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A compendium of multimethod studies of physical exercise and psychological well-being

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¡Preparados – listos – ya!
Un compendio de estudios multimétodo sobre ejercicio físico y bienestar psicológico

Memoria presentada por Ester Gil Beltrán **para optar al grado de doctora por la Universitat Jaume I**

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PRÓLOGO (Foreword)

El que haya hecho un doctorado o haya estado al lado de alguien que lo haya hecho, sabrá que es una carrera de fondo, para la que, además, nadie te prepara. En mi caso, además, nunca pensé en hacer un doctorado, ni siquiera sabía en qué consistía. Pero la vida me trajo hasta el equipo Want. Todo empezó cuando intentando ordenar mi vida decidí retomar el camino de la psicología, y buscando por dónde tirar llegué al Máster de Psicología del Trabajo, las Organizaciones y de los Recursos Humanos que dirigía Marisa Salanova, directora del equipo Want. Hacia tanto tiempo que había acabado la carrera que le pedí ir durante un año de oyente a las clases del grado para refrescar conocimientos y luego ya haría el máster. Y así lo hice. En ese momento mi idea era realizar el máster en la modalidad profesional, es decir, hacer las prácticas en una empresa, pero después de muchos intentos sin resultado, Merche Ventura, responsable de la asignatura de prácticas, me ofreció realizar las prácticas en el equipo Want y ahí empezó mi relación con la investigación. Al principio iba muy perdida, no lo voy a negar, pero con el tiempo le fui cogiendo el gusto sobre todo a ciertos aspectos, como el trabajar las bases de datos, si lo confieso, me encanta. Así que cuando acabé las prácticas, me ofrecieron el quedarme con una beca y después otra, hasta que en octubre del 2017 inicié mi carrera de fondo particular en el doctorado.

He estado vinculada al deporte toda mi vida, no concibo mi vida sin el deporte, con lo que mi tesis no podía ir de otra cosa que no fuera de los beneficios del ejercicio físico en el bienestar de las personas en general y en particular a nivel laboral. Soy una ferviente creyente en el ejercicio físico para tener una buena salud mental y Marisa también así que no fue difícil llegar a un acuerdo sobre el tema de la tesis. Así que no quedó más que el dar la salida, On your marks – get set – go!

CHAPTER 1
GENERAL INTRODUCTION

Nací el 11 de julio de 1982 a las 20:30 de la tarde, ese día a esa hora, se estaba jugando la final del mundial de fútbol que se realizó en España. Con lo que desde mi nacimiento estuve vinculada al deporte, pero no fue hasta la edad de 5 años que no empezó mi relación con él. A esta edad empecé a nadar siguiendo los pasos de mi hermano, que con el tiempo y sin darme cuenta, fue calando en mí y fui aprendiendo de responsabilidad, esfuerzo, sacrificio, trabajo en equipo. En definitiva, el deporte, además de proporcionarme salud física, me dio los valores que ayudaron a construir parte de los cimientos de lo que soy hoy en día. El tiempo pasó y llegó el día que el esfuerzo que requiere el deporte de competición dejó de compensar y lo dejé.

Han pasado 22 años desde entonces y nunca he dejado de realizar, esta vez, ejercicio físico, que para mí es algo menos exigente y estructurado, pero necesario. Cuando estoy un tiempo sin realizarlo el cuerpo me lo pide. A nivel físico, empiezo a notar como el cuerpo se me atrofia, me canso más, me duele todo más. A nivel emocional, la sensación que tengo cuando estoy en forma es que voy mejorando, supero retos, me da satisfacción y orgullo. Y a nivel cognitivo también me ayuda mucho a descargar mentalmente. Hay una clara diferencia entre el antes y el después de hacer ejercicio, sobre todo cuando tengo un día en el que no hago más que darles vueltas a los problemas. En esos días, puedo subirme a una elíptica o irme a correr con un problema en la cabeza al que no dejo de darle vueltas, atrapada emocionalmente en la angustia y sin encontrarle solución, pero a medida que voy cogiendo ritmo en el movimiento, voy despegándome tanto de la rumiación, como de la emoción, y van apareciendo opciones. Y al cabo del rato ya estoy en otras cosas, en la gente que me rodea, en las sensaciones del cuerpo, en lo que estoy haciendo. Puede haber muchas explicaciones científicas, desde que se activan circuitos cerebrales distintos mientras se realiza ejercicio que te hacen que la información se procese de otra forma (Basso & Suzuki, 2017), a que las emociones positivas que producen las hormonas que segregas al hacer ejercicio físico amplíe el foco de posibilidades y se vea la misma información de otra manera (Fredrickson, 1998, 2001, 2013).

Pero, esto que me provoca el ejercicio físico, ¿me pasa solo a mí? Como comentaba anteriormente, mi vida ha girado en torno al deporte, y, por ende, he estado rodeada de gente que ha realizado ejercicio físico o deporte de forma habitual. Así que he

tenido la oportunidad de comprobar que mi experiencia y mi sentir no es única. He compartido muchas conversaciones y experiencias con muchas personas, y las conclusiones, la mayoría de las veces eran parecidas: "me calma", "me ayuda a encontrarme mejor física y emocionalmente", "si no hago ejercicio no aguanto la presión del trabajo", "me ayuda a estar bien, para luego atender mejor a mis hijos". Mi conclusión es que el ejercicio físico puede proporcionar bienestar físico, mental y emocional. Así que llegó un día que pensé en poner a prueba científicamente lo que de forma experiencial y observacional veía. Es decir, ¿el ejercicio físico genera bienestar a quienes lo practican?, ¿el ejercicio físico está relacionado con el bienestar psicológico en el trabajo? Y si eso es así, ¿cómo el ejercicio físico genera el bienestar? ¿cuáles son los mecanismos psicológicos que explican esta relación? Y finalmente, si ejercicio físico puede llevar al bienestar, ¿Qué factores pueden ayudar a que el ejercicio físico se convierta en un hábito?

Lo primero de todo, contextualizaré qué es el ejercicio físico y qué consecuencias tiene para el ser humano el realizarlo, pero también el no realizarlo. Durante millones de años los seres humanos han consumido grandes cantidades de energía en la búsqueda de alimentos y en su supervivencia, sin embargo, en la actualidad, y especialmente en los países desarrollados, la tecnologización no favorece el movimiento del ser humano, es decir, la actividad física. Hechos como la automatización de las fábricas, los sistemas de transporte o la amplia gama de equipos electrónicos en las viviendas, han reducido considerablemente el trabajo físico que se realizaba antaño (Jackson, 2006). Sin embargo, si no se quiere que los cuerpos se enfermen, se les debe dar la cantidad de actividad física necesaria para no ser sedentarios (WHO, 2020), porque el cuerpo, como cualquier máquina si no se usa y se mantiene, se puede estropear. Con lo que, si el estilo de vida actual no facilita la actividad física necesaria, se debería proporcionar por otra vía. A eso se le llama ejercicio físico, que es una variedad de actividad física que se caracteriza por ser planificada, estructurada, repetitiva, y realizada con un objetivo relacionado con la mejora o el mantenimiento de uno o más componentes de la aptitud física (Acevedo, 2012).

¿Qué consecuencias tiene el ejercicio físico en las personas? La literatura nos dice que cuando el cuerpo pasa en reposo, principalmente sentado, más de lo recomendado, el cuerpo empieza a tener consecuencias. La inactividad física está asociada a enfermedades crónicas como la obesidad, la diabetes y enfermedades cardiovasculares, que pueden llevar a una muerte prematura (Rodulfo, 2019). Pero, cuando realizamos ejercicio físico, además de reducir la probabilidad de padecer las enfermedades anteriormente

mencionadas, también tenemos beneficios en positivo que impactan a 3 niveles: físico, neuroquímico y cognitivo/afectivo.

A nivel físico, se refiere a cambios en la estructura física del cuerpo humano. Entre los beneficios del ejercicio físico a este nivel los podemos encontrar en el sistema cardiorrespiratorio, muscular y óseo, y en la reducción del riesgo de padecer enfermedades no transmisibles (Després, 2016; Myers et al., 2015).

A nivel neuroquímico, se refiere a cambios en la composición química del cuerpo humano. Y los beneficios del EF a este nivel son incrementar los niveles de endocannabinoides (Marco et al., 2011; Raichlen et al., 2013), endorfinas (Boecker et al., 2008), serotonina (Wipfli et al., 2011) y dopamina (Berse et al., 2015; Heyman et al., 2012). Estos neurotransmisores son responsables de la reducción del dolor, la regulación emocional y el placer (Heijnen et al., 2016).

Por último, a nivel cognitivo/afectivo, se refiere a la regulación a nivel mental y emocional. En este aspecto el ejercicio físico reduce el riesgo de enfermedades mentales como la depresión o la ansiedad y disminuye el nivel de estrés (Ströhle, 2009). Pero también de forma positiva mejora las tareas cognitivas, el aprendizaje, la memoria a largo plazo y la asociativa, así como el estado de ánimo (Basso & Suzuki, 2017).

Esto es una muestra del bienestar físico y psicológico que genera la realización del ejercicio físico. Pero ¿qué pasa con la transferencia al bienestar psicológico en el trabajo? En este aspecto, existe cierto vacío en la literatura, ya que son pocos los estudios publicados que ayuden a responder a esta pregunta. Pero, los que hay, sí que apuntan a que el ejercicio físico tiene un efecto positivo en el bienestar psicológico en el trabajo. Por ejemplo, De Miguel Calvo et al. (2011) encontraron que aquellos empleados que se incorporaban al programa de ejercicio físico pensado para la mejora de la resistencia cardiaca, fuerza, y flexibilidad, además de mejorar los parámetros físicos, obtuvieron mayores niveles de satisfacción laboral y menores niveles de estrés que los empleados del grupo control. En este mismo sentido, también otros estudios encontraron reiteradas evidencias de mayores niveles de bienestar (Sonnentag, 2001), mayores niveles de engagement en el trabajo (Sonnentag, 2003) y mayores niveles de emociones positivas antes de irse a la cama (Nägel et al., 2015a), en las personas que realizaban ejercicio físico en comparación a las que no. Estos estudios ponen en relieve la importancia del ejercicio físico para tener un desapego cognitivo con el trabajo y una recuperación de los recursos utilizados durante el trabajo para llevar a unos niveles óptimos de bienestar.

Con lo que, siguiendo estas ideas, y con el afán, primero de seguir encontrando evidencia que afiance y amplíe los hallazgos encontrados hasta el momento sobre la relación entre ejercicio físico y bienestar, y segundo, de adentrarnos en los nuevos conocimientos de cómo hacer que el ejercicio se convierta en un hábito, a lo largo de esta tesis intentaré dar respuestas a las preguntas que me planteé tras tantas conversaciones con colegas del mundo del deporte:

1. ¿El ejercicio físico genera bienestar psicológico en el trabajo?
2. ¿Cómo el ejercicio físico genera bienestar psicológico en el trabajo?
3. ¿Qué factores pueden ayudar a que el ejercicio físico se convierta en hábito?

Para responder a estos interrogantes realicé cuatro estudios de investigación. Con el objetivo de analizar la relación del ejercicio físico con el bienestar psicológico en el trabajo. Los dos primeros estudios tuvieron los siguientes objetivos: 1) poner a prueba si las personas que realizan ejercicio físico muestran una mayor percepción de los recursos laborales (i.e., coordinación, empatía, autonomía y liderazgo) y mayores niveles de compromiso y desempeño que las que no lo hacen, y si hay diferencias en esa percepción entre hombres y mujeres que realizan ejercicio físico; y 2) investigar la relación entre la práctica del ejercicio físico y el bienestar psicológico en el trabajo (i.e., satisfacción laboral, emociones en el trabajo y estrés laboral), destacando el papel del vigor con el ejercicio físico como modulador de dicha relación. El tercer y cuarto estudio tenían el objetivo de profundizar en aquellos factores que ayudan a que el ejercicio físico se convierta en un hábito saludable en nuestras vidas. Los objetivos de estos estudios fueron los siguientes: 3) poner a prueba si los factores como la priorización de lo positivo y el hacer el ejercicio físico en compañía se relacionaba con unos mayores niveles de frecuencia, intensidad y duración del ejercicio físico, mediado todo por las emociones y el engagement al realizarlo, y 4) poner a prueba si a nivel diario se da una relación positiva entre realizar ejercicio físico y las emociones positivas y viceversa, y si esta relación está potenciada por la priorización de lo positivo.

El marco teórico en esta tesis que sustenta la relación del ejercicio físico con el bienestar en general, y el bienestar psicológico en el trabajo en particular, es el Modelo de Recuperación-Esfuerzo (Meijman & Mulder, 1998) y la Teoría de la Conservación de los Recursos (Hobfoll, 1998). Por un lado, estas teorías defienden la importancia de distanciarse de las fuentes de estrés para recuperarse y volver a los niveles anteriores (Meijman & Mulder, 1998). Por otro lado, enfatizan que existe una motivación para

conservar, fomentar y procesar nuestros recursos y, por lo tanto, recuperar los recursos que se ven disminuidos o agotados durante una situación estresante (Hobfoll, 1998).

La teoría que enmarca los factores que pueden ayudar a que el ejercicio físico se convierta en un hábito y por tanto ese bienestar psicológico en el trabajo y general perdure es la Teoría de la espiral ascendente de cambio de vida (Van Cappellen et al., 2018). Esta teoría presenta dos bucles: un bucle interno en que el afecto positivo experimentado durante la conducta (i.e., el ejercicio físico) pronostica la reiteración en la conducta a través de lo que llaman "motivos inconscientes". Y un bucle externo, en que los afectos positivos influyen en la construcción de recursos ventajosos (i.e., priorización de lo positivo, realizar el ejercicio físico en compañía) que a su vez potencian la relación entre la conducta y el afecto positivo.

Esquema de esta tesis:

Este proyecto de tesis intenta encontrar evidencia que afiance y amplíe los conocimientos que se tienen hasta el momento de la relación entre ejercicio físico y bienestar psicológico en el trabajo, y encontrar factores concretos que ayuden a hacer del ejercicio físico un hábito. Con este fin, se diseñaron 4 estudios empíricos que conforman 3 capítulos de la tesis (ver Tabla 1). El contenido de cada capítulo, sus metas e hipótesis específicas se presentan en los siguientes párrafos.

Tabla 1

Preguntas de investigación abordadas en los capítulos del proyecto de tesis

	OBJETIVO	**CAPÍTULO**		
ESTUDIO		**2**	**3**	**4**
1	¿El ejercicio físico genera bienestar psicológico en el trabajo?	X		
2	¿Cómo el ejercicio físico genera bienestar psicológico en el trabajo?		X	
3	¿Qué factores pueden ayudar a que el ejercicio físico se convierta en hábito?			X
4	¿Qué factores pueden ayudar a que el ejercicio físico se convierta en hábito?			X

Capítulo 2: ***Employees' Physical Exercise, Resources, Engagement, and Performance: A Cross-sectional Study from HERO Model***

En este primer capítulo empírico se aborda la pregunta de si el ejercicio físico genera bienestar psicológico en el trabajo. Lo primero que se quiso comprobar era si había relación entre realizar ejercicio físico, los beneficios de realizar ejercicio físico a nivel psicológico, y el bienestar en el trabajo.

La aproximación de este primer estudio fue muy general, se puso a prueba si había diferencias en la percepción de recursos laborales entre las personas que realizaban ejercicio físico asiduamente y las que no lo realizaban, usando como marco de referencia el modelo HERO (HEalthy and Resilient Organizations, (Salanova et al., 2012)). Este modelo nos dice que los recursos laborales (i.e., coordinación, empatía, liderazgo y autonomía), se relacionan con empleados más saludables (i.e., engagement laboral), y estos a la vez, con niveles de desempeño mayores (i.e., desempeño intra-rol y extra-rol). Además, se examinaron las posibles diferencias existentes en la percepción de las distintas variables que componían el modelo. Esto se realizó en una muestra de 319 empleados (156 sedentarios y 163 no sedentarios).

Este capítulo fue publicado en la revista Journal of Work and Organizational Psychology (JCR (2020) = 2478; 51/83. Psychology, Applied Q3) (Gil-Beltrán et al., 2020a)

Capítulo 3: ***Get Vigorous with Physical Exercise and Improve Your Well-Being at Work!***

En este segundo capítulo empírico se aborda la pregunta de cómo el ejercicio físico genera bienestar psicológico en el trabajo. Siendo que no existían diferencias significativas entre los grupos sedentarios y no sedentarios, se quiso comprobar si había alguna variable que estuviera afectando la relación entre el ejercicio físico y el bienestar psicológico en el trabajo, con lo que se puso a prueba el efecto del vigor en el ejercicio físico como variable que pudiese potenciar esa relación. Las personas con altos niveles de "vigor" se caracterizan por manifestar altos niveles de energía y ganas de invertir esfuerzo en la actividad que desarrollan, incluso cuando aparecen dificultades por el camino. Con lo que, en este caso, se podía entender el vigor en el ejercicio físico, como la motivación que impulsa a la realización del ejercicio físcio y la voluntad de invertir persistentemente esfuerzos en ello, lo que potenciaría la relación entre el ejercicio físico

y el bienestar psicológico en el trabajo. Esto se puso a prueba en una muestra de 485 trabajadores de diferentes empresas españolas y latinoamericanas.

Este capítulo fue publicado en la revista International Journal of Environmental Research and Public Health (JCR (2020) = 3390; 42/176; Q1) (Gil-Beltrán et al., 2020b).

Capítulo 4: ***Physical Exercise and Wellbeing in Time of COVID-19: A Cross-sectional and Diary Study***

En el tercer capítulo empírico se aborda la pregunta de qué factores pueden ayudar a que el ejercicio físico sea un hábito. Con el segundo estudio se vio que el ejercicio físico a través del vigor al realizarlo genera bienestar psicológico en el trabajo. Ahora tocaba estudiar cómo convertir el ejercicio físico en un hábito, para que no se quedara en el eterno propósito de año nuevo.

Este tercer capítulo está compuesto por dos estudios. El primer estudio, con un diseño transversal tiene como objetivo verificar la mediación del bienestar psicológico (i.e., engagement en el ejercicio físico y emoción en el ejercicio físico) en la relación entre variables que la teoría de la espiral ascendente de cambio de vida (Van Cappellen et al., 2017) plantea como recursos que facilitan la adquisición del ejercicio físico como hábito (i.e., Priorización de lo positivo y hacer ejercicio físico en compañía) y la realización de ejercicio físico (i.e., frecuencia, intensidad y duración). La priorización de lo positivo es un concepto que acuña Catalino et al. (2014) y representa el organizar el día conscientemente incluyendo experiencias que se saben placenteras para uno mismo, con el fin de ampliar e inducirse emociones positivas. Este estudio, se realizó con una muestra de 553 sujetos.

