N., Heynderickx, I., & Brinkman, W.-P. P. (2014). A meta-analysis on the relationship between self-reported presence and anxiety in virtual reality exposure therapy for anxiety disorders. *PLoS ONE*, *9*(5), e96144. https://doi.org/10.1371/journal.pone.0096144

López-Lara, E., Garrido-Cumbrera, M., & Díaz-Cuevas, M. P. (2012). Improving territorial accessibility of mental health services: The case of spain. *European Journal of Psychiatry*, *26*(4), 227–235. https://doi.org/10.4321/S0213-61632012000400002

Marks, I. M. (1987). *Fears, Phobias, and Rituals: Panic, Anxiety, and Their Disorders*. Oxford University Press.

Matthews, A. J., Scanlan, J. D., & Kirkby, K. C. (2012). Online exposure treatment for spider fear: The effects of moving versus static images on treatment adherence, fear elicitation and habituation. *Behaviour Change*, *29*(1), 15–24. https://doi.org/10.1017/bec.2012.7

Matthews, A. J., Wong, Z. H., Scanlan, J. D., & Kirkby, K. C. (2011). Online exposure for spider phobia: Continuous versus intermittent exposure. *Behaviour Change*, *28*(3), 143–155. https://doi.org/10.1375/bech.28.3.143

Medialdea, J., & Tejada, F. R. (2005). Phobic fear of flying in aircrews: Epidemiological aspects and comorbidity. *Aviation Space and Environmental Medicine*, *76*(6).

Mewton, L., Smith, J., Rossouw, P., & Andrews, G. (2014). Current perspectives on internet-delivered cognitive behavioral therapy for adults with anxiety and related disorders. In *Psychology Research and Behavior Management, 7*, 37–46. Dove Press. https://doi.org/10.2147/PRBM.S40879

Miralles, I., Granell, C., Díaz-Sanahuja, L., van Woensel, W., Bretón-López, J., Mira, A., Castilla, D., & Casteleyn, S. (2020). Smartphone apps for the treatment of mental disorders: Systematic review. In *JMIR mHealth and uHealth*, *8*(4) e14897. JMIR Publications Inc. https://doi.org/10.2196/14897

Moskalenko, M. Y., Hadjistavropoulos, H. D., & Katapally, T. R. (2020). The complex association of barriers and interest in internet-delivered cognitive behavior therapy for depression and anxiety: informing e-health policies through exploratory path analysis. *Journal of Mental Health*. https://doi.org/10.1080/09638237.2020.1793125

Oakes, M., & Bor, R. (2010). The psychology of fear of flying (part I): A critical evaluation of current perspectives on approaches to treatment. In *Travel Medicine and Infectious Disease*, *8*(6), 327–338. Elsevier USA. https://doi.org/10.1016/j.tmaid.2010.10.001

Olthuis, J. v., Watt, M. C., Bailey, K., Hayden, J. A., & Stewart, S. H. (2016). Therapist-supported Internet cognitive behavioural therapy for anxiety disorders in adults. *The Cochrane Database of Systematic Reviews*, *3*(3), CD011565. https://doi.org/10.1002/14651858.CD011565.pub2

Pihlaja, S., Stenberg, J. H., Joutsenniemi, K., Mehik, H., Ritola, V., & Joffe, G. (2018). Therapeutic alliance in guided internet therapy programs for depression and anxiety disorders – A systematic review. In *Internet Interventions, 11*, 1–10. Elsevier B.V. https://doi.org/10.1016/j.invent.2017.11.005

Price, M., & Anderson, P. (2007). The role of presence in virtual reality exposure therapy. *Journal of Anxiety Disorders*, *21*(5), 742–751. https://doi.org/10.1016/J.JANXDIS.2006.11.002

Price, M., Mehta, N., Tone, E. B., & Anderson, P. L. (2011). Does engagement with exposure yield better outcomes? Components of presence as a predictor of treatment response for virtual reality exposure therapy for social phobia. *Journal of Anxiety Disorders*, *25*(6), 763–770. https://doi.org/10.1016/j.janxdis.2011.03.004

Richards, D., & Richardson, T. (2012). Computer-based psychological treatments for depression: A systematic review and meta-analysis. In *Clinical Psychology Review*, *32*(4) 329–342. Pergamon. https://doi.org/10.1016/j.cpr.2012.02.004

Richards, D., Richardson, T., Timulak, L., & McElvaney, J. (2015). The efficacy of internet-delivered treatment for generalized anxiety disorder: A systematic review and meta-analysis. In *Internet Interventions, 2*(3), 272-282. Elsevier. https://doi.org/10.1016/j.invent.2015.07.003

Riva, G., Galimberti, C., Wiederhold, B. K., Gevirtz, R. N., & Spira, J. L. (2001). *Virtual Reality Exposure Therapy vs. Imagery Desensitization Therapy in the Treatment of Flying Phobia*. IOS Press.

Riva, G., Mantovani, F., Capideville, C. S., Preziosa, A., Morganti, F., Villani, D., Gaggioli, A., Botella, C., & Alcañiz, M. (2007). Affective interactions using virtual reality: The link between presence and emotions. *Cyberpsychology and Behavior*, *10*(1), 45–56. https://doi.org/10.1089/cpb.2006.9993

Robillard, G., Bouchard, S., Fournier, T., & Renaud, P. (2003). Anxiety and Presence during VR Immersion: A Comparative Study of the Reactions of Phobic and Non-phobic Participants in Therapeutic Virtual Environments Derived from Computer Games. *Cyberpsychology and Behavior*, *6*(5), 467–476. https://doi.org/10.1089/109493103769710497

Rothbaum, B. O., Anderson, P., Zimand, E., Hodges, L., Lang, D., & Wilson, J. (2006). Virtual Reality Exposure Therapy and Standard (in Vivo) Exposure Therapy in the Treatment of Fear of Flying. *Behavior Therapy*, *37*(1), 80–90. https://doi.org/10.1016/j.beth.2005.04.004

Rus-Calafell, M., Gutiérrez-Maldonado, J., Botella, C., & Baños, R. M. (2013). Virtual Reality Exposure and Imaginal Exposure in the Treatment of Fear of Flying: A Pilot Study. *Behavior Modification*, *37*(4), 568–590. https://doi.org/10.1177/0145445513482969

Salim, A., Mackinnon, A., Christensen, H., & Griffiths, K. (2008). Comparison of data analysis strategies for intent-to-treat analysis in pre-test-post-test designs with substantial dropout rates. *Psychiatry Research*, *160*(3), 335–345. https://doi.org/10.1016/j.psychres.2007.08.005

Schneider, A. J., Mataix-Cols, D., Marks, I. M., & Bachofen, M. (2005). Internet-guided self-help with or without exposure therapy for phobic and panic disorders: A randomised controlled trial. *Psychotherapy and Psychosomatics*, *74*(3), 154–164. https://doi.org/10.1159/000084000

Schröder, J., Jelinek, Lena; Moritz, S., & Moritz, S. (2017). A randomized controlled trial of a transdiagnostic Internet intervention for individuals with panic and phobias - One size fits all. *Journal of Behavior Therapy and Experimental Psychiatry, 54*, 17–24. https://www.sciencedirect.com/science/article/pii/S0005791616300957

Schubert, T., Friedmann, F., & Regenbrecht, H. (2001). The Experience of Presence: Factor Analytic Insights. *Presence: Teleoperators and Virtual Environments*, *10*(3), 266–281. https://doi.org/10.1162/105474601300343603

Shahnavaz, S., Hedman, E., Grindefjord, M., Reuterskiöld, L., & Dahllöf, G. (2016). Cognitive Behavioral Therapy for Children with Dental Anxiety: A Randomized Controlled Trial. *JDR Clinical & Translational Research*, *1*(3), 234–243. https://doi.org/10.1177/2380084416661473

Shahnavaz, S., Hedman-Lagerlöf, E., Hasselblad, T., Reuterskiöld, L., Kaldo, V., & Dahllöf, G. (2018). Internet-based cognitive behavioral therapy for children and adolescents with dental anxiety: Open trial. *Journal of Medical Internet Research*, *20*(1). https://doi.org/10.2196/jmir.7803

Slater, M., & Wilbur, S. (1997). A framework for immersive virtual environments (FIVE): Speculations on the role of presence in virtual environments. *Presence: Teleoperators and Virtual Environments*, *6*(6), 603–616. https://doi.org/10.1162/pres.1997.6.6.603

Slater, M., Usoh, M., & Steed, A. (1994). Depth of Presence in Virtual Environments. *Presence: Teleoperators and Virtual Environments*, *3*(2), 130–144. https://doi.org/10.1162/pres.1994.3.2.130

Smoktunowicz, E., Barak, A., Andersson, G., Banos, R. M., Berger, T., Botella, C., Dear, B. F., Donker, T., Ebert, D. D., Hadjistavropoulos, H., Hodgins, D. C., Kaldo, V., Mohr, D. C., Nordgreen, T., Powers, M. B., Riper, H., Ritterband, L. M., Rozental, A., Schueller, S. M., … Carlbring, P. (2020). Consensus statement on the problem of terminology in psychological interventions using the internet or digital components. *Internet Interventions*, *21*, 100331. https://doi.org/10.1016/J.INVENT.2020.100331

Soucy, J. N., Owens, V. A. M., Hadjistavropoulos, H. D., Dirkse, D. A., & Dear, B. F. (2016). Educating patients about Internet-delivered cognitive behaviour therapy: Perceptions among treatment seekers and non-treatment seekers before and after viewing an educational video. *Internet Interventions*, *6*, 57–63. https://doi.org/10.1016/j.invent.2016.09.003

Steuer, J. (1992). Defining Virtual Reality: Characteristics Determining Telepresence. *Journal of Communication*, *42*(4), 73–94.

