Explorando el poder de la autoeficacia sobre el tecnoestrés:

Resultados empíricos de estudios multi-muestra

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A mi padre y a mi madre por guiarme por el buen camino y confiar en mí,
a mi hermana por su apoyo incondicional y paciencia

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Prólogo

Recuerdo aquel día que solicité una beca de investigación con Rosa Grau, en el 2005. Afortunadamente, esa beca fue concedida y pude empezar a conocer el maravilloso mundo de la investigación. Mi primera misión fue pasar cuestionarios a empleados y supervisores de los hoteles de la provincia de Castellón, e ir a la caza y captura de los clientes para que contestaran. La verdad que fue una bella y divertida experiencia, y sobretodo junto con la compañera de risas y fatigas Susana Llorens.

Esta experiencia me animó a empezar el doctorado y me inscribí en el programa de doctorado POT. Este programa se parecía a un "gran hermano" de la investigación, por las horas que pasábamos conviviendo, el alumnado y los docentes, en cada seminario. Aún recuerdo el primer seminario del POT, en Punta Umbría (Huelva), donde casi tiro la toalla y abandono todo. Entre los motivos estaban el elevado nivel de algunos compañeros, ya que tenían elevadas competencias en inglés (parecían nativos) y en investigación, y la gran exigencia en las materias. Menos mal que estaba arropada de gente fabulosa, entre ellos, José Martín. Tengo que decir, que el POT nos ha marcado a todas las promociones y que para mí ha sido la experiencia de mi vida, tanto a nivel personal (he conocido a gente maravillosa) como profesional.

Mis ganas de aprender me llevaron a hacer el máster oficial de Psicología del Trabajo, de las Organizaciones y en Recursos Humanos, con la finalidad de mejorar cada día. Es cierto que el camino de mi formación ha sido largo y en ocasiones agotador, pero siempre he mirado al frente teniendo el objetivo claro, ser doctora algún día. Creo que ese paso está cerca….

"El gran logro no es haber terminado...
El gran logro es haber tenido el coraje de empezar." (Anónimo)

Introducción

La revolución digital en esta última década ha modificado los modelos de gestión empresarial, búsqueda de empleo y creación de empleo. Nos encontramos en una sociedad donde las tecnologías forman parte de nuestra vida, tanto en el mundo laboral como personal. Es difícil encontrar algún sector productivo que esté exento de tecnologías. Es más, en los últimos años las estadísticas nacionales nos indican un incremento en la inversión de las Tecnologías de la Información y Comunicación (TIC) en las empresas. Su incremento ha sido visible en las pequeñas empresas españolas, siendo el 98.7% de las empresas las que disponen internet y un 71.6% disponen página web (INE, 2013). Una de las razones de este incremento puede deberse a los beneficios que comporta, tanto a nivel técnico como social, el uso de la tecnología en el contexto laboral.

Invertir en tecnología permite mantener o incrementar la competitividad empresarial, permite proyectarse internacionalmente hacia nuevos mercados, mejorar las condiciones y la calidad del trabajo, la prosperidad económica y la supervivencia delas empresas en un mundo globalizado (Estrada-Hernández y León-Robaina, 2013). A pesar de los beneficios de la tecnología, los cambios y por extensión los cambios tecnológicos pueden provocar problemas técnicos, pero también problemas humanos y sociales que han sido objeto de profundo debate debido a sus consecuencias tanto para los trabajadores como para las organizaciones. Tal es el impacto de la introducción de tecnologías en el trabajo, que en nuestro país la Ley de Prevención de Riesgos Laborales (31/1995 de 8 de noviembre, articulo 16) señala explícitamente que la evaluación de riesgos debe llevarse a cabo “cuando las condiciones de trabajo cambien, por ejemplo, cuando una tecnología se implementa en el puesto de trabajo”. Desde esta perspectiva, se genera una necesidad de abordar los antecedentes de las innovaciones tecnológicas en las empresas para poder prevenir su impacto a nivel tanto individual

como organizacional. Además, la Agencia Europea (http://osha.europa.eu/) considera que las TIC pueden desarrollar nuevos riesgos emergentes en Europa, y por este motivo se hace necesario prevenir a nivel psicosocial las posibles consecuencias negativas que comporta el uso de la tecnología en las empresas y en los trabajadores.

En este punto, un riesgo emergente actual en las organizaciones, es el tecnoestrés. Se trata de un estado psicológico negativo relacionado con el uso de tecnología o con la amenaza de su uso en un futuro. Esta experiencia de tecnoestrés, se puede dividir en dos experiencias específicas: (1) el *tecnostrain* que se relaciona con sentimientos de ansiedad, fatiga mental, escepticismo y creencias de ineficacia, y (2) la *tecnoadicción* que se relaciona con el uso excesivo y una incontrolable compulsión a utilizar la tecnología en 'todo momento y en cualquier lugar' y durante 'largos períodos de tiempo' (Salanova, Llorens, Cifre, y Nogareda, 2007).Aunque la tecnología puede conllevar ciertos niveles de estrés en sus usuarios, la tecnología *per se* no es responsable de las consecuencias negativas producidas por su uso, como pueden ser los problemas musculares, dolores de cabeza, fatiga mental y física, ansiedad, temor y aburrimiento (Salanova et al., 2007) sino que es mas bien, su uso y abuso, la relación del usuario con la tecnología y cómo interpreta el usuario estas relaciones de manera subjetiva. En este sentido, la experiencia subjetiva de tecnoestrés depende de los recursos personales y laborales que disponga el usuario para hacer frente a las demandas y exigencias psicológicas generadas por la tecnología.

Un modelo heurístico que nos ha permitido analizar el proceso de la experiencia del tecnoestrés ha sido el modelo Recursos, Experiencias y Demandas (RED; Salanova, Llorens, y Schaufeli, 2011), donde los recursos personales se consideran un elemento fundamental que el trabajador tiene a su disposición para responder a las demandas y a la falta de recursos laborales en el trabajo, y por extensión en contextos tecnológicos. Es

un modelo que está basado por un lado, en la perspectiva de la Psicología Ocupacional Positiva (Salanova, Llorens, y Rodríguez, 2009) y por otro lado, en el concepto de salud de la Organización Mundial de la Salud (OMS), que asume que la salud no es sólo la mera ausencia de enfermedad, sino un estado de completo bienestar físico, psicológico y social. Este modelo, permite estudiar la salud psicosocial de manera integral y comprehensiva, puesto que engloba no sólo la evaluación del malestar psicosocial (de lo que va mal; en nuestro caso el tecnoestrés), sino también del bienestar psicosocial (de lo que va bien; e.g., el tecnoflow).

Además, se basa en la Teoría Social Cognitiva de Bandura (1997) donde las creencias de eficacia actúan como factor clave que determina cómo la persona percibe el ambiente y son responsables del desarrollo de dos tipos de espirales: espiral de deterioro y espiral de motivación. Así, el proceso de deterioro de salud comenzará cuando el usuario de las TIC perciba bajos niveles de autoeficacia y recursos laborales para hacer frente a las demandas laborales, generando malestar psicosocial (e.g., tecnoestrés, burnout). Por otro lado, el proceso motivacional comenzará cuando el usuario de las TIC perciba elevados niveles de autoeficacia específica con las TIC y recursos laborales para hacer frente a las demandas tecnológicas, estimulando la motivación de los empleados en forma de bienestar psicosocial (e.g., engagement).

Preguntas de investigación

El objetivo de esta tesis doctoral, es proporcionar una compresión más profunda del fenómeno del tecnoestrés y el desarrollo de consecuencias psicológicas de los usuarios de TIC. En otras palabras, estudiar las relaciones entre las TIC y el bienestar psicosocial en usuarios que utilizan tecnologías para poder responder a las siguientes preguntas de investigación.

El primer capítulo de esta tesis, es una revisión sistemática de la literatura científica sobre el tecnoestrés. Se centra en la conceptualización del tecnoestrés, diferenciación de los dos tipos de tecnoestrés (tecnostrain y tecnoadicción), modelos teóricos que intentan explicar el proceso de tecnoestrés, sus antecedentes y consecuencias, principales herramientas de medición y estrategias de prevención e intervención. Tras la revisión de la literatura, se han detectado importantes lagunas en la investigación del tecnoestrés, que se han convertido en retos a alcanzar mediante la realización de estudios empíricos.

En primer lugar, un aspecto de interés en la tesis es conocer los antecedentes del bienestar en los trabajadores del siglo XXI, que se encuentran inmersos en un mundo tecnológico. Los trabajadores se encuentran con el reto de saber gestionar una gran cantidad de datos e información necesaria en su trabajo, estar concentrados, atentos y en ocasiones estar pendientes de varias cosas a la vez; todo ello puede acarrear que perciban una elevada sobrecarga mental, y consecuentemente provocar malestar psicosocial. En esta línea, las investigaciones han encontrado que la sobrecarga mental está relacionada positivamente con el burnout a lo largo del tiempo (Hakanen, Schaufeli, y Ahola, 2008). Pero en cambio, otras investigaciones han encontrado que la sobrecarga mental está positivamente relacionada con el engagement a lo largo del tiempo (Mauno, Kinnunen, y Ruokolainen, 2007). Estas investigaciones llevan a pensar que existe algún factor determinante en la experiencia de bienestar psicosocial. De acuerdo con la TCS (Bandura 1997), un elemento clave que influye en la percepción de las demandas laborales (como es la sobrecarga mental) es la autoeficacia profesional. Por lo tanto, las personas con altos niveles de autoeficacia tienden a interpretar las demandas y problemas más como retos que como amenazas. Por otro lado, las investigaciones de Lepine y cols (Crawford, et al., 2010; LePine, Podsakoff, y LePine,

2005), indican que las demandas no son factores que aumenten o disminuyan los niveles de bienestar, sino que depende de cómo son percibidas, o bien como retos o cómo amenazas. Siguiendo las investigaciones de Lepine y cols (2005) se intenta conocer si existen dos tipos de demandas (reto y amenaza) y cómo se relacionan con el nivel de bienestar según los recursos personales disponibles por los trabajadores. En este sentido, en el primer estudio empírico se responde a la siguiente pregunta de investigación: (1) ¿la autoeficacia profesional está relacionada con la percepción de demandas reto y amenaza, y esta percepción repercute en los niveles de bienestar psicosocial (burnout y engagement)?

En segundo lugar, no se han encontrado investigaciones que expliquen las consecuencias del tecnoestrés, a nivel individual, a lo largo del tiempo. En este sentido, nos interesa conocer las consecuencias del tecnoestrés sobre la salud psicosocial de los trabajadores. Este segundo estudio empírico, se centra en conocer el efecto del tecnostrain que constituye la modalidad tradicional de tecnoestrés, sobre las creencias de eficacia en una muestra de profesores de secundaria y su repercusión sobre el burnout docente a lo largo del tiempo. La investigación previa ha demostrado que los usuarios de TIC son vulnerables al burnout como consecuencia del proceso de tecnoestrés (Salanova et al., 2000, Salanova y Schaufeli, 2000). Sin embargo, estos estudios no asumen el rol de la autoeficacia como variable interviniente en el proceso entre tecnoestrés y burnout. De acuerdo con Bandura (2002), la experiencia de estados afectivos (como puede ser el tecnostrain) puede ser interpretada por el usuario como un signo de ineficacia, pudiendo incrementar los niveles de malestar (ej., burnout hacia su uso) (Grau et al., 2001; Salanova et al 2000). Estos resultados sugieren que el tecnostrain y el burnout se relacionan con sentimientos de incompetencia profesional. A través de un diseño longitudinal de dos tiempos, se plantea un estudio en el que se

intenta responder a las siguientes preguntas de investigación: (2) ¿la autoeficacia juega un rol mediador entre el tecnostrain y el burnout?, y (3) ¿existe una "espiral negativa" en la que la experiencia de tecnostrain genere niveles bajos de autoeficacia y estos provoquen altos niveles de burnout docente, de manera recíproca a lo largo del tiempo?

Finalmente, nos interesa conocer como la percepción del líder por parte del grupo influye sobre el aumento de recursos personales (i.e., autoeficacia profesional) y la disminución del tecnostrain. En esta línea, la investigación sobre la influencia social ha encontrado que la percepción compartida sobre la eficacia del líder en un grupo refleja la calidad del ambiente social (Cole y Bedeian, 2007) y esta percepción grupal influye sobre el bienestar de los trabajadores (Bliese y Halverson, 1998). Centrándonos en contextos tecnológicos nos interesa conocer el rol que juega la percepción compartida sobre el liderazgo del grupo (denominado, clima de liderazgo) sobre la reducción del tecnostrain y el aumento de recursos personales en los trabajadores (autoeficacia).

Investigaciones previas (e.g., Bliese y Castro, 2000; Chen y Bliese, 2002) han demostrado que el clima de liderazgo puede aumentar los niveles de autoeficacia mediante aclaración de tareas laborales y proporcionando suficiente apoyo emocional a los trabajadores. Por otro lado, el percibir un clima de liderazgo positivo contribuye a aumentar los niveles de bienestar laboral (Bliese y Britt, 2001). Revisando la literatura, no encontramos estudios que relacionen el clima de liderazgo con el tecnostrain a través de la autoeficacia. Por este motivo, nos interesa conocer si la percepción grupal sobre el líder puede influir en la experiencia del tecnostrain y los recursos personales. En este sentido, en el tercer estudio empírico se intenta responder a las siguientes preguntas de investigación: (4) ¿el clima de liderazgo compartido por el equipo puede disminuir el

nivel de tecnostrain individual?, y (5) ¿la autoeficacia individual media la relación entre clima de liderazgo grupal y tecnostrain individual?

Planificación de la tesis: objetivos e hipótesis de la investigación

Con el fin de responder a las cinco preguntas de investigación planteadas anteriormente, esta tesis doctoral está compuesta por un capítulo teórico y tres estudios empíricos, escritos en inglés. Por otro lado, la tesis se cierra con un capítulo final que recoge los principales resultados obtenidos en los diferentes estudios empíricos. En este último capítulo, se discuten los resultados teóricos y prácticos, debilidades, fortalezas y retos para la investigación futura.

A continuación, se presenta un resumen del contenido de los cuatro capítulos, sus principales objetivos e hipótesis.

El ***capítulo 1*** presenta un resumen del fenómeno de tecnoestrés. Como se ha señalado anteriormente, se pretende ofrecer una visión general y sistemática de los temas de investigación más relevantes del fenómeno del tecnoestrés. Con esta revisión, se pretende conocer la investigación realizada hasta el año 2014 sobre la experiencia de tecnoestrés para poder desarrollar preguntas de investigación, con la finalidad de ponerlas a prueba en los estudios empíricos posteriores. Este capítulo es el punto de partida de la presente tesis doctoral, y orienta la investigación del tecnoestrés a lo largo de los capítulos.

En el primer estudio empírico (véase el ***capítulo 2***), el objetivo es analizar el rol predictor de la autoeficacia profesional en la percepción de demandas reto y amenaza, y su repercusión sobre el burnout y el engagement. Más específicamente, este estudio contribuye a explicar tres premisas básicas: (1) las demandas laborales se pueden clasificar en dos tipos: demandas reto y amenaza, (2) la autoeficacia es una variable predictora del ambiente laboral, (3) el bienestar psicosocial puede explicarse en función

de dos procesos básicos: el proceso de erosión (donde la presencia de bajos niveles de autoeficacia influye en la percepción de más demandas amenaza y menos reto, y provoca un mayor agotamiento y cinismo) y el proceso de motivación (donde la presencia de altos niveles de autoeficacia influye en la percepción de más demandas reto y menos amenaza, y provoca un mayor vigor, dedicación y absorción en el trabajo). Bajo estas premisas se pretende ampliar el modelo RED (Salanova, Cifre, Llorens, Martínez, y Lorente, 2011). Con un modelo multigrupo formado por dos muestras de usuarios de TIC (460 profesores de secundaria y 596 usuarios TIC) se intenta responder a las siguientes hipótesis:

Hipótesis 1: La autoeficacia profesional estará negativamente relacionada con el burnout a través de las demandas amenaza cuando las muestras se analizan tanto de forma independiente como en multigrupo. Esto es, los altos niveles de autoeficacia estarán relacionados con la percepción de menos demandas amenazas, que a su vez se relacionarán con altos niveles de burnout.

Hipótesis 2: La autoeficacia profesional estará positivamente relacionada con el engagement a través de las demandas reto cuando las muestras se analizan tanto de forma independiente como en multigrupo. Esto es, los altos niveles de autoeficacia estarán relacionados con la percepción de más demandas reto, que a su vez se relacionarán con altos niveles de engagement.

Hipótesis 3: La autoeficacia profesional estará negativamente relacionada con el burnout través de las demandas reto cuando las muestras se analizan tanto de forma independiente como en multigrupo. Esto es, los altos niveles de autoeficacia estarán relacionados con la percepción de más demandas reto, que a su vez se relacionarán con bajos niveles de burnout.

Hipótesis 4: La autoeficacia profesional estará positivamente relacionada con el engagement a través de las demandas amenaza cuando las muestras se analizan tanto de forma independiente como en multigrupo. Esto es, los altos niveles de autoeficacia estarán relacionados con la percepción de menos demandas amenaza, que a su vez se relacionarán con altos niveles de engagement.

En el estudio 2 (ver **capítulo 3**) el objetivo es analizar mediante un diseño longitudinal con dos momentos temporales de recogida de datos (tiempo 1; al principio de curso, y tiempo 2; al final de curso) el efecto del tecnostrain sobre la autoeficacia profesional de los docentes y su repercusión sobre el burnout a lo largo del tiempo. De acuerdo con la investigación previa, se espera que con el tiempo se produzca lo que se denomina una "espiral negativa" mediante la cual el tecnostrain genere niveles bajos de autoeficacia profesional, que con el paso del tiempo provocarían la aparición del burnout docente. En esta línea se analizan las relaciones causales que se establecen entre tecnostrain, autoeficacia profesional y burnout en una muestra de 258 profesores de secundaria, y se intenta responder a las siguientes hipótesis:

Hipótesis 1: la autoeficacia profesional media la relación entre el tecnostrain y el burnout a lo largo del tiempo.

Hipótesis 2: Existen relaciones recíprocas entre tecnostrain, autoeficacia y burnout, de manera que el burnout llevará a percibir menos niveles de autoeficacia (*hipótesis 2a*) que a su vez generará más tecnostrain (*hipótesis 2b*).

En el estudio 3 (ver **capítulo 4**) el objetivo es conocer el rol que juega el clima de liderazgo como factor determinante en la reducción del tecnostrain y aumento de la autoeficacia profesional. Basándonos en la TCS de Bandura (1997) los niveles de autoeficacia pueden incrementarse a través de cuatro fuentes principales: la experiencia de éxito, la persuasión verbal, la experiencia vicaria, y la interpretación de la actividad

somática y emocional. En este sentido, los líderes pueden incrementar los niveles de autoeficacia a través de feedback positivo a sus colaboradores, demostrando una conducta moral, ofreciendo apoyo social y facilitando la información para la ejecución de las tareas, todo ello contribuirá a optimizar los resultados y reducir el malestar (en este caso, tecnostrain). Basándonos en la investigación previa, se estudia el efecto transnivel del clima de liderazgo sobre la experiencia de tecnostrain, y los efectos de mediación de la autoeficacia en la relación entre clima de liderazgo y tecnostrain. En este capítulo se intenta responder a las siguientes hipótesis:

Hipótesis 1: A nivel individual, la autoeficacia estará negativamente asociada con la experiencia de tecnostrain.

Hipótesis 2: El clima de liderazgo a nivel de equipo estará positivamente asociado con la autoeficacia a nivel individual.

Hipótesis 3: El clima de liderazgo a nivel de equipo estará negativamente asociado con la experiencia tecnostrain individual.

Hipótesis 4: La relación entre clima de liderazgo y tecnostrain estará parcialmente mediada por la autoeficacia.

Finalmente, en el **capítulo 5** se resumen y discuten los principales resultados y conclusiones de cada capítulo. Todos los resultados obtenidos se integran para avanzar en la comprensión de un fenómeno complejo y un riesgo emergente, como es el tecnoestrés. Así, como para conocer el rol de la autoeficacia profesional sobre el bienestar psicosocial (tecnoestrés, burnout y engagement). Por otra parte, se discuten las implicaciones teóricas, metodológicas y prácticas de los diferentes capítulos de la tesis. Por último, también se presentan debilidades, fortalezas y retos para la investigación futura.

Nota Final

En general, esta tesis pretende contribuir al conocimiento científico de la experiencia de tecnoestrés y conocer como la autoeficacia profesional influye en el proceso de bienestar psicosocial (engagement, burnout y tecnostrain). Confío sinceramente en que los resultados derivados de esta tesis contribuyan a la mejora de la salud psicosocial de los empleados en general, proporcionando a profesionales del ámbito de los Recursos Humanos o técnicos de Riesgos Laborales, entre otros, datos que redunden en la mejora del bienestar psicosocial en contextos tecnológicos.

Chapter 1: Technostress: The dark side of technologies

(Revisión teórica del fenomeno de tecnoestrés)[1]

Summary

We define technostress as a negative psychological response to the use (and abuse) of technologies, as well as the harmful effects of the implementation of technologies within the workplace. However, despite the relevance of technostress in modern societies, research on the subject is scarce, and so the aim of this chapter is to provide an overview of technostress research that has been recently conducted. In particular, first we focus on the two most important ways of experiencing technostress, namely, technostrain and technoaddiction. Second, we describe the antecedents of technostress, with attention given to the specific technological demands and the lack of both job and personal resources. Moreover, we also highlight the physiological, psychosocial, organizational, and societal consequences of technostress. Third, the assessment of technostress using the RED-Technostress questionnaire is described. Finally, we address the main strategies employed in the prevention and intervention of technostress based on the social and the technical organizational systems.

Keywords: technostress, technostrain, technoaddiction.

[1] El capítulo 1 está publicado en Salanova, M., Llorens, S., & Ventura, M. (2014). Technostress: The Dark Side of Technologies. In C. Korunka & P. Hoonakker (Eds.), *The Impact of ICT on Quality of Working Life* (pp. 1–29). New York, NY: Springer. Retrieved from http://www.springer.com/psychology/book/978-94-017-8853-3

1.1 Conceptualizing technostress experiences

Internet, Wifi, teleworking, e-conomy or the information society are all familiar concepts nowadays. Technologies have become part of our private and public lives. In the workplace, these technologies have been introduced in most socioeconomic sectors, as well as in all functional areas of modern organizations. Data from European surveys reveal that 74% of workers in European countries use technologies in their daily work and 93% use the Internet in different facets of their lives (see Llorens et al., 2011). However, although organizations recognize the benefits of using technologies to increase business competitiveness and promote economic prosperity, the use of those technologies can also produce serious disadvantages, like technostress, as a job stressor in the workplace.

The concept of technostress was first coined in 1984 by Craig Brod (1984) in his book "Technostress: the human cost of the computer revolution". Technostress was defined as a modern disease of adaptation caused by an inability to cope with new computer technologies in a healthy way. For Brod the technostress is a form of adaptation disorder. Since the original concept of technostress was put forward, different definitions have been developed that include psychological, physical or behavioral strain responses to technostressors. For example, Wang et al., (2008, p. 3004) defined technostress as a "reflection of one's discomposure, fear, tenseness, and anxiety when one is learning and using computer technology directly or indirectly, that ultimately ends in psychological and emotional repulsion and prevents one from further learning or using computer technology".