En el cuarto estudio, se pone a prueba la Teoría de la espiral ascendente de cambio de vida (Van Cappellen et al., 2017), con sus dos bucles, en un estudio de diario. El objetivo de este estudio es observar si las variaciones en el ejercicio físico (i.e., frecuencia, intensidad y duración) se asocian positivamente con las emociones en el ejercicio físico, y viceversa. Además, se quiere comprobar si las emociones en el ejercicio físico se relacionan con los recursos ventajosos, que en este caso es la priorización de lo positivo, y este a su vez modula la relación entre el ejercicio físico y las emociones en el ejercicio físico. Este estudio se realiza con una muestra de 176 sujetos, los cuales contestaron cuestionarios sobre las variables importantes del estudio durante 7 días seguidos, en 3 momentos distintos del día (al iniciar el día, después de trabajar y al finalizar el día).

Este capítulo fue sometido en Sport, Exercise, and Performance Psychology.

Capítulo 5: *Conclusiones generales*

Finalmente, este último capítulo resume los principales hallazgos, conclusiones y contribuciones de los capítulos empíricos de esta tesis, junto con las principales implicaciones prácticas. Además, se identifican las limitaciones de los estudios junto con futuras vías de investigación.

CHAPTER 2

Employees' Physical Exercise, Resources, Engagement, and Performance: A Cross-sectional Study from HERO Model

Abstract

The purpose of this study is to investigate the mediating role of work engagement in the relationship between resources and performance, and the invariance of the HEalthy & Resilient Organizations model depending on physical exercise. Moreover, the study examines whether there are differences in the perception of these variables based on physical exercise and gender.

The sample is composed of 319 employees (156 sedentary; 163 non-sedentary). The results show that engagement mediates between resources and performance in both groups, which demonstrates the invariance of the model. Additionally, the findings revealed that, generally speaking, non-sedentary people are more empathetic and more absorbed in their job tasks and, specifically, that non-sedentary men are more empathetic and more vigorous at work than sedentary men. No differences were found between sedentary and non-sedentary women. Finally, regarding gender differences in the variables, women are more empathetic and have better performance than men.

Keywords: Physical exercise, model HERO, gender differences, resources, engagement, work performance. [1]

[1] Chapter 2 is based on: Gil-Beltrán, E., Llorens, S., & Salanova, M. (2020). Employees' physical exercise, resources, engagement, and performance: A Cross-sectional study from HERO model. *Journal of Work and Organizational Psychology, 36*(1), 39-47. https://doi.org/10.5093/jwop2020a4.

Until the 1950s, the study of healthy organizations focused on indicators such as low absenteeism, loyalty, production levels, or industrial safety. However, from the 1950s on, researchers' approaches began to change. In 1958, Argyris defined a "healthy organization" as one that allows optimal human functioning to occur. Working conditions began to be evaluated because they can negatively and positively influence employees' health (Gómez, 2007).

Following this more positive approach, in 2012, in the HEalthy & Resilient Organizations (HERO) model, Salanova et. al. defined healthy and resilient organizations as:

> Those organizations that make systematic, planned, and proactive efforts to improve the processes and results of their employees and organization. These efforts are related to organizational resources and practices, and to the characteristics of work at three levels: (1) task level (e.g., redesign of tasks to improve autonomy, feedback), (2) environmental social level (e.g., leadership), and (3) organizational level (e.g., organizational strategies for the improvement of health, work-family reconciliation) (p. 788)

The HERO model tells us that an organization that invests in healthy organizational practices and resources promotes higher levels of well-being in its employees, which, in turn, leads to better organizational results (Salanova et al., 2012). In sum, it is clear that investing in the health and well-being of employees is synonymous with profitability and competitiveness (Salanova et al., 2021). Based on this model, a healthy employee is also an engaged employee who experiences a positive affective-emotional and psychological state related to his/her work, characterized by vigor, dedication, and absorption (Salanova & Schaufeli, 2009). Previous research has shown that providing more job and personal resources at work, i.e. organizational trust (Acosta et al., 2012), team support climate (Torrente et al., 2012), or transformational leadership (Cruz-Ortiz et al., 2013), is related to a greater probability of having engaged employees. In addition, research has also shown that engagement has important consequences, such as increasing performance and service quality (Salanova et al., 2003, 2005; Torrente et al., 2012), job satisfaction, and organizational commitment (Llorens et al., 2006).

According to Sonnentag (2003), employees who feel sufficiently recovered from the work stress experienced the previous day have much higher engagement levels the next day, compared to those who do not know how to use their leisure time to recover. Physical exercise (PE) is an activity that can help employees to recover from the stress

generated during the workday (Sonnentag, 2001). Currently, PE is considered a valuable resource for improving physical and emotional well-being in companies (Nägel et al., 2015b). It is so relevant that, even in healthier organizations, it is adopted as a positive intervention mechanism to promote positive emotional states and increase performance (Nägel et al., 2015b).

Although some studies show the effect of PE on physical (Myers et al., 2015) and psychological well-being (Ströhle, 2009), engagement (Sonnentag, 2003), or emotions (Nägel et al., 2015b), there are no studies that explore the impact of PE on the development of different dimensions of a healthy and resilient organization (such as a HERO). A key element of the HERO Model (Salanova et al., 2019; Salanova et al., 2012) is the employees' perception of organizational practices and resources. With this research, we intend to study the role of PE in the HERO model structure for the first time.

Another relevant aspect in the applied research is the consideration of gender differences. Specifically, in the context addressed in the present study, research results are inconclusive. That is, some studies found gender differences in variables such as job resources, engagement, performance, and PE, (Maculano et al., 2014), whereas other studies found no differences (e.g., Gil et al., 2015; Kredlow et al., 2015). Thus, there is a need to continue with this line of research.

Theoretical Model: The HERO model

The HERO model is a heuristic and theoretical model that makes it possible to integrate results based on theoretical and empirical evidence emerging from studies on job stress and organizational behavior and from the field of Positive Occupational Health Psychology (Llorens et al., 2009). According to this model, a healthy and resilient organization combines three key components that interact with each other: (1) healthy organizational resources and practices (e.g., autonomy), (2) healthy employees (e.g., efficacy beliefs), and (3) healthy organizational results (e.g., performance). This model proposes that Healthy Organizational Resources and Practices are positively related to employees' well-being and healthy organizational results (Salanova et al., 2012).

The HERO model has been tested in different samples of employees and supervisors, providing evidence for the impact of organizational practices and resources on the development of healthy organizations through their effects on employees' well-being, using data aggregated to the team level and different sources of information (e.g., (Salanova et al., 2012; Torrente et al., 2012; Tripiana & Llorens, 2015). However, the

present study goes one step further and tests the HERO model, but focusing on the effect of employees' PE. Thus, the invariance of the HERO model is tested in two subsamples of employees depending on the physical activity they engage in: sedentary employees, those who do PE less than three times a week (WHO, 2010), and non-sedentary employees, the rest of the employees.

Job resources

Job resources are found within the Organizational Practices and Resources component of HERO, and they consist of task and social resources that, along with the organizational practices, are oriented toward increasing psychological and financial health at the individual, team, and organizational levels (Salanova et al., 2012).Task resources are those closest to the employees because they are related to the characteristics of the tasks themselves: clarity of the task and the job role, autonomy, the variety of tasks, and the existence of information and feedback about what is done. These resources promote employees' connection with and pride in their work and their immediate enjoyment. Social resources refer to the shared job context and include co-workers and bosses, as well as clients or employees of suppliers, increasing employees' connections with the people with whom they work. Research tells us that positive psychological states such as engagement can be increased and fostered through investments in resources (i.e., personal, task, social, organizational) and healthy organizational practices (Salanova & Schaufeli, 2004; Torrente et al., 2012; Tripiana et al., 2015).

Work engagement

Work engagement is understood as a positive emotional state related to work and characterized by vigor, dedication, and absorption. Rather than a specific and momentary state, engagement is a more persistent cognitive-affective state that is not focused on a particular object, event, or situation. Vigor is characterized by high levels of mental energy at work and the desire to invest effort in the work one is doing, even when difficulties arise. The dimension of dedication denotes high work involvement, along with feelings of significance, enthusiasm, inspiration, pride, and challenge on the job. Finally, absorption occurs when the employee is completely focused on the job, feels like time is flying by, and finds it difficult to disconnect from his/her tasks due to high levels of enjoyment and concentration (Schaufeli et al., 2002).

Although, to date, the study of work engagement has been oriented toward the individual, it can exist as a collective psychosocial phenomenon (Bakker & Leiter, 2010; Salanova et al., 2003). Members of teams and work units interact daily, mutually influencing their levels of work engagement. This means that the overall organization can benefit from a shared state of work engagement, and its maintenance would be a competitive advantage for the organization (Macey & Schneider, 2008).

Previous studies have found that encouraging engagement in organizations has positive effects on both individual and organizational performance. At the individual level, it favors employee performance and service quality (Salanova et al., 2005). At the organizational level, effects on team performance (Salanova et al., 2021) and service quality (Salanova et al., 2005) have been found.

Job performance

In the HERO model, Healthy Organizational Results refer to excellence in products and services and positive relationships between the organization and its intra-organizational environment, such as its employees, and the extra-organizational environment, such as suppliers and distributors, the local community, society in general, and clients, through satisfaction and loyalty. Therefore, the employees' performance would be an indicator of these Healthy Organizational Results. This performance has two dimensions: (1) intra-role, defined as activities related to the formal work, which can vary depending on the tasks within the same organization; and (2) extra-role, defined as activities that exceed the worker's job description (e.g., helping co-workers or working outside the usual timetable). These two dimensions correspond to task and contextual performance, respectively (Goodman & Svyantek, 1999).

A large body of scientific evidence confirms the positive relationship between engagement and both intra-role and extra-role performance (Demerouti & Cropanzano, 2010). For example, the study carried out by Halbesleben and Wheeler (2008)with North American employees, their supervisors, and their closest co-workers revealed that engagement helps to uniquely explain the variance in performance (after controlling for work engagement). In addition, the study by Salanova et al. (2005) with personnel and clients of restaurants and hotels in Spain showed that organizational resources and engagement were predictors of service climate, which, in turn, was a predictor of performance and, consequently, client loyalty.

Sedentariness vs Physical Exercise

Undoubtedly, the world has evolved scientifically and technologically. However, this development has had an effect on the physical activity of human beings, especially in developed countries. For millions of years, humans have consumed large amounts of energy in the search for food and survival, but today, particularly in developed countries, energy is widely available, and physical activity is not favored due to factors such as the automatization of factories, transportation systems, or the wide variety of electronic devices in homes that have considerably reduced the physical work performed (Jackson et al., 2006).

Sedentariness is defined by the World Health Organization (WHO) as 'less than 30 minutes of regular exercise fewer than three days per week', and it is associated with non-communicable diseases, but also with other problems such as depression and anxiety (Fox, 1999) or lack of vigor (Lee et al., 2001). PE consists of a variety of planned, structured, and repetitive physical activities carried out to improve or maintain one or more components of one's physical condition (Acevedo, 2012). According to the WHO, recurrent PE sustained in time leads to a series of physical benefits, such as improvements in cardiorespiratory functions and, therefore, less risk of cardiovascular diseases (Després, 2016; Myers et al., 2015), and reductions in the risk of non-communicable diseases such as depression or anxiety (Ströhle, 2009). Considering the effectiveness of PE at a preventive level, its potential as a strategy for optimizing and promoting well-being has been proposed.

In this study, we define PE as a personal practice and a recovery activity (Sonnentag, 2001). The process of recovering from a workday could be understood as the opposite of the stress process, or as the process through which stressed psychological systems return to their pre-stress levels (Meijman & Mulder, 1998). At a theoretical level, recovery is fundamentally based on two theories: the Recovery-Effort Model (Meijman & Mulder, 1998) and the Theory of Conservation of Resources (Hobfoll, 1998). On the one hand, these theories defend the importance of distancing oneself from the sources of stress in order to recover and return to previous levels (Meijman & Mulder, 1998). On the other hand, they emphasize that there is a motivation to conserve, foment, and process our resources and, therefore, recover any resources that are diminished or exhausted during a stressful situation (Hobfoll, 1998).

When and how a person recovers from the work day can be quite varied. Typically, workers use the vacation period or the weekend to recover from work, but on a daily basis this recuperation can also occur, for example, at work during formal rest periods (Trougakos et al., 2008), when changing from one task to another (Elsbach & Hargadon, 2006), or when the work day ends. This recovery does not necessarily have to involve inactivity. PE, for example, has also been found to contribute to recovery (Sonnentag, 2001; Sonnentag & Natter, 2004). The variety of possible activities would encompass low effort pursuits (e.g., reading, watching television, or just sitting on the sofa), social participation (e.g., going out to dinner with friends or making a phone call), and cognitive (e.g., playing video and/or computer games, learning a new language and/or skill) and physical challenges.

Physical activities stimulate physiological and psychological processes, and so they are beneficial at the level of physical and mental health (Brown, 1990; (McAuley et al., 2004). At the physiological level, PE elevates the levels of endorphins (Grossman et al., 1984), serotonin, noradrenalin, and dopamine (Cox, 2002). At the psychological level, many physical activities facilitate mental distraction from job demands (Yeung, 1996). The feeling of mastery and the increase in self-efficacy from performing a physical activity can also aid in recovering from stress (Demerouti, Bakker, Geurts, & Taris, 2009; Sonnentag & Jelden, 2009).

Research carried out by Nägel et al. (2015) found that on the days employees did exercise after work, they experienced an improvement in their positive affect and perceived serenity before going to bed. Positive affective states are important antecedents of results related to work and success (Ilies & Judge, 2005; Lyubomirsky et al., 2005; Tsai et al., 2007). Therefore, especially after an exhausting day at work, when the affective states could be deteriorated, it is crucial for employees to do activities such as PE in their free time to restore these affects. In doing so, employees will improve their well-being and, thus, be able to perform their work well and efficiently. Along the same lines, Sonnentag (2003) also showed that the level of engagement is positively associated with the degree to which employees recover from the physical, mental, and emotional efforts of the previous workday.

In spite of the importance of recovering resources after a stressful workday, and the fact that PE is an important activity in this recovery, few studies have been carried out on this topic. Thus, we aim to analyze the relationship between the frequency of PE

and the levels of well-being, in terms of engagement, and their relationship with performance at work.

Gender differences

Research on gender differences in the context addressed in the present study is extensive, but also inconclusive, as mentioned above. On the one hand, some studies point to the absence of gender differences in the perception of healthy organizational resources and practices (i.e., work-family enrichment) or engagement (Hakanen et al., 2011) in a sample of dentists. This lack of gender differences has also been found in a meta-analysis performed by Kredlow et al., (2015) on the benefits of regular PE for sleep quality, and in the study by Gil et al. (2015), who concluded that gender similitude on a work team does not influence the perception of positive team affects. On the other hand, other studies reveal the existence of gender differences, for example, in the perception of job demands and resources and psychosocial well-being (Cifre et al., 2000, 2011; Cifre & Salanova, 2010). There are also differences in the pre-disposition toward and use of transformational leadership, which is higher in women (Pounder & Coleman, 2002), or in the levels of arousal and sleep time, where women present lower levels of arousal and better sleep quality (Maculano et al., 2014).

The present study

The purpose of the present study is to analyze the relationship between job resources and job performance, taking into account the mediating role of engagement and testing the invariance of the HERO model depending on the employees' PE. Another objective is to find out whether people who engage in PE show a greater perception of resources at work and higher levels of engagement and performance than those who do not. Additionally we attempt to discover if there are differences according to gender and PE. Specifically, the study hypotheses are the following (see Figure 1):

Hypothesis 1: We expect work engagement to fully mediate the relationship between resources and performance, regardless of the physical activity of the employees (sedentary and non-sedentary).

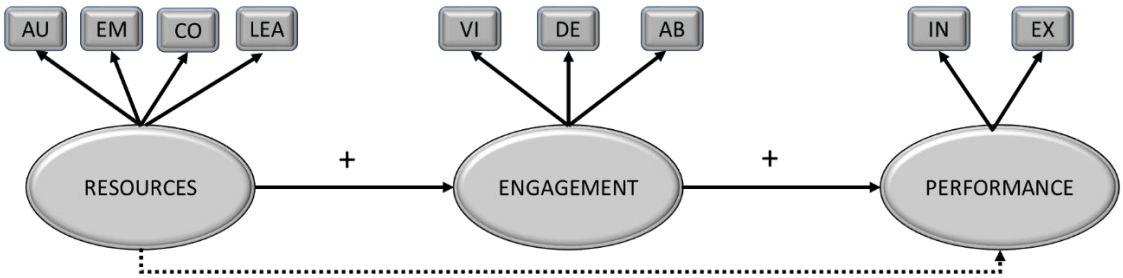
Hypothesis 2: We expect employees who do PE (non-sedentary) to show higher levels of the study variables (resources, engagement, and performance), compared to those who do not (sedentary).

Hypothesis 3: We expect to find no significant differences between men and women in the study variables (resources, engagement, and performance), without taking into account the PE performed.

Hypothesis 4: We expect the male employees who do PE (non-sedentary) to show higher levels of the study variables (resources, engagement, and performance) than the male employees who do not (sedentary).

Hypothesis 5: We expect the female employees who do PE (non-sedentary) to show higher levels of the study variables (resources, engagement, and performance) than the female employees who do not (sedentary).

Figure 1.
Hypothesized Model.



AU = autonomy; EM = empathy; CO = coordination; LEA = leadership; VI = vigor; DE = dedication; AB = absorption; IN = intra-role; EX = extra-role.

Method

Participants and Procedure

The total sample was composed of 319 employees from different Spanish organizations who participated in a research project on active aging. It was a convenience sample, and the data were collected in 2016. Regarding sex, 52% of the employees were men, the mean age was 37 years (Minimum = 19; Maximum = 63, *SD* = 8.8), and 71% had a permanent contract. This sample was adequate for performing Structural Equation Analyses, given that it exceeded the minimum of 148 observations for a statistical power of .50 and 50 degrees of freedom (MacCallum et al., 1996).