Tardif, N., Therrien, C.-É., & Bouchard, S. (2019). Re-Examining Psychological Mechanisms Underlying Virtual Reality-Based Exposure for Spider Phobia. *Cyberpsychology, Behavior, and Social Networking*, *22*(1), 39–45. https://doi.org/10.1089/cyber.2017.0711

Tortella-Feliu, M., Bornas, X., & Llabres, J. (2008). Computer-Assisted Exposure Treatment for Flight Phobia. *International Journal of Behavioral Consultation and Therapy*, *4*(2), 158–171. https://doi.org/10.1037/h0100840

Tortella-Feliu, M., Botella, C., Llabrés, J., Bretón-López, J. M., del Amo, A. R., Baños, R. M., & Gelabert, J. M. (2011). Virtual reality versus computer-aided exposure treatments for fear of flying. *Behavior Modification*, *35*(1), 3–30. https://doi.org/10.1177/0145445510390801

Trumpf, J., Margraf, J., Vriends, N., Meyer, A. H., & Becker, E. S. (2010). Specific phobia predicts psychopathology in young women. *Social Psychiatry and Psychiatric Epidemiology*, *45*(12), 1161–1166. https://doi.org/10.1007/s00127-009-0159-5

Vigerland, S., Thulin, U., Ljótsson, B., Svirsky, L., Öst, L. G., Lindefors, N., Andersson, G., & Serlachius, E. (2013). Internet-Delivered CBT for Children with Specific Phobia: A Pilot Study. *Cognitive Behaviour Therapy*, *42*(4), 303–314. https://doi.org/10.1080/16506073.2013.844201

Wardenaar, K. J., Lim, C. C. W., Al-Hamzawi, A. O., Alonso, J., Andrade, L. H., Benjet, C., Bunting, B., de Girolamo, G., Demyttenaere, K., Florescu, S. E., Gureje, O., Hisateru, T., Hu, C., Huang, Y., Karam, E., Kiejna, A., Lepine, J. P., Navarro-Mateu, F., Oakley Browne, M., … de Jonge, P. (2017). The cross-national epidemiology of specific phobia in the World Mental Health Surveys. *Psychological Medicine*, *47*(10), 1744–1760. https://doi.org/10.1017/S0033291717000174

Wechsler, T. F., Mühlberger, A., & Kümpers, F. (2019). Inferiority or even superiority of virtual reality exposure therapy in phobias? - A systematic review and quantitative meta-analysis on randomized controlled trials specifically comparing the efficacy of virtual reality exposure to gold standard in vivo e. In *Frontiers in Psychology*, 1758). Frontiers Media S.A. https://doi.org/10.3389/fpsyg.2019.01758

Wilhelm, F. H., & Roth, W. T. (1997). Clinical characteristics of flight phobia. *Journal of Anxiety Disorders*, *11*(3), 241–261. https://doi.org/10.1016/S0887-6185(97)00009-1

Witmer, B. G., & Singer, M. J. (1998). Measuring Presence in Virtual Environments: A Presence Questionnaire. *Presence: Teleoperators and Virtual Environments*, *7*(3), 225–240. https://doi.org/10.1162/105474698565686

Witthauer, C., Ajdacic-Gross, V., Meyer, A. H., Vollenweider, P., Waeber, G., Preisig, M., & Lieb, R. (2016). Associations of specific phobia and its subtypes with physical diseases: An adult community study. *BMC Psychiatry*, *16*(1). https://doi.org/10.1186/s12888-016-0863-0

Wolitzky-Taylor, K. B., Horowitz, J. D., Powers, M. B., & Telch, M. J. (2008). Psychological approaches in the treatment of specific phobias: A meta-analysis. *Clinical Psychology Review*, *28*(6), 1021–1037. https://doi.org/10.1016/J.CPR.2008.02.007

World Health Organization (2017). *Mental health*. https://www.who.int/health-topics/mental-health#tab=tab_2

Zikic, N. (2007). Evaluating relative impact of VR components screen size, stereoscopy and field of view on spatial comprehension and presence in architecture. (Doctoral dissertation, Pennsylvania State University).

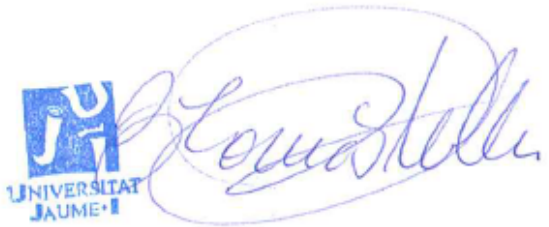
ANNEXES

ETHICAL APPROVAL

UNIVERSITAT JAUME I

Beatriz Tomás Mallén, secretaria de la Comisión Deontológica de la Universitat Jaume I de Castelló de la Plana,

CERTIFICO: Que la Comisión Deontológica de la Universitat Jaume I ha emitido informe favorable sobre el proyecto con número de expediente 7/2017 "Un programa de tratamiento computerizado aplicado a través de Internet para la Fobia a Volar: Un estudio controlado " cuyas investigadoras principales son Cristina Botella Arbona y Soledad Quero Castellano, por considerar que cumple las normas deontológicas exigidas.

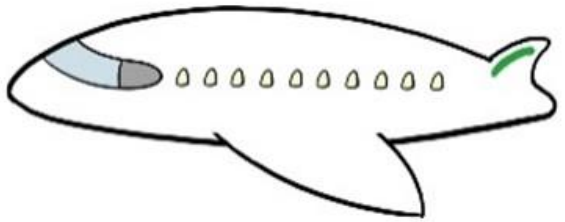


Castellón de la Plana, 4 de julio de 2017

SAMPLE RECRUITMENT

SIN MIEDO Airlines

¿Tienes **miedo a volar**?



Desde la Universitat Jaume I te ofrecemos:

Tratamiento **GRATUITO** a través de **Internet**

Si tienes más de 18 años, y deseas participar, entra en nuestra web y evalúa si es adecuado para ti en: **www.fobiavolar.uji.es/public/evaluacion**

O contacta con nosotros

llamando al **964 38 76 43,** o enviando un correo a **volar@uji.es**

labpsitec
LABORATORIO DE PSICOLOGÍA Y TECNOLOGÍA

UNIVERSITAT JAUME·I

VNIVERSITAT DE VALÈNCIA

INFORMED CONSENT

CONSENTIMIENTO INFORMADO: "SIN MIEDO Airlines"

Tu participación en este estudio implica el acceso al programa **SIN MIEDO Airlines**. El objetivo principal del tratamiento es ayudarte para que seas capaz de afrontar las situaciones temidas relacionadas con el hecho de volar y, en el caso de que ahora seas capaz de volar, que dejes de utilizar estrategias para protegerte (como recurrir al alcohol o a los fármacos ansiolíticos).

Este programa contiene una serie de situaciones relacionadas con los aviones, y con el hecho de volar, a las que puedes exponerte de forma progresiva, estructurada y sistemática. Una vez hayas acabado la exposición deberías realizar un vuelo para comprobar los cambios alcanzados. Es un paso esencial para que superes tu miedo. Y conviene que lo hagas lo antes posible, alrededor de unos 15 días después de haber acabado con el tratamiento.

Este programa lo podrás realizar desde tu casa, totalmente autoaplicado a través de Internet. Por lo que será necesario tener acceso a un ordenador y a Internet.

En el estudio habrá tres grupos. Dos de los grupos tendrán acceso al programa **SIN MIEDO Airlines** de forma totalmente auto-aplicada y sólo diferirán entre ellos por el tipo de imágenes al que serán expuestos. El tercer grupo formará parte de una lista de espera. Al grupo lista espera, se le ofrecerá la posibilidad de realizar el tratamiento tras el periodo de tiempo que dura el tratamiento de los otros dos grupos (aproximadamente seis semanas). La asignación a cada uno de los grupos será aleatoria.

Te informaremos por teléfono a qué grupo perteneces. En caso de poder participar, el tratamiento será gratuito.

Acepto de manera libre mi participación en el estudio:

"SIN MIEDO Airlines"

Entiendo la naturaleza y el propósito de los procedimientos que entrañan el presente estudio que se me han comunicado previamente.

Entiendo que la investigación está diseñada para promover el conocimiento científico y que la Universitat Jaume I de Castellón usará los datos que yo le proporcione sólo y exclusivamente para esta investigación.

Entiendo que los datos que proporciono serán considerados como confidenciales. Mi nombre o cualquier otra información no se harán públicos en ninguna presentación o publicación de la investigación. El procesamiento y uso de mis datos anónimos se llevará a cabo y se almacenará en papel y en formato electrónico durante 15 años.

Entiendo que puedo retirarme del estudio en cualquier momento, sin dar ningún tipo de explicación y sin ningún tipo de inconveniente para mí.

Entiendo que la Universitat Jaume I de Castellón puede usar los datos recogidos en este proyecto para un proyecto de investigación posterior pero que las condiciones bajo las cuales he proporcionado la información seguirán siendo las mismas.

Nombre y apellidos en MAYÚSCULAS: _____

_____

DNI: _____

Fecha y Lugar: _____

Firma del participante: _____

PHONE SCREENING

GUIÓN SCREENING TELEFÓNICO

Este guión es la garantía de que vamos a tratar a todos los participantes de igual manera.
Las palabras exactas pueden variar, cada cual tiene su ritmo y sus preferencias al expresarse, pero es muy conveniente que les hagamos llegar la información de la misma manera.

1.- Saludar.
2.- Asegurarse de que hablamos con la persona correcta. En caso de no estar disponible informar que la llamaremos más tarde.

Mi nombre es…….. Te llamo de parte del equipo de investigación Labpsitec, de la Universitat Jaume I de Castellón. Te pusiste en contacto con nosotros por el estudio de miedo a volar "SIN MIEDO Airlines". Queremos agradecerte tu interés en colaborar en nuestro estudio y pedirte disculpas si te hemos hecho esperar.

Esta llamada telefónica tiene el objetivo de explicarte en qué consistirá el estudio y si estás interesado/a, valorar si puedes participar en el mismo.

Tu participación en este estudio implicaría:

***1)** El acceso al programa de tratamiento SIN MIEDO Airlines, para ayudarte a que seas capaz de afrontar las situaciones temidas relacionadas con el hecho de volar y, en el caso de que ahora seas capaz de volar, que dejes de utilizar estrategias para protegerte (como recurrir al alcohol o a los fármacos ansiolíticos). Este programa lo podrás realizar desde tu casa, totalmente auto-aplicado a través de Internet. En el **estudio** habrá **tres grupos**. Dos de los grupos tendrán acceso al programa **SIN MIEDO Airlines** de forma totalmente auto-aplicada, y sólo diferirán entre ellos por el tipo de imágenes al que serán expuestos, y el otro grupo formará parte de una lista de espera. Al grupo lista espera, se le ofrecerá la posibilidad de realizar el tratamiento tras el periodo de tiempo que dura el tratamiento de los otros dos grupos (aproximadamente seis semanas). La asignación a cada uno de los grupos será aleatoria. Te informaremos por teléfono a qué grupo perteneces. En caso de poder participar, el tratamiento sería gratuito.*

2) *Para valorar si el programa puede ser de utilidad en tu caso, así como conocer en qué medida te ha beneficiado al finalizar es importante que te comprometas a realizar una evaluación inicial, una evaluación al finalizar el programa, así como dos seguimientos a los 3 y 12 meses. Estas evaluaciones se realizarán a través de Internet y por teléfono, por lo que en ningún momento se requerirá tu desplazamiento.*

3) *Por último, también es importante que una vez hayas acabado el tratamiento realices un vuelo para comprobar los cambios alcanzados. Es un paso esencial para que superes tu miedo. Y conviene que lo hagas lo antes posible, alrededor de unos 15 días después de haber acabado con el tratamiento. En este momento, puede que te resulte difícil pensar en la idea de volar, pero una vez realizado el tratamiento te va a resultar mucho más fácil* (Enviar consentimiento informado).

→ SI LA PERSONA SIGUE INTERESADA, SE LE PASAN LAS PREGUNTAS DEL SCREENING TELEFÓNICO (A continuación te voy a hacer una serie de preguntas…).

- **SE CONFIRMA SI PUEDE ENTRAR EN EL ESTUDIO.**
- **SE LE PIDEN DATOS COMPLETOS DE NOMBRE-APELLIDOS-TELEFÓNO e E-MAIL (comprobar que esté correcto en el sistema).**
- **SE LE DA UNA CITA TELEFÓNICA PARA LA EVALUACION PRE (o se hace en el momento si dispone de entre 30 y 40 minutos).**

→ Se realiza la EVALUACIÓN PRE (seguir protocolo evaluación) y se informa que tras valorar la entrevista inicial con el equipo clínico se le llamará de nuevo para comunicarle si puede participar en el estudio. De ser así, se le comunicará la condición asignada y los pasos a seguir.