Based on workplace contexts, Salanova and colleagues (Salanova et al. 2007; Salanova et al., 2013) proposed a more operational definition of the technostress experience in the workplace. They defined technostress at work as a negative

psychological state associated with the use (and abuse) of technology as well as the threat of technology use in the future. Moreover, technostress is related to a mismatch among demands and resources related to technology in the workplace. This experience is related to negative psychological experiences such as feelings of anxiety, mental fatigue, skepticism, inefficacy beliefs and addiction to technology. The novelty of this definition is that: (1) technostress is seen as a negative psychological experience; (2) technostress does not occur as a result of the negative impact of technology per se, but depends on the relationship between demands and resources; (3) technostress is extended to the use of technology in general (e.g., computers, tablets, smartphones, videogames, e-mail, social networks); and (4) two different technostress experiences should be differentiated: technostrain and technoaddiction.

1.1 Technostrain: Feeling anxious with technologies

Technostrain could be considered a negative psychological experience composed of: (1) high levels of anxiety and fatigue (affective dimension); (2) skepticism (attitudinal dimension); and (3) inefficacy (cognitive dimension) related to the use of technology (Salanova et al. 2013). As shown by the results of a review of "technostress" from 1982 to 2012 in the PsycINFO database, around 90% of the publications are specifically related to technostrain experiences (521 articles). This provides evidence that technostrain is the most traditional type of technostress experience.

According to previous research, the technostrain experience is commonly determined by high levels of anxiety, that is, by high physiological activation, tension and discomfort with regard to technologies. Experiencing anxiety includes the fear of hitting a wrong key and losing information, doubts about using computers for fear of making a mistake, and finding computers intimidating (cf. Ragu-Nathan et al. 2008).

Secondly, users also feel lower levels of psychological activation, i.e., mental fatigue. One of the special experiences of fatigue is Information Fatigue Syndrome (IFS), which derives from the current requirements of the Information Society and from dealing with information overload (Lewis 1996). The consequences of IFS are related to poor decision-making, difficulty in memorizing and remembering, and reduced attention span.

The third component in the technostrain experience is skepticism, which refers to the attitudinal dimension of the syndrome. The term skepticism is based on studies conducted on job burnout, specifically on the burnout dimension of "cynicism". Skepticism, as a dimension of technostrain, is defined as the display of indifferent, detached, and distant attitudes toward the use of technology. More specifically it is a feeling of cognitive distancing that consists in developing indifference or a cynical attitude when users are exhausted and discouraged due to the use of technology (Schaufeli and Salanova 2007).

The last dimension of technostrain is inefficacy beliefs about the right use of technology. Previous research has shown that technology-related self-efficacy influences the choice of whether to use technologies or not, the expenditure on effort and persistence, and the performance achieved with the use of technology (Bandura 1997). In fact, technology self-efficacy has proven its role in enhancing motivation in the use of technology, and moderating the levels of job burnout (Salanova et al. 2000) and anxiety related to technology use (Henderson et al. 1995).

This multidimensional model of technostrain was tested in a sample of 1,072 ICT users (N = 675 non-intensive ICT users and N = 397 intensive ICT users) (Salanova et al. 2013). Results from Multigroup Confirmatory Factor Analyses among

non-intensive and intensive ICT users showed, as expected, the four-factor structure of technostrain in both samples.

1.2 Technoaddiction: Being abusive with technologies

According to the World Health Organization (WHO) (Arias et al. 2012; Kessler and Ustun 2008), the abuse of technology has increased and one out of four people is suffering from addiction to technologies in one way or another in 2008. The concept of technoaddiction is based on the literature on workaholism, i.e., the tendency to work excessively hard in a compulsive way (Libano et al. 2010). Workaholism and technoaddiction might go together, as there is a connection between working excessively and the use of technology (Porter and Kakabadse 2006).

Technoaddiction is defined "as a specific technostress experience due to an uncontrollable compulsion to use technology 'everywhere and anytime' and to use them for long periods of time in an excessive way" (Salanova et al. 2007, p. 2). People experience technoaddiction when using technology not for pleasure or satisfaction, but from an internal impulse through which they feel compelled to use it and keep up to date with the last technological advances. In fact, they become psychologically dependent on the technology and, consequently, technology becomes the only relevant thing in their lives. This psychological dependence results in an individual's inability to live without technology, without their mobile phone, without checking their email all day long, without being connected to the Internet anytime and anywhere, without their social networks, and so forth.

To sum up, recent research shows that technoaddiction is characterized by: (1) "compulsion" in the use of technology, i.e., the person is obsessed with technology and persistently and frequently thinks about/uses it; (2) "excessive use" of technology, i.e., they tend to allocate exceptionally large amounts of time to using technology; (3) they

feel anxious when they are not using it; and (4) fatigue related to using technology in excess (see Llorens et al. 2011; Salanova et al. 2013).

2 Predictors and consequences of technostress

Several theoretical models in Occupational Health Psychology may be useful to understand the process of technostress (e.g., Lazarus and Folkman 1984), but we explain the antecedents and consequences of technostress based on the Spiral Model of Occupational Health (SMOH; Salanova et al. 2007; Salanova et al. 2009). Generally speaking, the SMOH Model displays the following characteristics (see Figure 1.1):

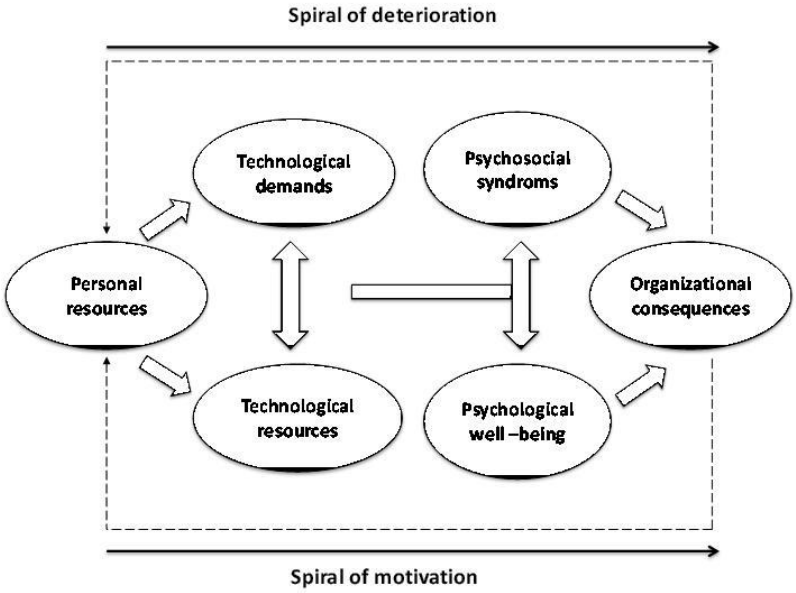
1. According to WHO, health is a state of complete physical, psychological, and social well-being, and not just the mere absence of illness.

2. The model is grounded in Positive Occupational Health Psychology (POHP), since it tests psychosocial health in a holistic, comprehensive way that encompasses not only the assessment of psychosocial distress (e.g., technostress), but also well-being (e.g., technoflow).

3. The technostress experience is explained by a negative spiral of deterioration (i.e., a vicious spiral) which is determined by low personal resources (specifically, low technology self-efficacy). These resources enhance the perception of high technological demands and low technological resources, which in turn gives rise to psychosocial syndromes (e.g., technostrain), negative organizational consequences (e.g., low performance), and so on.

Based on the key dimensions of the SMOH Model, the main determinants of technostress (technological demands, and lack of technological and personal resources), as well as their consequences, are described below.

Figure 1.1. Spiral Model of Occupational Health (SMOH)



2.1 Technological demands and technostress

Technological demands are defined as "those physical and/or psychological, social and organizational aspects related to technology that require a sustained physical and/or psychological effort from the worker, and which are associated to certain physiological and/or psychological costs" (Llorens et al. 2011, p. 53). Based on the SMOH Model, we can distinguish four types of technological demands, which are detailed below.

First, technological demands at the task level are the ones closest to users, since they are associated with the tasks that users employ technology to perform. The main technological demands are: (1) quantitative overload: the degree to which a technology user perceives there is an excess of work generated as a result of the use of technology or network outages (Salanova et al. 2013; Yang and Carayon 1995); (2) mental qualitative overload: the extent to which work with technologies requires excessive attentional demands such as concentration, precision or multitasking to solve problems in order to prevent or correct errors (Salanova et al. 2007); (3) ergonomic qualitative

overload: the extent to which technology causes ergonomic workload, in terms of awkward postures and repetitive movements that can lead to psychosomatic complaints, such as itchy eyes or carpal tunnel syndrome (Tarafdar et al. 2007); (4) continuous pace of technology: the extent to which the user perceives that the time required to perform one or more tasks using technology is less than the time available to do them (Korunka et al. 1995); (5) role ambiguity: the degree to which task performed with technologies are vague, unclear and ill-defined (Salanova et al. 2013), and (5) routine: the degree to which tasks performed with technology are boring, repetitive, monotonous, unchallenging, and not motivating.

Second, technological demands at the social level refer to the relationship people establish with other people at the workplace because of the use of technology. These relationships can be developed with co-workers, but also with people outside the organizations (e.g., external clients). The most important social demand is role conflict, i.e., when the technology user perceives a conflict between the use of new and traditional technology, as well as when the user belongs to multiple virtual teams whose modus operandi is completely different (Tarafdar et al. 2007). Social isolation due to the use of virtual relations with colleagues and clients could be another social technostressor. Finally, in the study by Salanova et al. (2013) it was showed that emotional overload and mobbing were also predictors of technostrain at work.

Third, technological demands at the organizational level are those which are related to the maintenance of competitive advantage and to "staying" alive in the labor market: (1) job insecurity: when users perceive that their job is at risk because technologies will replace them or, otherwise, because of "technological unemployment"; (2) organizational culture: the organizational pyramid structure and innovative structure show higher levels of technostress because of the lack of

employees' participation in decision-making and higher levels of international competitiveness (Wang et al. 2008); (3) technological obstacles such as lack of training regarding ICT (Salanova et al. 2013); and (4) the technology implementation approach: if the implementation is focused on "technology", it will produce technostress, whereas if the implementation is focused on the "end – user", it will produce well-being (Salanova et al. 2007).

Finally, technological demands at the extra-organizational level are mainly related to work-family conflict. These are basically produced when there is a conflict between working and personal life which comes about when technologies invade our private live; that is, people need to be connected to answer their email, thus reducing the time available to enjoy life with their family at the weekend, for example.

2.2 (Lack of) Technological resources and technostress

Other key factors in the development of the technostress experience are the lack of technological resources. Generally, they are defined as "those physical, structural, social and organizational aspects of work with technologies that are functional in achieving goals, reduce the technological demands, and stimulate growing and personal development" (Llorens et al. 2011, p. 53). Again, technological resources can be differentiated into three levels that are detailed below.

First, the main technological resources at the task level are: (1) autonomy: the degree of control, responsibilities and challenges related to work with technologies (Jackson et al. 1993; Salanova et al. 2013); (2) participation in the process of implementing technologies at work; (3) variety of tasks: novelty and change in the work environment caused by technology, in terms of the activities and skills that need to be carried out (intrinsic variety) and changes in the environment (extrinsic variety); and

finally, (4) clarity in the task, which refers to the degree to which the role and tasks to be carried out by the technology users are well-defined.

Second, technological resources at the social level refers to: (1) social networks and trust, which is understood as the contacts within the work context that allow technology users to relate with one another inside as well as outside the organizations in order to avoid the isolation brought out by the use of technology (Zorn 2002); (2) social support climate: personal relationships among technology users and stakeholders (co-workers or supervisors) in which empathy, trust and instrumental support are exchanged (Salanova et al. 2013); (3) transformational leadership was also good negative predictor of technostrain (Salanova et al. 2013), and (4) feedback: the degree to which the technology user has clear and direct information about the effectiveness of their performance provided by their supervisor, colleagues and customers themselves (Salanova and Schaufeli 2000).

Third, technological resources at the organizational level are related to healthy practices in human resource development. The presence of these organizational resources promotes the acceptance and use of technology and the development of positive psychosocial consequences on technology users. These resources are the following: (1) technology-implementing policies focused on the final user, that is, when the user has responsibility for and control over the work instead of technology (Salanova et al. 2007); (2) promoting high-quality training actions for technology in changing contexts (e.g., training workshops related to the new technologies) (Salanova and Llorens 2008); and (3) implementing strategies to balance work-personal life, by means of flexible schedules (for example, by teleworking), providing benefits and assistance for the care of relatives, and by giving advice and training as well as social or extra-legal benefits (Salanova et al. 2013).

In addition, we should also mention the extra-organizational resources, which can serve as facilitators of technological change. The main resource at this level is private-work life support from friends and family (e.g., one's own partner). This support makes it possible to combine personal and technological demands, and acts as a buffer for the technostress experience (Poelmans et al. 2005).

2.3 (Lack of) Personal resources and technostress

According to the SMOH Model, personal resources are the key elements to coping with technological demands and low technological resources. There are basically three main personal resources in technostress: (1) coping strategies; (2) assessment of past experience with technologies; and (3) technology self-efficacy.

First, coping strategies (focusing on the problem and on emotion) refer to cognitive and behavioral efforts that are made to control the specific external and/or internal demands that are evaluated as exceeding the individual's resources (Lazarus and Folkman 1984). Research has shown two main coping strategies to deal with technostress: (1) focused on the problem: behaviors to change the situation which enhances technostress (e.g., look for information, attend training courses); and (2) focused on emotions: behaviors to change the emotion felt by the technology users although the problematic situation persists and is accepted (e.g., to see the positive side of technological change) (see Llorens et al. 2011, for more details).

Second, assessment of past experience constitutes another personal resource to cope with technostress. Research has shown that the experience of technology has no direct relationship with technostress, but its (negative) effect depends on: (1) the technological resources available to the user, and (2) the assessment of past experiences with technology (Chua et al. 1999), that is, by the value, significance, and relevance of the past experience with each person's use of technology. Such users, who assessed the

experience of technology in a negative way, will experience technostress (Korunka and Vitouch 1999).

Finally, the most relevant personal resource in coping with technostress is specific self-efficacy regarding technology. Based on the Social Cognitive Theory (Bandura 1997), this refers to the belief in one's capabilities to use technology successfully (Salanova et al. 2000). Research has shown that self-efficacy in technology enhances: (1) the desire, effort, and persistence to do activities in which technology is used; (2) positive emotions related to the use of technology (e.g., satisfaction); and (3) thoughts about success in the use of technology. On the other hand, people with low levels of self-efficacy in technology tend to exaggerate the magnitude of their shortcomings and difficulties in using the technology, which can lead to burnout.

2.4 Consequences of technostress

In addition to the antecedents, there is also empirical evidence regarding the consequences of technostress. Basically, we can classify the main consequences of technostress into four categories, based on the review performed by Llorens et al. (2011): (1) physiological; (2) psychosocial; (3) organizational; and (4) societal consequences.

Regarding the physiological consequences, research has shown that the use/abuse of technology may generate psychosomatic problems in users, such as sleep problems, headaches, musculoskeletal pain, carpal tunnel syndrome, depression symptoms, increased levels of adrenaline, nor-adrenaline, higher blood pressure and heart rate, and increases in skin conductance. Especially in technoaddiction, sleep deprivation due to the long hours spent using technologies could enhance fatigue, immune system problems, and health deterioration in general (e.g., Thomee et al. 2007).

At the psychological level, technostress may be responsible for anxiety, job dissatisfaction, and a decrease in the levels of work engagement. As a consequence of the technostress experience over a long time, the user could also experience burnout, mainly as a general state of mental exhaustion due to the use of technology. This negative experience leads to an increase in the user's skeptical attitudes toward the usefulness of technologies, which finally enhance the belief that they are not very competent in the performance of their professional duties (Llorens et al. 2007).

Technostress could also generate organizational consequences such as absenteeism and low performance. This reduction in performance could be triggered by the non-use, misuse or abuse of technology at work, as well as being due to the pervasiveness of technology in human life. In fact, in order to remain up to date in technologies, users have to dedicate long hours of their own personal time to the matter. Other consequences of technostress are represented by low levels of commitment and a low level of intention to remain in the organization (Salanova and Schaufeli 2000).

Finally, technostress may also show its consequences at the societal level. The abuse of technology can significantly reduce the user's social activities. Social networks are also deteriorated, since the user becomes more irritable, with mood changes, and neglects both their working life (e.g., poor communication with peers) and their personal life (e.g., poor relationship with their partner, which can lead to divorce). In addition, the technology addict spends so much time using technology that societal and financial problems are evident (Douglas et al. 2008).

3. Assessing technostress: The RED-Technostress questionnaire

Policies on Occupational Health Psychology should begin by conducting an accurate assessment of the psychosocial factors deriving from technology use and the technostress experience. Basically, testing the technostress experience seeks to

accomplish three main objectives: (1) to identify and test the psychosocial risks due to the use/abuse of technology as a part of the evaluation process; (2) to propose suitable measures to eliminate or mitigate the psychosocial risks from technology; and (3) to improve the security and psychosocial health of technology users and their quality of life.

Despite the great variety of instruments in the form of interviews and checklists that may be used for such purposes, self-report questionnaires are the key tools. One of the most operative, comprehensive, and scientific questionnaires is the RED Technostress (see Llorens et al. 2011; Salanova et al. 2007; 2013).

Its main characteristics are the following: (1) it is based on theoretical models, such as the Spiral Model of Occupational Health; (2) its reliability and validity have been demonstrated in research; (3) it is easy to complete and correct (20 minutes); (4) it diagnoses the phenomenon of the technostress experience (technostrain and technoaddiction), as well as its antecedents and consequences, and (5) it can be completed using the traditional paper format or the online version (www.wont.uji.es). In its online version, the user receives immediate feedback about his/her results in comparison to a baseline value (Llorens et al. 2011; Salanova et al. 2013; Salanova and Schaufeli 2000).

In the studies conducted in Spain with the RED Technostress questionnaire: (1) the samples were made up of individuals from a variety of fields (N = 1,790 ICT users): 21% technical and qualified professionals, 8% supervisors, 5% managers, 4% blue-collar workers, 27% secondary school teachers, 22% university lecturers, and 13% university students; (2) 63% commonly used ICT (e.g., computers, tablets, PDAs) as just another tool in their work, and 37% (mainly women) used computers in an intensive way; and the results also showed that (3) technology workers perceived more

technological resources and personal resources than technological demands, and more positive experiences (e.g., Llorens et al. 2006; Llorens et al. 2007; Rodríguez et al. 2008; Salanova and Llorens 2009; Salanova et al. 2013; Salanova et al. 2010; Salanova et al. 2003) (see Table 1.1 and 1.2).

Table 1.1 Percentage of technological demands and resources, and personal resources perceived by ITC users

Technological demands	**Technological and personal resources**
60% emotional overload	74% positive appraisal of exposure to ICT
57% work overload	78 % mental competences
60% technology obstacles	74% autonomy
39% role ambiguity	70% efficacy beliefs related to technology
12% mobbing	66 % social support
	64% transformational leadership
	60% technology facilitators

Table 1.2 Percentage of positive and negative experience perceived by ICT users

Positive experience	**Negative experience**
84% enthusiasm	39% anxiety
81% satisfaction	34% burnout
78% comfort	
78% organizational commitment	
66% engagement	
37% task performance	

4. Strategies for technostress prevention and intervention

The intervention process is defined as "… such specific actions to eliminate/reduce sources of stress, their responses or their effects, and optimize health factors and their consequences" (Salanova et al. 2009, p. 50).

Despite the relevance of protecting and promoting employees' (and in our case technology users') well-being, the psychosocial intervention processes remain an ongoing issue in current research, as does their implementation in real organizations. Linking research and professional practice (Research To Practice – R2P) is a challenge for the occupational health psychologist. Based on Salanova et al.'s classification (2009), technostress interventions could be distinguished by: (1) the focus (technology users and technical system), and (2) the objective of the intervention (primary, secondary, and tertiary intervention). Below we explain the main prevention-intervention strategies on technostress (for a review, see Llorens et al. 2011, and Salanova et al. 2007).

4.1 Prevention strategies on technostress

Prevention strategies are aimed at healthy individuals (groups) who are not under risk conditions. They are of a general nature oriented toward all technology users, and are proactive and very effective (Lamontagne et al. 2007), their aim being to prevent harm. The main prevention strategies in technostress are classified taking into account: (1) the end users; (2) the organization; and (3) the technological system. These strategies are shown below.

4.1.1 Prevention strategies focused on the final user

Survey feedback. This is a strategy based on bidirectional communication between facilitators and participants. It has two objectives: (1) to know more about

technostress, and (2) to establish improvement strategies that are under the technology users' control.

Technostress workshop. This consists in a work meeting (with practical exercises) to solve technostress in a group of users. This strategy seeks: (1) to draw the study of technostress closer to the participants through their own self-diagnosis; (2) to teach them how to apply these processes to their own situation; (3) to become more familiar with diagnostic measures of technostress; and (4) to learn how to discriminate prevention and intervention strategies that are useful for them.

4.1.2 Prevention strategies focused on the social system

Information and communication. This is easy to apply and very beneficial for users. It consists in giving information to users, supervisors and indeed everybody that could be involved in the changes due to the technology. The main objective is to inform them about: (1) the changes in the organization as a consequence of the technology implementation, and (2) the results obtained from the technostress diagnosis. This is a good strategy to avoid rumors, resistance to change, boycotts, and the development of negative attitudes toward the use of technology.

Job redesign. This strategy involves enriching those jobs in which technology should be implemented. Its objective is to promote: (1) the development of technology users at the individual, social, and professional levels; and (2) the perception of technology as a resource in order to cope with the environment. It implies three types of specific strategies: (1) enriching jobs (i.e., giving more autonomy); (2) clarifying the role (i.e., giving feedback about the job with technologies); and (3) improvement of the ergonomic aspects of technology (i.e., use of ergonomic keyboards).

Participation in decision-making. Users of technology can participate in: (1) the implementation of technology; (2) the selection of the specific characteristics of the

technology; (3) the evaluation of technostress; and (4) the selection of the prevention-intervention strategies to be implemented. The benefits to be gained from participating are the following: (1) it provides a feeling of "gratitude" because the user perceives that his/her opinion is taken into account; (2) it involves a greater commitment to decisions; (3) it reduces the stressful effects of changing technology (technostress experience); (4) it increases the levels of psychological attachment to technology; and (5) it increases the likelihood of technology acceptance.

4.1.3 Prevention strategies focused on the technological system

Prevention strategies can also be aimed at changing the system through the technology design. According to research, technology will succeed when three basic criteria are met: (1) the technology design is ergonomic (e.g., use of wireless connections, widescreen displays, ergonomic keyboards) and avoids the appearance of physical problems in users (eye problems, headaches, back pain); (2) it is "usable" and functional in order to ensure the use of technology; and (3) it is friendly, simple, and easy to use successfully, both for experts and for other less proficient users.

4.2 Secondary intervention strategies on technostress

Secondary intervention strategies are carried out in individuals and groups that are under risk conditions, with the aim of minimizing or eliminating the risk. These strategies: (1) are applied when the first symptoms of psychosocial and/or organizational damage are starting to manifest; (2) are only applied to those users or groups in which a symptom is detected; and (3) have an active agent, i.e., the user, whose role is crucial in the implementation of these strategies (Lamontagne et al. 2007). These strategies are shown below.

4.2.1 Secondary intervention strategies focused on the social system: The user

Tutoring and coaching. The aim of this strategy is to support the user in the development of specific skills in technological innovations. The coach should help the technology user to establish goals, objectives, and work planning, and should offer advice to help in the development of their employability. This strategy requires a transformational leader to guide technology users and to help them solve problems, but it also gives rise to questions and even the expression of positive emotions that can spread to other employees.