To address the study objectives, the sample was divided into two groups according to the PE they usually do. To perform this classification, the WHO definition for sedentariness was used, where 'sedentariness' means doing less than 30 minutes of PE fewer than three days a week. Using this criterion, the total sample was divided into two subsamples: 'Sedentary', corresponding to employees who did PE less than three days a week, and 'Non-sedentary', corresponding to employees who exercised three or more

days a week. The sedentary sample consisted of 156 participants whose mean age was 37 years (Minimum = 20; Maximum = 60; *SD* = 8.5); 52% were men, and 74% had permanent contracts. The non-sedentary sample consisted of 163 participants whose mean age was 36 years (Minimum = 19; Maximum = 63; *SD* = 9.1); 52% were men, and 68% had a permanent contract.

With regard to the procedure, the sample filled out the questionnaire in its online format after each firm's management had given its consent. To do so, the participants were provided with a personal access code and the link to the questionnaire. Confidentiality of the data was guaranteed at all times.

Measures

The variables proposed were from the HERO model, whose scales and their relationships have been validated by Salanova et al. (2012). The present study will evaluate the relationships among the three basic components of the HERO model: healthy organizational practices and resources (specifically, resources such as autonomy, empathy, coordination, and leadership), healthy employees (engagement: vigor, dedication, and absorption), and healthy organizational results (performance). The variables were measured with previously validated scales and reworded using "teams" as a reference (Salanova et al., 2012). A Likert-type scale from 0 (*never*) to 6 (*always*) was used. The variables used are described below.

Job resources. Four resources were evaluated with eight items (α = .81): (1) Autonomy (Jackson et al., 1993), one item: 'In my job, I determine when to start, when to finish, and the order in which I do my tasks'; (2) Empathy, one item: 'I try to 'put myself' in the other person's place (co-workers, bosses, clients) to know how s/he feels'; (3) Coordination (Salanova et al., 2011), one item: 'We coordinate with each other to do the job'; and (4) Leadership (Rafferty & Griffin, 2004), five items: 'She/he encourages me to view changes as situations full of opportunities'.

Work engagement. This was evaluated with the reduced version (three items; α = .81) of the Utrecht Work Engagement Scale (Schaufeli et al., 2019), which evaluates three dimensions: (1) vigor, one item: 'I feel strong and vigorous when doing my job'; (2) dedication, one item: 'I feel excited about my job'; and (3) absorption, one item: 'I am immersed in my work'.

Performance. This was evaluated with two items (r = .22, p<.001) referring to two key dimensions: (1) Extra-role performance (Goodman & Svyantek, 1999), one item: 'I

perform functions that are not required by the contract but improve the functioning and well-being of the organization'; and (2) Intra-role performance (Goodman & Svyantek, 1999), one item: 'I fulfill the functions and tasks my job requires'. This measure was validated by Salanova et al. (2012).

Physical exercise. This was evaluated with one behavioral item that refers to the frequency with which the participants engage in PE each week: 'How many days a week do you do physical exercise?' Employees who did PE less than three times a week were classified as sedentary (WHO, 2010), whereas the rest were classified as non-sedentary.

Data analysis

First, analyses were conducted of the internal consistency (Cronbach's alpha), descriptive statistics (means, standard deviations), and internal correlations of the variables considered in the study, using the statistical packet IBM SPSS Statistics 23.0. Second, the Harman one-factor test was performed (see Podsakoff et al., 2003), using the statistical packet AMOS 23.0 to test common variance bias.

Next, Multigroup Structural Equation Models (SEM) were carried out using the AMOS 23.0 program to test the invariance of the hypothesized model simultaneously in both samples (N sedentary = 156 and N non-sedentary = 163). Three models were tested (James et al., 2006): (M1), *Full mediation model*, which proposes that engagement fully mediates the relationship between job resources and workers' performance; (M2), *Partial mediation model*, which proposes the mediation of engagement between job resources and workers' performance, and a direct relationship between job resources and performance. In addition, the MacKinnon, Lockwood, Hoffman, West & Sheets (2002) mediation test was used to test the mediator effect of engagement between job resources and performance; and M3, *completely constrained model*, which proposes that all the model relationships are equal in both samples.

The maximum likelihood method was selected as the estimation procedure because we did not find any normality violations (i.e., Skewness index smaller than 2; Kurtosis index smaller than 10; Weston & Gore, 2006) of the study variables. We calculated the absolute and relative goodness of fit indexes (Marsh et al., 1996): the Chi-squared index ($p > .05$), relative chi-squared index (chi-squared/gl; up to 5.0), *Root Mean Square Error of Approximation* (RMSEA), *Comparative Fit Index* (CFI), *Tucker- Lewis Index* (TLI), and *Incremental Fit Index* (IFI). Values below .08 indicate a good fit for RMSEA (Browne & Cudeck, 1992), and values above .90 indicate a good fit for the rest

of the indexes (Hornung & Glaser, 2010; Hoyle, 1995) . Moreover, the Akaike Information Criterion (AIC; (Akaike, 1987) was calculated to compare non-nested comparative models; the lower the AIC, the better the fit.

Additionally, Multiple Analyses of Variance (MANOVA) were performed with the IBM SPSS Statistics 23.0 program to test the existence of significant differences in the study variables (resources, engagement, and performance), depending on: (1) PE (sedentary and non-sedentary employees), (2) gender (women and men), and (3) PE and gender (sedentary men vs. non-sedentary men and sedentary women vs. non-sedentary women).

Results

Descriptive analyses and Harman's Test

Table 1 shows the means, standard deviations, and inter-correlations among the study variables in the two samples. The correlation analyses reveal that the variables are positively related in the two samples (sedentary *r* mean = .40; non-sedentary *r* mean = .38) (see Table 1). Furthermore, the results show that all the scales meet the reliability criterion proposed by the scientific research (Nunnally, J. C., & Bernstein, 1994): Resources (α = .81), engagement (α = .81) and performance (*r* = .21, p<.001).

Table 1

Descriptives and Correlations Between the Variables Among Sedentary and Non-Sedentary Workers

	Variables	M (Sedentary)	SD (Sedentary)	M (Non Sedentary)	SD (Non Sedentary)	F	1	2	3	4	5
1	Resources	4.19	1.07	4.26	0.96	.34		.315***	.429***	.237**	.161*
2	Vigor	4.65	1.13	4.88	0.99	3.81	.341***		.650***	.569***	.278***
3	Dedication	4.44	1.22	4.62	1.21	1.77	.380***	.657***		.579***	.252***
4	Absorption	4.83	1.03	5.06	1.00	4.093*	.278***	.458***	.650***		.379***
5	Performance	5.11	0.82	5.10	0.92	.02	.293***	.327***	.290***	.372***	

Note. The correlation is significant at the level * p <0.05 ** p <0.01 *** p <0.001 (bilateral). Below the diagonal appear the correlations of the sedentary group. Sedentary (n =156) and Non-Sedentary (n = 163). M=mean, SD= standard F = Multiple Analyses of Variance.

Second, the results of the one-factor Harman's test (Podsakoff et al., 2003) revealed a poor fit to the data, χ^2 (54) = 188.036, RMSEA = .08, CFI =.79, TLI = .72, IFI = .79. Moreover, following the recommendations of Podsakoff, et al., (2012), the questionnaire had different headings to differentiate its distinct parts. Common method variance bias did not seem to affect the study data. Therefore, we can attribute the variance in the variables to the psychosocial constructs being evaluated, rather than to the evaluation method.

Model fit: Multigroup structural equation models.

Table 2 shows the results of the SEM models of the relationships between job resources, work engagement, and performance. The model has one exogenous variable (resources) and two endogenous variables (engagement with its dimensions of vigor, dedication, and absorption; and performance). All the scales were treated as latent variables. Job resources had four indicators, engagement had three, and performance had two.

The results of the SEM indicate that the hypothesized model M1, *Full mediation model,* where engagement fully mediates between job resources and workers' performance, χ^2 (50) = 110.68, RMSEA = .062, CFI = .91, TLI = .86, IFI = .91, AIC = 226.68 fits slightly better than M2, *Partial mediation model*, $\chi^2(48) = 109.78$, RMSEA = .064, CFI = .90, TLI = .86, IFI = .86, AIC = 229.78, although there are no statistically significant differences between the two models with regard to χ^2, Delta $\chi^2(2) =$. 09, ns. However, the results favor M1, *Full mediation model,* given that: (1) the fit indexes are better in M1, *Full mediation model,* and (2) the direct relationship between resources and performance included in M2, *Partial mediation model*, is not statistically significant. Therefore, these data support M1, *Full mediation model.* Thus, resources are significantly and positively related to performance through engagement.

Table 2.

Fit Indexes for the Multigroup Structural Equation Models for the Sedentary and Non-Sedentary Samples

Model	χ2	gl	χ2/gl	RMSEA	CFI	IFI	TLI	AIC	χ2dif
M1	110.68	50	2.21	.062	.91	.91	.86	226.68	
M2	109.78	48	2.29	.064	.90	.86	.86	229.78	.9 ns
M3	111.66	58	1.93	.540	.92	.92	.90	211.66	.98 ns

Notes. = χ2 Chi-square; gl = degrees of freedom; χ2 / gl = relative Chi-square; RMSEA = Root Mean Square Error of approximation; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; IFI = Incremental Fit Index; AIC = Akaike information Criterion; dif. = difference. ns = not significant. M1 Full mediation model; M2 Partial mediation model; M3 Completely constrained model. Sedentary (n=156) and non-sedentary (n=163) samples.

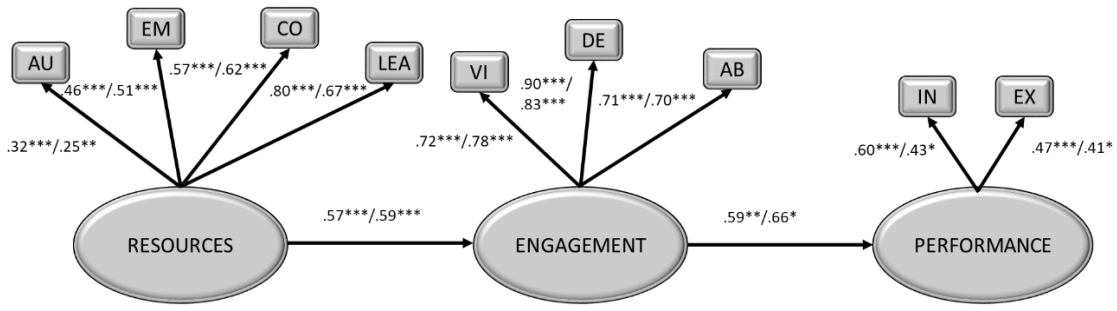
Furthermore, using the coefficient product method by MacKinnon et al., (2002), in M1, *Full mediation model,* all the requirements are met in both subsamples. For the sedentary employees: (1) job resources are positively and significantly related to work engagement (mediator variable), $\alpha^1 = .73$, $p < .01$; (2) work engagement is positively and significantly related to performance, $\beta^1 = .29$, $p < .01$; and (3) the mediation effect is positive and statistically significant, $\alpha^1\beta^1 = .21$, $p < .01$. Second, for the non-sedentary employees: (1) job resources are positively and significantly related to work engagement (mediator variable), $\alpha^2 = .92$, $p < .01$; (2) work engagement is significantly and positively related to

performance, $\beta^2 = .39$, $p < .01$; and (3) the mediation effect is positive and statistically significant, $\alpha^2\beta^2 = .36$, $p < .01$. These results show that work engagement fully mediates the relationship between job resources (autonomy, empathy, coordination, and leadership) and performance in both groups, with a direct relationship between resources and performance of $\tau 1 = .08$, $p = .41$ and $\tau 2 = -.05$ $p = .79$ for sedentary and non-sedentary employees, respectively.

Therefore, using SEM and the MacKinnon et al., method (2002), the results provide evidence supporting M1, *Full mediation model,* in both subsamples, and they also provide evidence for the invariance of the model, regardless of the employees' PE, thus supporting Hypothesis 1. Figure 2 shows the graphical representation of this final model. The manifest variables have factorial weights ranging from .32 to .90 in the sedentary group, and from .25 to .83 in the non-sedentary group. Second, a review of the regression weights for M1 reveals that, as expected, resources are positively and significantly related to engagement, $\beta = .57$, $p<.01$, $R^2 = 33\%$ and $\beta = .59$, $p<.01$, $R^2 = 35\%$ for the sedentary and non-sedentary groups, respectively. In addition, engagement, in turn, is positively and significantly related to performance, $\beta = .59$, $p<.001$, $R^2 = 35\%$ and $\beta = .66$, $p<.001$, $R^2 = 44\%$ for sedentary and non-sedentary participants, respectively.

Figure 2.

Structural Model.



Note. Structural model in two samples, sedentary (n = 156) and non-sedentary (n = 163). AU = autonomy; EM = empathy; CO = coordination; LEA = leadership; VI = vigor; DE = dedication; AB = absorption; IN = intra-role; EX = extra-role. All the standardized coefficients are significant at p <.05. The data to the left of the bar correspond to the sedentary group and those on the right to the non-sedentary group.

Additionally, in order to discover whether there are differences in the estimations of the parameters in the two samples, sedentary and non-sedentary, tests of equality of covariances and factorial weights were performed, establishing constraints in the parameters corresponding to the factorial weights (Byrne, 2001). M3, *Completely constrained model*, assuming the equality of the factorial weights of the three latent factors in both

samples, obtains a fit that is not significantly different from the data used to compare the free model (M1, non-constrained model, expressed as Delta $\chi^2 = 0.98$, *ns*). In conclusion, the results of the multigroup Confirmatory Factorial Analyses support the model's invariance, regardless of the PE done by the employees. These results support Hypothesis 1.

Next, MANOVA were performed. First, the groups (sedentary and non-sedentary) were used as the independent variable, and the rest of the study variables (resources, vigor, dedication, absorption, and performance) as dependent variables. The results showed significant differences between the sedentary and non-sedentary employees. The non-sedentary employees showed significantly higher levels of empathy, F (1, 312) = 6.61, $p<.05$, and absorption, F (1, 315) = 4.09, $p<.05$, and they also tended to show significantly higher levels of vigor, F (1, 316) = 4.28, $p<.052$, compared to employees who did not do PE. These results partially support hypothesis 2.

Second, with regard to gender (as independent variable), the results showed significant differences in favor of women on empathy, F (1, 366) = 7.94, $p< .01$, mean for women = 4.77; mean for men = 4.37, and performance F (1, 314) = 7.62, $p< .05$, mean for women = 5.24; mean for men = 4.97. Therefore, hypothesis 3 is not supported.

Third, MANOVA were performed with PE and gender (sedentary men vs non-sedentary men and sedentary women vs non-sedentary women). The results showed that non-sedentary men have more empathy, F (1, 164) = 7.62, $p< .01$, (mean for non-sedentary men= 4.82, mean for sedentary men = 4.68), and more vigor, F (1, 165) = 4.12, $p< .05$, mean for sedentary men = 4.78, mean for non-sedentary men = 4.66, than sedentary men. These results confirm hypothesis 4. In the case of women, no significant differences were found between those who did PE and those who did not. The results do not confirm hypothesis 5.

Discussion

The purpose of the present study was to evaluate the relationship between job resources and job performance, taking into account the mediating role of engagement and testing the invariance of the HERO model, depending on the employees' PE. We expected that (1) work engagement would fully mediate the relationship between resources and performance, regardless of the employees' physical activity (sedentary and non-sedentary); and (2) that the employees who do PE (non-sedentary) would show higher

levels of the study variables (resources, engagement, and performance) than those who do not (sedentary).

The results of the *SEM* showed that the relationship between job resources and performance perceived by employees is fully mediated by engagement, both in the group that exercises (non-sedentary) and in the group that does not (sedentary). Moreover, this model is equivalent in both samples, which gives greater validity to the model. Therefore, the results suggest that the team's resources (related to the task and social) are positively related to the positive psychological state of work engagement, which, in turn, is related to performance, regardless of whether the employee exercises or not, thus showing the invariability of the HERO model. Specifically, the results show that all the employees (whether or not they do PE) who perceive that the organization invests in positive resources, such as coordination, leadership, empathy, and autonomy, present higher levels of engagement. This means that higher levels of vigor, dedication, and absorption are related, in turn, to one of the organizational results par excellence, performance at work. This performance involves tasks that are consistent with the employment contract and tasks that involve going the extra mile for the organization. These results support Hypothesis 1.

These findings are consistent with previous research showing positive relationships between resources, engagement, and performance when these variables are measured at the individual (e.g., Tripiana et al., 2015) and collective (e.g., Salanova et al., 2012; Torrente et al., 2012) levels. Furthermore, they make a novel contribution by showing that, independently from the employees' PE, the organization's investment in resources has beneficial effects on both sedentary and non-sedentary employees.

Although the model is invariant depending on the employees' PE (as expected), significant differences were obtained in the levels of some study variables. It is interesting to note that, as expected, employees who do PE (non-sedentary) show higher levels on one of the resources (i.e., empathy) and on absorption (the third dimension of engagement), compared to sedentary employees. It seems that the employees who usually do exercise are more capable of putting themselves in someone else's place (co-workers, clients), and time flies by for them at work, thus partially supporting Hypothesis 2.

It was also interesting to find significant differences between men and women because we did not expect to find gender differences in the study variables. Differences were observed in the variables of empathy and performance in favor of women. It seems that women are more empathetic and obtain higher results on their job tasks than men.

Thus, hypothesis 3 was not supported. As we mentioned in the introduction, there is evidence both for and against the existence of gender differences. In this case, these results coincide with the line of studies by Cifre et al., 2000, 2011; Cifre & Salanova, 2008, in that they show differences between men and women in the perception of job demands and resources and psychosocial well-being.

Finally, regarding the last two hypotheses, where we expected to find differences between sedentary and non-sedentary groups, within the group of men (hypothesis 4) and within the group of women (hypothesis 5), the results were different for the two subsamples. In the group of men, significant differences were found in the variables of empathy and vigor. Men who do PE are more empathetic and vigorous at work than sedentary men, which supports hypothesis 4. However, within the group of women, no significant differences were found between women who do PE and those who do not. These results do not provide evidence for hypothesis 5.

Hypotheses 4 and 5 (as well as hypothesis 2) aimed to demonstrate that considering PE as a way to recover from work stress (Sonnentag, 2001; Sonnentag et al., 2004) and improve positive emotions (Nägel et al., 2015) could help to increase the perception of job resources, work engagement (Sonnentag, 2003), and job performance. The results show that there are differences in the population in general and in a group of men, but not when sedentary women are compared to non-sedentary women.