ASSESSMENT PROTOCOL (PRETREATMENT)

ID_____

Fecha:___/___/201_

PROTOCOLO DE EVALUACIÓN TELEFÓNICA

PRE-TRATAMIENTO

(FUERA DEL SISTEMA)

☐ Imágenes fijas
☐ Imágenes navegables
☐ Grupo control lista de espera

Nota para el entrevistador:

Tras el screening se realiza la evaluación PRE. Puede ser a continuación o citarlo otro día.

Duración: 30-45 min.

ENTREVISTA ESTRUCTURADA PARA LOS TRASTORNOS DE ANSIEDAD PARA EL DSM-IV (ADIS-IV-L) FOBIA ESPECÍFICA

I. ENTREVISTA INICIAL

Para cada situación, evalúe separadamente el nivel de miedo y el grado de evitación utilizando la siguiente escala:

0	1	2	3	4	5	6	7	8
Ningún miedo Nunca evita		Miedo ligero Raramente evita		Miedo moderado A veces evita		Miedo severo A menudo evita		Miedo muy severo Siempre evita

Para cada situación, pregunte por episodios actuales y pasados:

1. **Actualmente, teme o tiene la necesidad de evitar cosas tales como: Alguna vez ha temido o ha sentido la necesidad de evitar cosas tales como:**

Si el paciente confirma un miedo específico actual, cuando se le pregunta acerca de miedos pasados hacia el mismo objeto/ situación estas preguntas deben ser para determinar la presencia de episodios discretos de malestar anteriores (p. ej. "Desde que el miedo empezó, ¿ha habido períodos de tiempo en los que no se sentía molesto por él?") Usar el espacio para los comentarios para anotar otra información clínicamente relevante (p. ej. La frecuencia con la que se presentan las situaciones temidas).

		ACTUAL		COMENTARIOS	PASADO	
		MIEDO	EVITACIÓN		MIEDO	EVITACIÓN
	Aviones					
	Alturas					
	Ascensores/espacios cerrados					
	Otros					

II. EPISODIOS ACTUALES

Complete para cada miedo específico que potencialmente puede tener gravedad clínica: Si hay evidencia de un episodio discreto pasado, introduzca esta sección de la entrevista con: **Ahora quiero hacerle una serie de preguntas acerca de sus miedos específicos <u>actuales.</u>**

A. Miedo específico #1: AVIONES

1. ¿Qué le preocupa que suceda en esta situación?

   _____

   _____

2. ¿Experimenta usted ansiedad prácticamente todas las veces que se encuentra con_____? SÍ_____NO_____

3. ¿Aparece la ansiedad tan pronto como usted se encuentra con la situación o cuando va a encontrarse con la situación, o a veces la ansiedad aparece más tarde o de forma inesperada?

ANTICIPADA INMEDIATA DEMORADA

4. a. ¿Está usted ansioso en esa situación porque tiene miedo de tener un ataque de pánico inesperado? SÍ NO

EN CASO AFIRMATIVO,

4. b. En otras ocasiones en las que usted se ha expuesto a_____, ¿ha experimentado un aumento rápido e inesperado del miedo/ ansiedad?
SÍ NO

EN CASO AFIRMATIVO, ¿dónde ocurrió esto?_____

En caso de que conteste **AFIRMATIVAMENTE 4a. o 4b**., considere si el miedo podría explicarse por la presencia de un ***trastorno de pánico***.

5. ¿De qué modo interfiere este miedo en su vida (p. ej. Rutinas cotidianas, trabajo, actividades sociales)? ¿Cuánto malestar le produce este miedo?

Interferencia:_____Malestar: _____

0	1	2	3	4	5	6	7	8
Nada		Ligero		Moderado		Severo		Muy severo

6. a. ¿Cuándo empezó la ansiedad por_____a ser un problema que le causaba un gran malestar o una gran interferencia en su vida? *(Nota: si el paciente es vago en la fecha de comienzo, intentar averiguar más información específica p. ej. Asociando el comienzo con sucesos vitales objetivos)*

_____

Fecha de inicio_____Mes_____Año

6. b. ¿Puede recordar usted alguna cosa que pueda haberle producido este miedo?

_____

_____

B. Miedo específico #2: ……..

1. ¿Qué le preocupa que suceda en esta situación?

   _____

   _____

2. ¿Experimenta usted ansiedad prácticamente todas las veces que se encuentra con_____? SÍ_____NO_____

3. ¿Aparece la ansiedad tan pronto como usted se encuentra con la situación o cuando va a encontrarse con la situación, o a veces la ansiedad aparece más tarde o de forma inesperada?

   ANTICIPADA INMEDIATA DEMORADA

4. a. ¿Está usted ansioso en esa situación porque tiene miedo de tener un ataque de pánico inesperado? SÍ NO

   EN CASO AFIRMATIVO:

5. b. En otras ocasiones en las que usted se ha expuesto a _____, ¿ha experimentado un aumento rápido e inesperado del miedo/ ansiedad?

   SÍ NO

   EN CASO AFIRMATIVO, ¿dónde ocurrió esto?_____

   En caso de que conteste **AFIRMATIVAMENTE 4a. o 4b.,** considere si el miedo podría explicarse por la presencia de un ***trastorno de pánico***.

5. De qué modo interfiere este miedo en su vida (p. ej. Rutinas cotidianas, trabajo, actividades sociales)?; ¿Cuánto malestar le produce este miedo?

   Interferencia:_____Malestar: _____

0	1	2	3	4	5	6	7	8
Nada		Ligero		Moderado		Severo		Muy severo

6. a. ¿Cuándo empezó la ansiedad por_____a ser un problema que le causaba un gran malestar o una gran interferencia en su vida? *(Nota: si el paciente es vago en la fecha de comienzo, intentar averiguar más información específica p. ej. Asociando el comienzo con sucesos vitales objetivos)*

_____

   Fecha de inicio_____Mes_____Año

6. b. ¿Puede recordar usted alguna cosa que pueda haberle producido este miedo?

   _____

   _____

II. EPISODIOS PASADOS

Complete para cada miedo específico que potencialmente pudo tener gravedad clínica: **Ahora quiero hacerle una serie de preguntas acerca de sus miedos específicos <u>pasados.</u>**

A. Miedo específico #1: _____

1. ¿Qué le preocupaba que sucediera en esa situación?

   _____

   _____

2. ¿Experimentaba usted ansiedad prácticamente todas las veces que se encontraba con_____? SÍ_____NO_____

3. ¿Aparecía la ansiedad tan pronto como usted se encontraba con esa situación o cuando iba a encontrarse con la situación, o algunas veces la ansiedad aparece más tarde o de forma inesperada?
   INMEDIATA_____DEMORADA_____

4. a. ¿Estaba usted ansioso en esa situación porque tenía miedo de tener un ataque de pánico inesperado? SÍ_____NO_____

   EN CASO AFIRMATIVO:

4. b. En otras ocasiones en las que usted se ha expuesto a_____, ¿ha experimentado un aumento rápido e inesperado del miedo/ ansiedad?
   SÍ_____NO_____

   EN CASO AFIRMATIVO, ¿dónde ocurrió esto?_____

   En caso de que conteste **AFIRMATIVAMENTE 4a. o 4b**., considere si el miedo podría explicarse por la presencia de un ***trastorno de pánico***.

5. ¿De qué modo interfirió este miedo en su vida (p. ej. Rutinas cotidianas, trabajo, actividades sociales)? ¿Cuánto malestar le produjo este miedo?

   Interferencia:_____Malestar: _____

0	1	2	3	4	5	6	7	8
Nada		Ligero		Moderado		Severo		Muy severo

6. a. ¿Cuándo empezó la ansiedad por_____a ser un problema que le causaba un gran malestar o una gran interferencia en su vida? *(Nota: si el paciente es vago en la fecha de comienzo, intentar averiguar más información específica p. ej. Asociando el comienzo con sucesos vitales objetivos)*

_____

Fecha de inicio_____Mes_____Año

6. b. ¿Puede recordar usted alguna cosa que pueda haberle producido este miedo?

_____

_____

7. a. ¿Cuándo dejó de ser la ansiedad por_____un problema y usted ya se encontraba cómodo con_____, o ya no le causaba un gran malestar o ya no interfería en su vida?

_____

_____

Fecha de remisión:_____Mes_____Año_____

7. b. ¿Puede recordar alguna razón (o razones) por las que ya no estaba ansioso a causa de esta situación?

_____

_____

IV. INVESTIGACIÓN

Las preguntas deben referirse a los **episodios actuales** de malestar.

A. SÍNTOMAS DE ATAQUE DE PÁNICO

1. Miedo específico #1: _____

Nota: señalar también para miedo especifico #2:_____

¿Experimenta usted_____cuando se encuentra con_____?

0	1	2	3	4	5	6	7	8	9	10
Nada		Ligero		Moderado			Severo		Muy severo	

1. Palpitaciones, sacudidas del corazón o elevación de la frecuencia cardiaca	__	8. Escalofríos, sofocaciones o rubor	__
2. Sudoración	__	9. Vértigo, sensaciones de inestabilidad, mareo o desmayo	__
3. Temblores o sacudidas	__	10. Sensación de irrealidad o de estar separado de uno mismo (despersonalización)	__
4. Sensaciones de ahogo o falta de aliento	__	11. Sensación de entumecimiento u hormigueo	__
5. Sensación de atragantamiento	__	12. Miedo a morir	__
6. Dolor o malestar torácico	__	13. Miedo a volverse loco	__
7. Náuseas o molestias abdominales	__	14. Miedo a perder el control	__

SIN MIEDO Airlines

CONTROL MEDICACIÓN

1) En el momento de la evaluación inicial, ¿tomaba algún tipo de medicación para controlar su ansiedad? ❑ SI ❑ NO

Si la repuesta es SI, anotar nombre y dosis de la medicación.

Nombre	Dosis

¿Cuánto tiempo lleva tomando esta medicación?

2) ¿Ha comenzado a tomar medicación durante el tratamiento?

Si la respuesta es SI, anotar nombre y dosis de la medicación.

Nombre	Dosis

¿Cuánto tiempo después de iniciar el tratamiento comenzó a tomar medicación?

3) Desde que inicio el tratamiento la dosis de medicación (señalar una opción):

___permanece igual

___ha aumentado en _____

___ha disminuido en _____

___ha sido discontinuada “altogether”

___ha sido añadida otra medicación. Nombre y dosis _____

labpsitec

4) ¿Toma algún tipo de medicación para controlar su ansiedad durante el vuelo?

❑ SI ❑ NO

Nombre	Dosis

5) ¿Ha recibido tratamiento psicológico anteriormente?