4.2.2 Secondary intervention strategies focused on the social system: The organization

Team building and team development. This involves the creation of stable work teams through a series of activities and exercises (e.g., testing prototypes, outdoor training). These strategies allow technology users to identify themselves with the team goals and objectives by promoting group cohesion and effectiveness. The creation of these groups is even more important in these technological contexts where the groups have the power to solve any problems generated as a result of the use/abuse of technology.

4.2.3 Secondary intervention strategies focused on the technical system

Replacement technologies. This strategy is related to changing technology that has become obsolete, useless, barely usable, "unfriendly" or ergonomically stressful. The decision to replace technologies could be determined as a result of the team building and team development strategy, outlined earlier.

4.3 Tertiary intervention strategies on technostress

Finally, tertiary intervention strategies are carried out in individuals and groups who are sick, where technostress has appeared with the full range of all its symptoms. Its aim is to reduce the severity or disability associated with technostress by trying to help people recover. These strategies are: (1) therapeutic and attempt to recover and

rehabilitate workers and groups that have suffered from technostress; and (2) reactive, since they are applied once all the damage has been done. This last objective is the reintegration and/or rehabilitation of users who have suffered technostress in their workplace. These strategies are as follows.

4.3.1 Tertiary intervention strategies focused on the social system: The user

Counseling and psychotherapy. Briefly, both are related to psychosocial treatment, and obviously the user should be sent to an expert. The aim is to make the user aware that he/she has a psychological problem, to eliminate negative reactions, to increase confidence as well as positive attitudes toward technology, and to help him/her regain control over the use of technology. In general, these strategies imply that users actively learn to take responsibility for their behavior and to realize the situation is under control. To be successful, these strategies should be controlled and guided by a specialist, but they also involve working with the group (especially peers, tutor, supervisor, and even the family), which has to receive and reintegrate the technology user.

4.3.2 Tertiary intervention strategies focused on the social system: The organization

This last strategy is focused on promoting the institutionalization of prevention services in order to promote the overall health of employees. The aim of this strategy is to ensure the care and the overall well-being of workers, and by extension technology users, in the organization. It involves the assessment of future and proactive needs and organizational changes derived from the culture of creativity and innovation in the organization. It also involves planning and monitoring the implementation of prevention-intervention measures to deal with technostress. Generally, this strategy reveals the relevance of integrating prevention within the company, which should be seen as a priority in organizations.

5. Concluding remarks

Despite the relevance of technology nowadays, psychological consequences such as technostress could be experienced in non-intensive as well as intensive technology users. In order to facilitate the interventions, it is relevant to diagnose it in a correct way. For this reason, it is important to conceptualize technostress as an umbrella attending to the both typology of technostress, i.e., technostrain and technoaddiction experiences. Furthermore, we must distinguish among the experience of technostress (technostrain and technoaddiction) and their predictors and consequences. To achieve this objective, the Spiral Model of Occupational Health and specifically the RED Technostress questionnaire, are a scientific and operative way to explain and measure the technostress experience. According to this, technostress could be assessed attending to three fundamental "ingredients": technological demands, technological resources, and personal resources. In particular, (the lack of) specific self-efficacy with technology has been shown to be a key element in the determination of technostress. Also the model and the questionnaire establish the main consequences of technostrain. These consequences should be oriented to capture not only the idiosyncratic character of the phenomenon (physiological and psychological), but also the organizational and societal problems derived from technostress. If the evaluation and diagnosis of technostress are important, also the strategies for preventing and intervening are a key subject. From a practical point of view it is recommended to select the better strategy attending to the objective (prevention, secondary and tertiary interventions) and the focus (on the users of technology, the organization and the technical system) of the intervention. At this point, we have to highlight the need to combine the strategies in order to intervene in technostress in a suitable way.

In sum, in the present chapter we have shown that technology has the power to make our lives easier, but sometimes it fails to do so. Thus, the dark side of technologies has reared its head in the form of technostress. We really would like to encourage researchers, practitioners, organizations, governments, and society in general to establish mechanisms that make it possible to turn technology into our ally. Nevertheless, more research is needed in order to better understand the mechanisms underlying technostress, as well as ways to prevent it in today's organizations and societies.

Chapter 2

Professional self-efficacy as a predictor of burnout and engagement: the role of challenge and hindrance demands[2]

Summary

The objective of the current study is to analyze the role of professional self-efficacy as a predictor of psychosocial well-being (i.e., burnout and engagement) following the Social Cognitive Theory of Albert Bandura (1997). Structural Equation Modeling was performed in a sample of secondary school teachers (n = 460) and users of Information and Communication Technology (n = 596). Results show empirical support for the predicting role that professional self-efficacy plays in the perception of challenge (i.e., mental overload) and hindrance demands (i.e., role conflict, lack of control, and lack of social support), which are in turn related to burnout (i.e., erosion process) and engagement (i.e., motivational process). Specifically, employees with more professional self-efficacy will perceive more challenge demands and fewer hindrance demands, and this will in turn relate to more engagement and less burnout. A multi-group analysis showed that the research model was invariant across both samples. Theoretical and practical implications are discussed.

Keywords: professional self-efficacy, challenge demands, hindrance demands, engagement and burnout

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JCR = 1.253

Introduction

Currently job stress is considered one of the main complaint s suffered by workers in relation to health at work (Eurofound, 2012). Among other factors, employees' stress is due to rapid changes in psychological and physiological conditions (Beehr & Newman, 1978). Particularly, the introduction of technologies seems to be a relevant stress factor nowadays. This kind of situation may increase demands on employees, such as those related to the intensification of work, the need to develop additional technological competences, and a poor work–life balance (Milczarek, Schneider, & Rial–González, 2009).

Although job demands have been seen as factors that increase work-related strain from the traditional theoretical models of stress and well-being (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001; Johnson & Hall, 1998; Karasek, 1979; Schaufeli & Bakker, 2004), recent research has shown that the role that demands play in job stress is not so clear (Crawford, LePine, & Rich, 2010). This lack of clarity is perhaps the main reason for the ambiguity in some research findings where the relationships between job demands and well-being are positive (e.g., workload and mental overload has been related positively to engagement over time; Mauno, Kinnunen, & Ruokolainen, 2007) or negative (e.g., workload, work contents and physical work environment has been related positively to burnout over time; Hakanen, Schaufeli, & Ahola, 2008), or there is no direct relationship (time and method control have zero relationships with engagement; Llorens, Schaufeli, Bakker, & Salanova, 2007b). One possible reason for this is that job demands have not been assessed correctly.

Thus, recent research (Crawford et al., 2010; LePine, Podsakoff, & LePine, 2005) indicates that demands do not necessarily have to be factors that increase strain,

but rather it depends on how they are perceived, that is, whether they are seen as challenges or hindrances.

One of the key elements that influence the perception of work environment and psychosocial well-being is self-efficacy. According to the Social Cognitive Theory (SCT, Bandura, 1997, p.3) it seems that people with high levels of self-efficacy tend to interpret demands and problems more as challenges than as hindrances or subjectively uncontrollable events. In this regard, self-efficacy is postulated as maybe playing a predictor role of psychosocial well-being (e.g., burnout and engagement) (e.g., Llorens et al., 2007b; Salanova, Bresó, & Schaufeli, 2005a; Salanova, Llorens, & Schaufeli, 2011b).

Hence, the purpose of this study was to extend the Resources–Experience–Demands model (RED model; Salanova, Cifre, Llorens, Martínez, & Lorente, 2011a) in two different samples: secondary school teachers and ICT users. We are interested in examining whether self-efficacy is related to well-being (i.e., engagement and burnout) through the perception of challenge and hindrance demands.

Extension of the RED Model

The hypothesized model in this study is an extension of the RED model (Salanova et al., 2011a), which draws on the main assumptions of SCT and the Job Demands–Resources (JD–R) model (Demerouti et al., 2001).

The JD–R model assumes that the characteristics of work environments (i.e., job demands and resources) can trigger two relatively independent psychological processes: (1) erosion process, in which poorly designed jobs or chronic job demands exhaust employees' mental and physical resources, and may therefore lead to the depletion of energy and, as a result, health problems, and (2) a motivational process, in which the availability of job resources leads to high work engagement, high organizational

commitment, low cynicism, and excellent performance (Bakker & Demerouti, 2007; Schaufeli & Bakker, 2004).

However, JD–R model does not pay attention to resources that can help employees to cope with job demands, that is, personal resources. Personal resources affect both the stress process and the coping process. Related to the stress process, personal resources influence how a person appraises the situation. In addition, personal resources are important for coping with demands and to recover from job stress (Salanova, Bakker, & Llorens, 2006). In this regard, research has found that the self-efficacy plays a key role in coping with stress, and that job demands and resources mediated the relationship between self-efficacy, burnout (Consiglio, Borgogni, Alessandri, & Schaufeli, 2013; Vera, Salanova, & Lorente, 2012), and engagement (Xanthopoulou, Bakker, Demerouti, & Schaufeli, 2007).

In this sense, the RED model (Salanova et al., 2011a), in line with the SCT (Bandura, 1997), considers self-efficacy an important personal resource, which plays a predicting role in the development of the motivation and erosion processes of burnout and engagement at work. Empirical evidence of the positive relationship between self-efficacy and engagement across time supports that core self-evaluations or self-efficacy beliefs are crucial determinants of employee engagement (Judge, Bono, Erez, & Locke, 2005; Salanova, Schaufeli, Xanthopoulou, & Bakker, 2010; Xanthopoulou, Bakker, Demerouti, & Schaufeli, 2009). In addition, studies using longitudinal designs support the motivational process indicating that there are reciprocal relationship between self-efficacy and job resources and engagement (Xanthopoulou et al., 2009). In similar line, Vera et al. (2012) tested two processes: (1) motivational processes, in which high levels of self-efficacy enhance the perception of job resources, which in turn enhances engagement, and (2) erosion process, in which low levels of efficacy lead to the

perception of more job demands, which produces burnout. Thus, employees with high self-efficacy perceive that they control the workplace effectively, and demands are seen as challenges and resources as being abundant and positive for accomplishing the task. As a result, employees tend to be more engaged and suffer from less burnout with their work (Llorens et al., 2007b).

Last, although diverse research demonstrates a clear relationship between job demands and burnout, it also shows the ambiguous role that job demands play in their relationship with engagement. Indeed, as we have already mentioned, some studies demonstrate that demands are negatively related with engagement, for example, high job demands produce low engagement (Hakanen et al., 2008), and more job insecurity and work–family conflict are related to low engagement (Mauno et al., 2007). Other studies, in contrast, have reported positive relationships between demands and engagement. For instance, the combination of high job demands (i.e., workload and mental overload) and high job resources produces a high level of engagement, specifically higher level of vigor and dedication (Bakker et al., 2007; Bakker, Demerouti, & Schaufeli, 2005; Bakker, Van Emmerik, & Euwema, 2006; Mauno et al., 2007; Llorens, 2004). Last, results from other studies report no direct or weak relationship between job demands and engagement (Llorens, Bakker, Schaufeli, & Salanova, 2006; Schaufeli & Bakker, 2004). Thus, the relationship between demands and engagement will depend on the type of job demand in question.

Challenge and Hindrance Demands

To solve this ambivalence of the impact that demands have on psychosocial well-being, LePine and colleagues (LePine et al., 2005; Podsakoff, LePine, & LePine, 2007) proposed to differentiate the demands into two types, following previous findings obtained by Lazarus and Folkman (1984). These authors classified job demands as either challenges or hindrances. Job demands that are perceived by employees to be challenging or potentially promoters of their personal growth will exhibit positive outcomes, while job demands that are perceived as hindrances will exhibit negative outcomes.

From this perspective, challenge demands are defined as positively valued demands since they have the potential to promote personal gain or growth, trigger positive emotions and an active or problem-solving style of coping (e.g., increasing effort) (LePine et al., 2005). In a similar line, Podsakoff et al. (2007) performed a meta-analysis and considered the following variables as challenge demands: time pressure, responsibility, workload, and mental overload. Workers tend to perceive or to value these job demands as creative challenges and/or opportunities for personal development and accomplishment. On the other hand, and in line with Lazarus and Folkman (1984), hindrance demands are defined as the negative demands that may potentially harm personal growth or gain, which trigger negative emotions and a passive or emotional style of coping (e.g., withdrawing from the situation, rationalizing) (LePine et al., 2005). Podsakoff et al. (2007) considered inadequate resources, role conflict, role ambiguity, organizational politics, and concerns about job security as hindrance demands. Workers tend to perceive or value these job demands as obstacles to personal growth and task accomplishment.

Previous findings suggest that challenge demands are positively associated with performance, motivation, job satisfaction, positive emotions and attitudes toward work, and are negatively associated with job search behaviors and turnover intention.

Conversely, hindrance demands are negatively associated with performance, motivation, job satisfaction and organizational commitment (Boswell, Olson–Buchanan, & LePine, 2004; Cavanaugh, Boswell, Roehling, & Boudreau, 2000; Lazarus & Folkman, 1984; LePine et al., 2005; Podsakoff et al., 2007).

In the current study, we extend the RED model by differentiating between challenge and hindrance demands, and their different effects on workers' psychological well-being (i.e., burnout and engagement). Moreover, LePine et al. (2010), based on the SCT (Bandura, 1997), proposed self-efficacy should be taken as a predictor of psychosocial well-being.

Professional Self-efficacy: The Power of Belief That You Can Do It…

In accordance with the SCT of Bandura (1997) then, one of the mechanisms which predominates the level of operation and the events that take place in our life is self-efficacy. It is defined as the beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments (Bandura, 1997). These beliefs in one's own capacities may develop through successful past experiences, vicarious learning, verbal persuasion, and physiological and psychological states (Bandura, 1997), in such a way that self-efficacy may determine motivation, how we feel, what we think, and what we do (Bandura, 2001; Garrido, 2000). In this sense, people avoid doing tasks which are beyond their capacities, and they do those tasks that they feel they are able to control.

Theoretical and empirical research in self-efficacy in occupational contexts has shown that self-efficacy is a relevant factor in job stress. There are research findings

that recognize the fundamental moderating role of self-efficacy in the models of stress, thereby suggesting that it helps to mitigate some of the consequences of stress, such as lack of satisfaction, physical symptoms, turnover, low organizational commitment (Jex & Bliese, 1999), anxiety and depression (Beas & Salanova, 2006), and burnout (Grau, Salanova, & Peiró, 2000; Salanova, Grau, Cifre, & Llorens, 2000a; Salanova, Grau, Llorens, & Schaufeli, 2001; Salanova et al., 2002). Other research highlights the mediating role of self-efficacy in negative consequences, that is, between techno-stress and burnout in a sample of secondary school teachers (Llorens, Salanova, & Ventura, 2007a), and in positive consequences, that is, between job resources and engagement (Llorens et al., 2007b; Xanthopoulou et al., 2007).

Last, recent research indicates that self-efficacy plays a predicting role in the development of the motivational process and erosion process of burnout (Vera et al., 2012) and engagement (Salanova, et al., 2011b; Vera et al., 2012) at work. As a result, self-efficacy was shown to influence how the environment is perceived by having the power to produce the desired effects. Without such beliefs, people would have little incentive to act or persevere when faced with difficulties. Therefore, those who display high levels of self-efficacy tend to interpret demands and problems as challenges and not as hindrances or subjectively uncontrollable events (Bandura, 1999, 2001).

Research carried out on self-efficacy and psychosocial well-being indicates that people with low self-efficacy have pessimistic feelings about their performance and their own personal achievements and, consequently, these low levels of efficacy are associated with depression and anxiety (Schwarzer, 1999), and with burnout in the long term (Cherniss, 1993; Llorens, García, & Salanova, 2005). On the other hand, people with high levels of self-efficacy have more optimistic thoughts, which are in turn

associated with persistence, dedication, satisfaction, and engagement (Llorens et al., 2007b; Salanova et al., 2011b; Vera et al., 2012).

In this way, self-efficacy is considered a clear forerunner of psychosocial well-being. Thus, successive efficacy crises would be responsible for the appearance of burnout (Cherniss, 1993; Llorens et al., 2005; Vera et al., 2012), whereas high levels of efficacy would enhance the development of engagement (Llorens et al., 2007b; Salanova et al., 2011b).

Job Burnout and Engagement

Burnout is defined as a persistent, negative, work-related state of mind in normal individuals that is primarily characterized by exhaustion, which is accompanied by distress, a sense of reduced effectiveness, decreased motivation, and the development of dysfunctional attitudes and behaviors at work (Schaufeli & Enzmann, 1998). In this case, burnout is composed of a tri-dimensional structure made up of exhaustion (i.e., fatigue produced by excessive efforts made at work), cynicism (i.e., indifference and distant attitudes toward the work one does in general), and lack of professional efficacy (i.e., the tendency to assess one's own work negatively, and it involves less sense of competence and performance at work) (Maslach, Schaufeli, & Leiter, 2001; Schaufeli, Maslach, & Marek, 1993).

Even though high levels of exhaustion and cynicism, and low levels of professional efficacy are general indicators of burnout, there is empirical evidence to show that exhaustion and cynicism constitute what has become known as the core of burnout (Green, Walkey, & Taylor, 1991). From this empirical viewpoint, the results of a meta-analysis show the independent role of professional efficacy compared with the dimensions of exhaustion and cynicism (Lee & Ashforth, 1996). Indeed, some studies have found that burnout is a consequence of a crisis in efficacy (Leiter, 1992; Llorens et

al., 2005); it is that lack of confidence in one's own competence that is a critical factor in the development of burnout (Cheniss, 1993). In accordance with these previous findings, in this study professional efficacy is not considered a dimension of burnout, but instead one of its key predictors.

The construct of engagement is the theoretical opposite of burnout and can be defined as a positive, fulfilling, work-related state of mind that is characterized by vigor, dedication and absorption (Schaufeli, Salanova, González-Romá, & Bakker, 2002).*Vigor* is characterized by high levels of energy and mental resilience while working, the willingness to invest effort in one's work, and persistence even in the face of difficulties. *Dedication* refers to being strongly involved in one's work, and experiencing a sense of significance, enthusiasm, inspiration, pride, and challenge. Last, *absorption* refers to being fully concentrated and happily engrossed in one's work, where time is felt to pass quickly and one has difficulties with detaching oneself from work.

Previous research shows that engagement is positively related to self-efficacy (Llorens et al., 2007b; Salanova et al., 2010; Xanthopoulou et al., 2007). Therefore, from SCT we may state that engagement is intrinsic work-driven motivation, and is a result of people's high levels of self-efficacy (Salanova et al., 2005a; Salanova et al., 2011b).

The Current Study: Self-efficacy, Challenge and Hindrance Demands, Engagement and Burnout

This research study considers an extended version of the RED model by proposing the differentiation between challenge and hindrance demands, following the proposition put forward by LePine et al. (2005) according to which not all demands are negative in the occupational context. Indeed their potential role depends on how they

are perceived. Based on the SCT of Bandura (1997), the objective of this study is to analyze the role of professional self-efficacy as a predictor variable of the perception of challenge and hindrance demands, and its relationship with burnout and engagement in two different samples: secondary school teachers and ICT users. Specifically, the model hypothesized for this study proposed three basic premises: (1) it explains psychosocial well-being in terms of two job characteristics: challenge and hindrance demands (LePine et al., 2005; Podsakoff et al., 2007); (2) it considers a personal resource, self-efficacy, which influences the perception of the work environment; and (3) it explains the psychosocial well-being process in terms of two basic processes: the erosion and motivational processes. This theoretical model is depicted in Figure 2.1.

More specifically, it is expected that:

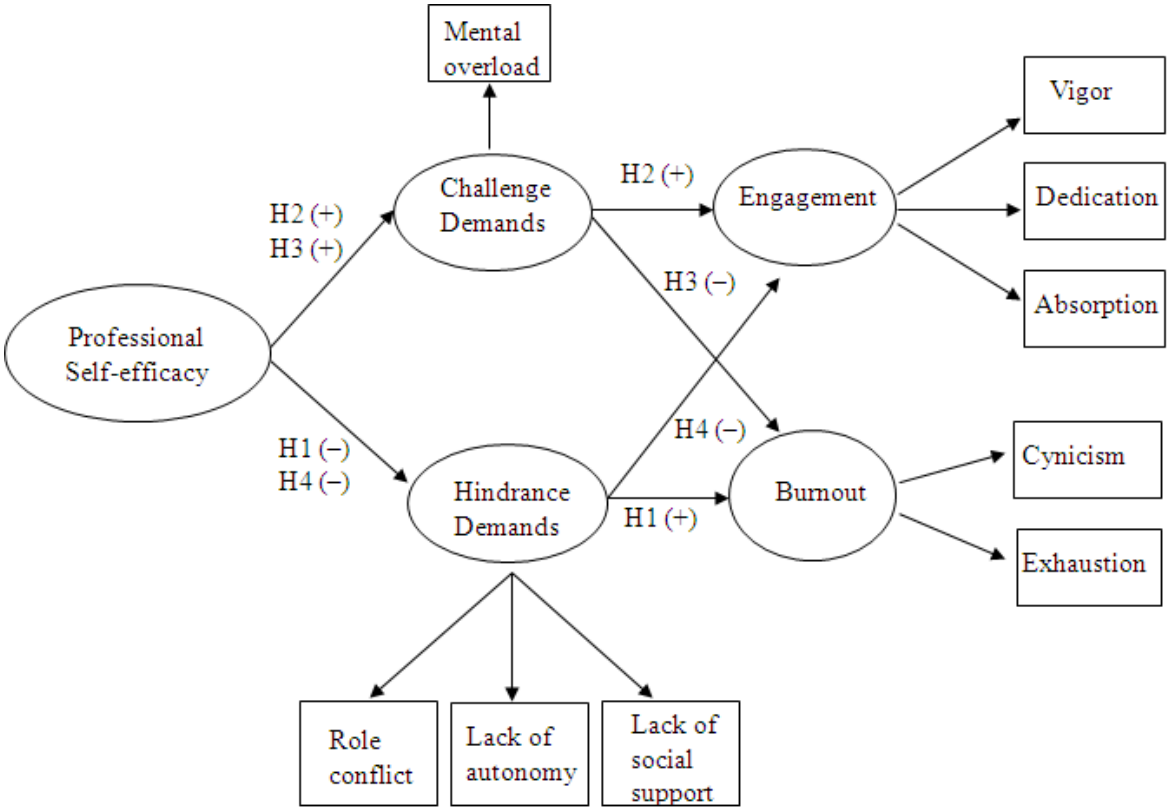
Hypothesis 1: Professional self-efficacy will be negatively related with burnout through hindrance demands (i.e., erosion process) when samples are analyzed independently and in the multi-group analysis. That is, low levels of professional self-efficacy are related to the perception of more hindrance demands, which is further related to high levels of burnout.

Hypothesis 2: Professional self-efficacy will be positively related with engagement through challenge demands (i.e., the motivation process) when samples are analyzed independently and in the multi-group analysis. That is, high levels of professional self-efficacy are related to the perception of more challenge demands, which is further related to high levels of engagement.

Hypothesis 3: Professional self-efficacy will be negatively related with burnout through challenge demands when samples are analyzed independently and in the multi-group analysis. That is, low levels of professional self-efficacy are related to the perception of less challenge demands, which is further related to high levels of burnout.

Hypothesis 4: Professional self-efficacy will be positively related with engagement through hindrance demands when samples are analyzed independently and in the multi-group analysis. That is, high levels of professional self-efficacy are related to the perception of less hindrance demands, which is further related to high levels of engagement.