In other words, regarding the role of PE in the well-being of workers, we found that non-sedentary people in general are more empathetic and more absorbed in their job tasks, and men, in particular, are also more vigorous at work. These results follow along the lines of studies that relate PE to an improvement in positive affect and perceived serenity (Nägel et al., 2015) or work engagement (Sonnentag, 2003).

Theoretical and practical implications

The present study makes both theoretical and practical contributions. At the theoretical level, the study extends the knowledge about the HERO model, especially about the mediator role of work engagement in the relationship between healthy organizational resources and job performance. The results provide evidence about the HERO model, considering that the perception of resources at work leads to engagement and better performance on tasks defined in the job role and tasks that pursue a better work environment, regardless of the regular practice of PE.

From a practical point of view, the results provide evidence for implementing intervention strategies designed to develop engagement and performance at work and implement positive practices. Specifically, the results indicate that, in order to increase work engagement, it is necessary to activate intervention strategies that facilitate the development of resources (both task-related and social). This can be achieved by fostering employees' autonomy in decision-making at work, co-workers' coordination when performing tasks, the capacity to put oneself in another's place (co-workers, clients), and the development of positive leaders. To do so, this intervention should focus on the organizational level, for example, by carrying out periodic evaluations to optimize the company's levels of healthy organizational resources, or activities to foment leadership skills in order to develop positive leaders. These interventions in resources would allow organizations to benefit from employees who are more engaged and more involved in their work, which would translate into improvements in job performance. Furthermore, the study also indicates the relevance of fomenting employees' PE because employees who exercise are more empathetic and engaged, in terms of absorption, compared to sedentary employees. Finally, the study showed that if organizations want to promote empathy and vigor at work in men, they can adopt the strategy of favoring PE.

Study limitations and future research

The present study has several limitations. First, a convenience sample was used, which limits the generalization of the results. However, the data were collected in a real context, including workers from different labor contexts. A second limitation of the study is that it has a cross-sectional design. This type of study captures inter-individual variation and does not pay attention to intra-individual aspects (e.g., Molenaar, 2004; Molenaar & Campbell, 2009). Taking into account the type of variables in our study, which vary at the individual level, we should choose methods that provide adequate information about them (Navarro et al., 2015). However, in studies like this one that analyze invariance and gender differences, it is sufficient to carry out a cross-sectional study. Future studies should include longitudinal designs and diary studies in order to test the effects of PE on stress recovery and, thus, on employees' engagement the next day.

Finally, there are several limitations related to the measurement of the job performance variable. First, this variable was evaluated with self-reported measures. According to Scullen, Mount & Goff, (2000), this type of evaluation of this construct

would have considerably less validity than evaluations by the supervisor or peers. However, the same authors also point out that the self-report provides valuable information that is not available from other perspectives. In addition, Multiple Analyses of Variance in a sample composed of 162 work teams (162 supervisors and their 1135 employees) were computed to verify the validity of self-report performance measures based on employees' perceptions. Results showed that there are no significant differences in the performance variable when it is assessed by employees or supervisors. Thus, it seems that the employee's perception can be used to measure performance. Other limitations are, on the one hand, the number of dimensions used in the study. According to the review carried out by Koopmans et al., (2011), the dimensions of the work performance construct are task performance, contextual performance, adaptive performance, and counterproductive work behavior. In this study, we only included the first two because the instrument we used only contemplated these two dimensions. On the other hand, the use of only two items is also a limitation since, according to Lloret-Segura, Ferreres-Traver, Hernández-Baeza, and Tomás-Marco (2014), the minimum number of items recommended for a sample of 319 subjects is 3-4. However, there are different studies whose variables (satisfaction, work engagement) have been evaluated successfully with only one item (Nagy, 2002; Schaufeli et al., 2019). This is an increasingly common practice when advising companies that ask for short versions of questionnaires. Future studies should take into account the limitations related to this variable by trying to address all the dimensions of the construct, using an appropriate number of items for the sample, and collecting the information from several informants.

CHAPTER 3

Get Vigorous with Physical Exercise and Improve Your Well-Being at Work!

Abstract

The aim of this study is to investigate whether people who exercise regularly have higher levels of psychological well-being at work. Doing physical exercise is a habit that not only has consequences for physical and mental health, but it can also have positive consequences for organizations because physical exercise makes it easier for the employee to recover from physical, mental, and emotional effort during the workday, thus showing higher levels of engagement the next day. Through the analysis of structural equation models in a sample of 485 workers from different Spanish and Latin American companies, this study shows that subjects who exercise during more time have higher levels of vigor in physical exercise, which is positively related to high levels of well-being at work. This means that organizations that promote activities related to physical exercise among their employees are building a process of resource recovery, which, through the vigor of these activities, makes workers feel less stressed, and more satisfied and experience greater well-being at work. Therefore, at a practical level, these results suggest that the practice of physical exercise is a tool for organizations that want to promote their employees' psychological well-being.

Keywords: Physical exercise; well-being; vigor; job satisfaction; positive affect; stress; healthy organizations [2]

[2] Chapter 3 is based on: Gil-Beltrán, E., Meneghel, I., Llorens, S., & Salanova, M. (2020). Get Vigorous with Physical Exercise and Improve Your Well-Being at Work! *Int. J. Environ. Res. Public Health*, *17*(17), 6384. https://doi.org/10.3390/ijerph17176384.

1. Introduction

In the past century, the world has evolved considerably at a scientific and technological level, especially in developed countries where this progression is more evident. What human beings did for millions of years depended exclusively on their physical capacity, but today machines do this work, factories have been automated, transport has been mechanized, and even for housework, countless household appliances have been invented that are increasingly autonomous. All these results have caused the physical activity that was carried out in the past to be considerably reduced (Jackson et al., 2006).

According to the latest data, the World Health Organization (World Health Organization, 2018) estimates that at least 23% of the adult population and 81% of adolescents worldwide have physical activity levels that are below those necessary to maintain health and control their body weight. This lack of activity can be associated with non-communicable diseases, depression and anxiety problems (Fox, 1999), or lack of vigor (Lee et al., 2001).

A possible solution to this sedentary lifestyle and its negative consequences would be the practice of physical exercise (PE). Acevedo (Acevedo, 2012) conceptualizes it as "a structured form of physical activity, with the specific objective of improving or maintaining physical health or fitness" (p. 4). In addition, he shows that the recurrent and sustained practice of PE can lead to physical benefits at the cardiorespiratory, muscular, and bone levels, as well as reducing the risk of non-communicable diseases.

But would PE have other benefits? The answer is yes because previous studies have shown that it can also be valuable at a physiological level: PE increases levels of endocannabinoids (Marco et al., 2011; Raichlen et al., 2013), endorphins (Boecker et al., 2008), serotonin (Wipfli et al., 2011), and dopamine (Berse et al., 2015; Heyman et al., 2012). These neurotransmitters are responsible for pain reduction, emotion regulation, and pleasure (Heijnen et al., 2016), and stress reduction (Suzuki & Fitzpatrick, 2015). In addition, the practice of PE would also be beneficial for improving psychological well-being: PE helps to provide mental distraction from workday demands (Yeung, 1996), and both the feeling of mastery and the increase in self-efficacy when performing PE can facilitate recovery from stress levels (Demerouti et al., 2009; Sonnentag & Jelden, 2009).

Therefore, in the long term, the practice of PE would also result in benefits for organizations. In fact, healthy employees who feel good, are resilient in the face of

stressful situations, and experience positive emotions have better performance in terms of economic or quality results (Salanova et al., 2019; Salanova et al., 2012). Along these lines, there is evidence that organizations that are considered healthy adopt PE intervention mechanisms aimed at increasing positive emotional states and, collaterally, performance (Nägel et al., 2015b).

Even though there is evidence about PE's relevance for people and, by extension, for organizations, research on the impact of PE on employee well-being is extremely scarce. For all these reasons, the objective of this study is to contribute to expanding this research by investigating the relationship between the amount of time of PE and well-being at work, understood as job satisfaction, the presence of positive affect in the work environment and absence of stress. Furthermore, another objective is to investigate the modulating effect of vigor in PE on this relationship.

1.1. Physical Exercise

According to Sonnentag (2001), PE can be understood as a recovery activity and, therefore, a promoter of psychological well-being. Recovery after a workday is a process that would allow the psychological systems, which have been subjected to stress during the workday, to return to their pre-stress levels (Meijman & Mulder, 1998). Recovery is theoretically based on Conservation of Resources Theory (Hobfoll, 1998, 2001) and the Effort-Recovery Model (Meijman & Mulder, 1998). These theories propose that people tend to recover these resources that are depleted during stressful situations because they have the motivation to conserve, promote, and protect their resources (Hobfoll, 1998, 2001). At the same time, people tend to move away from sources of stress with the same intention of recovering and returning to the levels they had before the stressful situation (Meijman, T. F., & Mulder, 1998).

Performing PE makes us obtain energy resources that can be categorized into three types: (1) physical resources, such as better aerobic or cardiorespiratory capacity or greater muscle power; (2) cognitive resources because, according to Yeung (1996), PE can be a good mental distractor from job demands; and, more importantly for our study, (3) emotional resources because research has shown that performing PE activates the left prefrontal cortex and, as explained above, releases neurotransmitters that are related to pleasure, motivation, and regulation of emotions (Basso & Suzuki, 2017).

As noted above, PE, in addition to physical benefits, produces benefits on an emotional and psychological level. In their study, Nägel, et al., (2015b) show that on the

days when employees do PE after their workday, they perceive an improvement in their positive affect, understood as the presence of positive emotional states, and in the serenity they experience before going to bed. Moreover, these benefits at the emotional level extend to the organizational level because there is ample evidence that positive affective states are important antecedents of good work results and success (Erez & Isen, 2002; Ilies & Judge, 2005; Lyubomirsky et al., 2005; Tsai et al., 2007). Along these lines, recently, non-sedentary people were shown to be more empathetic and more absorbed in their work tasks (Gil-Beltrán et al., 2020a).

1.2. Well-being at work

The concept of well-being can be understood from two perspectives: eudaimonic, and hedonic well-being. Eudaimonic well-being, also called psychological well-being, establishes that well-being lies in carrying out activities that are consistent with one's vital values (Waterman, 1993). Hedonic well-being, also called subjective well-being, has the life goal of accumulating experiences of pleasure (Vázquez et al., 2009), and it consists of two elements; on the one hand, the affective balance, that is , the difference between the positive and negative emotions experienced; and, on the other hand, life satisfaction, which is an overall judgment of one's life (Lucas et al., 1996).

The present study refers to three indicators of subjective well-being at work resulting from PE. The variables taken into consideration are: (1) job satisfaction, understood as a pleasant or positive state that results from the positive evaluation of work or work experiences; (2) positive affect, understood as the presence of positive emotional states in the work environment; and (3) stress (as an indicator of absence of well-being), understood as the employee's perception of having worries and pressures that negatively alter his/her mood. According to the Conservation of Resources Theory (Hobfoll, 1998) and the Effort-Recovery Model (Meijman & Mulder, 1998), mentioned above, the practice of PE is expected to have a positive impact on the indicators of well-being at work. That is, the greater the amount of PE carried out, the higher the levels of job satisfaction and positive affect, and the lesser the level of stress.

1.3. Vigor in Physical Exercise

With the aim of enhancing the effects of PE on work well-being, this study proposes that vigor in physical exercise can act as a modulator. Vigor, according to Schaufeli, Salanova, González-Romá and Bakker (2002), is one of the dimensions of engagement

(please see Schaufeli et al, (2002) for more information), and it is characterized by high levels of energy and the desire to invest effort in the activity being performed, even when difficulties appear along the way. Therefore, vigor can be considered a motivational measure. In this study, transferring this definition to the vigor in PE, it can be understood as the motivation that drives the performance of PE and the will to persistently invest effort in it.

This definition proposes that vigor when performing PE enhances the positive effects of PE on work well-being. If people feel this vigor when doing PE, the acquisition, retention and / or protection of all the energy resources that are obtained from it, and that lead to positive emotions, are fostered. Therefore, vigor is a key element in PE that helps us to continue to obtain the resources PE provides and increases its positive effects on well-being.

1.4. Hypotheses of the study

The objective of the present study is to investigate the relationship between PE practice and work well-being, emphasizing the modulating effect of vigor in PE on this relationship. Thus, the effect of vigor is expected to act as an enhancer of the relationship proposed. Therefore, PE would have a direct positive effect on the indicators of work well-being. Experiencing the sensation of energy and the desire to invest effort in PE, that is, high levels of vigor, would lead to higher levels of work well-being.

Specifically, the study hypotheses are as follows (see figure 1):

Hypothesis 1: A positive and significant relationship is expected between PE and well-being at work. That is, the more PE, the higher the levels of well-being (higher job satisfaction and positive affect and lower stress)

Hypothesis 2: Vigor is expected to modulate the relationship between PE and well-being at work, so that when vigor in PE is higher, the relationship between PE and well-being will be more intense.

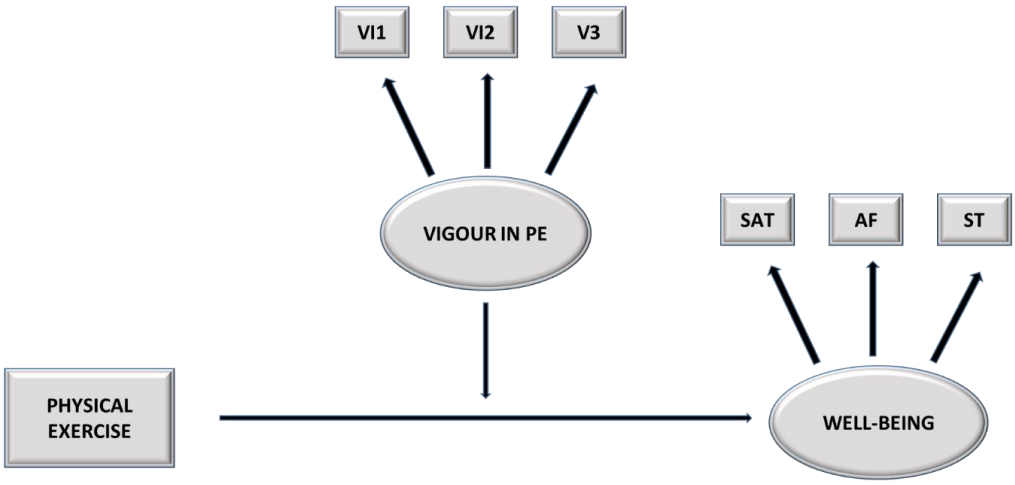


Figure 1. Hypothesized Model. VI1= Item 1; VI2= Item 2; VI3= Item 3; SAT = Job satisfaction, AF = Positive affect, ST = Stress

2. Materials and Methods

2.1. Participants and Protocol

The total sample was made up of 485 employees who do PE at least 90 minutes a week, which is the cut-off point proposed by OMS to distinguish between sedentary and active people (32b). 52% of the employees are women, the average age is 39.20 years (Minimum = 19; Maximum = 64, SD = 8.8), and 77% had an indefinite contract.

Regarding the procedure, the participants completed the questionnaire in its online format, with the prior consent of the companies' management. Likewise, and ensuring the confidentiality of the data at all times, when starting the questionnaire, they were asked for their consent for these data to be processed only for scientific and non-profit purposes, according to the Data Protection Law. Finally, in order to complete the questionnaire, a link was provided.

2.2. Measures

Relying on evidence of the validity of using single-item scales when evaluating variables such as Satisfaction or Engagement (Nagy, 2002; Schaufeli et al., 2019), and with the aim of reducing response time, which is highly demanded by companies and the subjects themselves, some of the scales that make up the questionnaire consist of a single item. The variables and questionnaires used for the study are described below:

- Physical exercise. It was evaluated as the amount of time the participants spent carrying out physical exercise during the week. For each sport they practiced, they

were asked to indicate how long the session/s was/were. For the study, it was taken into account the sum of the minutes of all the exercises performed during the week (Minimum = 90 min.; Maximum = 1,560 min.; Mean = 266.50 min.; SD = 179.27).

- Vigor in physical exercise. It was evaluated using the three items corresponding to the vigor dimension of the UWES-9 (Schaufeli et al., 2006), but adapted to PE ('When I do physical exercise, I feel full of energy' ; 'When I wake up in the morning, I feel like going to do physical exercise'; 'Due to physical exercise, I feel strong and energetic'). It was measured with a Likert-type scale ranging from 0 (never) to 6 (always).

- Job satisfaction. It was evaluated using a scale of faces (Kunin, 1955); on a single item, they were asked to indicate the face that best expressed their degree of satisfaction with their work (0 = sad face, very dissatisfied and 6 = face happy, very satisfied).

- Positive affect. It was evaluated using a 7-point visual analog scale (Fernández-Castro et al., 2017), where a single item asked them to indicate the face that best expressed how they had felt at the level of emotional well-being during the past year at work (0 = sad face and 6 = happy face).

- Stress. It was evaluated using the one item corresponding to the stress dimension of the General Health Questionnaire (GHQ) (Sánchez López & Dresch, 2008) adapted to the work context (‘In my work, my worries have taken my sleep away’). It was measured with a Likert-type scale ranging from 0 (Much less than usual) to 6 (Much more than usual).

2.3. Data analysis

First, internal consistency analyses (Cronbach's alpha), descriptive analyses (means, standard deviations), and internal correlations of the variables considered in the study were performed using the IBM SPSS Statistics 24.0 statistical package. Second, the single-factor Harman test [see (Podsakoff et al., 2003)] was performed using the AMOS 24.0 statistical package to check for common variance bias.

Hierarchical regression analyses were then performed to assess modulation effects (Cohen & Cohen, 1983), using each of the three indicators of well-being at work as dependent variable. To test modulation, the procedure pretends to enter the independent and modulating variables into the equations in three successive steps (Aiken et al., 1991). In the first step, the amount of time the participants spent carrying out physical exercise during the week (independent variable) was introduced. In the second step, vigor with the PE (modulator) was introduced. Finally, in the third step, the interaction between the independent and the modulator variables was included.

3. Results

3.1. Descriptive analyses and Harman's test

Table 1 shows the means, standard deviations, and intercorrelations between the study variables. The results show that the scale of vigor in PE (α = .75) meets the reliability criterion proposed by the scientific research (Nunnally, J. C., & Bernstein, 1994); the rest of the variables had one item and, therefore, reliability cannot be measured. Correlation analyses show that the variables are positively related to each other, except for the amount of time spent doing PE, which only correlate with vigor in PE (see Table 1).