SIN MIEDO Airlines

ENTREVISTA ESTRUCTURADA FOBIA A VOLAR (VERSIÓN BREVE)

1. ¿Con qué frecuencia tiene que volar?_____

De los siguientes sucesos, indique, en una escala de 0 a 10 (donde 0= nada en absoluto y 10= totalmente) en qué medida cree que cada una de estas cosas podría sucederle en una situación de vuelo:

El avión podría chocar con otro avión	0	1	2	3	4	5	6	7	8	9	10
Podría haber problemas con los motores (incendiarse, desprenderse, atascarse…)	0	1	2	3	4	5	6	7	8	9	10
El avión podría estallar	0	1	2	3	4	5	6	7	8	9	10
El avión podría caerse desde el cielo	0	1	2	3	4	5	6	7	8	9	10
Podría entrar en una tormenta	0	1	2	3	4	5	6	7	8	9	10
Un ala podría caerse o averiarse	0	1	2	3	4	5	6	7	8	9	10
El tren de aterrizaje podría no funcionar	0	1	2	3	4	5	6	7	8	9	10

2. ¿Cuándo aparece la ansiedad? **Antes** incluso de que se encuentre con la situación, **tan pronto** como se encuentra con la situación, o **más tarde**, de forma inesperada.

   ANTICIPATORIA_____INMEDIATA_____DEMORADA_____

   2.1. Si indica que padece **ansiedad anticipatoria**: ¿Cuánto tiempo antes de que se tenga que enfrentar con el hecho de volar aparece la ansiedad?

   Días antes_____
   Horas antes_____
   En el aeropuerto_____
   Sólo pensarlo_____

   2.2. Si indica que aparece **ansiedad demorada**, ¿Cuánto tiempo después de enfrentarse al hecho de volar aparece la ansiedad?_____

3. ¿Cuándo desaparece la ansiedad o el malestar? (Especificar si en algún momento del vuelo).

   _____
   _____
   _____

4. ¿Cuándo voló por primera vez?_____¿Cómo fue ese vuelo?_____
   _____

labpsitec

5. ¿Hay alguna circunstancia que haga su miedo más o menos intenso?

- Viajar solo	más	menos	indiferente
- Viajar acompañado	más	menos	indiferente
- Viajar con buen tiempo	más	menos	indiferente
- Viajar con mal tiempo	más	menos	indiferente
- Viajes cortos	más	menos	indiferente
- Viajes largos	más	menos	indiferente
- Viajes por vacaciones	más	menos	indiferente
- Viajes por trabajo	más	menos	indiferente

SIN MIEDO Airlines

ESCALA DE EVITACIÓN

(Adaptada de Marks y Mathews, 1979)

Ahora te pediremos que señales cuánto miedo experimentas e indiques con qué frecuencia evitas la conducta-objetivo ***VOLAR*** según la siguiente escala.

ESCALA DE MIEDO Y EVITACIÓN

	0	1	2	3	4	5	6	7	8	9	10
Miedo	Nada		Poco			Algo		Bastante			Mucho
Evitación	Nunca		Pocas veces			Algunas veces		Muchas veces			Siempre

Conducta	MIEDO	EVITACIÓN
1. Volar		

PENSAMIENTOS NEGATIVOS ASOCIADOS A LA CONDUCTA OBJETIVO

Señala a continuación el pensamiento que hace que te resulte difícil realizar la conducta objetivo, así como el grado de creencia que tienes acerca de la veracidad de cada uno de los pensamientos negativos.

0	1	2	3	4	5	6	7	8	9	10
Nada		Poco			Algo		Bastante			Mucho

Pensamientos	Grado de creencia
1.	
2.	

labpsitec

SIN MIEDO Airlines

ESCALA DE MIEDO A VOLAR

(Fear of Flying Scale, FSS; Haug et al., 1987)

A continuación, te presentamos una serie de situaciones o acciones que están relacionadas con el hecho de volar. Señala en qué medida cada una de esas situaciones te provoca ansiedad, siguiendo la siguiente escala:

1	2	3	4
Ninguna ansiedad	Alguna ansiedad	Bastante ansiedad	Mucha ansiedad

	Ninguna ansiedad	Alguna ansiedad	Bastante ansiedad	Mucha ansiedad
1. Ver un avión en vuelo	1	2	3	4
2. Ver un avión en televisión o en una película	1	2	3	4
3. Oír hablar a otros sobre viajar en avión	1	2	3	4
4. Llevar a otros al aeropuerto	1	2	3	4
5. Planificar un viaje en avión	1	2	3	4
6. Tomar la decisión de viajar en avión (con el billete comprado)	1	2	3	4
7. Ir hacia el aeropuerto (cuando va a viajar en avión)	1	2	3	4
8. Esperar el momento de la salida	1	2	3	4
9. Entrar en el avión	1	2	3	4
10. Estar sentado dentro del avión mientras éste permanece todavía en tierra	1	2	3	4
11. Se cierran las puertas del avión	1	2	3	4
12. El avión toma la salida por la pista de despegue	1	2	3	4
13. Oír la aceleración del motor	1	2	3	4
14. El avión acelera y despega	1	2	3	4
15. El avión aumenta de altitud	1	2	3	4
16. Mirar por la ventana durante el vuelo	1	2	3	4
17. El avión se mueve por las nubes o el viento	1	2	3	4
18. El avión vibra fuertemente en una turbulencia	1	2	3	4
19. El avión empieza a descender	1	2	3	4
20. El avión aterriza	1	2	3	4
21. El avión pone el freno y reduce velocidad	1	2	3	4

Nota para el entrevistador: una vez finalizada la primera parte de la entrevista telefónica se valorará la inclusión en el proyecto y se contactará de nuevo con el participante para comunicarle si puede participar en el estudio. En este punto también se le explican las distintas condiciones del estudio y se le envía un consentimiento informado con toda la información para que firme y nos envíe.

labpsitec

ESCALA DE VALORACIÓN DEL CLÍNICO

(Adaptación de la clinician's ratings del ADIS-IV,

Di Nardo, Brown y Barlow, 1994)

Teniendo en cuenta la información recabada en la evaluación, evaluaría la gravedad de este paciente como:

AUSENTE		LEVE		MODERADA		GRAVE		MUY GRAVE
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Ninguna		Ligeramente perturbadora/ no realmente incapacitante		Definitivamente perturbadora/ incapacitante		Marcadamente perturbadora/ incapacitante		Muy gravemente perturbadora/ incapacitante

Nota importante: La valoración de esta escala se realizará tras la evaluación diagnóstica.

2ª LLAMADA TELEFÓNICA

Nota para el entrevistador: Una vez finalizada la primera parte de la entrevista telefónica se valorará la inclusión en el proyecto y se contactará de nuevo con el participante para comunicarle si puede participar en el estudio.

- Si se aleatoriza a SIN MIEDO Airlines: Se explican las dos condiciones de tratamiento y se evalúa preferencias. Después, se le dice la condición a la que se le ha asignado de forma aleatoria y se le pregunta expectativas de tratamiento.

- Si es Lista de Espera: Le daremos el enlace al Survey Monkey y en 6 semanas volveremos a contactar con él.

A continuación, te vamos a realizar una serie de preguntas sobre el proyecto en el que vas a participar. Te explicaremos las distintas condiciones de tratamiento y te preguntaremos por tus preferencias, antes de saber a qué condición has sigo asignado/a de forma aleatoria. Después te diremos qué condición experimental te ha tocado y te preguntaremos por tus expectativas antes del tratamiento que estás a punto de empezar.

BREVE EXPLICACIÓN DEL TRATAMIENTO

El programa de tratamiento que te ofrecemos (SIN MIEDO Airlines) permite a las personas con miedo a volar exponerse a imágenes y sonidos relacionados con su miedo en un ordenador estándar, desde su casa, a través de Internet. Es decir, te lo puedes aplicar tu mismo, paso a paso y a tu ritmo.

La técnica de exposición a las situaciones temidas es el tratamiento psicológico más eficaz para la fobia a volar. Es una técnica que ha demostrado eficacia en numerosos estudios y por ello se recomienda en las guías sobre buenas prácticas clínicas de las asociaciones internacionales de psicología (*American Psychological Association* y *National Institute for Health and Clinical Excellence*). El principio de la exposición supone que al enfrentarse a la situación temida se experimentará ansiedad, pero progresivamente la persona se irá habituando a la situación y esa ansiedad irá disminuyendo. Lo importante es permanecer en la situación hasta que la ansiedad disminuya.

Este programa contiene una serie de situaciones relacionadas con los aviones, y con el hecho de volar, a las que puedes exponerte de forma progresiva, estructurada y sistemática. Al finalizar la exposición podrás elegir si quieres repetir alguno de los escenarios de exposición aumentando un poco la dificultad (condiciones de lluvia y turbulencias). Además, al inicio, encontrarás información sobre el miedo a volar que te puede resultar de utilidad para afrontar tu miedo. Lo recomendado es que realices dos escenarios de exposición a la semana, dejando algún día de descanso entre medio, por lo que en 3-4 semanas podrías finalizar el tratamiento. No obstante, puedes seguir el ritmo que tú prefieras, hasta alcanzar un máximo de 6 semanas (un escenario a la semana). Una vez hayas terminado el tratamiento deberías realizar un vuelo para comprobar los cambios alcanzados. Es un paso esencial para que superes tu miedo. Y conviene que lo hagas lo antes posible, alrededor de unos 15 días después de haber acabado con el tratamiento. A lo largo del tratamiento, encontrarás pautas esenciales para que puedas planificar este vuelo, a medida que te vayas sintiendo más preparado/a.

En el estudio que vas a participar, como ya sabes, hay tres condiciones de tratamiento y un grupo control lista de espera a las que serás asignado de forma aleatoria por un programa informático. Las dos condiciones de tratamiento son las siguientes:

1) **Tratamiento auto-aplicado a través del programa "SIN MIEDO Airlines" con imágenes fijas y sonido estéreo.** Recibirás acceso al programa para que lo completes a través de Internet al ritmo que tú desees. En esta condición las imágenes que se te presentarán en los escenarios de exposición serán fijas.

2) . **Tratamiento auto-aplicado a través del programa "SIN MIEDO Airlines" con imágenes navegables.** Recibirás acceso al programa para que lo completes a través de Internet al ritmo que tú desees. En esta condición algunas de las imágenes que se te presentarán en los escenarios de exposición serán navegables (es decir, podrás desplazarte dentro del escenario en las siguientes direcciones: arriba-abajo-derecha-izquierda)

3) **Lista de espera**

Los participantes que sean asignados al grupo de "Lista de Espera" podrán acceder al tratamiento de forma voluntaria pasadas 6 semanas. *****Se les envía por correo el enlace del survey.***

ESCALA DE PREFERENCIAS

Por favor, después de haber leído la breve descripción sobre el tratamiento y las dos condiciones de tratamiento de este estudio, contesta a las siguientes preguntas: (Nota: sin saber cuál es su condición todavía).

1. Si pudieras elegir entre las DOS condiciones de tratamiento, ¿cuál elegirías?

a) "SIN MIEDO Airlines" con imágenes fijas.
b) "SIN MIEDO Airlines" con imágenes navegables.

2. ¿Cuál de estas dos condiciones de tratamiento, consideras que puede ser más eficaz o útil para ayudarte a superar tu problema?

a) "SIN MIEDO Airlines" con imágenes fijas.
b) "SIN MIEDO Airlines" con imágenes navegables.

3. ¿Cuál de estas dos condiciones de tratamiento, consideras que es más lógica para ayudarte a superar tu problema?

a) "SIN MIEDO Airlines" con imágenes fijas.
b) "SIN MIEDO Airlines" con imágenes navegables.