Figure 2.1. *Research model of professional self-efficacy, challenge and hindrance demands, burnout and engagement.*



Note: H = hypothesis

Method

Participants and Procedure

This study was conducted using two convenience samples: secondary school teachers and ICT users. The first sample was made up of a total of 460 secondary school teachers (81% response rate) from 34 public and private schools in Spain. 56% were women and the average age was 40 years (*SD* = 8.2 years).

The second sample consisted of 596 ICT users from different Spanish public and private companies (80% response rate). 55% were males and the average age was 38 years (*SD* = 8.3 years). The sample was quite heterogeneous, with workers from the following occupational contexts: administration (55%), technical support (11%), laboratory (10%), blue-collar workers (8%), sales (7%), human resources (6%), and management (3%). Even though it was a heterogeneous sample in terms of the occupational group the subjects belonged to, the common denominator of all the workers was the use of ICT in their work (over 51% of their weekly work time).

In both cases, the research team explained the purpose of the study to the head teachers of the different schools or the Human Resources Officers (HR officers) of the enterprises, as well as offering them instructions on how to distribute the self-report questionnaire used in this research. Subsequently, the head teachers or HR officers distributed the paper–and–pencil questionnaire in an envelope together with a cover letter explaining the purpose of the study and that participation was voluntary with guaranteed confidentiality. Respondents returned the completed questionnaires in a sealed envelope either to the person who had given them out (head teacher or HR officer) or directly to the research team.

Measures

We used 10 original, reworded, or adapted versions of well-known, validated scales (see Table 2.1 for details) using Likert scales ranging from "never" to "always".

Professional self-efficacy was measured with the professional self-efficacy version by Schwarzer (1999), which was adapted to a specific domain: the work setting.

Job demands were measured with five scales which were divided in terms of hindrance and challenge demands. *Hindrance demands* were tested by role conflict, lack of autonomy, and lack of social support[3]. *Challenge demands*, in contrast, were tested by mental overload.

Job Burnout was measured with the two "core of burnout" dimensions: exhaustion and cynicism, using the Spanish version of the MBI-GS (Salanova, Schaufeli, Llorens, Peiró, & Grau, 2000b).

Work Engagement was measured with the subscales of the Utrecht Work Engagement Scale (UWES; Schaufeli et al., 2002) in its Spanish version (Salanova et al., 2000b). The three dimensions of engagement were used: vigor, dedication, and absorption.

[3] The items on the autonomy and social support scale (which were originally job resources) were reversed, so they were considered to negatively assess "lack of autonomy" and "lack of social support", just as indicated by Podsakoff et al. (2007).

Table 2.1. *Scales, number of items, range of Likert-type scales (for secondary school teachers/ICT users), source and an example of an item*

Scale	*Item*	*Range*	*Source*	*Example of item*
Professional self-efficacy	10/5	7/5	**Schwarzer (1999)	*"I will be capable of efficiently handling unexpected events in my work"*
Role conflict	8/3	7/5	**Rizzo, House, & Lirtzman, 1970	*"I receive incompatible demands from two people or more"*
Social support	3/5	7/5	Van Muijen et al., 1999.	*"In this organization, people show interest and support for their colleagues' personal problem"*
Autonomy	5/5	7/5	**Jackson, Wall, Martin, & Davis, 1993	*"I can decide which tasks I will do each day"*
Mental overload	5/5	7/5	**Van Veldhoven & Meijman, 1994	*"My work requires that I am continuously alert"*
Exhaustion	5/5	7/7	*Salanova et al., 2000b	*"I am emotionally exhausted by my work"*
Cynicism	4/4	7/7	*Salanova et al., 2000b	*"I've lost interest in my work since I began this job"*
Vigor	6/6	7/7	*Salanova et al., 2000b	*"At my work, I feel bursting with energy"*
Dedication	5/5	7/7	*Salanova et al., 2000b	*"To me, my work is challenging"*
Absorption	6/6	7/7	*Salanova et al., 2000b	*"Time flies when I'm working"*

Note: *reworded scale, **adapted scale.

Data Analyses

Firstly, internal consistencies (Cronbach's α), descriptive analyses (i.e., means, standard deviations, and correlations), and intercorrelations were calculated using SPSS 19.0. Since different Likert-type scales were used for measurement, variables were transformed into Z-scores (ranging from –1 to 1) in order to be able to compare and interpret the results correctly.

Secondly, Harman's single factor test (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003) was computed for the variables in the study in order to test for bias due to common method variance using multi-group analyses.

Thirdly, we have computed following analyses to evidence reliability and convergent validity among all variables: (1) multi-group Confirmatory Factor Analysis (CFA) for both samples simultaneously analysed, (2) Composite Reliability (CR) and (3) Analyses of Variance Extracted (AVE) (Fornell & Larcker, 1981).

Last, to be able to test the hypotheses of the study, the Structural Equation Modeling (SEM) method was implemented using the AMOS 19.0 (Analyses of MOment Structures, Arbuckle, 1997) software program. Three competitive models were tested independently in each sample: (a) the proposed model (M1) assumed that professional self-efficacy is related to burnout and engagement through hindrance and challenge demands, in such a way that there is greater self-efficacy, the worker will perceive more challenge demands and fewer hindrance demands; (b) Model 2 (M2) considers that professional self-efficacy plays a mediating role between demands (challenge and hindrance), and engagement and burnout; and, (c) Model 3 (M3) considers that professional self-efficacy is a consequence of the influence that challenge and hindrance demands have on burnout and engagement. Last, we defined the Model 4

(M4) as the final model which includes only the significance relationship among the variables in each sample independently analyzed.

Furthermore, these M4 was tested using multi-group analyses (MLG; Byrne, 2001) in order to assess structural invariance across both samples. As a consequence of these MLG, Model 4 (the free model) was compared with other competing models in both samples simultaneously analyses: the full constrained model ($M4_{\text{full constrained}}$), the model with only constrained regression coefficients ($M4_{\text{regression constrained}}$), the model with only constrained factorial weights ($M4_{\text{factor constrained}}$), the model with covariances among the constrained errors ($M4_{\text{constrained covariances}}$), and the final model ($M4_{\text{final}}$), with only significant relationships and constrained parameters in both samples simultaneously analyzed.

Maximum likelihood estimation methods were used, in which the input for each analysis was the covariance matrix of the items. Two absolute goodness-of-fit indices were analyzed to evaluate the goodness-of-fit of the models: (1) the χ^2 goodness-of-fit statistic, and (2) the Root Mean Square Error of Approximation (RMSEA). The χ^2 goodness-of-fit index is sensitive to sample size, so the use of relative goodness-of-fit measures is recommended (Bentler, 1990). Hence, three relative goodness-of-fit indices were used: Comparative Fit Index (CFI), Normed Fit Index (NFI), and Incremental Fit Index (IFI). Last, the Akaike Information Criterion (AIC) index was also computed. For RMSEA, values smaller than .05 are considered to indicate an excellent fit, .08 are considered to indicate an acceptable fit, whereas values greater than .1 should lead to model rejection (Browne & Cudeck, 1993). For the relative fit indices, values greater than .90 are indicative of a good fit (Hu & Bentler, 1995). The lower the AIC index, the better the fit is (Akaike, 1987; Hu & Bentler, 1995).

Results

Descriptive Results

Table 2.2 displays the results of the Cronbach's alpha descriptive analyses for each scale in both samples. The alpha values meet the criterion of .70 (Nunnally & Bernstein, 1994). The correlations of the scales are presented in Table 2.3.

Results of Harman's single factor test (see Podsakoff et al., 2003) using multi-group analyses (N =1056) reveal a bad fit to the data χ^2 (10) = 170.178, p = .000, RMSEA = .116, CFI = .79, NFI = .79, TLI = .39, IFI = .80. Consequently, common method variance can be considered not to be a serious deficiency in this dataset.

Table 2.2. *Means, Standard Deviations and internal consistencies for secondary school teachers (n = 460) and ICT users (n = 596)*

	Secondary School Teachers			ICT Users		
	Mean	*SD*	α	Mean	*SD*	α
1. Professional self-efficacy	–.39	.91	.93	.30	.95	.83
2. Mental overload	.23	1.07	.85	–.18	.90	.84
3. Role conflict	.09	1.04	.83	–.08	.96	.73
4. Lack of social support	–.13	.91	.85	.10	1.05	.85
5. Lack of autonomy	–.37	.97	.92	.29	.92	.90
6. Vigor	.19	1.02	.85	–.15	.97	.80
7. Dedication	.09	.95	.90	–.07	1.03	.89
8. Absorption	.02	1.04	.80	–.02	.96	.71
9.Exhaustion	–.09	.92	.86	.08	1.05	.84
9. Cynicism	–.09	.99	.83	.07	.99	.86

Note: Means and Standard Deviations (*SD*) are Z-scores; α = Cronbach's alpha.

Table 2.3. *Intercorrelations between the study variables in a sample of secondary school teachers (n = 460) and ICT users (n = 596)*

	2	3	4	5	6	7	8	9	10
Secondary School Teachers									
1. Professional self-efficacy	.91*	–.15**	–.21***	–.26***	.43***	.45***	.30***	–.37***	–.43***
2. Mental overload	_	.30***	–.04	–.06	.09*	.14**	.18***	.25***	–.07
3. Role conflict		_	.23***	.18***	–.13**	–.15**	.02	.27***	.30***
4. Lack of social support			_	.19***	–.14**	–.20***	–.12*	.17***	.19***
5. Lack of autonomy				_	–.16**	–.17***	–.15*	.15**	–.11*
6. Vigor					_	.66***	.56***	–.39***	–.39***
7. Dedication						_	.62***	–.32***	–.57***
8. Absorption							_	–.15**	–.32***
9. Exhaustion								_	.51***
10. Cynicism									_
ICT users									
1. Professional self-efficacy	.17***	.01	–.06	–.19***	.24***	.20***	.16***	–.17***	–.20***
2. Mental overload	_	.25***	–.12**	–.15***	.28***	.45***	.36***	–.08*	–.13**
3. Role conflict		_	.08*	–.02	–.01	–.02	.06	.28***	.28***
4. Lack of social support			_	.20***	–.27***	–.35***	–.31***	.17***	.31***
5. Lack of autonomy				_	–.16***	–.22***	–.15***	.11**	.14**
6. Vigor					_	.65***	.65***	–.31***	–.41***
7. Dedication						_	.71***	–.26***	–.52***
8. Absorption							_	–.11**	–.35***
9. Exhaustion								_	.56***
10. Cynicism									_

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

Reliability and Convergent Validity

Results of CFA for both samples presented an adequate fit to the data, χ^2 (68) = 428.17, p<.00, RMSEA = .06, CFI = .91, GFI = .94, IFI = .91, NFI = .90. Moreover, results of reliability and convergent validity among all variables showed: (1) for ICT users CR (ranges from .72 to .86) are higher of 0.7 with the exception of hindrance demands (CR = .30) and AVE (ranges from .57 to .77) are higher than .05 with the exception of hindrance demands (AVE = .24), and (2) for secondary school teachers CR (ranges from .70 to .88) are higher of 0.7 with the exception of hindrance demands (CR = .43), and AVE (ranges from .52 to .85) are higher than .05 with the exception of hindrance demands (AVE = .22). Furthermore, all factors loadings are highly significant since the regression weights are significantly different from zero at the 0.001 level (two-tailed).

Model Fit: Structural Equation Modeling

To compute SEM, we used the database that included professional self-efficacy, challenge demands, hindrance demands, engagement, and burnout in two different samples: secondary school teachers and ICT users. The results of the structural equation analyses are presented separately for both samples in Table 2.4.

By firstly focusing on the sample of secondary school teachers (n = 460), the model of the direct relationships between variables (M1) does not fit the data well, the modification indices thus suggesting the inclusion of a correlation between the errors of cynicism and dedication (the correlation between these errors systematically appeared in other studies; see Salanova et al., 2000b, 2005a; Schaufeli & Bakker, 2004). Moreover, the fit indices showed that it is advisable to include a correlation between the errors of the challenge and hindrance demands. Therefore, the reviewed model ($M1_r$), which

includes these correlations between errors, significantly improves in relation to M1 $\Delta\chi^2(2) = 50.83$, $p < .001$.

Two alternative models are then tested. Results show that the first alternative model (M2), which proposes that professional self-efficacy mediates the relationship between job demands (challenge and hindrance) and psychosocial well-being (burnout and engagement), fits significantly worse than the reviewed model ($M1_r$) $\Delta\chi^2(3) = 51.93$, $p < .001$. The test of the second alternative model (M3), which proposed that professional self-efficacy is a consequence of the relationship between job demands (challenge and hindrance) and psychosocial well-being (burnout and engagement), reveals a better fit to the data than M1, $\Delta\chi^2(1) = 78.74$, $p < .001$, $M1_r$, $\Delta\chi^2(1) = 27.91$, $p < .001$, and M2, $\Delta\chi^2(2) = 79.84$, $p < .001$. Last, Table 4 depicts the final model (M4) which presents the best fit to the data in secondary school teachers, by including only the significant relationships among the variables. This model (M4), which includes $M1_r$ without the direct relationship between challenge demands and burnout, shows the best fit compared to M1, $\Delta\chi^2(0) = 76.99$, $p < .001$, $M1_r$, $\Delta\chi^2(2) = 26.16$, $p < .001$,and M2,$\Delta\chi^2(1) = 78.09$, $p < .001$, although no significant differences in fit were obtained compared with M3, $\Delta\chi^2(1) = 1.75$, *n.s.*

For the sample of ICT users ($n = 596$), we conducted a similar set of SEM analyses as in the case of the sample of secondary school teachers. These analyses reveal that the proposed M1 does not fit the data. Again the modification indices suggest the inclusion of a correlation between the errors of cynicism and dedication. Thus, the reviewed model ($M1_r$), which includes these correlations between the errors of cynicism and dedication, significantly improves the fit in relation to M1, $\Delta\chi^2(1) = 15.28$, $p < .001$. Similarly to the case of secondary school teachers, the alternative M2, which proposes that professional self-efficacy mediates the relationship between job demands

(challenge and hindrance) and psychosocial well-being (burnout and engagement), fits the data worse than M1, $\Delta\chi^2(2) = 203.27$, $p < .001$, and $M1_r$, $\Delta\chi^2(3) = 218.55$, $p < .001$. Furthermore, M3, which proposes that professional self-efficacy is the result of the relationship between job demands (challenge and hindrance) on psychosocial well-being (burnout and engagement), fits the data worse than M1, $\Delta\chi^2(0) = 4.29$, $p < .001$, and $M1_r$, $\Delta\chi^2(1) = 19.57$, $p < .001$, but fits better than M2, $\Delta\chi^2(2) = 198.98$, $p < .001$. Last, Table 4 depicts the final model (M4) which presents the best fit to the data by including only the significant relationships among the variables M4 fits significantly better than M1, $\Delta\chi^2(1) = 13.40$, $p < .001$, M2, $\Delta\chi^2(1) = 216.67$, $p < .001$, and M3, $\Delta\chi^2(1) = 17.69$, $p < .001$, but it does not show significant differences from $M1_r$, $\Delta\chi^2(2) = 1.88$, *n.s.*

Table 2.4. *Fit indices for Structural Equation Models in Secondary School Teachers (n = 460) and ICT users (n = 596)*

	χ^2	*df*	RMSEA	NFI	CFI	AIC	$\Delta\chi^2$	Δdf
Secondary School Teachers								
M1	235.17	38	.10	.86	.88	291.16		
$M1_r$	184.34	36	.09	.89	.91	244.34	$M1_r$ – M1=50.83***	2
M2	236.27	39	.10	.86	.88	290.27	M2 – M1=1.1	1
							M2 – $M1_r$ =51.93***	3
M3	156.43	37	.08	.90	.93	214.43	M3 – M1=78.74***	1
							M3 – $M1_r$ =27.91***	1
							M3 – M2=79.84***	2
M4	158.18	38	.08	.91	.93	214.18	M4 – M1=76.99***	0
							M4 – $M1_r$ =26.16***	2
							M4 – M2=78.09***	1
							M4 – M3=1.75	1
ICT users								
M1	251.70	38	.10	.86	.89	307.71		
$M1_r$	236.42	37	.09	.88	.90	294.42	$M1_r$ – M1=15.28***	1
M2	454.97	40	.13	.79	.75	506.97	M2 – M1=203.27***	2
							M2 – $M1_r$ =218.55***	3
M3	255.99	38	.09	.85	.86	311.98	M3 – M1=4.29***	0
							M3 – $M1_r$ =19.57***	1
							M3 – M2=198.98***	2
M4	238.30	39	.09	.89	.90	292.30	M4 – M1=13.40***	1
							M4 – $M1_r$ =1.88	2
							M4 – M2=216.67***	1
							M4 – M3=17.69***	1

Note: $\chi 2$ = Chi-square; *df* = degrees of freedom; GFI = Goodness of Fit Index; AGFI = Adjusted Goodness of Fit Index; RMSEA= Root Mean Square Error of Approximation; NFI= Normed Fit Index; CFI = Comparative Fit Index; AIC = Akaike Information Criterion; $\Delta\chi 2$ = chi-square difference; $\Delta\chi 2$ is significant at *** p<.001.

Multi-group Analyses

Once the model has been tested separately in the two samples, a multi-group analysis is performed by testing the two samples simultaneously. As expected, M4 (free model) was tested simultaneously in both samples. Results shows a good fit with the data of both samples, and all the indicators present values above their criterion (see Table 5). Nonetheless, the fit deteriorates significantly when all coefficients are constrained to be equal in both samples ($M4_{\text{full constrained}}$). This means that, although the underlying structure of the model is similar in both samples, the sizes of some coefficients may differ.

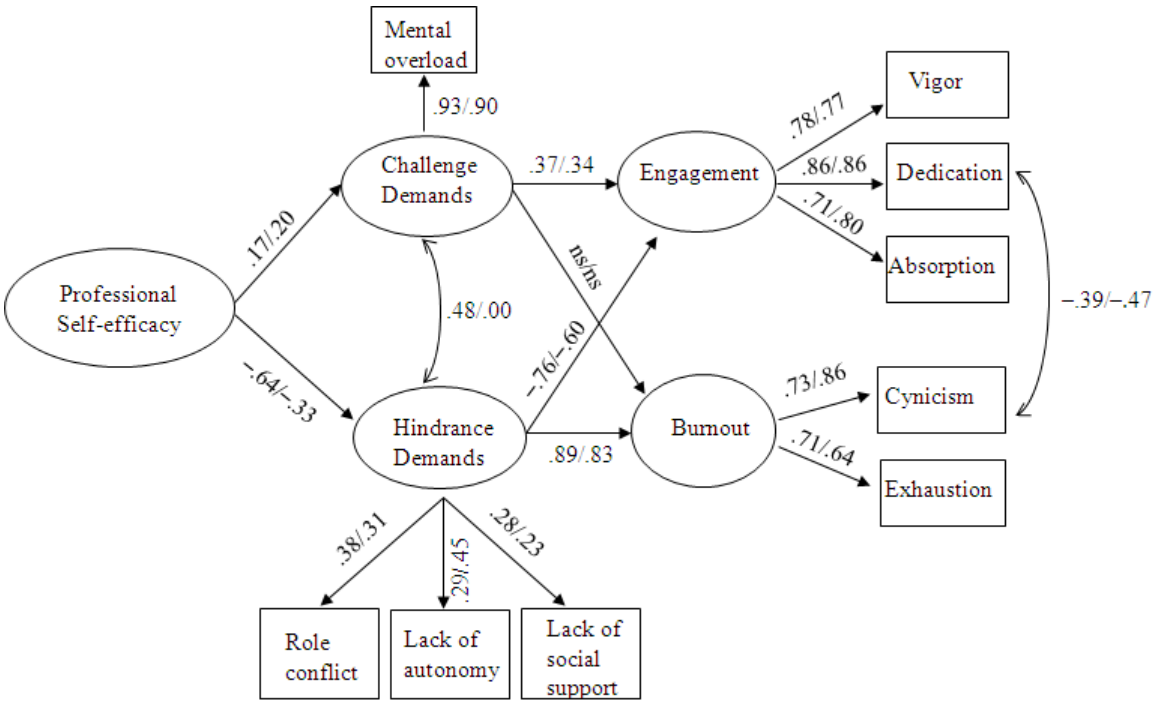
In this way, and in order to be able to test the invariance of the model in more detail, three additional models were tested: (1) a model that assumes that only the regression coefficients are invariant ($M4_{\text{regression constrained}}$); (2) a model that assumes that only the factorial weights are invariant ($M4_{\text{factor constrained}}$); and (3) a model that assumes that only the covariance between errors is invariant ($M4_{\text{constrained covariances}}$). As can be seen from Table 2.5, although these new models fit the data, the fit worsens significantly in comparison to the free model (M4). This implies that the regression coefficients, the factorial weights and the covariance between the errors differ significantly and systematically between both samples.

Moreover, as recommended by Byrne (2001), an interactive process is used in order to assess the invariance of each coefficient separately. That is, the invariance of each coefficient is individually assessed by comparing the fit of the model, when each particular constrained coefficient is included, with the free model. When the fit does not deteriorate, this constrained coefficient is included in the next model, to which another constrained coefficient is added, and so on. This process is repeated until a final model is found ($M4_{\text{final}}$) (see Figure 2.2). In this final model, the invariant coefficients in both

samples are: the factorial weights of professional self-efficacy, each with its indicators, the vigor dimension and lack of autonomy, the regression weights from professional self-efficacy to challenge demands, and from hindrance demands to engagement; and the covariance between the errors of cynicism and dedication.

Last, professional self-efficacy explains 3% of the variance in challenge demands, and 41% of the variance in hindrance demands. Moreover, 58% of the variance of engagement is explained by demands (i.e., challenge and hindrance), and 79% of the variance of burnout is explained by hindrance demands.

Figure 2.2: *Multi-group SEM analyses in secondary school teachers (n = 460) and ICT users (n = 596).*



Note: All coefficients represented here are significant at *** $p < .001$.

Table 2.5. *Fit indices for Multi-group Structural Equation Models in Secondary School Teachers (n = 460) and ICT users (n = 596)*

Model	χ^2	*df*	*RMSEA*	*NFI*	*IFI*	*CFI*	*AIC*	$\Delta\chi^2$	*ΔNFI*	ΔIFI	ΔCFI	*ΔAIC*
1. M4	396.49	77	.06	.89	.91	.91	506.49					
2. M4c: full constrained	457.30	89	.06	.87	.90	.89	543.30					
Diff. M4c & M4								60.81***	.2	.1	.2	36.81
3. M4r: regression constrained	431.50	82	.06	.88	.90	.90	531.50					
Diff. M4r & M4								35.01***	.1	.1	.1	25.01
4. M4f: factor constrained	422.19	83	.06	.88	.91	.90	520.19					
Diff. M4f & M4								25.69***	.1	0	.1	13.7
5. M4co: constrained covariance	403.61	78	.06	.89	.91	.91	511.61					
Diff. M4co & M4								7.12***	0	0	0	5.12
6. M4fi: final	405.56	82	.06	.89	.91	.91	505.56					
Diff. M4fi & M4								9.07	0	0	0	0.93

Note: $\chi 2$ = Chi-square; df = degrees of freedom; RMSEA= Root Mean Square Error of Approximation; NFI= Normed Fit Index; IFI= Incremental Fit Index; CFI = Comparative Fit Index; AIC = Akaike Information Criterion; $\Delta\chi 2$ = chi-square difference; *** p<.001.