Table 1. Descriptive Statistics and Correlations between the Study Variables.

	Variables	M	DT	1	2	3	4	5
1	Amount time PE	266.50	179.27	-				
2	Vigour PE	4.21	1.09	.28**	-			
3	Job satisfaction	4.46	1.19	.04	.07	-		
4	Positive affect	4.11	1.40	.07	.18**	.71**	-	
5	Stress	2.81	1.88	-.08	-.12**	-.26**	-.42**	-

Note. The correlation is significant at the level of * p < .05 and ** p < .01 (bilateral).

Second, the results of the Harman single factor test revealed a poor fit of the data, χ^2 (9) = 427.42, RMSEA = .31, CFI = .55, TLI = -.06, IFI = .55. Furthermore, following the recommendations of Podsakoff, Mackenzie, and Podsakoff (2012), in order to minimize the impact of common method variance bias, the questionnaire had different headings to differentiate its different parts, as well as different response scales. Therefore, it can be considered that this bias does not affect the study data, and so the variance in the variables can be attributed to the evaluated constructs, and not to the evaluation method.

3.2. Hierarchical regression analysis.

The results of the regression analyses show that there is a not significant relationship between the amount of time spent in PE with well-being ($\beta = .06$, $p = .16$). Thus, steps 2 and 3 of the modulation analyses were not performed. These results indicate that neither H1 nor H2 is confirmed.

3.3. Additional analyses.

Because the results of the evaluation of the modulation effects showed that vigor in PE did not modulate the relationship between PE and work well-being, but there was a relationship between vigor in PE and well-being, additional analyses were performed. The analyses carried out were aimed at verifying whether vigor in PE acts as a mediator, rather than as a modulator, in the relationship between PE and well-being at work. For this purpose, Structural Equation Analysis (SEM) was carried out.

The SEM was performed using the AMOS 25.0 program, testing two models (James et al., 2006): (M1) the physical exercise model, which proposes that vigor in PE fully mediates the relationship between PE and well-being; and the alternative model (M2), which proposes a well-being mediates the relationship between PE and vigor in PE. Furthermore, to test mediation, the MacKinnon et al. test (MacKinnon et al., 2002) was performed. To do this, three steps were taken to estimate: 1) the unstandardized weight of PE on vigor in PE (α), 2) the unstandardized weight of vigor in PE on well-being (β), and 3) the product of the previous effects ($\alpha\beta$). To determine whether mediation was full or partial, the direct effect from the independent variable to the dependent variable (τ) was calculated, which must not be significant in order for full mediation to occur.

Maximum likelihood estimation methods were used with the calculation of the absolute and relative goodness of fit indices (Marsh, H. W., Balla, J. R., & Hau, 1996): the Chi-square index ($p > .05$), relative chi-square index (chi-square / gl; up to 5.0), Root Mean Square Error of Approximation (RMSEA), as well as the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), and the Incremental Fit Index (IFI). Values below .08 and higher than .90 indicate a good fit for RMSEA (Browne & Cudeck, 1992) and for the rest of the indices (Hornung & Glaser, 2010), respectively. Furthermore, the Akaike Information Criterion (AIC; (Akaike, 1987)) was calculated to compare non-nested competitive models (i.e., M1 versus M2); the lower the AIC levels, the better the fit.

3.3.1. Model fit: Structural Equation Models.

Table 4 shows the SEM results for the models testes. The variables of vigor and well-being were latent variables, composed of three indicators each, whereas PE variable was observable.

Table 4. Fit indices for Structural Equation Models.

Model	$\chi 2$	gl	$\chi 2/gl$	RMSEA	CFI	IFI	TLI	AIC
M1	23.36	13	1.80	.04	.99	.99	.98	67.36
M2	55.96	13	4.30	.08	.95	.96	.90	99.96

Notes: $\chi 2$ = Chi-square; gl = degrees of freedom; $\chi 2/gl$ = relative Chi-square; RMSEA = Root Mean Square Error of approximation; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; IFI = Incremental Fit Index; AIC = Akaike information Criterion. M1 Physical exercise model; M2 Alternative model.

The SEM results indicate that the hypothesized M1, where vigor in PE mediates the relationship between PE and job satisfaction and positive affect, $\chi^2(2) = 23.36$, RMSEA = .04, CFI = .99, TLI = .98, IFI = .99, AIC = 67.36, fits better than M2, the alternative model, where well-being mediates the relationship between PE and vigor in PE χ^2 (2) = 55.96, RMSEA = .80, CFI = .95, TLI = .90, IFI = .96, AIC = 99.96, because its AIC (67.36) is lower.

Furthermore, following the MacKinnon et al. product of coefficients method (MacKinnon et al., 2002), the hypothesized model, meets all the requirements for a full mediation effect of vigor in PE on the dependent variable. The results were: (1) the amount of time of PE is positively and significantly related to vigor in PE, $\alpha = .01$, $p < .001$; (2) vigor in PE is significantly and positively related to well-being, $\beta = .23$, $p < .001$; (3) the mediation effect is positive and statistically significant, $\alpha\beta = .03$, $p < .01$.These results show that vigor in PE mediates the relationship between the frequency of PE and well-being at work. This mediation is full because the direct relationship between the independent and the dependent variable is not significant: amount of time of PE and well-being $\tau = .00$, $p = .86$.

The final model is depicted in Figure 2.

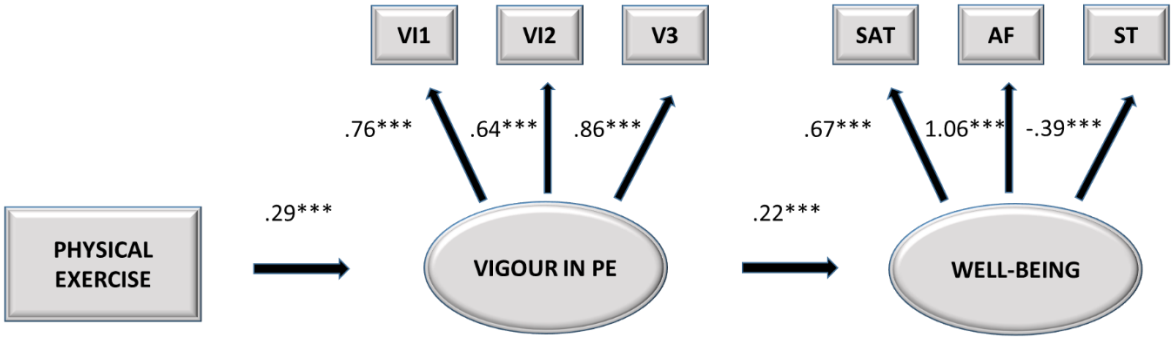


Figure 2. Final Model. VI1= Item 1; VI2= Item 2; VI3= Item 3; SAT = Job satisfaction, AF = Positive affect, ST = Stress

4. Discussion

The objective of the present study was to investigate the relationship between PE practice and employees well-being, emphasizing the modulating effect of vigor in PE in this relationship. The results showed that this modulation was not significant. In fact, there was no direct relationship between the PE performed and the workplace well-being variables. This leads us to reject both Hypothesis 1 and Hypothesis 2, and to consider the possible mediator effect of vigor in PE, which would mean that the way the PE is psychologically experienced is important in the way of PE motivation (i.e., high levels of energy, feeling strong and vigorous doing PE, and feeling like doing it) in achieving higher level of well-being. This idea was tested by SEM analysis, and the results showed that, indeed, there was a full mediation by vigor in PE in the relationship between the PE carried out and well-being at work. These results suggest that people who do PE and then they are feeling vigorous/motivated about it experience higher levels of workplace well-being, lower level of stress, and greater satisfaction with their work, and positive emotions.

These results could be explained by what Catalino et al. (2014) call "prioritization of the positive". This concept is based on the formula of happiness by Lyubomirsky et al. (2005). This formula states that happiness is made up of genetics, circumstances, and intentional activities. Based on this latter element, Catalino et al. (2014) established that people who organize their daily lives looking for positivity, that is, taking into account their potential happiness, have more positive emotions and higher levels of satisfaction with life. In our study, vigor in PE means high energy levels and the desire to invest effort in the activity carried out, even when difficulties appear along the way. Thus, there is an intention and motivation for a healthy activity.

Another possible explanation would be that PE promotes vigor through a motivational process that meets the basic need for autonomy, relationship, and competence, as postulated in the Self-Determination theory (Ryan & Deci, 2000). For example, regular physical exercise encourages improvement, thus increasing competition, whereas determining what your exercise goals are satisfies autonomy needs, and sharing moments of physical exercise with others satisfies the need to belong, respectively. Therefore, people who feel vigorous have a feeling of energetic and affective connection with PE.

Both explanations would lead us to positive affects, either by searching for them through PE (prioritization of the positive) or as a result of satisfying basic needs when doing PE, and positive affects are important antecedents of work-related outcomes and success (Erez & Isen, 2002; Lyubomirsky et al., 2005; Tsai et al., 2007).

In short, the results indicate that performing PE (measured through its duration) is a way of encouraging workers to be satisfied and emotionally positive in their work, as long as they experience vigor when doing it.

4.1. Theoretical and practical implications

From a theoretical point of view, this study expands the investigation of the effects of PE on the level of psychological well-being at work. Specifically, the importance PE is evident, but there is a need for motivation, a perceived vigor, so that these optimal levels of well-being at work can occur.

From a practical point of view, taking into account that doing PE continuously is a source of psychological well-being at work, it would be a good strategy for organizations to encourage their employees to do PE. However, this is not enough doing PE but this important that employees feel vigorous and motivated to do it! So wellness practices from organizations should be contemplate PE programs for organize activities or set up facilities within the organization itself, so that workers does not have to travel to do sports, or they can contribute by providing a discount on part of the registration fee in sports centers. These practices to enhance PE should be attractive for employees in order that they feel motivated and vigorous for doing it, and then they could improve their levels of employee well-being.

4.2. Study limitations and future research

The present study has various limitations. In the first place, it was used a convenience sample, which compromises the generalization of the results obtained. However, the data have the strength of including workers from different labor contexts and countries. The second limitation is that it is a cross-sectional study. Finally, another limitation is that given that vigor is a motivational measure which reflects a cognitive/emotional construct, some potential multicollinearity issues with the data (especially job satisfaction and positive affect) can be found.

Future studies should include longitudinal designs to test the effect of PE and vigour in PE on well-being at work. These studies could also show evidence of the effects of PE as a stress recovery activity and promoter of positive emotions at work, and they could also incorporate job performance into the equation.

It would also be interesting to test the possible explanations for the mediation of vigor in PE, collecting data on the subjects' "prioritization of the positive" and their motivations for performing PE.

Finally, in this study we have seen that there are not significant effect of PE on well-being indicators, however we have also seen that the more PE, the more vigor in PE and in turn will provide higher levels of job satisfaction and positive affect. Future experimental and longitudinal studies may deepen into the study of the minimum frequency of PE that provides enough vigor in the PE so that there feel higher levels of job satisfaction and positive affect.

5. Conclusions

The results of this study show that there is no direct relationship between the PE performed and well-being at work, as pointed out in the introduction. What this study shows is that in order to decrease stress level, and improve job satisfaction levels and make work emotions more positive, it is not enough to carry out PE regularly, but there must also be a motivation to experience vigor when doing it.

CHAPTER 4

Physical Exercise and Wellbeing in Time of COVID-19: A Cross-sectional and Diary Study

Abstract

This work is a double study in which, through a cross-sectional study and a diary study, we wanted to test how physical exercise becomes a habit. Following the upward spiral theory of lifestyle change, we tested the role as a vantages resource of prioritizing positivity and performing physical exercise in company, and its looping effect on the relational loop of physical exercise behavior, and the emotions and engagement when doing it. The first study was carried out with a sample of 553 and the second with a sample of 146. Both were made up of people who worked and did physical exercise. The analyzes performed were Structural Equation Modelling and multilevel, respectively. The results of the first study are that more exercise is done when there are higher levels of commitment and positive emotions when exercising and, in addition, it has been done in company and there has been prioritization of the positive ones. In the results of the second study, we found that the prioritization of the positive works as an antecedent of emotions in physical exercise, which feeds the relational loop of emotion and exercise behavior. The conclusion of both studies is that people who prioritize feel better psychologically and more engaged to physical exercise.

Keywords: Physical exercise, engagement, positive emotion, prioritizing positivity, upward spiral theory of lifestyle change [3]

[3] Chapter has been submitted for publication as: Gil-Beltrán, E., Coo, C., Meneghel, I., Llorens, S., and Salanova, M. Physical Exercise and Wellbeing in Time of COVID-19: A Cross-sectional and Diary Study.

One of the growing problems in the world today, related with lifestyle, is sedentarism. Work and free time are increasingly related to technology and, consequently, people of all ages spend more time interacting with technology in the form of the Internet, video games, interactive television, mobile phones, etc., also commuting from home to work and vice versa is done frequently by car. Due to the pandemic, technologies are even more crucial in our lives, due to teleworking, as well as to the digital technologies we use for socializing and our hobbies. This means that the average adult spends more than half of the day in a sedentary attitude, causing sedentary lifestyle in industrialized countries to have increased in recent decades (Biswas et al., 2015). Specifically, studies on Eurobarometers between 2005 and 2017 have shown that there was an increment in the prevalence of sedentarism in adults, and that this increment is higher in men than in women (López-Valenciano et al., 2020). This concern about sedentary lifestyle is due to the fact that there are different studies, showing an increased risk of suffering from cardiovascular diseases and premature death in people who accumulate more than 4 hours of sedentarism every day (Chastin et al., 2019; Ekelund et al., 2016), which makes sedentary lifestyle an important risk factor.

Already at the beginning of the 21st century, large world organizations proposed physical activity as a palliative at the level of sedentary lifestyle, as for instance the World Health Organization with Physical Activity and Health in Europe (Cavill & Kahlmeier 2006), the EU with the Physical Activity Guidelines (EU Working Group Sport & Health, 2008), or the US with the Physical Activity and Health Report (U.S. Department of Health and Human Services., 2008). These guides are based on the fact that leading an active life provides many benefits in terms of physical, but also social and psychological health.

Now, how do we make sure physical exercise (PE) becomes a habit in our lives, and not just a passing thing or a fad? Some studies suggest that behaviors, associated with enjoyment, are more likely to be carried out, that is, behaviors such as performing PE are more likely to be repeated in the future if they are considered pleasant than if they are considered beneficial (Lawton et al., 2009). This highlights the importance of the affective part of the behavior so that, on the one hand, the behavior will be repeated in the future and that the benefits are greater, creating a positive vicious circle.

A theoretical explanation of this fact is given by the upward spiral theory of lifestyle change (Van Cappellen et al., 2018). This theory consists of two loops that are based on two theories, 1) the incentive salience theory of addiction (Berridge, 2007; Smith et al., 2011) and 2) the broaden-and-build theory of positive emotions (Fredrickson,

1998, 2001, 2013). The first loop, explained by the incentive salience theory, tells us how the positive affect that we experience when adopting a behavior creates unconscious motives that are associated with the signals that the behavior is going to occur, and over time, these unconscious motives are what upholds the decisions to persist in this behavior. The second loop, explained by the broaden-and-build theory of positive emotions, tells us how, over time, repeated exposure to positive affect creates the socalled vantage resources, which strengthen the relationship between behavior and positive affect. These vantage resources can be biological (vagus nerve or the oxytocin system), social (social support), and psychological (prioritization of the positive) (Fredrickson, 2013).

In the current study, we wanted to test some of the mechanisms that convert a behavior into a habit, following the theory of the upward spiral of lifestyle change (Van Cappellen et al., 2018). Following the steps of the above-mentioned theories, the vantage resources taken into account are: i) performing PE with other people and ii) prioritizing the positive, exemplified by the way the person makes decisions about how to organize his or her daily life, can make that person happier. The idea is that, when people are doing PE together with others, and prioritize the positive, then the frequency and intensity of PE is higher because they are feeling well psychologically (i.e., engagement and emotion regarding PE). We approach this well-being that is experienced from its two aspects, the hedonic, which has to do with satisfaction with life and affective components (PE emotions), and the eudaimonic, which focuses on optimal psychological functioning (PE engagement) (Vázquez et al., 2009).

To achieve our purpose, we use two complementary approaches. On the one hand, we test the mechanism with a between-subjects design, using a cross-sectional study (Study 1). The objective of this first study is to verify the mediation of psychological well-being (i.e., PE engagement and PE emotion) in the relationship between vantage resources (i.e., Prioritization of the positive and doing PE in company) and performing PE. That is, to see if those people who prioritize the positive and doing PE in company, experience more engagement and affect in PE, and thus have an increased habit in PE: they perform PE more frequently, in longer sessions and / or with higher intensity.

On the other hand, we test the mechanism from a within-subject perspective, we supported our research model in the upward spiral theory of lifestyle change (Van Cappellen et al., 2018), testing our hypothesis using a diary study (Study 2). The objective of this second study is to observe whether daily variations in the frequency, intensity and duration of PE sessions are positively associated with the affect, related to PE (i.e., PE

emotion). In addition, we examined the modulating role of prioritizing positivity as an advantageous resource, on the relationship between PE and PE-related affect on that day. We expect that, when people prioritize the positive in their life, their sense of effectiveness in physical exercise will be boosted, and this will have a positive effect on their affect at the daily level. Prioritizing the positive every day boosts people´s sense of control, because they feel in control of the agenda of their life. According to Bandura social cognitive theory (1974), feeling more effective while doing an activity (i.e., physical exercise on a daily basis) gives you more positive feelings and wellbeing.

Study 1

Study 1 is a between-subject study, in which we want to see if people who prioritize the positive and perform PE in company experience more PE emotion when performing PE. And in turn, whether these people perform PE more frequently, in longer sessions, and more intensively.