4. ¿Cuál de estas dos condiciones de tratamiento, consideras que puede ser más aversiva (desagradable, molesta)?

a) "SIN MIEDO Airlines" con imágenes fijas.
b) "SIN MIEDO Airlines" con imágenes navegables.

5. ¿Cuál de estas dos condiciones de tratamiento, recomendarías a un amigo que tuviera el mismo problema?

a) "SIN MIEDO Airlines" con imágenes fijas.
b) "SIN MIEDO Airlines" con imágenes navegables.

Ahora indicarle la condición asignada: _____

labpsitec

Escala de expectativas sobre el tratamiento

(Adaptado de Borkovec y Nau, 1972)

Nota para el entrevistador: Antes de que el participante responda esta escala **se le dice la condición de tratamiento asignada.**

Después de haberte explicado en qué va a consistir el tratamiento que vas a recibir, nos gustaría saber tu opinión sobre el mismo. Por favor, contesta a las siguientes preguntas.

☐ Imágenes fijas
☐ Imágenes navegables

1.- ¿En qué medida te parece lógico este tratamiento?

0 1 2 3 4 5 6 7 8 9 10

Nada Muchísimo

2.- ¿En qué medida te satisface el tratamiento que va a recibir?

0 1 2 3 4 5 6 7 8 9 10

Nada Muchísimo

3.- ¿En qué medida le recomendarías este tratamiento a un amigo que tuviera tu mismo problema?

0 1 2 3 4 5 6 7 8 9 10

Nada Muchísimo

4.- ¿En qué medida crees que este tratamiento podría ser útil para tratar otros problemas psicológicos?

0 1 2 3 4 5 6 7 8 9 10

Nada Muchísimo

5.- ¿En qué medida crees que el tratamiento va a resultar útil en tu caso?

0 1 2 3 4 5 6 7 8 9 10

Nada Muchísimo

6.- ¿En qué medida este tratamiento te resulta aversivo (desagradable o molesto)?

0 1 2 3 4 5 6 7 8 9 10

Nada Muchísimo

labpsitec

Muchas gracias por contestar a todas nuestras preguntas. Has terminado la primera parte de la evaluación del estudio. Ahora ya puedes acceder al programa de tratamiento. En unos días recibirás el usuario y la contraseña en tu correo electrónico. Recuerda cambiar tu contraseña y recordarla para poder acceder al programa.

De nuevo, gracias por tu colaboración y esperamos que puedas sacarle el máximo partido a este programa de tratamiento auto-aplicado a través de Internet para el miedo a volar.

ASSESSMENT PROTOCOL (POSTTREATMENT)

ID_____

Fecha:___/___/201_

PROTOCOLO DE EVALUACIÓN TELEFÓNICA

POST TRATAMIENTO

(FUERA DEL SISTEMA)

☐ Imágenes fijas
☐ Imágenes navegables
☐ Grupo control lista de espera

1

SIN MIEDO Airlines

ENTREVISTA ESTRUCTURADA PARA LOS TRASTORNOS DE ANSIEDAD PARA EL DSM-IV (ADIS-IV-L) FOBIA ESPECÍFICA

Nota para los terapeutas: Evaluar también los trastornos comórbidos evaluados en el PRE.

I. ENTREVISTA INICIAL

Para cada situación, evalúe separadamente el nivel de miedo y el grado de evitación utilizando la siguiente escala:

0	1	2	3	4	5	6	7	8
Ningún miedo Nunca evita		Miedo ligero Raramente evita		Miedo moderado A veces evita		Miedo severo A menudo evita		Miedo muy severo Siempre evita

Para cada situación, pregunte por episodios actuales y pasados:

1. **Actualmente, teme o tiene la necesidad de evitar cosas tales como: Alguna vez ha temido o ha sentido la necesidad de evitar cosas tales como:**

Si el paciente confirma un miedo específico actual, cuando se le pregunta acerca de miedos pasados hacia el mismo objeto/ situación estas preguntas deben ser para determinar la presencia de episodios discretos de malestar anteriores (p. ej. "Desde que el miedo empezó, ¿ha habido períodos de tiempo en los que no se sentía molesto por él?") Usar el espacio para los comentarios para anotar otra información clínicamente relevante (p. ej. La frecuencia con la que se presentan las situaciones temidas).

		ACTUAL		COMENTARIOS	PASADO	
		MIEDO	EVITACIÓN		MIEDO	EVITACIÓN
	Aviones					
	Alturas					
	Ascensores/espacios cerrados					
	Otros					

II. EPISODIOS ACTUALES

Complete para cada miedo específico que potencialmente puede tener gravedad clínica: Si hay evidencia de un episodio discreto pasado, introduzca esta sección de la entrevista con: **Ahora quiero hacerle una serie de preguntas acerca de sus miedos específicos <u>actuales.</u>**

A. Miedo específico #1: AVIONES

1. ¿Qué le preocupa que suceda en esta situación?

   _____

   _____

2. ¿Experimenta usted ansiedad prácticamente todas las veces que se encuentra con _____? SÍ_____ NO_____

3. ¿Aparece la ansiedad tan pronto como usted se encuentra con la situación o cuando va a encontrarse con la situación, o a veces la ansiedad aparece más tarde o de forma inesperada?

   ANTICIPADA INMEDIATA DEMORADA

4. a. ¿Está usted ansioso en esa situación porque tiene miedo de tener un ataque de pánico inesperado? SÍ NO

EN CASO AFIRMATIVO,

4. b. En otras ocasiones en las que usted se ha expuesto a _____, ¿ha experimentado un aumento rápido e inesperado del miedo/ ansiedad?
   SÍ NO

   EN CASO AFIRMATIVO, ¿dónde ocurrió esto?_____

En caso de que conteste **AFIRMATIVAMENTE 4a. o 4b**., considere si el miedo podría explicarse por la presencia de un ***trastorno de pánico***.

5. De qué modo interfiere este miedo en su vida (p. ej. Rutinas cotidianas, trabajo, actividades sociales)? ¿Cuánto malestar le produce este miedo?

   Interferencia: _____ Malestar: _____

0	1	2	3	4	5	6	7	8
Nada		Ligero		Moderado		Severo		Muy severo

6. a. ¿Cuándo empezó la ansiedad por _____ a ser un problema que le causaba un gran malestar o una gran interferencia en su vida? *(Nota: si el paciente es vago en la fecha de comienzo, intentar averiguar más información específica p. ej. Asociando el comienzo con sucesos vitales objetivos)*

   _____

   Fecha de inicio_____ Mes _____Año

6. b. ¿Puede recordar usted alguna cosa que pueda haberle producido este miedo?

   _____

   _____

B. Miedo específico #2: ……..

1. ¿Qué le preocupa que suceda en esta situación?

   _____

   _____

2. ¿Experimenta usted ansiedad prácticamente todas las veces que se encuentra con _____? SÍ_____ NO_____

3. ¿Aparece la ansiedad tan pronto como usted se encuentra con la situación o cuando va a encontrarse con la situación, o a veces la ansiedad aparece más tarde o de forma inesperada?

   ANTICIPADA INMEDIATA DEMORADA

4. a. ¿Está usted ansioso en esa situación porque tiene miedo de tener un ataque de pánico inesperado? SÍ NO

   EN CASO AFIRMATIVO:

5. b. En otras ocasiones en las que usted se ha expuesto a _____, ¿ha experimentado un aumento rápido e inesperado del miedo/ ansiedad?

   SÍ NO

   EN CASO AFIRMATIVO, ¿dónde ocurrió esto?_____

   En caso de que conteste **AFIRMATIVAMENTE 4a. o 4b.,** considere si el miedo podría explicarse por la presencia de un ***trastorno de pánico***.

5. De qué modo interfiere este miedo en su vida (p. ej. Rutinas cotidianas, trabajo, actividades sociales)?; ¿Cuánto malestar le produce este miedo?

   Interferencia: _____ Malestar: _____

0	1	2	3	4	5	6	7	8
Nada		Ligero		Moderado		Severo		Muy severo

6. a. ¿Cuándo empezó la ansiedad por _____ a ser un problema que le causaba un gran malestar o una gran interferencia en su vida? *(Nota: si el paciente es vago en la fecha de comienzo, intentar averiguar más información específica p. ej. Asociando el comienzo con sucesos vitales objetivos)*

_____

   Fecha de inicio_____ Mes _____Año

6. b. ¿Puede recordar usted alguna cosa que pueda haberle producido este miedo?_____

   _____

IV. INVESTIGACIÓN

Las preguntas deben referirse a los **episodios actuales** de malestar.

A. SÍNTOMAS DE ATAQUE DE PÁNICO

1. Miedo específico #1: _____

Nota: señalar también para miedo especifico #2:_____

¿Experimenta usted _____cuando se encuentra con_____?

0	1	2	3	4	5	6	7	8	9	10
Nada		Ligero		Moderado			Severo		Muy severo	

1. Palpitaciones, sacudidas del corazón o elevación de la frecuencia cardiaca	__	8. Escalofríos, sofocaciones o rubor	__
2. Sudoración	__	9. Vértigo, sensaciones de inestabilidad, mareo o desmayo	__
3. Temblores o sacudidas	__	10. Sensación de irrealidad o de estar separado de uno mismo (despersonalización)	__
4. Sensaciones de ahogo o falta de aliento	__	11. Sensación de entumecimiento u hormigueo	__
5. Sensación de atragantamiento	__	12. Miedo a morir	__
6. Dolor o malestar torácico	__	13. Miedo a volverse loco	__
7. Náuseas o molestias abdominales	__	14. Miedo a perder el control	__

SIN MIEDO Airlines

CONTROL MEDICACIÓN

1) En el momento de la evaluación inicial, ¿tomaba algún tipo de medicación para controlar su ansiedad? ❑ SI ❑ NO

Si la repuesta es SI, anotar nombre y dosis de la medicación.

Nombre	Dosis

¿Cuánto tiempo lleva tomando esta medicación?

2) ¿Ha comenzado a tomar medicación durante el tratamiento?

Si la respuesta es SI, anotar nombre y dosis de la medicación.

Nombre	Dosis

¿Cuánto tiempo después de iniciar el tratamiento comenzó a tomar medicación?

3) Desde que inicio el tratamiento la dosis de medicación (señalar una opción):

___permanece igual

___ha aumentado en _____

___ha disminuido en _____

___ha sido discontinuada “altogether”

___ha sido añadida otra medicación. Nombre y dosis _____

ENTREVISTA ESTRUCTURADA FOBIA A VOLAR (VERSIÓN BREVE)

1. ¿Con qué frecuencia tiene que volar?_____

   NOTA PARA EL ENTREVISTADOR: Preguntar si ha volado después de finalizar el tratamiento. SI/NO. ¿Cuántas veces?____

   ¿Qué nivel de ansiedad experimentaste (0 a 10)?