Discussion

The aim of the current study was to analyze the role of professional self-efficacy as a predictor variable of the perception of challenge and hindrance demands, and its relationship with burnout and engagement in a sample of secondary school teachers and ICT users. This hypothesized model proposed three basics premises: (1) psychosocial well-being could be explained in terms of two job characteristics: challenge and hindrance demands (LePine, LePine, & Jackson, 2004; LePine et al., 2005; Podsakoff et al., 2007), (2) professional self-efficacy has been considered to be a personal resource par excellence, such that professional self-efficacy would act as a predictor of social perception, and would act as a referent to perceive the work environment, and (3) to explain the psychosocial well-being process in terms of two processes: the erosion process (i.e., the presence of low levels of professional self-efficacy, generating the perception of more hindrance demands and greater burnout), and the motivation process

(i.e., the presence of high levels of professional self-efficacy, generating the perception of challenge demands and greater engagement).

Findings concerning the SEM analyses for two independent samples with multi-group analyses supported the erosion process, thus supporting Hypothesis 1. More specifically, we found that professional self-efficacy was related with burnout through hindrance demands when samples are analyzed independently and in the multi-group analysis. In agreement with previous research (Podsakoff et al., 2007), workers perceive hindrance demands as stressors that may delimit their personal accomplishments and development. Furthermore, the results of the present study shed light on the understanding of how low levels of professional self-efficacy is positively related to the perception of more hindrance demands and their relationship with negative experiences such as burnout. Consequently, low levels of professional self-efficacy, in the presence of hindrance demands, is related to a reduction in levels of energy and persistence to face demands (i.e., exhaustion), as well as a lack of identification with one's work (i.e., cynicism), as has been confirmed by previous research (e.g., Llorens et al., 2005; Xanthopoulou et al., 2007).

Conversely, the motivational process was supported by Hypothesis 2, which considered that professional self-efficacy would be positively related to engagement through challenge demands when samples are analyzed independently, and in the multi-group analysis. In accordance with previous research (Podsakoff et al., 2007), workers can perceive challenge demands as an opportunity to potentially increase their personal growth and development, which in turn trigger motivational processes. In this sense, workers with high levels of professional self-efficacy perceive more challenge demands and consequently more positive experiences such as engagement. Thus, high levels of professional self-efficacy are positively associated with high levels of energy and

activation (i.e., vigor), enthusiasm, pride, and inspiration at work (i.e., dedication), and to an elevated state of concentration (i.e., absorption) aimed at fulfilling objectives (Salanova, Martínez, & Llorens, 2005b).

Hence, the hypothesized model contemplated two crossed relationships. First of all, Hypothesis 3 considered that professional self-efficacy would be negatively related with burnout through challenge demands when samples are analyzed independently, and in the multi-group analysis. But this hypothesis was not supported. The latter finding is in line with previous results in which no association between challenge demands and exhaustion was found (Van den Broeck, De Cuyper, De Witte, & Vansteenkiste, 2010). In addition, previous research has shown that the status of job challenge demands is perhaps less clear with regards to burnout. That is, some research results indicated negative relations between challenge demands and exhaustion (LePine et al., 2005), while other research has found that challenge demands were positively related to burnout (Crawford et al., 2010) and exhaustion (LePine et al., 2004). These contradictory results should stimulate future research to gain a deeper understanding of the relation between professional self-efficacy, challenge demands, and burnout.

Secondly, Hypothesis 4 considered that professional self-efficacy would be positively related to engagement through hindrance demands when samples are analyzed independently, and in the multi-group analysis. This hypothesis was supported, since results show that workers who possessed high levels of professional self-efficacy perceived lower levels of hindrance demands, which strengthened their levels of engagement. This hypothesis coincides with previous research, in which job demands (i.e., role conflict and lack of autonomy and lack of social support) may produce positive effects on well-being when workers show high levels of professional efficacy (Salanova et al., 2001).

By way of conclusion, this research has presented an extended version of the RED Model based on the SCT where we find two different processes: (1) the erosion process, where low levels of professional self-efficacy are related to the perception of more hindrance demands, which is further related to high levels of burnout (*Hypothesis 1*), and (2) the motivational process, where high levels of professional self-efficacy are related to the perception of high levels of challenge demands (*Hypothesis 2*), and low levels of hindrance demands (*Hypothesis* 4), which is further related to high levels of engagement.

Limitations and Further Research

The present study has several different limitations. First, data were obtained using self-reported measures. Considering the nature of this study, which includes covert psychological phenomena (i.e., affects, attitudes, and beliefs), objective data cannot be employed. However, we followed Harman's test procedure (see Podsakoff et al., 2003) to check for common method variance in our data, and results show that it is not a serious problem in this study.

Second, we used a convenience sample. However, this sample includes different samples (secondary school teachers and ICT users from different enterprises).

Another limitation is that the study was based on cross-sectional research. This implies that the relationships obtained among professional self-efficacy, challenge and hindrance demands, and the burnout and engagement processes need to be interpreted carefully and no casual inferences must be made. A further step in research should be to consider testing the model longitudinally with at least three waves. In other words, research should be conducted to check whether professional self-efficacy increases challenge and hindrance demands at Time 1, which would increase burnout and engagement at Time 2, and would in turn increase professional self-efficacy at Time 3.

This design would make it possible to test for the existence of negative and positive self-efficacy spirals over time.

As a starting point for future research, other occupational samples should be tested with the theoretical model proposed in the present study (e.g., police, medical professionals, university lecturers, etc.), and transcultural samples, as well as laboratory studies, using longitudinal designs in all the studies.

On the other hand, future studies ought to include a higher number of challenge demands (e.g., workload, job responsibility, pressure) and hindrance demands (e.g., routine, role ambiguity, organizational politics) because only one challenge demand (i.e., mental overload) and three hindrance demands (i.e., role conflict, lack of autonomy, and lack of social support) have been used in this study. In addition, it would be interesting to extend the number of personal resources at both the individual level (e.g., mental and emotional competences) and the group level (e.g., collective efficacy).

Last, there is the possibility of testing a socio-cognitive intervention with longitudinal studies for the purpose of improving levels of professional self-efficacy and to verify their effectiveness in the short, mid and long term.

Theoretical and Practical Implications

The results obtained in the present study have important theoretical and practical implications for organizations. At the theoretical level, the present study extends the RED model (Salanova et al., 2011a) by including professional self-efficacy as an antecedent variable of the model. Further input was to consider the contributions of LePine et al. (2005) in the differentiation of challenge and hindrance demands in two different occupational samples: secondary school teachers and ICT users. Thus, the results of the present study provide evidence that might be instructive and even necessary to differentiate between challenge and hindrance demands and include

personal resources, as important variables to be considered, in the different models of stress.

The basic contributions imply that psychosocial well-being is the result of two processes. Thus, results suggest that in order to prevent burnout, and to reduce the perception of hindrance demands, levels of self-efficacy should increase. On the other hand, high levels of self-efficacy are needed to increase or maintain levels of engagement and to increase the perception of challenge demands.

From a practical point of view, results can be used by Human Resources Management in order to increase levels of personal resources as a source of well-being that helps secondary school teachers and ICT users to be more engaged in their work and therefore less likely to suffer from burnout. Specifically, to achieve this aim, training should include a range of components that are consistent with theoretical keys to develop efficacy beliefs, that is, starting with the sources of self-efficacy as its forerunners (Bandura, 1997, 1999). In this way, professional self-efficacy may be increased through role-playing in order to promote successful experiences among secondary education teachers and ICT users, the development of performance models by vicarious learning, verbal persuasion (e.g., coaching), and moderating negative affective states (e.g., anxiety) with relaxation, meditation practices, etc. (Martínez & Salanova, 2006). This is a way to generate “positive jobs”, as well as “positive teachers” and ICT users from the Positive Occupational Health Psychology framework (Llorens, Salanova, & Martínez, 2008; Salanova et al., 2005b).

To conclude, the present study provides evidence for the importance of professional self-efficacy, as it was shown to be related to perceptions of job demands and important outcomes (burnout and engagement). Accordingly, we propose that efficacy beliefs need to be developed in work settings in order to influence the

perception of job demands (i.e., challenge and hindrance) and thus prevent negative psychosocial consequences such as those related to burnout, and thereby contribute to develop a healthy work environment.

Chapter 3

Technostress effects on professional efficacy beliefs and teaching burnout: a longitudinal study[4]

Summary

Secondary teaching can be considered to be one of the most stressful professions. Other than emotional work, teachers need to cope with new demands to which they are submitted: the use of Information and Communication Technology (ICT). The objective of the present study is to test the role of technostress as a predictor of teachers' professional efficacy beliefs and burnout. The sample comprised 258 Spanish secondary school teachers (57% women; mean age of 40 years; 90% use ICT). A two-wave longitudinal study was performed (at the beginning and the end of the academic year) using a paper-and-pencil version of the RED questionnaire (Resources, Emotions/Experiences, Demands; Salanova, Llorens, Cifre, & Martínez, 2006). Structural equation modeling, controlling by gender and age, presents evidence of the reciprocal model ($\chi 2$ = 271.30; df = 82; RMSEA = .08; CFI = .91), showing the negative effect of technostress on professional efficacy beliefs, which lead to burnout, which in turn reduce levels of professional efficacy over time. Theoretical and practical implications are related to the delimitation of the technostress concept and process, and to the accurate intervention to generate 'positive' jobs and workers.

Keywords: technostress, efficacy beliefs, burnout

[4] El capítulo 3 está publicado en Llorens, S., Salanova, M., y Ventura, M. (2007). Technostress effects on professional efficacy beliefs and teaching burnout: a longitudinal study. *Revista de Orientación Vocacional, 21*, 47-65.

Introduction

Teaching is considered to be one of the most stressful professions. Teachers are not only deeply affected by economical, social and cultural changes, but also by scientific and technological ones (Chan, 2002; Golg & Roth, 1993; Van-Der-Doef, & Maes, 2002). Despite the relevance of these technological advances in teaching, they may also have negative consequences. The present study focuses on these negative consequences caused by the technology impact, specifically on a new psychosocial damage: technostress. In this context, the objective of the present study is to test the role of technostress as a predictor of teachers' professional efficacy beliefs and its influence on teaching burnout over time using a two-wave longitudinal design in a sample of secondary school teachers.

Technostress at Work

Generally speaking, the different definitions of technostress coincide in that this phenomenon is related to negative psychosocial effects caused by Information & Communication Technology (ICT) use. In the Spanish Preventive Technical Note about technostress, the conceptual development of this phenomenon is shown (Salanova, Llorens, Cifre, & Nogareda, 2007). Traditionally, technostress has been defined as a modern disease of adaptation caused by an inability to cope with new computer technology in a healthy manner (Brod, 1984). In this definition we can observe the character of 'illnesses' caused by an incompetence problem. Weil and Rosen (1997) continue to emphasize this negative meaning and they define technostress as a negative impact on attitudes, thoughts, behaviors, or a body physiology that is directly or indirectly caused by technology. Finally, Salanova (2003, p. 3, in Salanova et al., 2007) defines technostress as either 'a negative psychological state associated with ICT use or an anticipatory threat of its future use. This state is based on a mismatch between

demands and resources related to ICT use which leads to a high level of unpleasant psycho-physiological activation and to the development of negative attitudes toward ICT'.

Recent research (Salanova et al., 2007) proposes technostress is a generic concept which includes three specific types of technostress: (1) technoanxiety (i.e., high levels of negative physiological activation and tension, skeptical attitudes and negative thoughts about one's own competence toward ICT use), (2) technoexhaustion (i.e., high levels of exhaustion or mental fatigue because the use of ICT over long periods of time, skeptical attitudes and negative thoughts about one's own competence toward ICT use) and (3) technoaddiction (i.e., uncontrolled compulsion to use ICT anywhere and anytime over long periods of time). In the present study, we focus on technoanxiety since this is the most common type of the technostress. According to Salanova et al. (2007) technoanxiety is composed of three main dimensions: 1) anxiety (affective symptoms), 2) skepticism (attitudinal dimension) and 3) inefficacy related to ICT use (cognitive dimension).

Empirical analyses on technostress reveal significant differences in gender and age. Thus, women show *higher* levels of technostress; specifically, women show *higher* levels of anxiety and inefficacy related to ICT use than men. On the other hand, the elderly show *higher* levels in technostress than young people; specifically, older people show higher levels of anxiety, scepticism and inefficacy in relation to ICT (e.g., Birdi & Zapf, 1997; Chou, 2001; Salanova et al., 2007; Shaw & Gant, 2002). Research shows that these are possibly produced by educational development and societal practices (Bussey & Bandura, 1999; Gallie, 1991).

Although research into the consequences of technostress is limited, various authors show that technostress (in our case, technoanxiety) could generate psychosomatic complaints (e.g., sleep disorders, headaches, musculoeskeletal disorders), organizational damage (e.g., absenteeism and decreased performance) (Korunka, Weiss, Huemer, & Karetta, 1995; Salanova & Schaufeli, 2000), job anxiety, dissatisfaction as well as burnout (see Salanova, Peiró, & Schaufeli, 2002). Specifically, different authors in teaching settings (Chan, 2002; Van-Der-Doef & Maes, 2002) reveal that teachers could develop burnout as a consequence of the introduction of ICT as a part of their jobs.

Job Burnout

Burnout is defined as a consequence of exposure to chronic occupational stress because of a low sense of efficacy in managing job demands and enlisting social support at times of difficulties (Leiter, 1992). Schaufeli and Enzmann (1998, p. 36) defined it as 'a persistent, negative, work-related state of mind in "normal" individuals that is primarily characterized by exhaustion, which is accompanied by distress, a sense of reduced effectiveness, decreased motivation, and the development of dysfunctional attitudes and behaviors at work'.

Although burnout can be observed in any occupation, this phenomenon has been considered a widespread problem in teachers (see Doménech, 2006), particularly when they also use ICT at work (Salanova & Schaufeli, 2000). For the traditional sources of burnout in teachers (e.g., work overload, role stress, poor working conditions, lack of professional recognition, staff conflicts and pupil misbehavior), the introduction of ICT at schools (e.g., software, the Internet) is nowadays considered a significant antecedent of burnout (particularly when pupils show more knowledge and competences of ICT than teachers themselves) (Chan, 2002; Van-Der-Doef & Maes, 2002).

Generally speaking, empirical analyses reveal significant differences in burnout across gender and age in different samples. Thus, women show *higher* levels of exhaustion and *lower* levels of professional efficacy than men. According to age, older people show *higher* levels in exhaustion than younger people (Maslach & Jackson, 1981).

Although traditionally speaking the basic dimensions of burnout were exhaustion (i.e., fatigue due to excessive efforts at work), cynicism (i.e., indifference, detached and distant attitudes toward work in general) and a lack of professional efficacy (i.e., the tendency to evaluate one's work negatively and a reduction in feelings of job competence and work performance) (Maslach, Schaufeli, & Leiter, 2001), there is evidence that exhaustion and cynicism constitute the "core of burnout" (Green, Walkey, & Taylor, 1991, p. 463).

Thus, professional efficacy, as the third dimension of burnout, has been criticized since it may be considered nearer to a variable of personality (Cordes & Dougherty, 1993; Shirom, 1989). Empirical research shows the independent role of professional efficacy compared to the dimensions of exhaustion and cynicism (Lee & Ashforth, 1996). In fact, Cherniss (1993) assumes that lack of confidence in one's own competence is a critical factor in the development of burnout. In the same vein, Leiter (1992) considers that burnout is a consequence of a "crisis in efficacy". Recent research with secondary school teachers and longitudinal designs points out that a "successive crisis" of professional efficacy is the proximal antecedent for teaching burnout (Brouwers, Evers, & Tomic, 2002; Llorens, García-Renedo, & Salanova, 2005). From this viewpoint, professional efficacy may be immersed in the Social Cognitive Theory (SCT) of Bandura (1997, 1999, 2000) and could approach the concept of "efficacy beliefs".

Efficacy beliefs

According to Bandura's SCT (1997, p. 3), one of the mechanisms governing one's own level of functioning and the events that affect one's life are efficacy beliefs. At a personal level, self-efficacy is defined as the "…beliefs in one's capabilities to organize and execute the course of action required to produce given attainments". These beliefs are based on the idea that one has the power to produce desired effects by one's actions; otherwise, one has little incentive to act or to persevere in the face of difficulties. Research shows that one's own belief of efficacy can determine motivation, affect, thought and action (Bandura, 2002). People avoid doing tasks that exceed their capacities and they do those they are capable of managing. Moreover, efficacy beliefs may act as an important determinant of the effort and persistence in pursuing goals (Bandura, 1997). Given the relevance of the use of a specific measure of efficacy beliefs (e.g., Grau, Salanova, & Peiró, 2001), a specific measure of professional efficacy (i.e., the belief in the ability to correctly fulfill one's professional role) is used in the present study (Cherniss, 1993).

Efficacy beliefs '…are constructed from four principal sources of information: enactive mastery experiences, the verbal persuasion of others, vicarious experience and the interpretation of physiological and affective states. Any given influence, depending on its form, may operate through one or more of these sources of efficacy information' (Bandura, 1997, p. 79). In the present study, we focus on the fourth source of efficacy beliefs, specifically on the interpretation of a negative affective state: technostress. According to the SCT, the experience of negative psychological states (in our case, technostress) activates thoughts of past failings. Consequently, it may be interpreted by the employee as signs of vulnerability to dysfunction and may also reduce efficacy beliefs (Bandura, 2000).

Research into different occupational samples documents the negative impact of poor self-efficacy on levels of performance and job stress processes (see Jex & Bliese, 1999; Salanova et al., 2002). Specifically in ICT contexts, research reveals that the quality of the effects of ICT use on well-being depends on efficacy beliefs (Bakker, Demerouti, & Schaufeli, 2003; Chua, Chen, & Wong, 1999). Particularly, different authors provide evidence of the negative effect of efficacy beliefs on burnout (Beas & Salanova, 2006; Leithwood, Menzies, Jantzi, & Leithwood, 1999). For example, in ICT samples research evidences that workers with lower levels of efficacy beliefs present more burnout compared to workers with higher levels of efficacy beliefs (Grau et al., 2001; Salanova, Grau, Cifre, & Llorens, 2000). In the same way, research using longitudinal designs on secondary school teachers reveals that 'crisis of professional efficacy beliefs' are the proximal antecedent of burnout, which in turn decreases the levels of professional efficacy beliefs over time (Llorens et al., 2005). Moreover, and according to Bandura (1997), these low levels of professional efficacy beliefs further influence the interpretation of a negative affective state (by increasing technostress in our case).

The Present Study

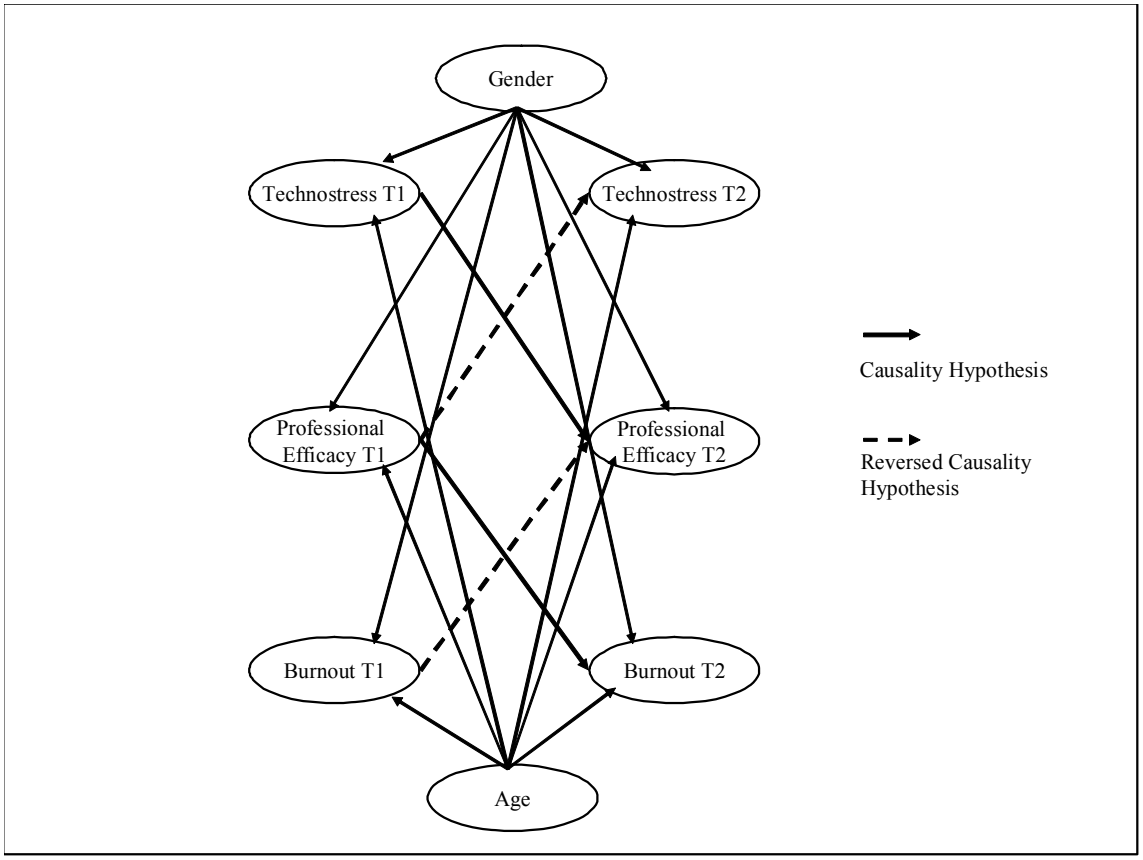
The present longitudinal study focuses on testing the role of technostress as a predictor of teachers' professional efficacy beliefs and its influence on teaching burnout over time using a two-wave longitudinal design in a sample of secondary school teachers. Previous research has provided evidence that workers are vulnerable to burnout as a consequence of the technostress process (Salanova, Grau, et al., 2000; Salanova & Schaufeli, 2000). However, these studies do not assume the role of personal resources, such as professional efficacy beliefs, as intervening variables in the process. Recently, Salanova, Grau, et al. (2000) stated that technostress does not have a direct

effect on burnout over time; rather it depends on the lack of professional efficacy. Longitudinally speaking, burnout may lead to a decrease of professional efficacy beliefs again (Grau et al., 2001; Llorens et al., 2005), which in turn increase levels of negative affective states (such as, technostress) over time (Bandura, 1997). Our research model focuses on the negative effect of technostress on professional efficacy beliefs and burnout over time by also taking into account the differences in gender and age (see Figure 3.1). More specifically, it is expected that:

Hypothesis 1: Technostress (i.e., anxiety, skepticism and inefficacy related to ICT) have a negative influence on professional efficacy beliefs (*Hypothesis 1a*), which in turn have a negative influence on burnout (i.e., exhaustion and cynicism) over time (*Hypothesis 1b*) (causation hypothesis).

Hypothesis 2: Burnout (i.e., exhaustion and cynicism) has a negative influence on professional efficacy beliefs (*Hypothesis 2a*) which in turn have a negative influence on technostress (*Hypothesis 2b*) (reversed causation hypothesis).

Figure 3.1. *Hypothesized structural model of technostress, professional efficacy beliefs and burnout.*



Method

Participants and Procedure

The present study used a two-wave longitudinal design among 258 Spanish Secondary School Teachers (57% women, 43% men) from 24 schools. The mean age of the sample was 40 years (SD = 7.46) with ages ranging from 24 to 57 years. A total of 90% of teachers use technologies at work, specifically software (64%) (i.e., Word, Excel, Autocad, Contaplus, Access, Power Point, Autosketch and Derive) and the Internet (36%).

A letter was sent to 50 secondary schools at the beginning of the academic year explaining the aim of the research. Self-report questionnaires, including scales to

measure the main variables of the current study, and other scales related to psychological well-being, were used.