Following the upward spiral theory of lifestyle change (Van Cappellen et al., 2018), the hypothesized model was explored through the following hypotheses (see Figure 1):

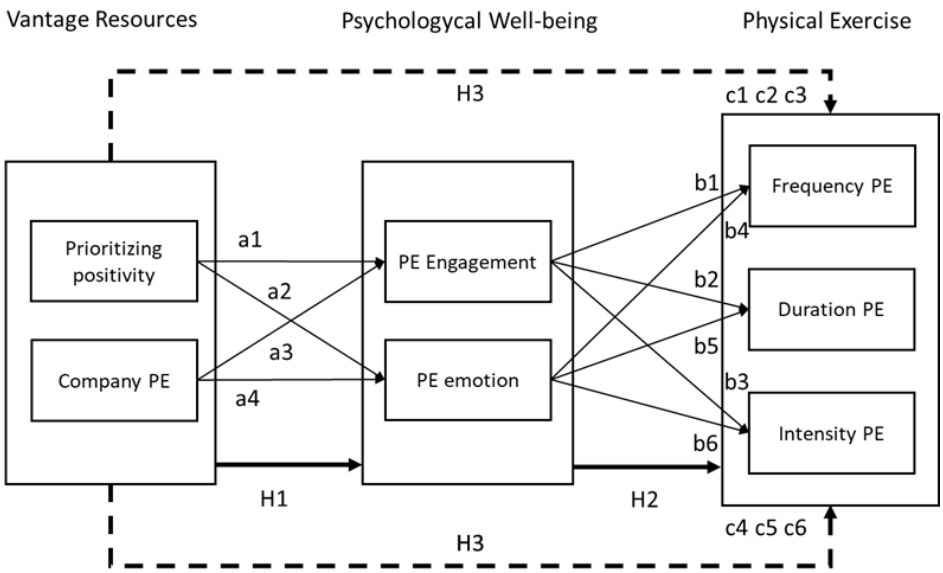
Hypothesis 1: We expect that vantage resources (i.e., Prioritization of the positive and doing PE in company) will be positively associated with Psychological Well-being (i.e., PE engagement (a1, a3) and PE emotion (a2, a4)).

Hypothesis 2: We expect that psychological well-being (i.e., PE engagement (b1, b2, b3) and PE emotion (b4, b5, b6)) will be positively associated with the practice of PE (i.e., frequency, duration, and intensity).

Hypothesis 3: We expect psychological well-being (i.e., PE engagement (c1, c2, c3) and PE emotion (c4, c5, c6)) to fully mediate the relationship between vantage resources (i.e., prioritization of the positive and company PE) and the characteristics of the PE (i.e., frequency, duration, and intensity).

Figure 1

The Hypothesized Model Study 1.



Note: PE = Physical exercise.

Materials and Methods

Participants and Protocol

This study was conducted online during the confinement period of 2020, due to the COVID-19 pandemic, and consisted of two phases. Phase 1 consisted of a cross-sectional study, for which a call was launched through social networks, in which people were encouraged to participate in the study. In this, a link was published that gave access to the survey, in which 1,266 people participated anonymously. The sample for Study 1 was selected from this general sample, by choosing only those people who were performing PE during the confinement. It consisted of 553 subjects of which 61% were women, with a mean age of 41 years (SD = 10.62), and with 77% of them working from home.

In this phase, they were asked if they wanted to participate in Phase 2, from which the sample of the second study would be drawn.

The study, with file number "CD/33/2020", complies with the ethical standards required by the Ethics Commission of the university to which the authors belong.

Measures

The variables and questionnaires, used for the study are described below:

- Prioritizing positivity. This was evaluated through a 6-item scale (Catalino et al., 2014) (α = .83), (e.g., 'A priority for me is experiencing happiness in everyday life'; 'I look for and nurture my positive emotions'). It was measured with a Likert-type scale, ranging from 0 (never) to 6 (always).
- PE in company. This was evaluated with a behavioral item that refers to whether, during confinement, they performed PE alone or in company ('Generally, you are doing physical exercise alone (1 = 70.3%) or in company (2 = 29.5%).
- PE Engagement. This was evaluated using the UWES-3 of 3 items (Schaufeli et al., 2019) (α = .88), but adapted to PE ('When I do physical exercise, I feel full of energy'; 'During confinement, I feel excited doing physical exercise'; 'During confinement, time flies when I do physical exercise'). It was measured with a Likert-type scale ranging from 0 (never) to 6 (always).
- PE emotions. This was evaluated using a 7-point visual analog scale (Fernández-Castro et al., 2017; Kunin, 1955), where a single item asked them to indicate the face that best expressed how they had felt at the level of emotional affect while doing PE (0 = sad face and 6 = happy face) (mean = 5.1; SD = .88).
- Physical exercise. This was evaluated with three indicator parameters. Firstly, as the frequency with which the participants carried out physical exercise during the week (1-2 days; 3-4 days; 5-6 days; every day; more than once a day). Secondly, as the amount of time the participants spent in physical exercise sessions. They were asked to indicate how long the session lasted (20-30 minutes; 31-45 minutes; 46-60 minutes; 61-90 minutes; 91-120 minutes; more than 120 minutes). Thirdly, the intensity with which they did the physical exercise session was evaluated, using a 6-point visual analog scale (Fernández-Castro et al., 2017; Kunin, 1955), where a single item asked them to indicate the battery that best expressed how high the intensity had been during the physical exercise sessions (0 = almost empty battery and 5 = full battery) (mean = 2.91; SD = 1.24).

Data analysis

The statistical package IBM SPSS Statistics 26.0 was used for this study to perform descriptive analysis (means, standard deviations), internal consistency analysis (Cronbach's alpha), and internal correlations of the variables, considered in the study. The common variance bias was also checked using the Harman single factor test (Podsakoff et al., 2003)

Then, we tested the complete mediation model, including indirect effects, using a Structural Equation Modelling (SEM; AMOS 26.0). This allowed us to test all relationships in a single serial mediation model with confidence intervals (Hayes, 2017). The mediation of the hypothesized model (Figure 1) proposes that well-being in PE (PE Engagement and PE positive emotions) completely mediates the relationship between vantage resources (Prioritize positivity or and PE in company) and PE.

Study 1 results

Descriptive analyses and Harman's test.

In Table 1, the means, standard deviations and intercorrelations between the study variables can be found. The results show that the PE engagement scales (α = .88) and Prioritizing positivity (α = .83) meet the reliability criteria, proposed by scientific research (Nunnally & Bernstein, 1994); the rest of the variables are mono-items and, therefore, reliability cannot be measured. The frequency data of the variables in which we use intervals are PE frequency (1-2 days = 22.8%; 3-4 days = 33.6%; 5-6 days = 22.4%; every day = 18.8%; more than once a day = 2.4%), and PE duration (20-30 minutes = 25%; 31-45 minutes = 23.5%; 46-60 minutes = 36.3%; 61-90 minutes = 11.9%; 91-120 minutes = 1.8%; more than 120 minutes = 1.3%).

The questionnaire consisted mostly of a single item to reduce response time. This is also based on evidence of the validity of using single-item scales when assessing (Nagy, 2002; Schaufeli et al., 2019). The correlation analyses show that the variables are positively related to each other, except for performing PE in company with prioritizing positivity and with all the PE variables (frequency, duration, and intensity).

Table 1

Descriptive Statistics and Correlations between the Study Variables.

	Variables	*M*	*SD*	1	2	3	4	5	6	7
1	Prioritizing positivity	4.05	1.01							
2	PE in Company			-.01						
3	PE emotion	5.06	0.88	.31**	.09*					
4	PE engagement	4.33	1.08	.34**	.12**	.72**				
5	PE frequency	2.44	1.11	.09*	-.03	.24**	.30**			
6	PE duration	1.46	1.12	.10*	-.01	.29**	.39**	.30**		
7	PE intensity	2.91	1.24	.15**	-.07	.40**	.48**	.18**	.43**	

Note. The correlation is significant at the level of * p < .05 and ** p < .01 (bilateral). M = Means; SD = Standard Deviations; PE = Physical Exercise

Second, the results of the Harman test revealed that the single factor explains 38% of the variance. Since it is less than 50%, it can be said that there is no common variance bias (Gaskin, 2021). Furthermore, the recommendations of Podsakoff, Mackenzie and Podsakoff (2012) were followed, differentiating the different parts of the questionnaire by titles, as well as with different response scales, to minimize the impact of the variance bias of the common method. Therefore, it can be considered that this bias does not affect the study data, so the variance in the variables can be attributed to the evaluated constructs and not to the evaluation method.

Structural Equation Models

The results of the analyses, testing the hypotheses, are reported in Table 2. Pathways that are central to hypothesis evaluation are depicted in Figure 1 and mentioned in Table 2 to facilitate readability.

The results fully confirm Hypothesis 1, with significant and positive relationships between prioritization of the positive and PE engagement ($\beta = .37$, $p < .001$) and PE emotions ($\beta = .27$, $p < .001$). The same occurs with performing PE in company in both relationships, with PE engagement ($\beta = .29$, $p < .01$) and PE emotions ($\beta = .18$, $p < .05$), which are significant and positive.

Hypothesis 2 is confirmed only for the relationships between PE engagement and the three PE variables: frequency ($\beta = .28$, $p < .001$), intensity ($\beta = .41$, $p < .001$) and PE duration ($\beta = .48$, $p < .01$). However, the relationships between the PE emotions and the PE variables are not significant, except for intensity ($\beta = .15$, $p < .05$).

Finally, Hypothesis 3 is also partially confirmed. On the one hand, PE engagement is confirmed as a full mediator in the relationships between vantage resources (prioritizing the positivity / PE in company) and PE variables (PE frequency / PE duration / PE intensity). The indirect effects were all positive and significant, and are listed in Table 2 (indirect effect 1 = .10, $p < .001$; indirect effect 2 = .15, $p < .001$; indirect effect 3 = .18, $p < .001$ / indirect effect 7 = .08, $p < .01$; indirect effect 8 = .11, $p < .01$; indirect effect 9 = .14, $p < .01$). On the other hand, only PE emotions are confirmed as a full mediator in the relationship between PE in company and PE intensity (indirect effect 12 = .03, $p < .05$). The rest of the mediations by PE emotions did not occur, since the indirect effects were not significant. All given mediations are total, since all the direct effects are not significant (see table 2).

Table 2

Mediation Model.

	Estimate β	*SE*	Hypotheses
Path a1: Prioritizing positivity --> PE Engagement	.37	.04***	1
Path a2: Prioritizing positivity --> PE emotions	.27	.04***	1
Path a3: Company --> PE Engagement	.29	.09**	1
Path a4: Company --> PE emotions	.18	.08*	1
Path b1: PE Engagement --> Frequency PE	.28	.05***	2
Path b2: PE Engagement --> Duration PE	.41	.04***	2
Path b3: PE Engagement --> Intensity PE	.48	.05***	2
Path b4: PE emotions --> Frequency PE	.06	.06	2
Path b5: PE emotions --> Duration PE	.03	.05	2
Path b6: PE emotions --> Intensity PE	.15	.06*	2
Path c1: Prioritizing positivity --> Frequency PE	-.02	.05	3
Path c2: Prioritizing positivity --> Duration PE	-.05	.05	3
Path c3: Prioritizing positivity --> Intensity PE	-.04	.05	3
Path c4: Company --> Frequency PE	-.03	.10	3
Path c5: Company --> Duration PE	-.15	.10	3
Path c6: Company --> Intensity PE	.02	.10	3
Prioritizing positivity <--> Company	-.00	.02	
Indirect effect 1: a1 x b1 Prioritizing positivity --> PE engagement --> Frequency PE	.10	.09***	3
Indirect effect 2: a1 x b2 Prioritizing positivity --> PE engagement --> Duration PE	.15	.13***	3
Indirect effect 3: a1 x b3 Prioritizing positivity --> PE engagement --> Intensity PE	.18	.15***	3
Indirect effect 4: a2 x b4 Prioritizing positivity --> PE emotions --> Frequency PE	.02	.02	3
Indirect effect 5: a2 x b5 Prioritizing positivity --> PE emotions --> Duration PE	.01	.01	3
Indirect effect 6: a2 x b6 Prioritizing positivity --> PE emotions --> Intensity PE	.04	.04	3
Indirect effect 7: a3 x b1 Company --> PE engagement --> Frequency PE	.08	.03**	3
Indirect effect 8: a3 x b2 Company --> PE engagement --> Duration PE	.11	.05**	3
Indirect effect 9: a3 x b3 Company --> PE engagement --> Intensity PE	.14	.05**	3
Indirect effect 10: a4 x b4 Company --> PE emotions --> Frequency PE	.01	.01	3
Indirect effect 11: a4 x b5 Company --> PE emotions --> Duration PE	.01	.00	3
Indirect effect 12: a4 x b6 Company --> PE emotions --> Intensity PE	.03	.01*	3

Note. * $p < .05$, ** $p < .01$ and *** $p < .001$ (bilateral). PE = Physical Exercise

Study 2

In Study 2, we proposed an intra-individual analysis to observe whether daily variations in the frequency, intensity and duration of PE are positively associated with the emotions, related to PE on a daily base. Furthermore, we examined the role of prioritizing positivity as a vantage resource that enhances the effectiveness of PE and its effects on PE-related emotion.

So far, following the upward spiral theory of lifestyle change (Van Cappellen et al., 2018), the hypothesized model was tested with the next hypotheses (see Figure 2):

Hypothesis 1: Different characteristics of PE, such as its frequency, duration, and intensity, will be positively associated with PE emotion.

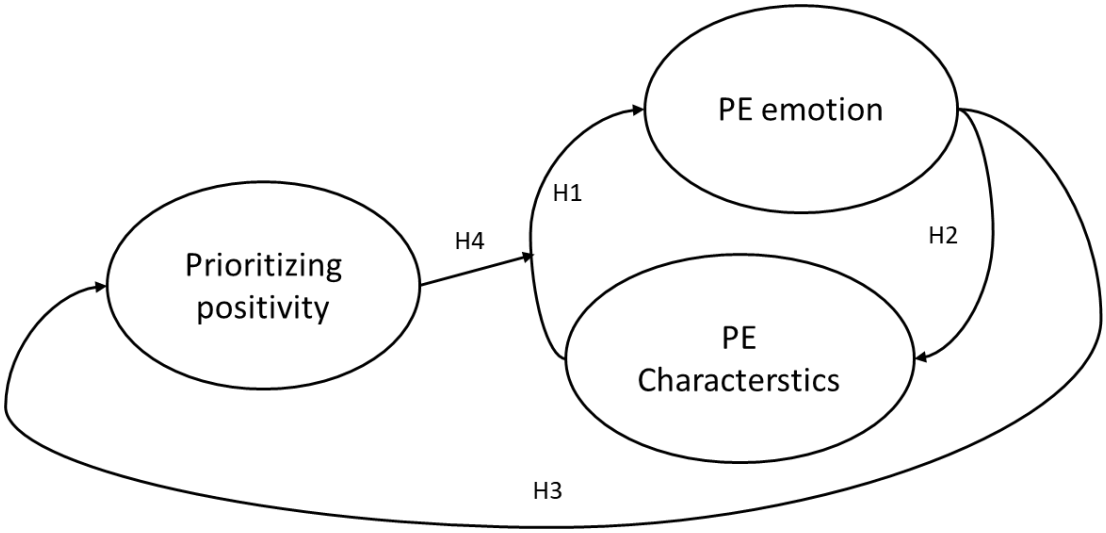
Hypothesis 2: PE-related emotion will be positively associated with PE characteristics (i.e., frequency, duration, and intensity)

Hypothesis 3: PE-related emotion will be positively associated with Prioritizing positivity.

Hypothesis 4: Prioritizing positivity will modulate the relationship between PE characteristics (frequency, duration and intensity) and PE-related emotion.

Figure 2

Hypothesized Model Study 2.



Note: PE = Physical Exercise

Materials and Methods

Participants and Protocol

With the voluntary participants in Study 1, we offered them a diary study in which they would have to fill out a questionnaire three times a day (M1, before work / in the morning; M2, after work / in the afternoon; M3, in the evening) for a full week (Monday to Sunday). Of the 1,266 people who answered the first questionnaire, 343 agreed to participate in Study 2. We began Phase 2 by contacting 314 persons by email, describing how the study worked and providing links to the questionnaires. In this email, they were also given the option of having the researchers send out reminders at each moment of

every day. Participants who chose this option could choose to be part of an instant messaging group or to be notified by email. During the week of the study, daily reminders were sent to the people who requested it, in addition to a mass mail in the middle of the week, encouraging their participation. To stimulate participation, 40 checks of 40€ each were also raffled among the participants who reached the end of the study.

Finally, of the 314 subjects we contacted at first, we were left with a sample of 146 participants, according to the following criteria:

1. They had responded at least 4 full days or 16 moments throughout the entire week (76% of the moments).

2. Answers at each moment of the day were separated by a minimum of 15 minutes.

Of these 146 participants, 77% were women, with a mean age of 34.8 years (SD = 13), 49.3% worked during confinement, and 42% of them did so from home.

The study, with file number "CD/33/2020", complies with the ethical standards required by the Ethics Commission of the university to which the authors belong.

Measures

The variables and questionnaires, used for the study, are described below:

- Physical exercise was measured with the same three indicators, used in Study 1. First, as the frequency with which the participants carried out physical exercise during the week (from once a week to more than once a day). Second, physical exercise session duration in minutes. And third, the intensity level of the physical exercise session, using a 6-point single item visual analog scale (Fernández-Castro et al., 2017; Kunin, 1955), asking them to indicate the battery that best represented the intensity during the physical exercise sessions (1 = almost empty battery/low intensity and 6 = full battery/maximum intensity) (mean = 3.87; SD = 1.15).

- PE emotions were measured using a 7-point visual analog scale (Fernández-Castro et al., 2017; Kunin, 1955), where a single item asked them to indicate the face that best expressed how they had felt at the level of emotional well-being during that day (0 = sad face and 6 = happy face).

- Prioritizing positivity was measured through a 3-item scale (Catalino et al., 2014) (α = .92), ('A priority for me today has been experiencing happiness'; 'Today, I have sought and nurtured my positive emotions'; 'Today, I have structured my day to maximize my happiness'). It was measured with a Likert-type scale ranging from 0

(never) to 6 (always). These items were only included in the third measurement of the day.

Data analysis

Descriptive statistics including means, standard deviations, correlations, and Cronbach's alpha are shown in Table 3. Prior to conducting further analysis and hypothesis testing, we calculated the intra-class correlation coefficient (ICC) to examine the be-tween-person and within-person variance, present in day-level variables.

The between-person variance for PE emotions was 45.41%. For prioritizing positivity between-person, variance was 60.52%. Thus, our variables exhibited both between- and within-person variance, warranting further examination of predictors at the person and day-level.

To test all four hypotheses, we followed the same procedure, utilizing multilevel analysis in MLwin 2.32 software (Rasbash et al., 2000). Following the recommendations of Ohly et al. (2010), all day-level variables were person-centered.