   Antes del vuelo_____ Durante el vuelo _____ Después del vuelo_____

De los siguientes sucesos, indique, en una escala de 0 a 10 (donde 0= nada en absoluto y 10= totalmente) en qué medida cree que cada una de estas cosas podría sucederle en una situación de vuelo:

El avión podría chocar con otro avión	0	1	2	3	4	5	6	7	8	9	10
Podría haber problemas con los motores (incendiarse, desprenderse, atascarse,…)	0	1	2	3	4	5	6	7	8	9	10
El avión podría estallar	0	1	2	3	4	5	6	7	8	9	10
El avión podría caerse desde el cielo	0	1	2	3	4	5	6	7	8	9	10
Podría entrar en una tormenta	0	1	2	3	4	5	6	7	8	9	10
Un ala podría caerse o averiarse	0	1	2	3	4	5	6	7	8	9	10
El tren de aterrizaje podría no funcionar	0	1	2	3	4	5	6	7	8	9	10

2. ¿Cuándo aparece la ansiedad? **Antes** incluso de que se encuentre con la situación, **tan pronto** como se encuentra con la situación, o **más tarde**, de forma inesperada.

   ANTICIPATORIA_____INMEDIATA_____DEMORADA_____

   2.1. Si indica que padece **ansiedad anticipatoria**: ¿Cuánto tiempo antes de que se tenga que enfrentar con el hecho de volar aparece la ansiedad?

   Días antes_____
   Horas antes_____
   En el aeropuerto_____
   Sólo pensarlo_____

   2.2. Si indica que aparece **ansiedad demorada**, ¿Cuánto tiempo después de enfrentarse al hecho de volar aparece la ansiedad?_____

3. ¿Cuándo desaparece la ansiedad o el malestar? (Especificar si en algún momento del vuelo).

   _____
   _____
   _____

4. ¿Hay alguna circunstancia que haga su miedo más o menos intenso?

- Viajar solo	más	menos	indiferente
- Viajar acompañado	más	menos	indiferente
- Viajar con buen tiempo	más	menos	indiferente
- Viajar con mal tiempo	más	menos	indiferente
- Viajes cortos	más	menos	indiferente
- Viajes largos	más	menos	indiferente
- Viajes por vacaciones	más	menos	indiferente
- Viajes por trabajo	más	menos	indiferente

SIN MIEDO Airlines

ESCALA DE EVITACIÓN

(Adaptada de Marks y Mathews, 1979)

Ahora te pediremos que señales cuánto miedo experimentas e indiques con qué frecuencia evitas la conducta-objetivo ***VOLAR*** según la siguiente escala.

ESCALA DE MIEDO Y EVITACIÓN

	0	1	2	3	4	5	6	7	8	9	10
Miedo	Nada		Poco			Algo		Bastante			Mucho
Evitación	Nunca		Pocas veces			Algunas veces		Muchas veces			Siempre

Conducta	MIEDO	EVITACIÓN
1. Volar		

PENSAMIENTOS NEGATIVOS ASOCIADOS A LA CONDUCTA OBJETIVO

Señala a continuación el pensamiento que hace que te resulte difícil realizar la conducta objetivo, así como el grado de creencia que tienes acerca de la veracidad de cada uno de los pensamientos negativos.

0	1	2	3	4	5	6	7	8	9	10
Nada		Poco			Algo		Bastante			Mucho

Pensamientos	Grado de creencia
1.	
2.	

Nota: Valorar los mismos pensamientos que en el PRE y especificar el principal.

ENTREVISTA CUALITATIVA "SIN MIEDO Airlines"

1. **¿En qué medida consideras que los escenarios de exposición del programa "SIN MIEDO Airlines" han sido una herramienta útil para afrontar tu miedo a volar?**

1	2	3	4	5
Muy poco	Poco	Algo	Mucho	Muchísimo

¿Por qué?

2. **¿En qué medida consideras que el uso de imágenes reales en los diferentes escenarios del programa es una herramienta útil para ayudarte a realizar la exposición?**

1	2	3	4	5
Muy poco	Poco	Algo	Mucho	Muchísimo

¿Por qué?

3. **¿En qué medida consideras que el uso de sonidos reales en los diferentes escenarios del programa es una herramienta útil para ayudarte a realizar la exposición?**

1	2	3	4	5
Muy poco	Poco	Algo	Mucho	Muchísimo

¿Por qué?

4. **¿En qué medida consideras que la información proporcionada por el programa "SIN MIEDO Arlines" sobre la fobia a volar (p.ej., a cuántas personas afecta o en qué consiste el miedo a volar) te ha resultado útil para afrontar tu miedo a volar?**

1	2	3	4	5
Muy poco	Poco	Algo	Mucho	Muchísimo

¿Por qué?

SIN MIEDO Airlines

5. **¿En qué medida consideras que el componente de sobre-aprendizaje (opcional) resulta útil para afrontar el miedo a volar?**

1	2	3	4	5
Muy poco	Poco	Algo	Mucho	Muchísimo

¿Por qué?

6. **¿Crees que es útil tener a tu disposición el programa "SIN MIEDO Airlines" durante más tiempo una vez finalizado el tratamiento?**

1. Sí

2. No

¿Por qué?

7. **¿En qué medidas te has sentido presente en los escenarios de exposición?**

1	2	3	4	5
Muy poco	Poco	Algo	Mucho	Muchísimo

¿Por qué?

8. **¿En qué medida te han parecido reales los escenarios de exposición?**

1	2	3	4	5
Muy poco	Poco	Algo	Mucho	Muchísimo

¿Por qué?

9. **SÓLO PARA LA CONDICIÓN IN: ¿En qué medida consideras que el uso de imágenes navegables en el escenario del aeropuerto y en el del interior del avión es una herramienta útil para ayudarte a realizar la exposición?**

1	2	3	4	5
Muy poco	Poco	Algo	Mucho	Muchísimo

¿Por qué?

11

10. **SÓLO PARA LA CONDICIÓN IN: ¿En qué medida consideras que el uso de imágenes fijas en el escenario del aeropuerto y en el del interior del avión es una herramienta útil para ayudarte a realizar la exposición?**

1	2	3	4	5
Muy poco	Poco	Algo	Mucho	Muchísimo

¿Por qué?

11. **SÓLO PARA LA CONDICIÓN IN: ¿En qué medida te has sentido presente durante los escenarios de exposición donde se presentaban imágenes navegables?**

1	2	3	4	5
Muy poco	Poco	Algo	Mucho	Muchísimo

¿Por qué?

12. **SÓLO PARA LA CONDICIÓN IN: ¿En qué medida te has sentido presente durante los escenarios de exposición donde se presentaban imágenes fijas?**

1	2	3	4	5
Muy poco	Poco	Algo	Mucho	Muchísimo

¿Por qué?

13. **SÓLO PARA LA CONDICIÓN IN: ¿Cómo te hubiera gustado que fueran todas las imágenes de los escenarios del programa?**

a) Imágenes fijas.
b) Imágenes navegables.
c) Indiferente.

¿Por qué?

14. Opinión general sobre el programa de intervención.

15. SOLO PARA IN: Opinión general sobre cada imagen.

ESCALA DE VALORACIÓN DEL CLÍNICO

(Adaptación de la clinician´s ratings del ADIS-IV,

Di Nardo, Brown y Barlow, 1994)

Teniendo en cuenta la información recabada en la evaluación, evaluaría la gravedad de este paciente como:

AUSENTE		LEVE		MODERADA		GRAVE		MUY GRAVE
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Ninguna		Ligeramente perturbadora/ no realmente incapacitante		Definitivamente perturbadora/ incapacitante		Marcadamente perturbadora/ incapacitante		Muy gravemente perturbadora/ incapacitante

Nota importante: La valoración de esta escala se realizará tras la evaluación diagnóstica.

SIN MIEDO Airlines

ESCALA DE MIEDO A VOLAR

(Fear of Flying Scale, FSS; Haug et al., 1987)

A continuación te presentamos una serie de situaciones o acciones que están relacionadas con el hecho de volar. Señala en qué medida cada una de esas situaciones te provoca ansiedad, siguiendo la siguiente escala:

1	2	3	4
Ninguna ansiedad	Alguna ansiedad	Bastante ansiedad	Mucha ansiedad

	Ninguna ansiedad	Alguna ansiedad	Bastante ansiedad	Mucha ansiedad
1. Ver un avión en vuelo	1	2	3	4
2. Ver un avión en televisión o en una película	1	2	3	4
3. Oír hablar a otros sobre viajar en avión	1	2	3	4
4. Llevar a otros al aeropuerto	1	2	3	4
5. Planificar un viaje en avión	1	2	3	4
6. Tomar la decisión de viajar en avión (con el billete comprado)	1	2	3	4
7. Ir hacia el aeropuerto (cuando va a viajar en avión)	1	2	3	4
8. Esperar el momento de la salida	1	2	3	4
9. Entrar en el avión	1	2	3	4
10. Estar sentado dentro del avión mientras éste permanece todavía en tierra	1	2	3	4
11. Se cierran las puertas del avión	1	2	3	4
12. El avión toma la salida por la pista de despegue	1	2	3	4
13. Oír la aceleración del motor	1	2	3	4
14. El avión acelera y despega	1	2	3	4
15. El avión aumenta de altitud	1	2	3	4
16. Mirar por la ventana durante el vuelo	1	2	3	4
17. El avión se mueve por las nubes o el viento	1	2	3	4
18. El avión vibra fuertemente en una turbulencia	1	2	3	4
19. El avión empieza a descender	1	2	3	4
20. El avión aterriza	1	2	3	4
21. El avión pone el freno y reduce velocidad	1	2	3	4

Valoración de Mejoría

(Adaptado de Guy, 1976)

Respecto al inicio del tratamiento, me he encontrado:

1	2	3	4	5	6	7
Mucho peor	**Bastante peor**	**Un poco peor**	**Sin cambios**	**Un poco mejor**	**Bastante mejor**	**Mucho mejor**

SIN MIEDO Airlines

Escala de Opinión sobre el tratamiento

(Adaptado de Borkovec y Nau, 1972)

Después de haber recibido el tratamiento nos gustaría saber tu opinión sobre el mismo. Por favor, contesta a las siguientes preguntas.

1.- ¿En qué medida te ha parecido lógico este tratamiento?

0	1	2	3	4	5	6	7	8	9	10
Nada										Muchísimo

2.- ¿En qué medida te ha satisfecho el tratamiento que has recibido?

0	1	2	3	4	5	6	7	8	9	10
Nada										Muchísimo

3.- ¿En qué medida le recomendarías este tratamiento a un amigo que tuviera tu mismo problema?

0	1	2	3	4	5	6	7	8	9	10
Nada										Muchísimo

4.- ¿En qué medida crees que este tratamiento podría ser útil para tratar otros problemas psicológicos?

0	1	2	3	4	5	6	7	8	9	10
Nada										Muchísimo

5.- ¿En qué medida crees que el tratamiento te ha resultado útil en tu caso?

0	1	2	3	4	5	6	7	8	9	10
Nada										Muchísimo

6.- ¿En qué medida este tratamiento te ha resultado aversivo (desagradable, molesto)?

0	1	2	3	4	5	6	7	8	9	10
Nada										Muchísimo

ESCALA DE PREFERENCIAS

Por favor, después de haber finalizado el programa de tratamiento "SIN MIEDO Airlines" para el miedo a volar, contesta a las siguientes preguntas.