Such questionnaires in Spanish were distributed among 600 secondary school teachers from these schools and were sent back by surface mail to the university. In total, 484 respondents from 34 schools returned the questionnaire (a response rate of 81%). Eight months later, at the end of the academic year, identical questionnaires were distributed among the same schools. After deletion of missing cases, 258 teachers from 24 schools had completed both questionnaires, and their scores could be used in the longitudinal analyses (258: 600). Thus, 57% of the teachers who participated at Time 1 (T1) also participated at Time 2 (T2).

In order to test whether the drop-outs differed from the panel group, we compared the T1 background variables (i.e., age, gender, type of school –(private vs. public), teaching experience, and organizational tenure) as well as the main study variables (i.e., anxiety, skepticism and inefficacy related to ICT, professional efficacy beliefs, exhaustion and cynicism) of both groups. The results from the ANOVAs and Chi-square analyses showed that there were no significant differences between the groups regarding the background and main variables. We therefore concluded that the panel group does not differ from the drop-outs in terms of the background and main variables in the study.

Measures

To test the variables in the present study, the RED questionnaire in Spanish (Resources, Emotions/Experiences and Demands; Salanova et al., 2006) was used in the paper-and-pencil version. This instrument tests three types of variables: (1) personal resources (e.g., self-efficacy) and job resources (e.g., autonomy), (2) emotions and experiences (e.g., burnout, technostress and engagement), and (3) job demands

(quantitative overload). The validity of this instrument has been tested in previous studies (e.g., Schaufeli, Bakker, & Salanova, 2006; Schaufeli, Salanova, González-Romá, & Bakker, 2002).

Concretely, technostress was assessed by three dimensions: anxiety (affective symptoms), skepticism (attitudinal dimensions) and inefficacy, always related to ICT use (cognitive dimension). The technostress instrument included in the RED questionnaire (Salanova et al., 2007) also included items referring to the name, time per week and months of ICT use (i.e., software programs, Internet). Anxiety related to ICT use was assessed by 5 items (e.g., '*I feel tense and anxious when I must use a new technology*'); Skepticism related to ICT was assessed by 7 items (e.g., '*I find new technologies less interesting with the passing of time*'); finally, inefficacy related to ICT use was evaluated by 7 items (e.g., '*I think I will not be able to learn the new technology language*'). The answer categories ranged from 0 ('totally disagree') to 6 ('totally agree'). Cronbach's alpha of each scale is shown in Table 1.

Professional efficacy beliefs were measured by 6 items of the Spanish version (Salanova, Schaufeli, Llorens, Peiró, & Grau, 2000) of the professional efficacy scale of the Maslach Burnout Inventory-General Survey (MBI-GS; Schaufeli, Leiter, Maslach, & Jackson, 1996). An example item is: '*In my opinion I am efficient in my job*'. Participants were asked to indicate the extent to which they agreed with each sentence on a seven-point rating scale (0 = never, 6 = everyday).

Burnout was assessed by using the 'core dimensions' that is: exhaustion and cynicism. A Spanish adaptation (Salanova, Schaufeli, et al., 2000) of the Maslach Burnout Inventory-General Survey (MBI-GS; Schaufeli et al., 1996) was used. Exhaustion comprises 5 items (e.g., '*I feel emotionally drained by my work*') and cynicism was measured by 4 of the 5 items from the original version (e.g., '*I have*

become more cynical as to whether my work contributes anything'). Item 13 from the original scale ('*I just want to do my job and not be bothered*') was omitted to improve scale reliability in the same way as previous studies (Salanova & Schaufeli, 2000; Schaufeli & Van Dierendonck, 2000; Schutte, Toppinen, Kalimo, & Schaufeli, 2000). Participants were asked to indicate the extent to which they agreed with each sentence on a seven-point rating scale (0 = never, 6 = everyday).

Data Analyses

At a first stage, descriptive analyses, internal consistencies (Cronbach's alpha) and intercorrelations among the variables were computed. Secondly, multiple analyses of variance (ANOVAs), using the gender and age as the independent variable and the rest of the variables in the model as dependent variables (i.e., technostress, professional efficacy beliefs and burnout), were done.

Following previous Confirmatory Factor Analyses (CFA) implemented by the AMOS software program (Arbuckle, 1997), each model component was included as a latent factor in the model, and was operationalized by the subscales introduced above, as observed, that is, the indicator variables. Specifically, technostress was used as a latent variable with three indicators (i.e., anxiety, skepticism and inefficacy related to ICT use); professional efficacy beliefs were indicated by two reliable halves of the professional efficacy scale of the MBI-GS. Finally, burnout was also considered a latent variable with two indicators (i.e., exhaustion and cynicism). In this last case, information on the reliability of the indicators was incorporated into the model by estimating the error variance indicator using the formula $(1 - \alpha) * \sigma^2$ and assigning this value to the indicator error variance.

Finally, Structural Equation Modelling (SEM) methods were also implemented by the AMOS software program (Arbuckle, 1997), using Maximum Likelihood Estimation methods in order to establish the relationships between the model variables.

A number of competing structural equation models were fitted to the data in several steps. Firstly, a model without cross-lagged structural paths, but with temporal stabilities and synchronous correlations (*Stability Model*, M1), was specified. Temporal stabilities were specified as correlations between the corresponding constructs for each pair of measurement waves (T1 and T2). This model estimates the total stability coefficient between T1 and T2 without decomposing the variance into constituent paths (direct and indirect paths) (Pitts, West, & Tein, 1996). Secondly, the fit of this stability model was compared to three more complex models that were nearest in likelihood to the hypothesized structural model: (a) *Causality Model* (M2): it is identical to M1 but also includes additional cross-lagged structural paths from T1 technostress to T2 professional efficacy beliefs and to T2 burnout, as well as from T1 professional efficacy beliefs to T2 burnout. (b) *Reversed Causation Model* (M3) is also identical to M1, but includes additional cross-lagged structural paths from T1 professional efficacy beliefs to T2 technostress, as well as from T1 burnout to T2 technostress and T2 professional efficacy beliefs. (c) Finally, the *Reciprocal Model* (M4) includes reciprocal relationships between technostress, professional efficacy beliefs and burnout. This model includes all paths of M2 and M3.

For all models, the measurement errors of the same indicators (i.e., subscales) collected at different time points were allowed to covary over time (e.g., a covariance is specified between the measurement error of technostress as measured at T1 and the measurement error of this scale as measured at T2). Whereas errors should not generally covary in the cross-sectional data measurement, the errors of measurement

corresponding to the same indicator should covary in longitudinal measurement models over time. According to different authors (Boker, Neale, & Rausch, 2004; McArdle & Bell, 2000; Pitts et al., 1996), this specification of covariance between errors of measurement accounts for the systematic (method) variance associated with each specific indicator.

The various nested models were compared by means of the chi-square difference test (Jöreskog & Sörbom, 1986). Besides the chi-square statistic, the analyses assessed the Goodness-of-Fit Index (GFI), and the Root Mean Square Error of Approximation (RMSEA). Furthermore, AMOS provides several fit indices that reflect the discrepancy between the hypothesized model and the baseline, Null model. In the present analyses, the Comparative Fit Index (CFI), Incremental Fit Index (IFI) and the Akaike Information Criterion (AIC; Akaike, 1987) are utilized. Marsh, Balla and Hau (1996) recommended their use because they are less dependent on sample size than the chi-square statistics and the GFI. In general, models with fit indices greater than .90 and a RMSEA smaller than .05 indicate a good fit (Hoyle, 1995). Finally, the lower the AIC index, the better the fit is.

Results

Descriptive statistics

Prior to the model testing, the means, standard deviations, Cronbach's alpha coefficients and bivariate correlations in both times (T1 and T2) were computed (see Table 1). As seen from this table, all variables at T1 and T2 had an alpha coefficient higher than .70, as Nunnally and Bernstein (1994) recommended.

Generally speaking, the pattern of correlations shows that, as expected, technostress (i.e., anxiety, skepticism and inefficacy related to ICT) at T1 is negatively related over time to professional efficacy beliefs at T2 and positively to burnout

(exhaustion and cynicism) at T2. In the same way, professional efficacy beliefs show significant and negative relationships to burnout (exhaustion and cynicism) and technostress over time. Finally, gender and age are positively correlated to technostress, professional efficacy beliefs and burnout at T1 and T2 (see Table 3.1).

Multiple analyses of variance (ANOVAs), using gender and age as independent variables and the rest of the variables in the model as dependent variables, show consistent differences in gender and age on technostress, professional efficacy beliefs and burnout. Based on age, results show significant differences on technostress at T1 [$F(1, 257) = 6.22$, $p < .01$)] and T2 [$F(1, 254) = 4.79$, $p < .05$)] and on burnout at T1 [$F(1, 257) = 3.96$, $p < .05$)] and T2 [$F(1, 257) = 9.14$, $p < .001$)]. However, non-significant differences were obtained in professional efficacy beliefs at T1 [$F(1, 257) = 1.23$, $p = .267$)] and at T2 [$F(1, 257) = 3.48$, $p = .163$)]. Based on age, the results also show significant differences on technostress at T1 [$F(2, 257) = 5.37$, $p < .01$)] and T2 [$F(2, 254) = 8.66$, $p<.001$)], on professional efficacy beliefs at T1 [$F(2, 257) = 4.37$, $p < .05$)] at T2 [$F(2, 257) = 3.91$, $p < .05$)] and on burnout at T1 [$F(2, 257) = 3.78$, $p < .05$)].

Since these preliminary analyses showed that the demographic variables (e.g., gender and age) are systematically related to the model variables, they were included in the model (as covariates) for all further analyses. Therefore, to facilitate the model estimation, gender and age were included in the model since their covariate is related to all variables.

Table 3.1. *Means (M), Standard deviations (SD), Cronbach's alpha (on the diagonal) and Correlations (n = 258).*

	Correlations													**Correlations**					
	M	**SD**	***1***	***2***	***3***	***4***	***5***	6	7	8	*9*	10	*11*	*12*	13	14	15	16	17	18
1.Genre	-	-	-																	
2. Age	40.21	7.46	-.18**	-																
3.AnxietyT1	2.14	1.01	.19**	.24***	(.81)															
4. SkepticismT1	1.51	.73	.04	.21**	.59***	(.73)														
5. ICT Ineffic.T1	1.89	.86	.17**	.21**	.65***	.69***	(.80)													
6. Profes.Effic.T1	4.27	.79	-.06	-.16**	-.15*	-.25***	-.25***	(.82)												
7. ExhaustionT1	2.13	1.07	.19**	.09	.21**	.05	.13*	-.32***	(.87)											
8. CynicismT1	1.74	1.18	.03	.22***	.18**	.08	.07	-.40***	.51***	(.83)										
9. AnxietyT2	2.15	1.03	.16*	.26***	.73***	.42***	.49***	-.08	.13*	.09	(.80)									
10. SkepticimsT2	1.60	.74	.08	.27***	.54***	.68***	.61***	-.21**	.06	.08	.58***	(.77)								
11.ICT Ineffic.T2	1.19	.71	.09	.26***	.56***	.56***	.64***	-.21***	.04	.04	.63***	.71***	(.73)							
12.Profes. Effic.T2	4.19	.77	-.11*	-.19**	-.16*	-.21***	-.26***	.61***	-.19**	-.24***	-.20**	-.22***	-.31***	(.80)						
13. ExhaustionT2	2.26	1.17	.23***	.02	.18**	.16*	.11*	-.26***	.75***	.41***	.16**	.06	.10*	-.18***	(.90)					
14. CynicismT2	1.78	1.24	.09	.16**	.15*	.15*	.12*	-.36***	.45***	.67***	.19**	.08	.13*	-.38***	.57***	(.86)				
15. TechnostressT1	1.85	.80	.15*	.23***	.86***	.83***	.88***	-.22***	.13*	.11*	.61***	.68***	.64***	-.22***	.11*	.12*	(.90)			
16. BurnoutT1	1.94	.98	.12*	.18**	.22***	.07	.11*	-.42***	.85***	.88***	.12**	.08	.04	-.25***	.66***	.65***	.14*	(.87)		
17. TechnostressT2	1.88	.72	.13*	.29***	.72***	.62***	.65***	-.18**	.09	.08	.88***	.85***	.87***	-.28***	.13*	.16**	.73***	.10*	(.89)	
18. BurnoutT2	2.02	1.07	.18***	.10*	.19**	.07	.11*	-.35***	.67***	.61***	.20**	.08	.14*	-.32***	.88***	.89***	.13*	.74***	.17**	(.90)

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

Model fit: Structural Equation Modelings

In order to test the mediational role of professional efficacy beliefs, the four steps of Baron and Kenny (1986) were followed. According to Baron and Kenny (1986) and Judd and Kenny (1981), when a mediational model involves latent constructs, SEM provides the basic data analyses strategy. In accordance with these four basic steps to establish mediation effects, we fitted the research model to the data. All four steps described by Baron and Kenny (1986) and Judd and Kenny (1981) were met. The results show that the professional efficacy beliefs fully mediated the relationship between technostress and burnout. Although the results of the mediating effects are significant, based on the arguments of Cole and Maxwell (2003) about the mediation in longitudinal data, the analyses have been restricted to direct effects since the present study is only composed by two waves.

Table 3.2 displays the overall fit indices of the competing models controlled by gender and age. In general, all models indicate a good fit since all fit indices are nearer to or higher than .90, the RMSEA is between .09 and .08, and the ratio between the chi-square statistic and the number of degrees of freedom is relatively low. We will first concentrate on the model comparisons.

Table 3.2. *Structural Equation Models of technostress, professional efficacy beliefs and burnout (n = 258).*

Model	$\chi 2$	df	p	GFI	RMSEA	CFI	IFI	AIC
M1. Stability	297.16	85	.000	.87	.09	.89	.90	399.16
M2. Causality	278.16	83	.000	.88	.09	.91	.91	384.16
M3. Reversed	293.20	84	.000	.87	.09	.90	.90	399.03
M4. Reciprocal	271.30	82	.000	.90	.08	.91	.91	379.30

Notes. $\chi 2$ = Chi-square; df = degrees of freedom; GFI = Goodness-of-Fit Index; RMSEA= Root Mean Square Error of Approximation; CFI = Comparative Fit Index; IFI = Incremental Fit Index; AIC = Akaike Information Criterion.

The *causality model* (M2) proved to be superior to the stability model (M1), Delta χ^2 (2) = 19, $p < .001$. This suggests that the inclusion of cross-lagged paths from T1 technostress to T2 professional efficacy beliefs, as well as from T1 professional efficacy beliefs to T2 burnout, are substantial. According to the modifications indices, all competitive models include five pairs of errors that correlate to anxiety, scepticism and inefficacy related to ICT, one of the indicators of professional efficacy beliefs, and cynicism from T1 and T2.

Additionally, the *reversed causality model* (M3) fitted the data significantly better than the stability model (M1), Delta $\chi^2(1) = 3.96$, $p < .05$. This indicates that the model with the cross-lagged path from T1 burnout to T2 professional efficacy beliefs shows a better fit to the data than the model including only temporal stabilities and synchronous correlations (M1).

Finally, the chi-square difference test regarding the stability model vis-à-vis the *reciprocal model* (M4; see Table 2) revealed that the addition of reciprocal effects significantly improve the stability model, Delta $\chi^2(3) = 25.86$, $p < .001$. Moreover, the model with the cross-lagged reciprocal relationships among the variables (M4) resulted in a significantly better fit to the data than the causality model (M2) and the reversed causality model (M3). The results of the chi-square difference tests for both comparisons (M2 vs. M4, and M3 vs. M4) are Delta χ^2 (1) = 6.86, $p < .01$, and Delta χ^2 (2) = 23.73, $p < .001$, respectively. Moreover, compared to the rest of the competitive models, M4 shows the lowest AIC. This means that the theoretical model including cross-lagged reciprocal relationships between technostress, professional efficacy beliefs and burnout offers the best fit to the data.

We will now discuss the specific structural relationships that resulted from these models. First of all, it is important to note that all manifest variables loaded significantly

on the intended latent factors. Inspection of the output revealed that all indicators of technostress had loadings on the intended latent factor which were higher than .88 at T1 and T2. Furthermore at both waves of measurement, the loadings of the two professional efficacy indicators were higher than .64, whereas the loadings of exhaustion and cynicism on the burnout factor were higher than .58. Secondly, the autocorrelations between the two waves were .76 for technostress, .60 for professional efficacy beliefs, and .74 for burnout.

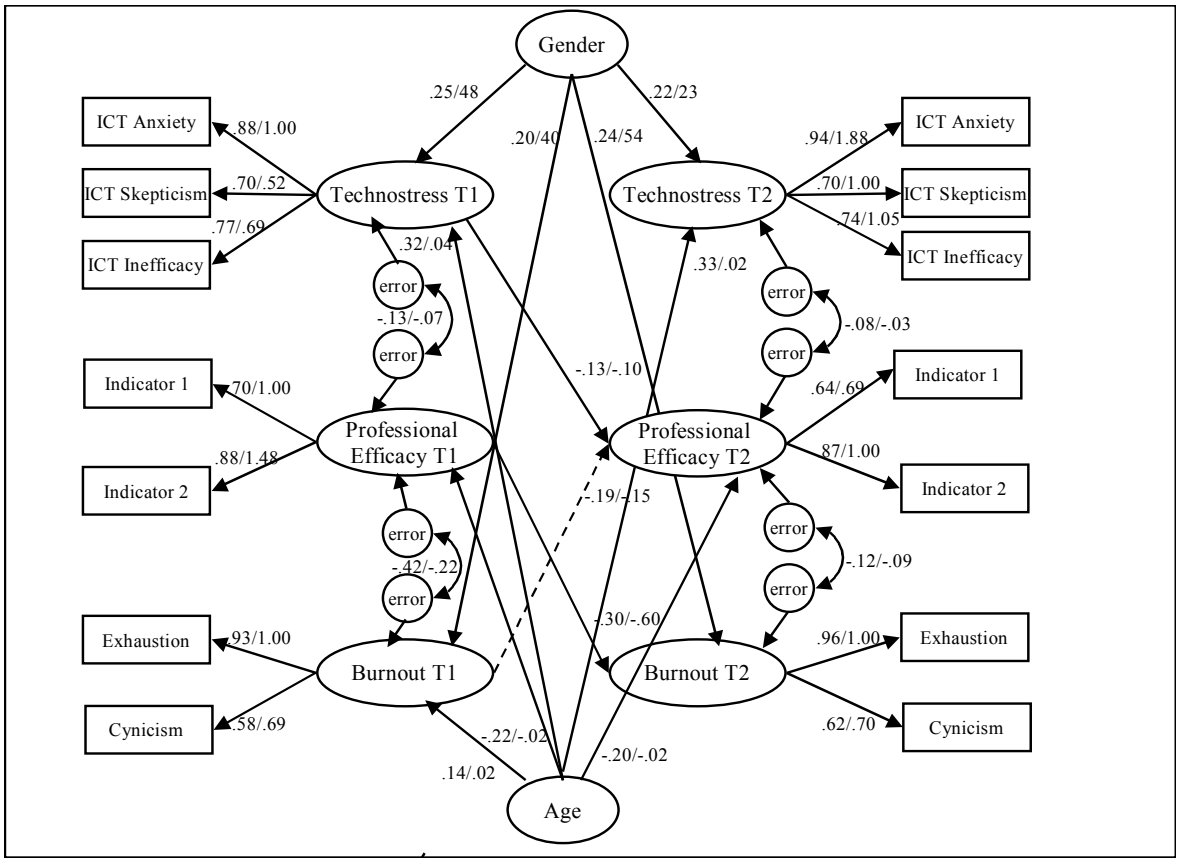
Hypothesis 1 asserted that technostress would have lagged negative effects on professional efficacy beliefs (Hypothesis 1a), and that professional efficacy beliefs would have lagged negative effects on burnout (Hypothesis 1b). The model that includes these causal relationships, the reciprocal model (M4), resulted in a significant lagged and negative effects of T1 technostress on T2 professional efficacy beliefs (β = -.13, t = -1.80, $p < .05$), as well as negative effects of T1 professional efficacy beliefs on T2 burnout (β = -.30, t = -4.28, $p < .001$). These findings clearly support our first hypothesis.

Hypothesis 2 stated that T1 burnout has a lagged negative effect on T2 professional efficacy beliefs (hypothesis 2a) and that T1 professional efficacy beliefs have a lagged negative effect on T2 technostress (Hypothesis 2b). The final reciprocal model also resulted in significant reversed causal structural relationships. Specifically, the significant negative relationship was as follows: T1 burnout – T2 professional efficacy beliefs β = -.19 (t = -2.61, $p < .01$). However, a nonsignificant relationship was obtained from T1 professional efficacy to T2 technostress β = -.09 (t = 1.65, $p < .087$). These findings partially support our third hypothesis since only Hypothesis 2a is supported.

Finally, it is relevant to note that gender shows a significant positive relationship with technostress at T1, $\beta = .25$ ($t = 3.94$, $p < .001$) and T2, $\beta = .22$ ($t = 3.51$, $p < .001$) as well as with burnout at T1, $\beta = .20$ ($t = 3.36$, $p < .001$) and T2, $\beta = .24$ ($t = 3.91$, $p < .001$). In the same way, age shows a significant positive relationship with technostress at T1, $\beta = .32$ ($t = 5.01$, $p < .001$) and T2, $\beta = .33$ ($t = 5.16$, $p < .001$), a negative relationship with professional efficacy beliefs at T1, $\beta = -.22$ ($t = -3.17$, $p < .01$) and T2, $\beta = -.20$ ($t = -2.85$, $p < .01$), and a positive relationship with burnout at T1, $\beta = .14$ ($t = 2.87$, $p < .01$).

Thus, the results from Model 4 (including the reciprocal relationships) showed that, when the model is controlled by gender and age, both causal and reversed causal relationships were simultaneously active. The significant paths of the reciprocal model are graphically displayed in Figure 3.2. The hypothesized predictors at T1 accounted for 16% of the variance in T2 technostress, 13% of the variance in T2 professional efficacy beliefs, and 15% of the variance in T2 burnout.

Figure 3.2. Structural model of technostress, professional efficacy beliefs and burnout, n = 258



Notes: Solid lines represent causality effects; dotted lines represent reversed causality effects. Significant standardized/unstandardized path coefficients are significant at, $p <$ .001.

Discussion

In the current study, the relationship of technostress, professional efficacy beliefs and burnout was investigated among teachers. The main research questions addressed were whether technostress could decrease professional efficacy beliefs, which in turn could facilitate burnout in the future, and whether burnout has a negative influence on professional efficacy beliefs, which in turns increase the levels of technostress over time. Thus, the objective of the present study was to test the role of technostress as a predictor of teachers' professional efficacy beliefs and its influence on teaching burnout over time using a two-wave longitudinal design.

In the present study, technostress was conceptualized either as a negative psychological state associated with ICT use, or an anticipatory threat of its future use. Following Salanova et al. (2007), the present study has focused on a specific type of technostress: technoanxiety, in which people experience high levels of unpleasant psycho-physiological activation and feel tension through the present or future use of any type of ICT. This anxiety leads to the development of skeptical attitudes toward ICT use, as well as negative thoughts about one's own capacity and competence toward ICT. Based on previous studies which document the evaluation of efficacy beliefs by specific measures in specific domains (Grau et al., 2001; Salanova et al., 2002), we used the specific professional efficacy beliefs related to the teaching profession (Cherniss, 1993). Finally, burnout has been measured by the core dimension, that is: exhaustion and cynicism (Green et al., 1991, p. 463).