First, for Hypothesis 1 and 4, we tested a null or intercept-only model. Next, we introduced control variables in Model 1, namely gender as a categorical value and day number, to test potential growth effects of PE emotions during the week. We did this as a strategy to try to capture "contaminating" variables that bias the results. Specifically, there is previous research that indicates that levels of PE emotions vary depending on the day of the week (Egloff et al., 1995), and PE depending on gender (Martín et al., 2014). In Model 2, we introduced the main effect variables for the different hypotheses. And finally, in Model 3, we tested for the interaction effect of prioritizing positivity and PE characteristics, mentioned in Hypothesis 4.

For Hypotheses 2 and 3, we ran four separate equations for each one of PE characteristics and prioritizing positivity as dependent variables. We started with a null or intercept-only model, followed by Model 1 which introduced control variables gender and day of the week. Finally, in Model 2 we tested for main effects, specifically introducing PE-related exercise as a predictor.

Table 3

Descriptive Statistics and Correlations between the Study 2 Variables.

	M (SD)	1	2	3	4	5	6	7	8
Age	34.70 (12.96)	-	-	-	-	-	-	-	-
Gender		-.237**	-	-	-	-	-	-	-
Day	4.00 (1.99)	-.003	.0	-	-	-	-	-	-
PE frequency	.64 (.61)	.100**	.010	-.026	-	-	-	-	-
PE duration	1.92 (1.35)	-.047	-.013	.153**	.210**	-	-	-	-
PE intensity	3.87 (1.15)	-.032	-.094*	.004	.011	.315**	-	-	-
Prioritizing positivity	3.73 (1.30)	-.108**	.238**	.136**	.106**	.142**	.179**	-	-
PriPos*PE frequency	2.34 (2.61)	.058	.073*	.066*	.903**	.204**	.147**	.428**	-
PriPos*PE intensity	15.17 (7.53)	-.109*	.069	.098*	.048	.289**	.737**	.783**	.530**

Note. * $p < .01$. ** $p < .001$. M = Means; SD = Standard Deviations; PE = Physical Exercise; PriPos = Prioritizing Positivity

Study 2 Results

Hypothesis 1 proposed PE characteristics (frequency, duration, and intensity) will be positively associated with PE emotion. As shown in Table 4, daily PE frequency (β = .18, t = 2.04, p = .038) and Intensity (β = .21, t = 6.30, p = .001) were significant predictors of PE emotions. On the contrary, PE duration was not a significant predictor (β = .01, t = -.06, p = .92). Thus, Hypothesis 1 is only partially supported, since two out of three PE characteristics showed a positive association with PE emotions. As per the control variables, in the final model (Model 3) including the interaction terms between prioritizing positivity and PE characteristics, neither gender (β = .22, t = 1.57, p = .17) nor day of the week (β = -.02, t = 1.26, p = .25) were significant predictors.

Table 4

*Multilevel Estimates for Models Predicting **PE Emotion**,* N *= 146 Participants,* N *= 1,022 Data Points.*

	Model 1			**Model 2**			**Model 3**		
	Estimate	**SE**	***p***	**Estimate**	**SE**	***p***	**Estimate**	**SE**	***p***
Constant	4.580	.063	***	4.453	.137	***	4.598	.141	***
Day	.013	.015	ns	.006	.015	ns	-.019	.015	ns
Gender (0 = male, 1 = female)	.198	.150	ns	.270	.137	ns	.223	.142	ns
PE frequency				.184	.090	*	-.022	.157	ns
PE intensity				.208	.033	**	.295	.055	**
PE duration				-.002	.033	ns	.000	.032	ns
Prioritizing positivity				.262	.036	**	.320	.084	**
PE frequency * Prioritizing positivity							.060	.037	ns
PE intensity * Prioritizing positivity							-.027	.015	ns
-2*log	1440.440			1203.607			1210.918		
Diff-2*log	17.48		***	236.833		***	7.311		ns
d.f.	4			6			8		
Between-person (Level 2) variance (SE)	.394	.064		.308	.052		.334	.055	
Within-person (Level 1) variance (SE)	.486	.032		.406	.029		.405	.029	

Note. * $p < .05$. ** $p < .01$. *** $p < .001$. Model 1 was compared to a Null Model with the intercept-only ($\gamma = 4.779$; SE = .063; t = 75.857; -2*log = 1457.920; Level 1 Variance = .488; SE = .032).

Hypothesis 2 proposed that PE emotions will be positively associated with PE characteristics (frequency, duration, and intensity) as a predictor. Tables 5 to 7 show the results of the models, tested for each of the PE characteristics as dependent variables. In the case of PE Frequency, the relation with PE emotions was not significant ($\beta = .03$, $t = 1.77$, $p = .17$). In the case of PE duration and intensity, the relation with PE emotions was significant in both cases (Duration: $\beta = .21$, $t = 3.67$, $p = .035$; Intensity: $\beta = .39$, $t = 7.78$, $p = .004$). Therefore, hypothesis 2 is partially supported, since PE emotions were a significant predictor of only two PE characteristics, namely duration and intensity. About the control variables, day of the week was the only significant predictor of PE intensity ($\beta = .09$, $t = 4.42$, $p = .021$). The rest of the relations were non-significant.

Table 5

*Multilevel Estimates for Models Predicting **PE Frequency**,* N *= 146 Participants,* N *= 1,022 Data Points.*

	Model 1			Model 2			Model 3		
	Estimate	**SE**	***p***	**Estimate**	**SE**	***p***	**Estimate**	**SE**	***p***
Constant	.640	.030	***	.566	.070	***	.961	.052	***
Day				-.008	.009	ns	.008	.007	ns
Gender (0 = male, 1 = female)				.138	.070	ns	.119	.051	ns
PE emotions							.032	.018	ns
-2*log	1787.600			1772.509			483.948		
Diff-2*log				15.091		**	1288.561		
d.f.	0			2			3		
Between-person (Level 2) variance (SE)	.086	.015		.083	.015		.030	.007	
Within-person (Level 1) variance (SE)	.291	.014		.291	.014		.112	.007	

Notes: * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 6

*Multilevel Estimates for Models Predicting **PE Duration**,* N *= 146 Participants,* N *= 1022 Data Points.*

	Model 0			Model 1			Model 2		
	Estimate	**SE**	***p***	**Estimate**	**SE**	***p***	**Estimate**	**SE**	***p***
Constant	1.834	.087	***	1.608	.200	***	1.646	.198	***
Day				.093	.021	**	.093	.021	**
Gender (0 = male, 1 = female)				-.164	.207	ns	-.205	.206	ns
PE emotions							.213	.058	*
-2*log	1875.667			1842.039			1824.314		
Diff-2*log				33.628		***	17.725		**
d.f.	0			2			3		
Between-person (Level 2) variance (SE)	.761	.124		.746	.122		.735	.120	
Within-person (Level 1) variance (SE)	.999	.066		.967	.064		.941	.063	

Note: * $p < .05$. ** $p < .01$. *** $p < .001$.

Table 7

Multilevel Estimates for Models Predicting PE Intensity, N = 146 Participants, N = 1,022 Data Points.

	Model 0			Model 1			Model 2		
	Estimate	**SE**	***p***	**Estimate**	**SE**	***p***	**Estimate**	**SE**	***p***
Constant	3.826	.077	***	3.860	.180	***	3.935	.166	***
Day				.010	.019	ns	.010	.018	ns
Gender (0 = male, 1 = female)				-.095	.187	ns	-.180	.170	ns
PE emotions							.389	.050	**
-2*log	1721.377			1710.287			1648.691		
Diff-2*log				11.09		**	61.596		***
d.f.	0			2			3		
Between-person (Level 2) variance (SE)	.608	.098		.612	.099		.485	.082	
Within-person (Level 1) variance (SE)	.769	.051		.773	.051		.719	.048	

Note. * $p < .05$. ** $p < .01$. *** $p < .001$.

Hypothesis 3 proposed that PE emotions were positively associated with Prioritizing positivity. Results shown in table 8 indicate the PE emotions affect was a significant predictor of prioritizing positivity (β = .35, t = 7.65, p = .005). As per the control variables, day of the week was the only significant predictor (β = .10, t = 6.46, p = .007). Therefore, Hypothesis 3 is supported.

Table 8

Multilevel Estimates for Models Predicting ***Prioritizing Positivity****,* N *= 146 Participants,* N *= 1,022 Data Points.*

	Model 0			**Model 1**			**Model 2**		
	Estimate	**SE**	***p***	**Estimate**	**SE**	***p***	**Estimate**	**SE**	***p***
Constant	3.715	.090	***	3.554	.189	***	3.672	.195	***
Day				.107	.014	**	.097	.015	**
Gender (0 = male, 1 = female)				-.338	.203	ns	-.244	.210	ns
PE emotions							.352	.046	**
-2*log	2349.145			2272.879			1339.183		
Diff-2*log	-			76.266		***	933.696		***
d.f.	0			2			3		
Between-person (Level 2) variance (SE)	1.038	.138		.985	.129		.904	.125	
Within-person (Level 1) variance (SE)	.677	.036		.625	.034		.422	.030	

Note. * p < .05. ** p < .01. *** p < .001.

Finally, Hypothesis 4 proposed that Prioritizing positivity modulated the relationship be-tween PE characteristics (frequency, duration, and intensity) and PE emotions. Results, shown in table 4, indicate that prioritizing positivity was a significant predictor of PE-related emotion (β = .35, t = 6.46, p = .004). As per the interaction terms, we tested for the interaction between prioritizing positivity and frequency and intensity. Since PE duration was not a significant predictor in the first place, we discarded it from further analysis. Both the interaction term for PE frequency t (β = .06, t = 1.62, p = .143) and the interaction term for intensity (β = -.03, t = 1.80, p = .109) were not significant. Therefore, Hypothesis 4 is not supported.

Discussion

In the current study, we tested the mechanisms that help a specific behavior (i.e., physical exercise, PE) to become a recurring habit from two approaches (between-subjects and within-subject), based on the upward spiral theory of lifestyle change (Van Cappellen et al., 2018). On the one hand, we conducted a study between subjects (Study

1), in which we wanted to know if people who prioritized the positive experienced more positive emotions when performing PE, and in turn whether these people performed PE more frequently, in a longer and more intense sessions. On the other hand, from a within-subject perspective, we conducted another study (Study 2) in which we wanted to test if daily variations in the frequency, intensity and duration of PE were positively associated with the PE-related emotion. Furthermore, we examined the role of prioritizing positivity as a vantage resource that improves the effectiveness of PE and its effects on PE emotions. The results we obtained from both studies were mixed.

Theoretical and practical implications

According to the evidence, showed in study 1, we observed the mechanism that promotes PE more frequently, with a longer duration and higher intensity, and people performed PE when they experienced positive psychological constructs such as engagement and positive emotions when they are doing physical exercise. Even more, its occurs when they are doing PE with other people and prioritize the positive, organizing the day to conduct behaviors that are a source of positive emotions.

However, the psychological mechanisms involved in these processes are not working in a similar way with respect to the PE engagement vs. positive emotions. On the one hand, when the PE engagement is the psychological mechanism that explains these relationships, people who prioritize the positive experience higher levels of engagement when performing PE and, in turn, perform PE more frequently, longer and more intensely. The same thing happens when doing the PE in company, through a greater sense of engagement in the PE, leading us to increased frequency, duration, and intensity of the PE.

On the other hand, when the emotions are the psychological mechanism, only PE in company is the driver, which also leads to (only) a higher intensity of PE. So far, it seems that engagement in the physical exercise is the main psychological mechanism that ex-plains how prioritizing positivity and doing PE with others have an influence on frequency, duration and intensity of the physical activity. Anyway, it is interesting to highlight that, when people are doing physical exercise in company, not only they experience engagement in the exercise, but also positive emotions that influence their physical behaviors, related to exercise.

This leads us to think that, for the PE that we perform to be more frequent, intenser and with longer sessions, the positive psychological experience when performing PE

should be rather eudaimonic (i.e., engagement in the PE) than hedonic (i.e., positive emotions).

Even more, we focused on what happens day by day (study 2) with the relationship between prioritizing the positive and the other variables from a within-person perspective. We focused on variations of PE frequency, duration and intensity as predictors of PE-related emotions and vice versa. As well, we looked at how prioritizing positivity as a vantage resource could potentially amplify the effect of physical exercise over PE emotions. The results showed that the relation between the PE intensity with PE-related emotions was reciprocal and positive over time. Similar results were obtained in study 1, where emotions were only related to the intensity of the PE (and not to frequency and du-ration). This suggests that the daily PE intensity could be more prominently compared to PE duration and frequency.

Regarding the modulating role of prioritizing the positive, it did not moderate the relationship between the PE characteristics and the PE emotions. The explanation for these partial results could be that a daily study may not capture the changes, required for a change in habit, since these potentially need more time to become a habit. Regarding prioritizing the positive as a vantage resource, the explanation can go along the same lines, understanding that prioritization tends to be more stable over time, to be more characteristic and, therefore, more difficult to capture in a daily study.

However, prioritizing positivity was associated with PE emotions in a positive and reciprocal link, showing its influence rather as a driving mechanism than as a moderator. This shows the recurrence between emotions and the prioritization of the positive. Being able to appreciate a loop that begins with the behavior (PE) that promotes positive emotions, which, in turn, promotes prioritizing the positive, which influences the emotion again. In other words, a linking positive cycle of affective and behavioral well-being is created (positive spirality). This leads us to rethink the theoretical model where, instead of asking under what conditions vantage resources moderate the link between PE and emotions, we can ask how these same resources could predict and link the psychological process between PE, emotions and resources.

Anyway, our results confirmed the hypotheses regarding prioritizing the positive, described by Barbara Fredrickson and colleagues (Catalino et al., 2014) when they found that people who are prioritizing positive activities in their lives feel better psychologically, more satisfied with their life and feeling more engaged in their activities, as is the case for doing PE in our study. In this way, teaching people how they can

prioritize the positive in their lives, for example, by implementing positive psychological interventions, based on goal setting (Corbu et al., 2021) and life crafting (Schippers & Ziegler, 2019), will have an effect on having competencies to prioritizing positivity and engaging in a more effective and positive way, with activities such as doing physical exercise and abandoning a sedentary lifestyle.

Study limitations and future research

Beyond the virtues of the studies carried out, we are aware that it also has several limitations. A first limitation is the fact that the studies were carried out in a very extreme and unusual context, such as confinement due to a pandemic. Emotions could be affected by psychological factors (e.g., being tired, depressed, chronically stressed and languishing) or physical factors (e.g., physical limitations, uncomfortably built environment, limited time) that could occur more unexpectedly and abruptly during the confinement and that we did not consider (for example, (Giles-Corti & Donovan, 2002; Lappalainen et al., 1997; Olano et al., 2015; Pate et al., 1995). Therefore, it would be convenient to repeat the studies in a more normalized situation, controlling these variables.

We would find a second limitation in relation to Study 2 (diary study), where we are trying to see how you feel today makes you repeat the behavior tomorrow. However, we can have a behavior, established as a habit in life, but maybe this behavior is generated by other causes, such as family obligations, and not what that behavior generates.

A third and last limitation would be found in relation to the variable of prioritizing positivity. This limitation would be related to the previous limitation, since it asks about the prioritizing positivity levels in general. This implies that, when we ask if they prioritize the positive and they say yes, they do not have to be prioritizing the PE, they may have many other activities that they consider to be a source of positive emotions and prioritize those, and that day, one of them is not the PE. Therefore, the fact that the referent when asking about the prioritizing positivity is the PE, which could correct this limitation and part of the previous limitation in future studies.

Conclusions

In this study, we tried to understand the psychological mechanisms that explain how PE could be considered as a habit. On the one hand, through a cross-sectional study where we could see how resources, such as prioritizing the positive and PE in company,

are good drivers of a higher PE frequency and intensity, and even longer sessions. And this occurs if it is mediated by PE engagement, that is, when there is a genuine and stable commitment to the PE. Since something more ephemeral, like PE-related emotions, only predicts a more intense EF, but not more frequent or longer lasting. On the other hand, through a diary study, we found two loops, established by the Theory of the upward spiral of basic lifestyle change (Van Cappellen et al., 2018), which did not occur, since the prioritization of the positive does not modulate the relationship between the PE and PE-related emotions. But we were able to observe a spiral in which a concatenation of recursive effects was produced: behavior, emotion, prioritization and emotion, and back to behavior. Furthermore, this re-cursive spiral is found only with the intensity of the EF, not with the frequency or duration. We found that is in line with the cross-sectional study in which emotions only influence the intensity of the PE and not on the rest of the characteristics of the PE, such as frequency and duration.

CHAPTER 5
GENERAL CONCLUSIONS

Los objetivos generales de la tesis fueron el buscar evidencias que afianzaran y ampliaran lo que se sabía sobre la relación entre el ejercicio físico y el bienestar psicológico en el trabajo, y el de adentrarnos en nuevos conocimientos de cómo el ejercicio físico se convertía en un hábito. Para llegar a esos objetivos me planteé 3 preguntas de investigación:

1. ¿El ejercicio físico genera bienestar psicológico en el trabajo?
2. ¿Cómo el ejercicio físico genera bienestar psicológico en el trabajo?
3. ¿Qué factores pueden ayudar a que el ejercicio físico se convierta en hábito?

Estas preguntas se han ido respondiendo a través de 3 capítulos (capítulo 2, capítulo 3 y capítulo 4), compuestos estos por 4 estudios empíricos. En cuanto a la relación del ejercicio físico y el bienestar psicológico en el trabajo, el primer estudio tuvo como objetivos poner a prueba si existían diferencias entre las personas que realizaban ejercicio físico y las que no, en cuanto a las percepciones de los recursos laborales (i.e., coordinación, empatía, liderazgo y autonomía), niveles de bienestar psicológico en el trabajo (i.e., engagement en el trabajo) y niveles de desempeño (capítulo 2). En la misma línea, el segundo estudio tuvo como objetivo investigar el papel del vigor con el ejercicio físico como modulador de la relación entre la práctica del ejercicio físico y el bienestar psicológico en el trabajo (i.e., satisfacción laboral, emociones en el trabajo y estrés laboral) (capítulo 3). En cuanto a cómo el ejercicio físico se puede convertir en un hábito, los otros dos estudios (capítulo 4) tenían como objetivo el poner a prueba si los factores como la priorización de lo positivo y el hacer el ejercicio físico en compañía podrían ser un buen recurso para la repetición en el tiempo de la conducta de ejercicio físico. En el tercer estudio, por tanto, se ponía a prueba si estos factores se relacionaban con unos mayores niveles de frecuencia, intensidad y duración del ejercicio físico, mediado todo por las emociones y el engagement con el ejercicio físico al realizarlo. En el cuarto estudio, se ponía a prueba si, a nivel diario, la priorización de lo positivo potenciaba la relación positiva entre el realizar ejercicio físico y las emociones.