1. Si hubieras podido elegir entre las DOS condiciones de tratamiento, ¿cuál hubieras elegido?

a) "SIN MIEDO Airlines" con imágenes fijas.
b) "SIN MIEDO Airlines" con imágenes navegables.

2. ¿Cuál de estas dos condiciones de tratamiento, consideras que es más eficaz o útil para el tratamiento del miedo a volar?

a) "SIN MIEDO Airlines" con imágenes fijas.
b) "SIN MIEDO Airlines" con imágenes navegables.

3. ¿Cuál de estas dos condiciones de tratamiento, consideras que es más lógica para el tratamiento del miedo a volar?

a) "SIN MIEDO Airlines" con imágenes fijas.
b) "SIN MIEDO Airlines" con imágenes navegables.

4. ¿Cuál de estas dos condiciones de tratamiento, consideras que es más aversiva (desagradable, molesta)?

a) "SIN MIEDO Airlines" con imágenes fijas.
b) "SIN MIEDO Airlines" con imágenes navegables.

5. ¿Cuál de estas dos condiciones de tratamiento, recomendarías a un amigo que tuviera el mismo problema?

a) "SIN MIEDO Airlines" con imágenes fijas.
b) "SIN MIEDO Airlines" con imágenes navegables.

CUESTIONARIO DE USABILIDAD Y ACEPTABILIDAD (CUA)

(Labpsitec, 2010)

Para cada una de las siguientes afirmaciones, marque la opción que mejor describa su opinión.

1-Pienso que la mayoría de las personas podrían aprender muy rápidamente a utilizar "SIN MIEDO Airlines".

Totalmente en desacuerdo	Algo en desacuerdo	Ni de acuerdo ni en desacuerdo	Bastante de acuerdo	Totalmente de acuerdo
☐	☐	☐	☐	☐

2-Me he sentido seguro de mí mismo (capaz) utilizando "SIN MIEDO Airlines".

Totalmente en desacuerdo	Algo en desacuerdo	Ni de acuerdo ni en desacuerdo	Bastante de acuerdo	Totalmente de acuerdo
☐	☐	☐	☐	☐

3-En general, he sabido qué tenía que hacer en cada momento. Por ejemplo, cuando he querido pulsar un botón concreto he sabido cómo hacerlo y lo he conseguido.

Siempre	Casi siempre	Frecuentemente	A veces	Nunca
☐	☐	☐	☐	☐

4-Una vez que he aprendido a usar "SIN MIEDO Airlines" he podido realizar las tareas rápidamente.

Totalmente desacuerdo	Algo en desacuerdo	Ni de acuerdo ni en desacuerdo	Bastante de acuerdo	Totalmente de acuerdo
☐	☐	☐	☐	☐

5- "SIN MIEDO Airlines" puede utilizarse en cualquier lugar y en cualquier contexto.

Totalmente en desacuerdo	Algo en desacuerdo	Ni de acuerdo ni en desacuerdo	Bastante de acuerdo	Totalmente de acuerdo
☐	☐	☐	☐	☐

6-Las instrucciones de "SIN MIEDO Airlines" son fáciles.

Totalmente en desacuerdo	Algo en desacuerdo	Ni de acuerdo ni en desacuerdo	Bastante de acuerdo	Totalmente de acuerdo
☐	☐	☐	☐	☐

7-El tamaño de letra y de los botones es suficiente para mí.

Totalmente en desacuerdo	Algo en desacuerdo	Ni de acuerdo ni en desacuerdo	Bastante de acuerdo	Totalmente de acuerdo
☐	☐	☐	☐	☐

8- Me gustaría utilizar este sistema frecuentemente.

Totalmente en desacuerdo	Algo en desacuerdo	Ni de acuerdo ni en desacuerdo	Bastante de acuerdo	Totalmente de acuerdo
☐	☐	☐	☐	☐

9-En general, creo que "SIN MIEDO Airlines" es muy útil para mí.

Totalmente en desacuerdo	Algo en desacuerdo	Ni de acuerdo ni en desacuerdo	Bastante de acuerdo	Totalmente de acuerdo
☐	☐	☐	☐	☐

10-En general, creo que "SIN MIEDO Airlines" es fácil de usar.

Totalmente en desacuerdo	Algo en desacuerdo	Ni de acuerdo ni en desacuerdo	Bastante de acuerdo	Totalmente de acuerdo
☐	☐	☐	☐	☐

Muchas gracias por contestar a todas nuestras preguntas***. Has terminado la evaluación después de completar "SIN MIEDO Airlines". Recuerda la importancia de poner en práctica lo aprendido.

A los 3 y 12 meses de haber finalizado el tratamiento nos volveremos a poner en contacto contigo para realizar los seguimientos acordados y valorar cómo estás en relación a tu miedo a volar. Recibirás un correo electrónico recordatorio unos días antes de que nos pongamos en contacto contigo. En ese momento, tendrás que volver a acceder a la página web de *SIN MIEDO Airlines* para contestar unas preguntas y, posteriormente, nos pondremos en contacto contigo a través de una llamada telefónica.

De nuevo, muchas gracias por tu colaboración.

***** Si es la condición lista de espera (LE) se agradece su participación y se explica que en estos momentos puede recibir tratamiento, si sigue interesado. Se asignará alguna de las dos condiciones de tratamiento (al azar) y se le facilitará el acceso al programa.**

COAUTHOR PERMIT

UNIVERSITAT JAUME I
Escola de Doctorat · ED

Place, day,
month, year

I, Per Carlbring, hereby authorise Sonia Mor Rodríguez to include the publications listed below in her doctoral thesis. In addition, I waive the right to use those articles as part of any other doctoral thesis.

List of articles:

- Mor, S., Botella, C., Campos, D., Carlbring, P., Tur, C. & Quero, S. (2021). An Internet-based treatment for Flying Phobia using 360° images: A feasibility pilot study. *Internet Interventions* [Manuscript submitted for publication]

Electronically signed by Professor Per Carlbring on the next page

In accordance with article 28 of the Regulations on doctoral studies of the Universitat Jaume I in Castelló*, regulated by RD 99/2011, at the Universitat Jaume I (*Approved by the Governing Council at its meeting no. 8/2020 held on 2 October 2020*):*
"(...)
4. In the case of joint publications, all the co-authors must explicitly state their approval that the doctoral student presented the work as part of her/his thesis and the express waiver of presenting this same work as part of another doctoral thesis. This authorisation must be attached as documentation when the evaluation of the thesis begins."

Signature page

This document has been electronically signed using eduSign.

eduSign

Electronically signed by
Per Carlbring

eduSign

Date and time of signature
2021-12-07 14:07 UTC

Authenticated by
Stockholms universitet

Validate signed documents at: https://validator.edusign.sunet.se

SUNET

UNIVERSITAT JAUME I
Escola de Doctorat · ED

Amsterdam,

November 29, 2021

I, Pim Cuijpers, hereby authorise Sonia Mor Rodríguez to include the publications listed below in her doctoral thesis. In addition, I waive the right to use those articles as part of any other doctoral thesis.

List of articles:

- Mor, S., Grimaldos, J., Tur, C., Miguel, C., Cuijpers, P., Botella, C., & Quero, S. (2021). Internet-and mobile-based interventions for the treatment of specific phobia: A systematic review and preliminary meta-analysis. *Internet Interventions*, *26*, 100462.

Signed,

Pim Cuijpers, Ph.D.

In accordance with article 28 of the Regulations on doctoral studies of the Universitat Jaume I in Castelló*, regulated by RD 99/2011, at the Universitat Jaume I (*Approved by the Governing Council at its meeting no. 8/2020 held on 2 October 2020*):*
"(...)
4. In the case of joint publications, all the co-authors must explicitly state their approval that the doctoral student presented the work as part of her/his thesis and the express waiver of presenting this same work as part of another doctoral thesis. This authorisation must be attached as documentation when the evaluation of the thesis begins."

UNIVERSITAT JAUME I
Escola de Doctorat · ED

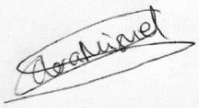
Clara Miguel Sanz, como coautora doy mi **autorización** a Sonia Mor Rodríguez para la presentación de las siguientes publicaciones como parte de su tesis doctoral.

Relación de publicaciones:

- Mor, S., Grimaldos, J., Tur, C., Miguel, C., Cuijpers, P., Botella, C., & Quero, S. (2021). Internet-and mobile-based interventions for the treatment of specific phobia: A systematic review and preliminary meta-analysis. *Internet Interventions*, *26*, 100462.

Asimismo, **renuncio** a poder utilizar estas publicaciones como parte de otra tesis doctoral.

Y para que conste firmo el presente documento,



Lugar, fecha y firma

Amsterdam, 29-11-2021

Todo ello, atendiendo al artículo 28 del Reglamento de los estudios de doctorado de la Universitat Jaume I de Castelló, regulados por el RD 99/2011, en la Universitat Jaume I (Aprobado en la sesión nº 8/2020 del Consejo de Gobierno de 02 /10/2020):

"(...)

4. En el caso de publicaciones conjuntas, todas las personas coautoras deberán manifestar explícitamente su autorización para que la doctoranda o doctorando presente el trabajo como parte de su tesis y la renuncia expresa a presentar este mismo trabajo como parte de otra tesis doctoral. Esta autorización se adjuntará como documentación en el momento del inicio de evaluación de la tesis.

UNIVERSITAT JAUME I
Escola de Doctorat · ED

Cintia Tur Domenech, como coautora doy mi **autorización** a Sonia Mor Rodríguez para la presentación de las siguientes publicaciones como parte de su tesis doctoral.

Relación de publicaciones:

- Mor, S., Botella, C., Campos, D., Tur, C., Castilla, D., Soler, C., & Quero, S. (2021). An Internet-based treatment for Flying Phobia using 360° images: Study protocol for a feasibility pilot study. *Internet Interventions, 24*, 100387.

- Mor, S., Grimaldos, J., Tur, C., Miguel, C., Cuijpers, P., Botella, C., & Quero, S. (2021). Internet-and mobile-based interventions for the treatment of specific phobia: A systematic review and preliminary meta-analysis. *Internet Interventions*, *26*, 100462.

- Mor, S., Botella, C., Campos, D., Carlbring, P., Tur, C. & Quero, S. (2021). An Internet-based treatment for Flying Phobia using 360° images: A feasibility pilot study. *Internet Interventions* [Manuscript submitted for publication]

Asimismo, **renuncio** a poder utilizar estas publicaciones como parte de otra tesis doctoral.

Y para que conste firmo el presente documento,

Lugar, fecha y firma

Firmado por CINTIA TUR DOMENECH - NIF:53632775H el día 26/11/2021 en Castellón de la Plana con un certificado emitido por ACCVCA-120

Todo ello, atendiendo al artículo 28 del Reglamento de los estudios de doctorado de la Universitat Jaume I de Castelló, regulados por el RD 99/2011, en la Universitat Jaume I (Aprobado en la sesión nº 8/2020 del Consejo de Gobierno de 02 /10/2020):

"(...)

4. En el caso de publicaciones conjuntas, todas las personas coautoras deberán manifestar explícitamente su autorización para que la doctoranda o doctorando presente el trabajo como parte de su tesis y la renuncia expresa a presentar este mismo trabajo como parte de otra tesis doctoral. Esta autorización se adjuntará como documentación en el momento del inicio de evaluación de la tesis.