Based on a brief literature review, it was predicted that technostress develops a reduction of professional efficacy beliefs over time (*Hypothesis 1a*), which in turn have a negative influence on burnout over time **(***Hypothesis 1b*). Finally, we hypothesized a reverse causal relationship between burnout, professional efficacy beliefs and

technostress, i.e., burnout would reduce professional efficacy beliefs (*Hypothesis 2a*), which in turn would increase technostress levels (*Hypothesis 2b*).

Moreover, the results of the ANOVAs showed significant differences in technostress, professional efficacy beliefs and burnout based on demographic variables (Birdi & Zapf, 1997; Salanova et al., 2007; Maslach & Jackson, 1981). This suggests the relevance to consider these differences in order to test the technostress process and to undertake specific intervention programs.

The results of the SEM analyses, where gender and age acted as covariates using a cross-lagged panel design (n = 258 secondary school teachers), generally supported both Hypotheses 2 and 3. More specifically, the results revealed that the theoretical model, which includes cross-lagged reciprocal relationships between technostress, professional efficacy beliefs and burnout, fits the empirical data best. This means that both causal and reversed causal relationships were simultaneously active in the reciprocal relationship between technostress, professional efficacy beliefs and burnout.

That is, technostress, a specific negative psychological state composed by anxiety (e.g., feeling tense and anxious when ICT is in use), skepticism (e.g., negative attitudes toward ICT) and inefficacy related to ICT use (e.g., beliefs in one's lack of capacity to use ICT), had a negative influence on teachers' professional efficacy over time. Simultaneously, this lack of professional efficacy, operationalized as strong beliefs in one's competence at work, fostered burnout over time. So far, the second hypotheses, that is, Hypotheses 1a and 1b are confirmed. These findings are consistent with predictions from the SCT, which assumes that the experience of negative psychological states is responsible for lack of efficacy (Bandura, 1997, 2000; Salanova et al, 2001). In sum, this lack of efficacy beliefs decreases well-being and would specifically lead to a decrease in both the energy and persistence to cope with demands

(i.e., exhaustion) as well as in work identification (i.e., cynicism), as confirmed in previous studies (Cherniss, 1993; Llorens et al., 2005; Salanova et al., 2002). It seems that suffering technostress in the present predicts a reduction of professional efficacy beliefs over time, which in turn seems to predict burnout in the future.

The second hypothesis was that burnout (i.e., exhaustion and cynicism) has a negative influence on professional efficacy beliefs, which in turn have a negative effect on technostress (i.e., anxiety, skepticism and inefficacy related to ICT use). In this study, and based on the literature, we assumed a reversed causal effect of burnout on professional efficacy beliefs and of professional efficacy beliefs on technostress. The results partially confirm our Hypothesis 2. More specifically, burnout in the present reduced the levels of professional efficacy beliefs in the future (*Hypothesis 2a*). These findings are consistent with previous longitudinal studies which point out that burnout reduces levels of professional efficacy beliefs over time, which in turn increase the perception of demands and obstacles, generating reciprocal relationships (Llorens et al., 2005). In our study, we found that burnout reduced the levels of professional efficacy among secondary school teachers over time. However, we did not find that this lack of professional efficacy beliefs predicts technostress. Consequently, *Hypothesis 2b* was not supported.

Together, our results showed that reciprocal relationships exist between technostress, professional efficacy beliefs and burnout over time. These results provide evidence (since the present study is only composed of two waves) of the loss spiral in which negative psychological states (in our case, technostress) reduce personal resources (in our case, professional efficacy beliefs), which in turn influence negative emotions (in our case, burnout) (Hobfoll, 1989, 2001). Findings from the current study showed that, according to the SCT (Bandura, 2001), negative psychological states such

as technostress lead to a decrease in professional efficacy beliefs, which in turn increase burnout in secondary school teachers, and that sometimes these levels of burnout are reciprocally influenced by lower levels of professional efficacy beliefs and technostress.

Study limitations and future research

One strong point of this study is its longitudinal character. Thus, the current findings could be framed in terms of cause and effect relationships because main variables are measured at different time points. However, the results are restricted to direct effects and not mediating effects since the present study is only composed of two waves (Cole & Maxwell, 2003). In this sense, it would be important to test the model using a cross-lagged panel design with more waves in order to test the long time effects of these reciprocal relationships over time.

Another strong point is that the model explained an acceptable part of the variance in the dependent variables (16%, 13% and 15% of the variance in T2 technostress, professional efficacy beliefs and burnout, respectively). However, a limitation of this study is that only teachers' self-reports were used, and consequently, the results may be influenced by the common method variance. Thus, it would be interesting to complement these with more objective measures.

Finally, this study is limited to the context of secondary school teachers. Since the main hypotheses were confirmed regarding reciprocal relationships between technostress, professional efficacy beliefs and burnout, it would be interesting and relevant to examine this phenomenon in other occupational fields, above all in specific ICT users or in teleworkers.

Theoretical and practical implications

Despite these limitations, the results may have important theoretical and practical implications to improve the job conditions of secondary school teachers and

specifically, to reduce the negative consequences caused by ICT use. At a theoretical level, there are two main implications related to the concept and process of technostress. The first is related to the technostress concept. Thus, in the present study, technostress has been delimited and has focused on a specific type of technostress, technoanxiety. In this sense, those teachers who experiment technostress are characterized by feeling anxiety, skeptical attitudes and inefficacy related to ICT use. The second theoretical implication refers to the etiology process of technostress and its consequences. Based on the SCT of Bandura (1997, 2001), technostress can act as a source of efficacy in the sense that it is considered a negative psychological state which would generate low levels of professional efficacy beliefs in teachers who use ICT. This lack of efficacy would also be responsible for the development of burnout, which in turn decreases the levels of professional efficacy beliefs over time (Llorens et al, 2005). In this way, the key role of efficacy beliefs in the process between technostress and its consequences (i.e., burnout) over time is shown.

At a practical level, these results indicate that the key for the intervention and optimization of well-being and psychosocial health of teachers who use ICT in their day-to-day work is to generate the belief that they are able to do their work successfully. The results also stress the role of the educational institutions to facilitate accurate training to promote professional efficacy beliefs. To achieve this aim, training should include a variety of components that are consistent with theoretical cues for efficacy building (Bandura, 1997, 1999): role-playing to provide experiences of success at work in teachers, models of performance by vicarious experiences, coaching and social persuasion. And above all, the reduction of negative emotional states such as technostress by giving, for example, accurate information and communication related to ICT, specific ICT training, participation, technical social support, and technology re-

design (Bird, Bird, & Scrugs, 1983). These are different ways to generate ‘positive’ jobs and ‘positive’ teachers in the framework of Positive Occupational Health Psychology (Salanova, Martínez, & Llorens, 2005).

Chapter 4

Leadership climate optimize self-efficacy levels to reduce technostrain experience: A Multi-level Study

Summary

A multilevel model of leadership climate, self-efficacy, and technostrain experience was tested using sample of 877 individual members nested in 76 teams. We expect that, high levels of self-efficacy partially mediate the relationship between leadership climate and technostrain (i.e., exhaustion, skepticism, anxiety, and inefficacy related to technology use). Our findings show that leadership climate have an optimizing effect on self-efficacy levels which reduce technostrain experience. Moreover, shared leadership perceptions are associated positively with reduced technostrain. Theoretical and practical implications are discussed.

Keywords: leadership climate, self-efficacy and technostrain.

Introduction

The use of Information and Communication Technologies (ICT) in the workplace can have both positive and negative effects on employees' work experience. On the positive side, ICT can be perceived as recourse that assist employees in completion of their works, enhance employees' ability to solve problems by increasing their access to information (Morgan, Morgan, & Hall, 2000), aid flexible work options (i.e., teleworking) that help to decrease work–family conflict, and improve employees' performance by increasing their ability to communicate with other organizational members (Dewett & Jones, 2001). However, on the other side, ICT can be perceived as an additional job demand in the workplace due the physical and/or psychological effort that employee confront with technology in their workplaces, such as the introduction of new technologies, the constantly update of ICT software and hardware, the accessibility to the workplace which increase work–family conflict (Golden, Veiga, & Simsek, 2006), and the increase expectations for productivity (O'Driscoll, Brough, Timms, & Sawang, 2010). Thus, these technological demands can have a negative effect on employee's work experience and create further psychosocial consequences, such as technostrain. Salanova, Llorens, Cifre, & Nogareda (2007) defined technostrain as a negative psychological experience composed of high levels of anxiety, fatigue, skepticism and inefficacy related to the use of ICT. Previous research has shown that personal and social resources are important factors in explaining technostrain experience (Salanova, Llorens, & Cifre, 2013). In this context, the relationship between self-efficacy (personal resources), leadership climate (social resources) and technostrain is of special interest.

At the individual level of analysis, research has found that self-efficacy plays an important role in influencing ICT perceptions and use (Deng, Doll, & Truong, 2004;

Igbaria & Iivari, 1995; Salanova, Grau, Cifre, & Llorens, 2000). Bandura (1997) defined self-efficacy as a "belief in one's capabilities to organize and execute the courses of action required to produce given attainments" (p.3). In this way, high levels of self-efficacy have a positive outcomes in individuals' motivation to use ITC (Deng et al., 2004) and it acts as a buffer ameliorating the negative effects of technostrain on employee's psychological well-being (Compeau, Higgins, & Huff, 1999; Llorens, Salanova, & Ventura, 2007).

At the group level analysis, leadership climate play an influential role in how employees experience their work (i.e., with new technologies) and represent an important influence on employee psychological well-being (Schyns & Van Veldhoven, 2010; Schyns, Veldhoven, & Wood, 2009; Tuckey, Bakker, & Dollard, 2012). Leadership climate is conceptualized as the shared perceptions of employees working in the same group towards their leaders behaviors (Chen & Bliese, 2002). Thus, leaders can best increase employee's self-efficacy by providing them with sufficient socio-emotional support and good working environment (Bliese & Castro, 2000; Chen & Bliese, 2002).

Hence, the purpose of this study was to examine the role of leadership climate as a predictor of self-efficacy since we believe that leadership in organizational setting is likely to be an important determinant of employee motivation with use of ICT. In particular, we are interested how leadership climate can decrease the level of technostrain by increasing the levels of self-efficacy.

At the Individual Level, Self-efficacy Predictor of Technostrain Experience

Technostrain could be considered a negative psychological experience composed of high levels of anxiety and fatigue (affective dimension), skepticism (attitudinal dimension) and inefficacy (cognitive dimension) related to the use of

technology (see Salanova et al., 2013). The more studied component of technostrain experiences is *anxiety*, which is determined by high physiological activation, tension, and discomfort with regard to technologies. Experiencing anxiety includes the fear of hitting a wrong key and losing information, doubts about using computers for fear of making a mistake, and finding computers intimidating (Ragu-Nathan, Tarafdar, & Ragu-Nathan, 2008). Secondly, users also feel lower levels of psychological activation, i.e., *mental fatigue*. One of the special experiences of fatigue is Information Fatigue Syndrome (IFS), which derives from the current requirements of the Information Society and from dealing with information overload (Lewis, 1996). The consequences of IFS are related to poor decision-making, difficulty in memorizing and remembering, and reduced attention span. The third component in the technostrain experience is *skepticism*; this term is based on studies conducted on job burnout, specifically on the burnout dimension of "cynicism". Skepticism, as a dimension of technostrain, is defined as the display of indifferent, detached, and distant attitudes toward the use of technology. More specifically, it is a feeling of cognitive distancing that consists in developing indifference or a cynical attitude when users are exhausted and discouraged due to the use of technology (Schaufeli & Salanova, 2007). The last component of technostrain is *inefficacy*, beliefs about the right use of technology (i.e., a judgment of ability regarding a specific task or domain). When people have to cope with overwhelming technological demands, lack technological resources, and lack personal resources (i.e., lack self-efficacy and mental competences) it contribute to anxiety, fatigue and skepticism, increasing their sense of inefficacy with the use of technology (Salanova et al., 2013).

Research has shown the crucial role of self-efficacy beliefs in coping with stress and specifically the technostrain (Salanova, Llorens, & Ventura, 2014; Salanova, Peiró,

& Schaufeli, 2002). According to Bandura's SCT (1997), one of the mechanisms governing one's own level of functioning and the events that affect one's life are self-efficacy beliefs. These beliefs are based on the idea that one has the power to produce desired effects by one's actions; otherwise, one has little incentive to act or to persevere in the face of difficulties. Moreover, self-efficacy beliefs may act as an important determinant of the effort and persistence in pursuing goals (Bandura, 1997). Given the relevance of the use of a specific measure of self-efficacy (e.g., Grau, Salanova, & Peiró, 2001), a specific measure of professional efficacy (i.e., the belief in the ability to correctly fulfill one's professional role) is used in the present study (Cherniss, 1993).

Research reveals that the quality of the effects of ICT use on well-being depends on self-efficacy (Shu, Tu, & Wang, 2011). For example, employees with high self-efficacy have a positive perception regarding how easy and useful is the technology (Chatzoglou, Sarigiannidis, Vraimaki, & Diamantidis, 2009; Venkatesh, 2000) and have more motivation in the use of technology (Salanova et al., 2000). In the same way, research show that people with low self-efficacy tend to be very anxious with the technology use (Downey & McMurtrey, 2007) and tend to interpret job demands as threats increasing technostrain (Salanova, Cifre, Martínez, & Llorens, 2007; Shu et al., 2011). Consistent with previous research, at the individual level we expect that employees who perceived more professional self-efficacy are likely to be less technostrain.

Hypothesis 1: Professional self-efficacy is negatively associated with technostrain experience.

At the Group Level, Mediating Role of Self-efficacy by Leadership Climate

Shamir, House, and Arthur (1993) were among the first to suggest that positive leadership enhance followers' perceptions of self-efficacy, in their self-concept

motivation theory of leadership. The authors suggested that such leaders increase the intrinsic value of efforts and goals by linking them to valued aspects of the follower's self-concept, thus harnessing the motivational forces of self-consistency, self-expression, self-esteem and self-efficacy (pp. 584). In the same way, Bandura (1997) argued that self-efficacy are constructed from four principal sources of information, that is, enactive mastery experiences, verbal persuasion, vicarious learning, and the interpretation of physiological and affective states. Therefore, leadership can also increase follower's self-efficacy thought enactive mastery (i.e., performance positive experiences) and positive emotional states; if the leaders help employees to focus on the processes in doing their work (e.g., providing information and social support), which helps to optimize outcomes and reduce, in this case, technostrain, will thus enhance self-efficacy (Llorens et al., 2007). Likewise, leadership can provide a point of reference for employees' vicarious learning, helping to define what kinds of behaviors it is good to develop (role modeling) (Shamir et al., 1993; Walumbwa, Avolio, & Zhu, 2008); and finally, leaders can use verbal persuasion in order to convince employees that they have what it takes to succeed and helping employees to become more confident in their abilities (Walumbwa et al., 2011).

Consistent with the literature on self-efficacy and leadership, we examine leadership climate as a more proximal, group-level predictor of self-efficacy. Previous research has included leadership as one of important dimension of climate in order to reflect employees' shared perceptions of their leadership behaviors (Chen & Bliese, 2002; Gavin & Hofmann, 2002). Chen and Bliese (2002) defined leadership climate as "a shared group-level climate variable that reflects group member's perceptions of the extent to which the leaders of their group provide task-related direction as well as socio-emotional support to subordinates" (p. 549). These authors refer to a leadership climate

as a facilitation and support environment. For example, a leadership focused on facilitating a climate of interaction within groups and the attainment of group-relevant goals (L. A. James & James, 1989), and leadership interested in follower's welfare, offering socio-emotional support and good working environment. Following up the work done by these authors, leadership can increase employee's self-efficacy by clarifying employees' work roles and providing sufficient socio-emotional support within group (see Bliese & Castro, 2000; Chen & Bliese, 2002).

Previous research suggested that leadership play an important role employee's health and well-being (Skakon, Nielsen, Borg, & Guzman, 2010). For example, the leadership can provide individualized support, appreciation and consideration their employees. Thus, leadership can positively influence follower's self-efficacy about his or her capability to achieve a task (Chen & Bliese, 2002; Munir & Nielsen, 2009), which in turn increase their sense of well-being. Moreover, cross-level research has found that leadership climate is positively associated with job satisfaction (Schyns et al., 2009), organizational commitment (Schyns & Van Veldhoven, 2010), work engagement (Tuckey et al., 2012), performance (Chen, Kirkman, Kanfer, Allen, & Rosen, 2007) and well-being (Bliese & Britt, 2001).

However, we are not aware of any research examining whether leadership climate affects technostrain. To date, studies demonstrated the importance of leadership climate in promoting self-efficacy and the relationship between leadership climate and strain (Chen & Bliese, 2002), in this case technostrain. Consistent with the arguments presented above, at the cross-level we expect that leadership climate would be negatively related to employees' technostrain, and it will enhance professional self-efficacy. We therefore hypothesize the following:

Hypothesis 2: Leadership climate is positively associated with self-efficacy.

Hypothesis 3: Leadership climate is negatively associated with techno-strain' experience.

Hypothesis 4: The relationship between leadership climate and technostrain' experience is partially mediated by self-efficacy.

Method

Sample and Procedure

This study was conducted using two convenience samples of different countries: Spain and Uruguay. The first sample consisted of 387 employees (54% women) of an online university (23% academic staff and 77 % administrative workers) in Spain distributed in 44 work units. In fact, employees in this sample work in an educational organization in which students' services are exclusively attended on-line (53% were teleworkers). We have no data about the age of this sample since this information was not disclosed by the company as a strategy to guarantee the anonymity of the participants. Furthermore, 57% had a full time contract with an average of 5.8 years working in the company (SD = 3.63).

The second sample comprised 490 bank employees (51 % men) in Uruguay distributed in 32 work units. The mean age of the sample was 46 years (SD = 9.09) with age ranging from 24 to 62 years. The majority of employees (94%) had a full-time work contract with an average of 22.2 years working in the company (SD = 11.8).

In both case, the assessment was conducted online. The research team sent an email explaining to participants how to complete the self-report questionnaire used in this research. Subsequently, and with the purpose of facilitating data protection and to assure anonymity, random passwords were given to each of the participants.

Measures

We used validated scales to measure the constructs under study.

Self-efficacy was measured with the professional self-efficacy version by Schwarzer (1999), which was adapted to a specific domain: work setting. The scale includes seven items for the clerical and bank samples, and nine items for the academic staff sample. All items refer to self-efficacy related to a specific task (e.g., "*I will be capable of efficiently handling unexpected events in my work")*. The Cronbach's alphas are .89.

Technostrain was assessed by four previously validated scales (Salanova et al., 2007): anxiety with four items, fatigue with four items, skepticism with four items, and inefficacy with four items. Examples of items are: *"I feel tense and anxious when I work with ICT"* (anxiety), *"It is difficult for me to relax after a day's work using ICT"* (fatigue)*, "As time goes by, ICT interest me less and less"* (skepticism), *"In my opinion, I am inefficacious when using ICT"* (inefficacy). The Cronbach's alpha is .87.

Leadership climate was measured using four items scale developed by Salanova et al., (2011). A sample item is "*The person who supervises me directly organizes and distributes responsibilities"*. The Cronbach's alpha is .94

Respondents answered items about self-efficacy, technostrain and leadership climate, using a seven point scale ranging from 0 (never) to 6 (always/ every day).

Control variable. At the team level, we controlled from team size, given it varied substantially across teams.

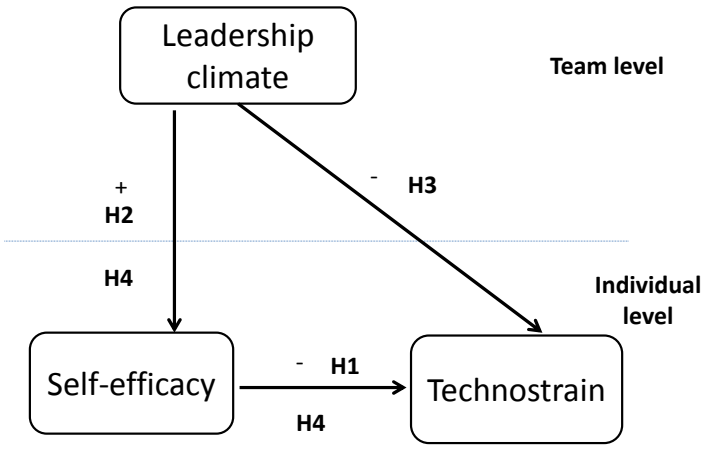
Analysis Strategy

The present data contained a hierarchical structure in which responses of individual-level variables (N = 877 employees; level 1) were nested within teams (N = 76 teams; level 2) (e.g., Hofmann, 1997). Following Bliese (2002), data was analyzed via random coefficient model (RCM; also referred to as hierarchical linear modeling; Gavin & Hofmann, 2002) using HLM 7 software (Raudenbush, Bryk, Cheong,

Congdon, & du Toit, 2011). We used RCM (Bliese, 2002) to test cross-level effect of leadership climate on technostrain's experience and the mediating effects of self-efficacy on the relationship between leadership climates and technostrain experience.

Finally, the cross-level mediation analyses were conducted using Baron & Kenny (1986) approach, four steps are calculated: (a) the relationship between the dependent variable (technostrain) and the mediator variable (self-efficacy) (Hypothesis 1); (b) the relationship between the independent variable (leadership climate) and the mediator variable (Hypothesis 2); (c) the relationship between the dependent variable and independent variable (Hypothesis 3); and (d) the change in magnitude of this relationship once the mediator was added (Hypothesis 4). This sequence is represented as Models A-D (see figure 4.1). The Monte Carlo Method (MCM; (Preacher & Kelley, 2011), a form of parametric bootstrapping, was used to generate 95% confidence intervals for the average indirect effects using 20,000 random draws from the estimated sampling distribution of the estimates. The MCM is appropriate for multilevel models where lower-level mediation (i.e., mediation by Level 1 variables) is predicted (Bauer, Preacher, & Gil, 2006), as in our theoretical model.

Figure 4.1: *Multilevel model of technostrain in teams.*



Note: H = hypothesis

Results

Aggregation Tests

To support the aggregation of leadership climate, we used two complementary approach (Kozlowski & Klein, 2000): a consistency–based an approach (computation of the Intraclass Correlation Coefficient (ICC)) and a consensus-based approach (computation of Average Deviation Index ($AD_{M(j)}$) and $r_{wg(j)}$).

We calculated Intraclass Correlation (ICC_1 and ICC_2, Bliese, 2000) and tested whether average scores differed significantly across team (indicated by an F test from a one-way Analysis de Variance [ANOVA] contrasting team means on leadership climate). ICC_1 indicates the proportion of variance in ratings due to team membership, whereas ICC_2 indicates the reliability of team membership. For leadership climate, we obtained good support for aggregation (ICC_1 = .09; ICC_2 = .68) because the ICC_1 values is above the .12 recommended level (James, 1982) and the ICC_2 values is above the .47 recommended cot off (Schneider, White, & Paul, 1998). The results obtained, F (75, 801) =16.54, p<.01, show that there was a significant degree of between-units differentiation and support the validity of the aggregate leadership climate measure.

Moreover, average $r_{wg(j)}$ value for leadership climate ($r_{wg(j)}$ =.69) was near the .70 recommendation (James, Demaree, & Wolf, 1993; Klein & Kozlowski, 2000) and mean AD value for leadership climate (AD =1.08) was less than 1.2 (Burke & Dunlap, 2002). Taking into account these results, we concluded that there was a good within-group agreement and further justifying the aggregation of collective responses to group level.

Descriptive Analysis

Table 4.1 presents the descriptive statistics and intercorrelation for the variables in the study at individual and team level. The correlation table indicates that self-

efficacy is correlated negatively with technostrain and positively with leadership climate and team size. In addition, leadership clime is correlated negatively with technostrain experience, as was expected. In contrast, the team size is not correlated with the units shared perception of leadership and technostrain.