Respuestas a las preguntas de investigación

¿El ejercicio físico genera bienestar psicológico en el trabajo?

La respuesta a esta pregunta se aborda en el capítulo 2 donde se presenta un estudio transversal con una muestra de 319 empleados, de los cuales 156 son sedentarios y 163 son no sedentarios. En este estudio se hipotetizaron diferencias significativas entre las personas sedentarias y las no sedentarias en la percepción de los diferentes componentes de conforman el Modelo HERO (Salanova, et al., 2012): recursos laborales (i.e., coordinación, empatía, liderazgo y autonomía), empleados saludables (i.e., engagement), y resultados organizacionales saludables (i.e., desempeño inrol y extrarol). Estas diferencias se esperaban encontrar a nivel general y a nivel de género, es decir, entre hombres sedentarios y no sedentarios, y entre mujeres sedentarias y no sedentarias.

Los resultados que se encontraron fueron variados. Por un lado, se encontró que el modelo HERO funcionaba independientemente de si las personas eran sedentarias o no. Eso quiere decir que, en ambas muestras, los recursos predecían el engagement que, a su vez, estaba relacionado con el desempeño Por otro lado, en cuanto a las diferencias en las variables analizadas, se encontró: a nivel general, que habían diferencias significativas en los recursos laborales en la variable de empatía y en el apartado de empleados saludables en la dimensión de absorción de la variable engagement, encontrando puntuaciones más altas en las personas que realizaban ejercicio físico (no sedentarias). Es decir, las personas no sedentarias muestran una mayor capacidad de ponerse en el lugar de los demás y de focalizarse en el trabajo. A nivel de género, entre los hombres sedentarios y los no sedentarios se encontraron diferencias significativas en los recursos laborales en la variable de empatía y en el apartado de empleados saludables en la dimensión de vigor de la variable engagement, siendo más altas en los hombres que realizaban ejercicio físico (no sedentarias). Es decir, los hombres no sedentarios muestran mayor capacidad de ponerse en el lugar de los demás y de tener mayores niveles de energía mental y deseo de invertir esfuerzo en el trabajo. Sin embargo, en las mujeres no hubo diferencias entre aquellas que realizaban ejercicio físico y las que no.

Los resultados que se dieron no fueron tan contundentes como se esperaban, ya que finalmente, en este estudio, no surgieron todas las diferencias esperadas entre los sujetos sedentarios y no sedentarios. Destacamos que las diferencias en cuanto al bienestar psicológico en el trabajo, medido a través del engagement, solo se observaron en algunas de las dimensiones como es la absorción a nivel general, y el vigor entre los hombres sedentarios y no sedentarios.

En este sentido, el aporte a la literatura como respuesta a la pregunta de si el ejercicio físico genera bienestar psicológico en el trabajo, sigue siendo ambiguo. Las

diferencias se centran básicamente en que los sujetos que realizan ejercicio físico, sea en general o en particular los hombres, se perciben con un mayor bienestar psicológico en el trabajo solo en alguna de las dimensiones del engagement, absorción y vigor. Por esa razón, en el siguiente capítulo se planteó la posibilidad de que la relación ejercicio físico – bienestar psicológico en el trabajo, se viera potenciada por otra variable.

¿Cómo el ejercicio físico genera bienestar psicológico en el trabajo?

La respuesta a esta pregunta se aborda en el capítulo 3 de esta tesis, donde se presenta un estudio transversal con una muestra de 485 empleados. Todos los sujetos realizaban un mínimo de 90 minutos de ejercicio físico a la semana, ya que este es el punto de corte propuesto por la OMS para distinguir entre personas sedentarias y activas. En este estudio se hipotetizó que el vigor en el ejercicio físico fuera la variable moderadora que potenciaba la relación entre ejercicio físico en bienestar psicológico en el trabajo.

Por tanto, en un primer momento se hipotetizó que sería la combinación del ejercicio físico (i.e., duración, intensidad y frecuencia) con el vigor al realizarlo el que estaría relacionado con el bienestar psicológico en el trabajo (i.e., satisfacción laboral, emociones positivas, estrés laboral). Pero los resultados que se obtuvieron mostraron que no existía un efecto combinado del ejercicio físico y el vigor al realizarlo sobre el bienestar psicológico en el trabajo. De hecho, el ejercicio físico no tenía una relación significativa con el bienestar psicológico en el trabajo. Esto llevó a plantear si el tipo de relación era otra, es decir, para que el ejercicio físico tuviera algún efecto sobre el bienestar psicológico en el trabajo, esto debía estar mediado por el vigor en el ejercicio físico. Y en los resultados así se observó: el vigor en el ejercicio físico mediaba de forma total la relación entre el ejercicio físico y el bienestar psicológico en el trabajo.

En esta línea, el aporte de este estudio a la literatura es que más que las características del ejercicio físico que realizamos, es el vigor con el que realizamos el ejercicio físico lo que nos lleva a un mayor bienestar psicológico en el trabajo.

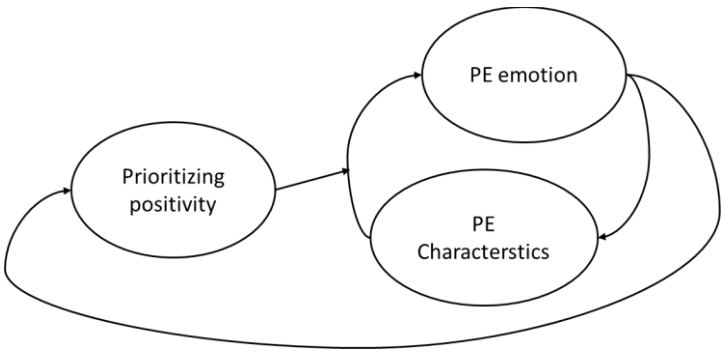
¿Qué factores pueden ayudar a que el ejercicio físico se convierta en hábito?

La respuesta a esta pregunta se aborda en el capítulo 4 mediante dos estudios, uno transversal y otro como estudio de diario. El primer estudio se hizo con una muestra compuesta por 553 personas que realizaron ejercicio físico durante el confinamiento. En este estudio se hipotetizó que el priorizar lo positivo y el realizar ejercicio físico en compañía eran unos buenos predictores del ejercicio físico (i.e., duración, frecuencia e

intensidad) siempre y cuando esta relación estuviera mediada por las emociones o el engagement con el ejercicio físico.

Los resultados que se encontraron fueron que ambos recursos, la priorización de lo positivo y el hacer ejercicio en compañía, estaban relacionados con mayores niveles de frecuencia, duración e intensidad de ejercicio físico cuando esta relación estaba mediada por el engagement en el ejercicio físico. Sin embargo, no se daba esa relación cuando el mediador eran las emociones en el ejercicio físico. Cuando el mediador eran las emociones, solo era un buen predictor para la intensidad del ejercicio físico, el hacerlo en compañía.

En cuanto al segundo estudio, se realizó con una muestra de 146 participantes que contestaron durante 7 días, en 3 momentos diarios (146*7*3 = 3.066 observaciones). En este estudio lo que se hipotetizó fue que a nivel de diario el ejercicio físico (i.e., duración, frecuencia e intensidad) se retroalimentaba con las emociones asociadas a este, a la vez que las emociones predecían el recurso de priorización de lo positivo. A su vez, la priorización de lo positivo serviría para potenciar la relación del ejercicio físico (i.e., duración, frecuencia e intensidad) con las emociones, y cerrar así un doble bucle que mantuviera en el tiempo la conducta del ejercicio físico en sus tres características (figura 1).



Los resultados fueron dispares en función de las características del ejercicio físico observadas, ya que solo la intensidad del ejercicio físico obtuvo una reciprocidad con las emociones en el ejercicio físico. Sin embargo, no fue así con la duración y la frecuencia. Además, se encontró que la priorización de lo positivo no modulaba la relación del ejercicio físico, en ninguna de sus características, y las emociones. Sin embargo, se encontró una relación recíproca entre la priorización de lo positivo con las emociones en el ejercicio físico, lo que le daba igualmente una continuidad al menos en la relación de la intensidad del ejercicio físico, emociones, y priorización.

Como conclusión del aporte de ambos estudios es que, en ambos, se evidencia que cuando la variable de bienestar psicológico en el trabajo que introducimos en las ecuaciones es la de las emociones, los factores como la priorización de lo positivo y el ejercicio físico en compañía solo predicen la intensidad del ejercicio, pero no la duración ni la frecuencia. Sin embargo, el primer estudio nos hace también el aporte que, si la variable de bienestar psicológico en el trabajo que tenemos en cuenta es el engagement en el ejercicio físico, tanto la priorización de lo positivo, como el realizarlo en compañía, pueden ser unos buenos predictores de la duración, intensidad y frecuencia con la que se realiza el ejercicio físico.

Implicaciones teóricas y prácticas

Las implicaciones teóricas y prácticas de esta tesis son varias. Por un lado, se ha aumentado el conocimiento específico sobre el impacto de que los trabajadores de una organización realicen ejercicio físico. Y esto es que los empleados que hacen ejercicio son más empáticos y engaged, en términos de absorción y vigor, en comparación con los empleados sedentarios. Esto podría tener por ejemplo una implicación práctica a la hora de querer incorporar a alguien en una organización con las características de empático y engaged. La investigación dice que las personas empáticas tienen mejores habilidades de gestión de conflictos y tienden a cooperar más con los demás y están más satisfechas con sus relaciones, siendo menos probable también que se comporten de forma agresiva (Oh & Roh, 2022). Y las personas engaged, la investigación dice que tienen mayores resultados en cuanto a desempeño y compromiso con su organización (Bakker & Demerouti, 2007, 2013).

También se ha podido observar que, para que el ejercicio físico tenga impacto en el bienestar psicológico en el trabajo, no sirve solo con realizar ejercicio físico, es importante que este sea realizado con vigor, es decir, con motivación. Este matiz es importante ya que hasta el momento solo se había tratado de averiguar las características óptimas, en cuanto a frecuencia, duración e intensidad, que llevarán a esos mayores niveles de bienestar psicológico en el trabajo (satisfacción, emociones y estrés). Por esa razón, a nivel práctico es importante a la hora de promover el ejercicio físico que no basta que se promueva solo la realización, sino que hay que preocuparse de que sea realizado con vigor.

Por otro lado, se ha podido aportar conocimiento en cuanto a los factores que pueden ayudar a que el ejercicio físico se realice con mayor intensidad, más

frecuentemente y con una duración mayor, y estos factores son el priorizar lo positivo en el día a día, y el realizar el ejercicio en compañía. Aunque nuevamente, tiene que estar mediado principalmente por el engagement en el ejercicio físico. Ya que si solo tenemos en cuenta las emociones que se experimentan al realizar ejercicio, solo predice la intensidad del ejercicio.

En cuanto a la teoría de la espiral ascendente de cambio de vida (Van Cappellen et al., 2017), en la que se basa el capítulo 4, no acaba de apoyarse. Esta teoría dice que la conducta (ejercicio físico) y el afecto (emociones en el ejercicio físico) se retroalimentan, siendo el uno predictor del otro. Además, el afecto predice los recursos ventajosos (priorización de lo positivo), y en presencia del recurso ventajoso, la predicción de la conducta sobre el afecto se ve modulada. Sin embargo, en este estudio esta modulación no se da, es decir, la relación entre el ejercicio físico y las emociones en el ejercicio físico no se ve modificada por la priorización de lo positivo. En este estudio lo que se ve es que el priorizar lo positivo tiene una relación directa a las emociones en el ejercicio físico, es decir, las emociones experimentadas al realizar ejercicio no se ven potenciadas, pero si predichas por la priorización de lo positivo. Esto es interesante porque se convierte en un antecedente de las emociones además de la propia conducta.

Limitaciones y futuras investigaciones

Esta tesis presenta diversas limitaciones. Por un lado, las muestras que se utilizaron son de conveniencia, lo que hace que no se pueda realizar una generalización de lo que en ella se concluye. Aun así, todas las muestras han sido variadas en cuanto a la diversidad de contextos laborales, ejercicio realizado y nacionalidades de los sujetos.

Datos transversales con excepción del estudio de diario

Otra de las limitaciones que podemos encontrar está relacionada con la forma de medir algunas de las variables utilizadas a lo largo de los diferentes estudios. En todos los casos fue realizada con instrumentos validados, pero con posibilidad de mejora en estudios futuros. Un ejemplo de esto sería el desempeño laboral del capítulo dos, esta variable se evaluó de forma autoinformada, pudiendo mejorarse recabando también la valoración por parte de los supervisores y de los pares. Y el otro ejemplo sería la variable de priorización de lo positivo del capítulo 4. En los estudios de este capítulo se preguntaba la priorización de lo positivo de forma general. Esto implica que no podemos inferir que esa priorización hace referencia a la realización del ejercicio físico, con lo que puede existir una priorización y que no sea del ejercicio físico. Por tanto, el hecho de que el

referente a la hora de preguntar por la priorización de lo positivo sea el ejercicio físico podría corregir esta limitación en futuros estudios. También en este mismo capítulo, otra limitación sería el momento en que se realizó la recogida de datos, ya que esta se realizó en pleno confinamiento producido por la pandemia por COVID 19 vivida durante el 2020. Con lo que sería recomendable el reproducir los estudios en un momento de normalidad.

Como futuros estudios, también se podría reproducir el estudio de diario del capítulo 4 con la variable engagement en el ejercicio físico como componente de bienestar. En el estudio realizado se utilizaron las emociones en el ejercicio físico, como componente de afecto de la teoría de la espiral ascendente de cambio de vida (Van Cappellen et al., 2017). Y tal y como ocurre en el estudio transversal del capítulo 4, las emociones solo se relacionan con la intensidad. Sin embargo, en ese estudio el engagement predice la intensidad, además de la duración y la frecuencia del ejercicio físico. Con que el objetivo de este futuro estudio sería ver si teniendo en cuenta el engagement en el ejercicio físico en lugar de las emociones, las espirales también funcionan para la duración y la frecuencia del ejercicio físico.

Y por supuesto, teniendo más evidencias de que la priorización de lo positivo y el realizarlo en compañía entran en juego a la hora de que el ejercicio físico se convierta en un hábito, desarrollar una intervención que tenga en cuenta estas variables. Así como seguir investigando otros posibles factores o recursos, como por ejemplo la autocompasión, que puedan ayudar a que se mantenga la conducta de realizar ejercicio físico en el tiempo.

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SUMMARY (English)

The main objective of this thesis is to deepen knowledge about physical exercise and psychological well-being at work, and what factors can help make physical exercise a habit in people's lives. With this objective, throughout the thesis three questions are raised:

1. Does physical exercise generate psychological well-being at work?
2. How does physical exercise generate psychological well-being at work?
3. What factors can help physical exercise become a habit?

These questions are addressed in four empirical studies. The first of the studies (chapter 2) tests the differences between people who perform physical exercise and those who do not, in terms of perceptions of work resources (i.e., coordination, empathy, leadership and autonomy), levels of well-being psychological at work (i.e., work engagement) and performance levels. The second study (chapter 3) tests the vigor with physical exercise as a modulator of the relationship between the practice of physical exercise and psychological well-being at work (i.e., job satisfaction, emotions at work and work stress). As for the last two studies, they are found in chapter 4, and test whether factors such as prioritizing the positive and doing physical exercise in company can be a good resource for repetition over time of the behavior of physical exercise. In the first of these studies, it is tested whether these factors are related to higher levels of frequency, intensity and duration of physical exercise, all mediated by emotions and engagement with physical exercise when doing it. The second of these studies tests whether, on a daily basis, prioritizing the positive enhances the positive relationship between physical exercise and emotions.

To carry out these studies, different methodologies, research designs, data analysis and samples were used.

The results contribute to broaden the knowledge about the differences in the perception of labor resources, psychological well-being at work and performance, on the relevance of vigor in physical exercise as a mediator between physical exercise and psychological well-being at work, and, lastly, on the role of prioritizing the positive and doing exercise in company as factors that can help physical exercise become a habit.

RESUMEN (Español)

El principal objetivo de esta tesis es el de profundizar en los conocimientos sobre el ejercicio físico y el bienestar psicológico laboral, y que factores pueden ayudar a que el ejercicio físico sea un hábito en la vida de las personas. Con este objetivo, a lo largo de la tesis se plantean 3 preguntas:

1. ¿El ejercicio físico genera bienestar psicológico en el trabajo?
2. ¿Cómo el ejercicio físico genera bienestar psicológico en el trabajo?
3. ¿Qué factores pueden ayudar a que el ejercicio físico se convierta en hábito?

Estas preguntas se abordan en cuatro estudios empíricos. El primero de los estudios (capitulo 2) pone a prueba las diferencias entre las personas que realizan ejercicio físico y las que no, en cuanto a las percepciones de los recursos laborales (i.e., coordinación, empatía, liderazgo y autonomía), niveles de bienestar psicológico en el trabajo (i.e., engagement en el trabajo) y niveles de desempeño. El segundo estudio (capítulo 3) pone a prueba el vigor con el ejercicio físico como modulador de la relación entre la práctica del ejercicio físico y el bienestar psicológico en el trabajo (i.e., satisfacción laboral, emociones en el trabajo y estrés laboral). En cuanto a los dos últimos estudios, se encuentran en el capítulo 4, y ponen a prueba si los factores como la priorización de lo positivo y el hacer el ejercicio físico en compañía pueden ser un buen recurso para la repetición en el tiempo de la conducta de ejercicio físico. En el primero de estos estudios se pone a prueba si estos factores se relacionan con mayores niveles de frecuencia, intensidad y duración del ejercicio físico, mediado todo por las emociones y el engagement con el ejercicio físico al realizarlo. El segundo de estos estudios, pone a prueba si, a nivel diario, la priorización de lo positivo potencia la relación positiva entre el realizar ejercicio físico y las emociones.

Para realizar estos estudios se emplearon diferentes metodologías, diseños de investigación, análisis de datos y muestras.

Los resultados contribuyen a ampliar el conocimiento sobre las diferencias en cuanto a percepción de los recursos laborales, el bienestar psicológico laboral y el desempeño, sobre la relevancia del vigor en el ejercicio físico como mediador entre el ejercicio físico y el bienestar psicológico laboral, y, por último, sobre el papel de la priorización de lo positivo y el hacer el ejercicio en compañía como factores que pueden ayudar a que ejercicio físico se vuelva un hábito.

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