UNIVERSITAT JAUME I
Escola de Doctorat · ED

Daniel Campos Bacas, como coautor doy mi **autorización** a Sonia Mor Rodríguez para la presentación de las siguientes publicaciones como parte de su tesis doctoral.

Relación de publicaciones:

- Mor, S., Botella, C., Campos, D., Tur, C., Castilla, D., Soler, C., & Quero, S. (2021). An Internet-based treatment for Flying Phobia using 360° images: Study protocol for a feasibility pilot study. *Internet Interventions, 24*, 100387.
- Mor, S., Botella, C., Campos, D., Carlbring, P., Tur, C. & Quero, S. (2021). An Internet-based treatment for Flying Phobia using 360° images: A feasibility pilot study. *Internet Interventions* [Manuscript submitted for publication]

Asimismo, **renuncio** a poder utilizar estas publicaciones como parte de otra tesis doctoral.

Y para que conste firmo el presente documento,

Lugar, fecha y firma
Zaragoza 28-11-2021

CAMPOS BACAS DANIEL - 20474408S

Firmado digitalmente por CAMPOS BACAS DANIEL - 20474408S
Nombre de reconocimiento (DN): c=ES, serialNumber=IDCES-20474408S, givenName=DANIEL, sn=CAMPOS BACAS, cn=CAMPOS BACAS DANIEL - 20474408S
Fecha: 2021.11.28 22:44:53 +01'00'

Todo ello, atendiendo al artículo 28 del Reglamento de los estudios de doctorado de la Universitat Jaume I de Castelló, regulados por el RD 99/2011, en la Universitat Jaume I (Aprobado en la sesión nº 8/2020 del Consejo de Gobierno de 02 /10/2020):

"(...)

4. En el caso de publicaciones conjuntas, todas las personas coautoras deberán manifestar explícitamente su autorización para que la doctoranda o doctorando presente el trabajo como parte de su tesis y la renuncia expresa a presentar este mismo trabajo como parte de otra tesis doctoral. Esta autorización se adjuntará como documentación en el momento del inicio de evaluación de la tesis.

UNIVERSITAT JAUME I
Escola de Doctorat · ED

Diana Virginia Castilla López, como coautora doy mi **autorización** a Sonia Mor Rodríguez para la presentación de las siguientes publicaciones como parte de su tesis doctoral.

Relación de publicaciones:

- Mor, S., Botella, C., Campos, D., Tur, C., Castilla, D., Soler, C., & Quero, S. (2021). An Internet-based treatment for Flying Phobia using 360° images: Study protocol for a feasibility pilot study. *Internet Interventions, 24*, 100387.

Asimismo, **renuncio** a poder utilizar estas publicaciones como parte de otra tesis doctoral.

Y para que conste firmo el presente documento,

DIANA VIRGINIA| CASTILLA| LOPEZ

Firmado digitalmente por DIANA VIRGINIA|CASTILLA|LOPEZ
Nombre de reconocimiento (DN): cn=DIANA VIRGINIA|CASTILLA|LOPEZ, serialNumber=34833268K, givenName=DIANA VIRGINIA, sn=CASTILLA LOPEZ, ou=CIUDADANOS, o=ACCV, c=ES
Fecha: 2021.11.27 16:08:30 +01'00'

Valencia, 27 de noviembre de 2021

Todo ello, atendiendo al artículo 28 del Reglamento de los estudios de doctorado de la Universitat Jaume I de Castelló, regulados por el RD 99/2011, en la Universitat Jaume I (Aprobado en la sesión nº 8/2020 del Consejo de Gobierno de 02 /10/2020):

"(...)

4. En el caso de publicaciones conjuntas, todas las personas coautoras deberán manifestar explícitamente su autorización para que la doctoranda o doctorando presente el trabajo como parte de su tesis y la renuncia expresa a presentar este mismo trabajo como parte de otra tesis doctoral. Esta autorización se adjuntará como documentación en el momento del inicio de evaluación de la tesis.

UNIVERSITAT JAUME I
Escola de Doctorat · ED

Jorge Grimaldos García, como coautora doy mi **autorización** a Sonia Mor Rodríguez para la presentación de las siguientes publicaciones como parte de su tesis doctoral.

Relación de publicaciones:

- Mor, S., Grimaldos, J., Tur, C., Miguel, C., Cuijpers, P., Botella, C., & Quero, S. (2021). Internet-and mobile-based interventions for the treatment of specific phobia: A systematic review and preliminary meta-analysis. *Internet Interventions*, *26*, 100462.

Asimismo, **renuncio** a poder utilizar estas publicaciones como parte de otra tesis doctoral.

Y para que conste firmo el presente documento,

Lugar, fecha y firma

Firmado por JORGE GRIMALDOS GARCIA - NIF:45912696G el día 29/11/2021 con un certificado emitido por ACCVCA-120

Todo ello, atendiendo al artículo 28 del Reglamento de los estudios de doctorado de la Universitat Jaume I de Castelló, regulados por el RD 99/2011, en la Universitat Jaume I (Aprobado en la sesión nº 8/2020 del Consejo de Gobierno de 02 /10/2020):

"(...)

4. En el caso de publicaciones conjuntas, todas las personas coautoras deberán manifestar explícitamente su autorización para que la doctoranda o doctorando presente el trabajo como parte de su tesis y la renuncia expresa a presentar este mismo trabajo como parte de otra tesis doctoral. Esta autorización se adjuntará como documentación en el momento del inicio de evaluación de la tesis.

UNIVERSITAT JAUME I
Escola de Doctorat · ED

Carla Soler Rovira, como coautora doy mi **autorización** a Sonia Mor Rodríguez para la presentación de las siguientes publicaciones como parte de su tesis doctoral.

Relación de publicaciones:

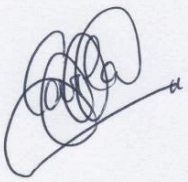
- Mor, S., Botella, C., Campos, D., Tur, C., Castilla, D., Soler, C., & Quero, S. (2021). An Internet-based treatment for Flying Phobia using 360° images: Study protocol for a feasibility pilot study. *Internet Interventions, 24*, 100387.

Asimismo, **renuncio** a poder utilizar estas publicaciones como parte de otra tesis doctoral.

Y para que conste firmo el presente documento,

Lugar, fecha y firma

En Castellón de la Plana, a 25 de noviembre de 2021



Todo ello, atendiendo al artículo 28 del Reglamento de los estudios de doctorado de la Universitat Jaume I de Castelló, regulados por el RD 99/2011, en la Universitat Jaume I (Aprobado en la sesión nº 8/2020 del Consejo de Gobierno de 02 /10/2020):

"(...)

4. En el caso de publicaciones conjuntas, todas las personas coautoras deberán manifestar explícitamente su autorización para que la doctoranda o doctorando presente el trabajo como parte de su tesis y la renuncia expresa a presentar este mismo trabajo como parte de otra tesis doctoral. Esta autorización se adjuntará como documentación en el momento del inicio de evaluación de la tesis.

UNIVERSITAT JAUME I
Escola de Doctorat · ED

Soledad Quero Castellano, como coautora doy mi **autorización** a Sonia Mor Rodríguez para la presentación de las siguientes publicaciones como parte de su tesis doctoral.

Relación de publicaciones:

- Mor, S., Botella, C., Campos, D., Tur, C., Castilla, D., Soler, C., & Quero, S. (2021). An Internet-based treatment for Flying Phobia using 360° images: Study protocol for a feasibility pilot study. *Internet Interventions, 24*, 100387.
- Mor, S., Grimaldos, J., Tur, C., Miguel, C., Cuijpers, P., Botella, C., & Quero, S. (2021). Internet-and mobile-based interventions for the treatment of specific phobia: A systematic review and preliminary meta-analysis. *Internet Interventions*, *26*, 100462.
- Mor, S., Botella, C., Campos, D., Carlbring, P., Tur, C. & Quero, S. (2021). An Internet-based treatment for Flying Phobia using 360° images: A feasibility pilot study. *Internet Interventions* [Manuscript submitted for publication]

Asimismo, **renuncio** a poder utilizar estas publicaciones como parte de otra tesis doctoral.

Y para que conste firmo el presente documento,

SOLEDAD| QUERO| CASTELLANO

Firmado digitalmente por SOLEDAD|QUERO| CASTELLANO
Fecha: 2021.12.09 12:31:42 +01'00'

Castellón, a 9 de Diciembre de 2021

Todo ello, atendiendo al artículo 28 del Reglamento de los estudios de doctorado de la Universitat Jaume I de Castelló, regulados por el RD 99/2011, en la Universitat Jaume I (Aprobado en la sesión nº 8/2020 del Consejo de Gobierno de 02 /10/2020):

"(...)

4. En el caso de publicaciones conjuntas, todas las personas coautoras deberán manifestar explícitamente su autorización para que la doctoranda o doctorando presente el trabajo como parte de su tesis y la renuncia expresa a presentar este mismo trabajo como parte de otra tesis doctoral. Esta autorización se adjuntará como documentación en el momento del inicio de evaluación de la tesis.

UNIVERSITAT JAUME I
Escola de Doctorat · ED

Cristina Botella Arbona, como coautora doy mi **autorización** a Sonia Mor Rodríguez para la presentación de las siguientes publicaciones como parte de su tesis doctoral.

Relación de publicaciones:

- Mor, S., Botella, C., Campos, D., Tur, C., Castilla, D., Soler, C., & Quero, S. (2021). An Internet-based treatment for Flying Phobia using 360° images: Study protocol for a feasibility pilot study. *Internet Interventions, 24*, 100387.
- Mor, S., Grimaldos, J., Tur, C., Miguel, C., Cuijpers, P., Botella, C., & Quero, S. (2021). Internet-and mobile-based interventions for the treatment of specific phobia: A systematic review and preliminary meta-analysis. *Internet Interventions*, *26*, 100462.
- Mor, S., Botella, C., Campos, D., Carlbring, P., Tur, C. & Quero, S. (2021). An Internet-based treatment for Flying Phobia using 360° images: A feasibility pilot study. *Internet Interventions* [Manuscript submitted for publication]

Asimismo, **renuncio** a poder utilizar estas publicaciones como parte de otra tesis doctoral.

Y para que conste firmo el presente documento,

MARIA CRISTINA| BOTELLA| ARBONA

Firmado digitalmente por MARIA CRISTINA| BOTELLA|ARBONA
Fecha: 2021.12.10 10:37:34 +01'00'

Lugar, fecha y firma

Castellón, a 9 de Diciembre de 2021

Todo ello, atendiendo al artículo 28 del Reglamento de los estudios de doctorado de la Universitat Jaume I de Castelló, regulados por el RD 99/2011, en la Universitat Jaume I (Aprobado en la sesión nº 8/2020 del Consejo de Gobierno de 02 /10/2020):

"(...)

4. En el caso de publicaciones conjuntas, todas las personas coautoras deberán manifestar explícitamente su autorización para que la doctoranda o doctorando presente el trabajo como parte de su tesis y la renuncia expresa a presentar este mismo trabajo como parte de otra tesis doctoral. Esta autorización se adjuntará como documentación en el momento del inicio de evaluación de la tesis.