Table 4.1. *Means, standard deviations and intercorrelations (N = 877, level 1; k = 76, level 2)*

Variable	Level	*Mean*	*SD*	1	2	3
1. Self-efficacy	1	4.57	.94	-		
2. Technostrain	1	1.17	.80	-20***	-	-
3. Leadership	2	4.25	1.22	.12***	-.21***	-
4. Team size	2	16.80	9.93	.10**	.03	-.30

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

Hypothesis testing

Table 4.2 shows, that technostrain had significant negative relationship with self-efficacy of the employees (see Model A), supporting hypotheses 1. As predicted, employees with more levels of self-efficacy reported less technostrain. Likewise, hypotheses 2 was supported based on the significant positive cross-level relations of leadership climate and individual self-efficacy (Model B). Hypothesis 3 was also supported based on the significant negative cross-level relations of leadership climate and individual technostrain (Model C). Hence the preconditions for mediation were established (Baron & Kenny, 1986). In a formal test of mediation, when individual self-efficacy was added to the model where group level leadership climate predicted individual technotrain (Model D), the coefficient for leadership climate reduced in size but remained significant, suggesting partial mediation. Finally, the 95% confidence intervals for the simultaneous indirect effects via self-efficacy (lower = 0.03, upper = 0.08) indicate that the effect of leadership climate on follower technostrain was carried

through personal resources of the employees (self-efficacy). Hypothesis 4 was thus supported.

Table 4.2. *Analyses of Direct and Mediating effects in the prediction of technostrain's experience*

Variable	γ	SE	*t -ratio*
Model A: DV = Technostrain			
Self-efficacy [a]	-.48	.01	-10.93**
Model B: DV: Self-efficacy			
Leadership climate [b]	.13	.05	2.53***
Team size [b]	.01	.00	1.72
Model C: DV = Technostrain			
Leadership climate [b]	-.22	.08	-2.71**
Team size [b]	-.01	.00	-2.04
Model D: DV = Technostrain			
Self-efficacy [a]	-.48	.04	-10.93**
Leadership climate [b]	-.19	.08	-2.58*
Team size [b]	-.00	.00	-1.96

Note: DV = dependent variable (all measured at the individual level).
[a] Level 1 (individual level) predictor. [b] Level 2 (group level) predictor.
*p<.05; **p<.01; *** p<.001

Discussion

The purpose of this research was to examine the antecedents of technostrain experience. Specifically, to examine the role of leadership climate as a predictor of self-efficacy and technostrain experience. In this examination, we were interested in identifying potential discontinuities in the predictors of technostrain across levels of analysis and in the role of leadership at different team levels. The data supported all our hypotheses, and results provide several extensions to research on technostrain, self-efficacy and leadership climate, and multilevel processes, with important implications for organizational and managerial practices.

Theoretical and Practical Implications

First, as we predicted in Hypothesis 1, the powerful motivational process of self-efficacy (Bandura, 2001) was confirmed. Thus, self-efficacy has been shown to motivate the ongoing technology use (Deng et al., 2004) and reduce the negative impact of ICT use leading to technostrain (Shu et al., 2011).

Second, this study clearly demonstrates that leadership climate is an important source of self-efficacy, thus Hypothesis 2 was confirmed. This agrees with previous research (Chen & Bliese, 2002; Walumbwa et al., 2011; Walumbwa, Hartnell, & Oke, 2010), which has found that shared perception of group is related positively with individual self-efficacy by different mechanisms. Thus, leadership can enhance followers' perceptions of self-efficacy through the clarifying tasks and providing socio-emotional support (Chen & Bliese, 2002).

Third, we also found an indirect cross-level relationship between leadership climate and follower technostrain (i.e., Hypothesis 3 was confirmed), where the effect of leadership at the group level on technostrain was partially mediated by individual perceptions of self-efficacy (i.e., Hypothesis 4 was confirmed). Therefore, our results agree with Salanova et al. (2013) who suggested that leadership has the potential to increase level of self-efficacy and reduce levels of technostrain in the followers.

Moreover, our study also contributes to research on leadership climate (multilevel research) and teams that work with technology, and its role to reduce technostrain experience. That is, the leaders can enhance employees' self-efficacy by providing them with sufficient socio-emotional support in the use of technology.

Finally, organizations should estimate the role of leader to develop healthy employees and workplaces. In particular, the organization should invest in develop the individual (i.e., self-efficacy) and group (i.e., share perception of leader) factors that

prevent technostrain. Thus, leadership can enhance followers' perceptions of self-efficacy through different forms 1) role-playing to promote successful experiences (i.e., enactive mastery experiences); 2) expressing positive evaluations and communications higher performance expectation (i.e., verbal persuasion); 3) reduce negative affective states of use ITC in the job with relaxation, meditation practices, etc. (i.e., regulation emotional states); and 4) demonstrate moral conduct (i.e., vicarious learning). This is a way to generate 'positive' technology jobs, as well as 'positive' employees from the Positive Occupational Health Psychology framework (Salanova, Llorens, Cifre, & Martinez, 2012).

Limitations and further research

The present study has different limitations. First, we collected data with only one source, which increase potential biases that may result from common method variance (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Second, we used short dataset to examine our hypotheses (i.e., 877 employees and 76 teams). However, we included different samples that use ITC in theirs jobs from different enterprises and country. But strictly speaking, we cannot generalize our results to larger groups.

In addition, as a third limitation, self-efficacy is not specified in technology, is professional self-efficacy. Future study should explore the role of self-efficacy towards the use of technology as a specific evaluation of this personal resource as suggested by Bandura (1997).

Finally, the study was based on cross-sectional research. This implies that the relationships obtained among leadership climate, self-efficacy, technostrain processes need to be carefully interpreted and no casual inferences must be made.

Thus, as a starting point for future research, causal inferences could be made when experimental and longitudinal studies replicate our findings, and other

occupational samples should be tested with the theoretical model proposed in the present study (e.g., teleworking).

On the other hand, it is convenient for future studies to extend the number of personal resources that are specific to technology at an individual level (e.g., mental competences) and also at a group level (e.g., collective efficacy).

Capítulo 5

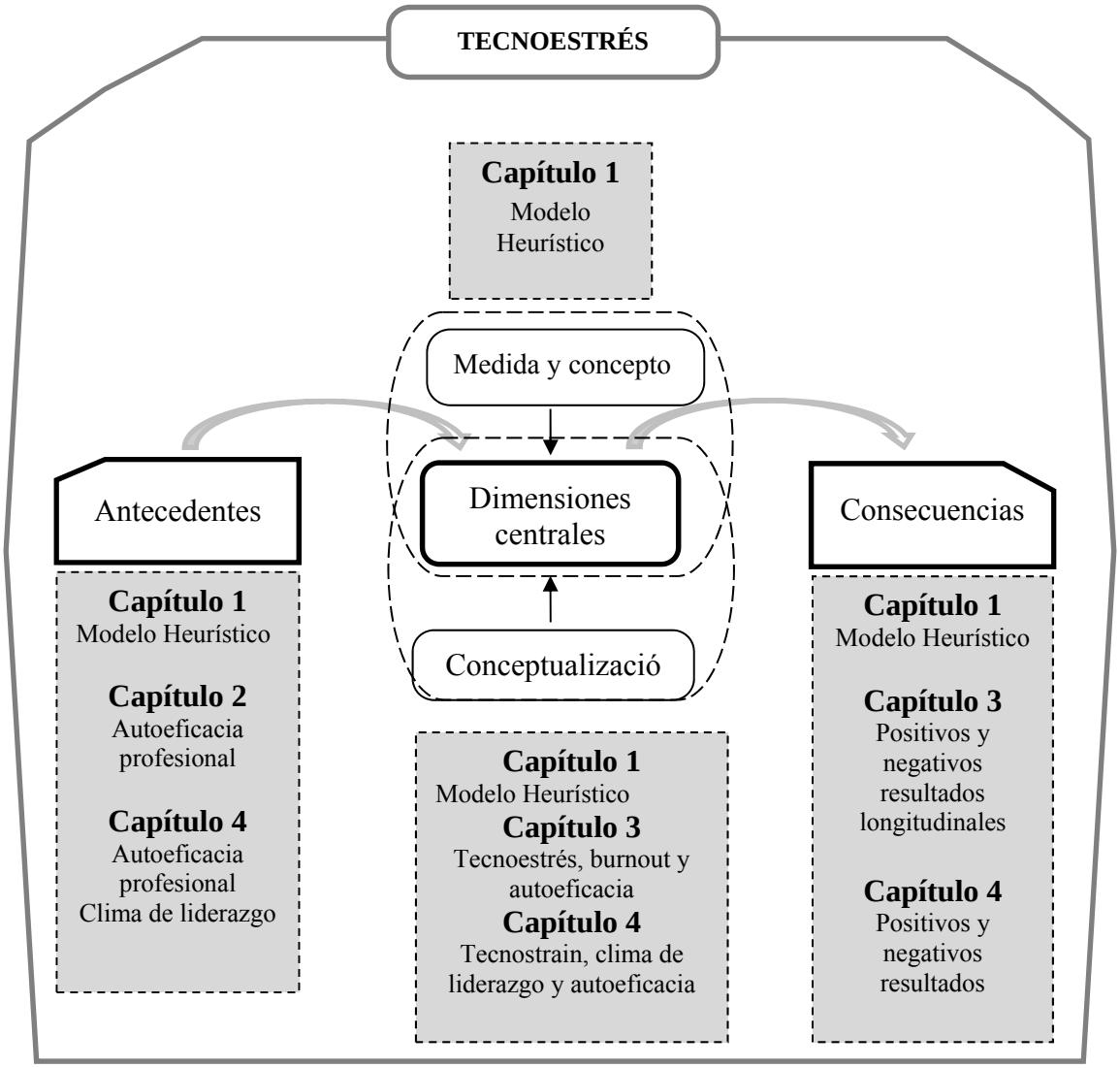
Discusión general

El principal objetivo de esta tesis era proporcionar una comprensión profunda sobre el tecnoestrés, un fenómeno que se sufre en las sociedades modernas. Este objetivo se ha traducido en el planteamiento de diversas preguntas de investigación en función de los vacios de conocimiento detectados en la literatura. Concretamente, a través de cinco capítulos de esta tesis se han descrito, operacionalizado y explorado las principales dimensiones, antecedentes y consecuencias del tecnoestrés. Los estudios empíricos se han basado en diferentes áreas ocupacionales (e.g., educación, salud, industria, etc.) y en trabajadores de diferentes países (i.e., España y Uruguay). Además, para llegar a las conclusiones de cada capítulo se han utilizado métodos estadísticos muy diversos (i.e, análisis factoriales confirmatorios, análisis multigrupo, ecuaciones estructurales con dos tiempos, y análisis multinivel).

Más específicamente, los cuatro objetivos de investigación de esta tesis se pueden resumir de la siguiente manera: (1) revisar el concepto de tecnoestrés para conocer la investigación realizada hasta el año 2014, y poder cubrir las lagunas de conocimiento sobre la experiencia de tecnoestrés, (2) examinar el rol predictor de la autoeficacia profesional sobre la percepción de demandas reto y amenaza, y su repercusión sobre el burnout y el engagement, (3) analizar mediante un diseño longitudinal con dos momentos temporales de recogida de datos (al principio de curso, y al final de curso) el efecto del tecnostrain sobre la autoeficacia profesional de los docentes y su repercusión sobre el burnout a lo largo del tiempo, y (4) examinar el rol que juega el clima de liderazgo como factor determinante en la reducción del tecnostrain y aumento de la profesional autoeficacia.

Los resultados empíricos que se corresponden a cinco preguntas de investigación se discuten en las siguientes secciones. Así, como las implicaciones teóricas y prácticas, las limitaciones y las fortalezas y los retos para la investigación futura, se discuten en los apartados que se presentan a continuación. En la Figura 5.1 se muestra qué aspectos de tecnoestrés están cubiertos por el cual capítulo.

Figura 5.1. Estructura de los capítulos



Resumen de las principales conclusiones

(1) revisión de la literatura sobre el fenómeno de tecnoestrés

Con la finalidad de alcanzar el primer objetivo de esta tesis, el **Capítulo 1** analizó el desarrollo de la conceptualización de tecnoestrés y sus formas de experimentarse. Centrándose en: (1) la conceptualización del tecnoestrés como un paraguas que atiende a dos tipología: tecnostrain y tecnoadicción, (2) antecedentes (i.e., demandas y recursos tecnológicos, y recursos personales) y consecuencias del tecnoestrés (i.e., consecuencias psicológicas, físicas, organizaciones y sociales), (3) el cuestionario RED-Tecnoestrés, como una herramienta científica y operativa para explicar y medir la experiencia tecnoestrés, y (4) las estrategias para la prevención y la intervención del tecnoestrés desde un punto de vista práctico. Por último, se presentan las conclusiones generales sobre todos los puntos explicados en la revisión.

(2) El rol predictor de la autoeficacia profesional

Las creencias de eficacia han demostrado jugar un papel muy importante para hacer frente a las características del ambiente y la gestión del estrés (Salanova, Bakker, y Llorens, 2006). En este sentido, la investigación ha demostrado que la autoeficacia influye en la percepción de las demandas como reto o como amenazas, así como su influencia sobre el bienestar psicosocial (i.e., burnout y engagement) (Consiglio, Borgogni, Alessandri, y Schaufeli, 2013; Vera, Salanova, y Lorente, 2012). Por esta razón, el objetivo principal del primer estudio empírico (**capítulo 2**) fue proponer un modelo multigrupo basado en dos muestras de conveniencia (muestra de usuarios TIC y profesores de secundaria), para conocer cómo se relacionaba la autoeficacia, con las demandas laborales (reto y amenaza) y bienestar psicosocial (burnout y engagement).

Para cumplir este objetivo, se planteó la siguiente pregunta de investigación: ¿la autoeficacia profesional está relacionada con la percepción de demandas reto y

amenaza, y esta percepción repercute en los niveles de bienestar psicosocial (burnout y engagement)? Esta investigación ha presentado una versión extendida del modelo de RED en base a la SCT de Bandura (2001): (1) se ha encontrado dos procesos diferentes: por un lado, el proceso de erosión, donde los bajos niveles de autoeficacia profesional se relacionan con la percepción de un obstáculo más demandas, que se refiere además a los altos niveles de burnout; por otro lado, el proceso motivacional, donde los altos niveles de autoeficacia profesional se relacionan con la percepción de altos niveles de demandas de impugnación, y baja niveles de demandas de impedimento, que se refiere además a altos niveles de compromiso. Finalmente, esta investigación ha contribuido a estudiar la influencia de la autoeficacia profesional sobre la reducción del malestar y aumento del bienestar, y conocer como la sobrecarga mental que es una demanda que se encuentra presente en los usuarios de TIC, por la gran cantidad de datos que tienen que recordar y gestionar, se puede convertir en una demanda retadora si se poseen altos niveles de autoeficacia para hacerle frente.

(3) Efecto del tecnostrain a lo largo del tiempo, sobre la autoeficacia profesional y el burnout

El segundo estudio empírico de esta tesis (**capítulo 3**) intentó responder a la segunda y tercera pregunta de investigación sobre las consecuencias del tecnostrain a lo largo del tiempo. Los resultados concluyeron que los profesores que sufrían tecnostrain al principio de ser evaluados se percibieron menos eficaces 8 meses después. A su vez, con el paso del tiempo, los bajos niveles de autoeficacia les condujeron a experimentar más agotamiento y más cinismo respecto a su trabajo como docente (esto es, más burnout).

(4) El clima del liderazgo, autoeficacia y tecnostrain

Por último, el tercer estudio empírico (**capítulo 4**) intentó responder a las dos últimas preguntas de la investigación en cuanto a si (4) el clima de liderazgo compartido por el equipo puede disminuir el tecnostrain percibido por el empleado, y si (5) la autoeficacia percibida por el empleado media la relación entre clima de liderazgo grupal y tecnostrain individual. En concreto, a través de un modelo transnivel se examina los antecedentes de la experiencia de tecnostrain. En concreto, se desea conocer el papel del clima de liderazgo como factor predictivo de la autoeficacia y la experiencia de tecnostrain. De acuerdo con la TCS (Bandura, 2001) la autoeficacia ha demostrado reducir los niveles de tecnostrain. Por otro lado, la percepción compartida sobre el líder está relacionada positivamente con la autoeficacia debido a diferentes mecanismos. En este sentido, la percepción compartida de los empleados de que su líder les ofrece apoyo socioemocional y les ofrece tareas claras, que les facilita su trabajo influye en que se perciban más eficaces frente en su trabajo (Chen & Bliese, 2002).

Implicaciones teóricas

(1) Modelo heurístico de la experiencia de tecnoestrés

La experiencia de tecnoestrés no puede entenderse de forma comprehensiva si no se consideran cuáles son sus antecedentes y sus consecuencias y cómo se desarrolla en el tiempo. Un fenómeno no se entiende si no conocemos cuál es el proceso por el que se genera. Para ello se fundamenta en un marco teórico que nos ayude a describir, explicar y predecir conductas y procesos psicosociales relacionados con el tecnoestrés y por tanto a intervenir para mejorar tales procesos. El tecnoestrés puede explicarse en función de 7 modelos teóricos de la salud ocupacional que se basan en 5 procesos complementarios (ver Salanova, Llorens, y Ventura, 2012). En esta tesis nos centramos

en el Modelo Espiral de la Salud Ocupacional (MESO; Salanova, Cifre, Martínez y Llorens, 2007) para explicar el proceso de tecnoestrés.

Entre las contribuciones teóricas destacar que se trata de un modelo que está basado en el concepto de salud de la Organización Mundial de la Salud (OMS) que asume que la salud no es sólo la ausencia de enfermedad, sino un estado de completo bienestar tanto físico, psicológico y social y en la perspectiva de la Psicología Ocupacional Positiva (Salanova, Llorens y Rodríguez, 2009). Permite estudiar la salud psicosocial de manera integral y comprehensiva, puesto que engloba no sólo la evaluación del malestar psicosocial (de lo que va mal; en nuestro caso el tecnoestrés), sino también del bienestar psicosocial (de lo que va bien; p. ej., el tecnoflow). Por otro lado, considera el papel negativo de las demandas tecnológicas y el positivo de los recursos tecnológicos, ampliando el tipo de demandas y recursos a nivel de tarea, social, organizacional y también a nivel extra-organizacional. Además, este modelo se basa en la Teoría Cognitiva Social de Bandura (1997) y otorga un importante poder a los recursos personales (i.e., autoeficacia) actuando como factor clave que determina cómo la persona percibe el ambiente y son responsables del desarrollo de dos tipos de espirales: espiral de deterioro y espiral de motivación.

Una de las contribuciones teóricas más importantes de esta tesis es que mejora la comprensión de los factores que afectan al tecnoestrés. Con el fin de adquirir una mejor comprensión de este fenómeno, el primer capítulo empírico ofrece un conjunto de hipótesis sobre los posibles antecedentes (por ejemplo, recursos personales, demandas y recursos tecnológicos) y las consecuencias psicológicas, físicas, organizacionales y sociales. Por lo tanto, la contribución más importante de este capítulo es ofrecer una interpretación general e inductiva del fenómeno del tecnoestrés con todas las variables relevantes.

(2) Evaluación de la experiencia de tecnoestrés

En el capítulo 1 se explica el RED- Tecnoestrés (i.e., hace mención a los Recursos, Emociones y Demandas generadas como consecuencia del uso de tecnologías, Salanova, Llorens y Cifre, 2010) para evaluar este fenómeno. Entre las contribuciones teóricas más relevantes se encuentra: (1) está basado en un modelo científico (i.e., el Modelo RED) y se basa en la TCS de Bandura (2001), está basado en una conceptualización del tecnoestrés interaccionista entre la persona (el usuario de la tecnología) y el ambiente de trabajo con tecnologías (la tecnología y la organización), (3) ha demostrado tanto su fiabilidad y validez científica como práctica, (4) evalúa el tecnoestrés de manera comprehensiva puesto que permite diagnosticar el tecnoestrés en toda su extensión: la experiencia tanto del *tecnostrain* como de la tecnoadicción, así como sus antecedentes y consecuencias, (5) se puede administrar a un amplio abanico de usuarios de tecnología, tanto en términos generales como a usuarios intensivos de tecnología, (6) permite diagnosticar el tecnoestrés atendiendo a baremos definidos por una muestra normativa con los que se comparan los resultados obtenidos por los usuarios, (7) ofrece un *feedback* inmediato sobre la experiencia de tecnoestrés cuando el cuestionario se cumplimenta *online* y (8) permite diseñar estrategias de prevención-intervención específica en tecnoestrés en función de los resultados obtenidos de la evaluación.

(3) Antecedentes de la experiencia de tecnoestrés

En el capítulo 1 se realiza una revisión de los antecedentes del tecnoestrés, que se agrupar en tres niveles: (1) demandas tecnológicas, (2) falta de recursos tecnológicos y (3) falta de recursos personales. Las demandas tecnológicas se consideran uno de los antecedentes más importantes del tecnoestrés, así atendiendo al Modelo Espiral de la Salud Ocupacional, las principales demandas tecnológicas se clasifican en cuatro

categorías: demandas relacionadas con las tareas, demandas sociales, organizacionales y extra-organizacionales. En el capítulo 2, se revisa el tipo de demandas que influye en el desarrollo de bienestar. En este sentido, los modelos tradicionales de estrés y bienestar han mostrado que las demandas laborales (o tecnológicas) han sido factores que aumentan el estrés en el puesto de trabajo (Demerouti, Bakker, Nachreiner, & Schaufeli, 2001; Johnson & Hall, 1998; Karasek, 1979; Schaufeli & Bakker, 2004). Pero, la investigación nos muestra que el rol que juegan las demandas laborales sobre el estrés laboral no está clara (Crawford, LePine, & Rich, 2010). En este sentido, las demandas no necesariamente tienen que ser los factores que aumentan el strain, sino que depende de cómo son percibidas, es decir, si son vistas como retos o amenazas. Entre las contribuciones teóricas que aportar la investigación del capítulo 2, se encuentra: (1) la extensión del modelo RED (Salanova et al., 2011) incluyendo la autoeficacia profesional como una variable antecedente del modelo. Además, los resultados evidencian que es necesario diferencia entre dos tipos de demandas (reto y amenaza) y que es importante considerar la autoeficacia en los diferentes modelos de estrés. Así, esta contribución implica que el bienestar psicosocial es el resultado de dos procesos: (1) el proceso de erosión, donde los bajos niveles de autoeficacia profesional se relacionan con la percepción de más demandas amenazas, relacionándose con altos niveles de burnout y (2) el proceso motivacional, donde los altos niveles de autoeficacia profesional se relacionan con la percepción de más demandas retos y menos demandas amenazas, lo cual está relacionado con altos niveles de engagement.

Basándonos en estas aportaciones, en el capítulo 4 se extiende la investigación a nivel multinivel para conocer como los recursos personales de los empleados (i.e., autoeficacia) y los recursos sociales del grupo (i.e., clima de liderazgo) influyen sobre la percepción del tecnostrain. En este capítulo se encuentran las diferentes contribuciones

teóricas: (1) la autoeficacia individual está relacionada positivamente con el nivel de tecnostrain de los empleados, (2) la percepción compartida del grupo está relacionada positivamente con la autoeficacia de los empleados, and (3) encontramos un relación transnivel entre clima de liderazgo y tecnostrain en los empleados, cuando los efectos del clima de liderazgo está parcialmente mediada por las percepción de la autoeficacia del empleado. Finalmente, argumentamos que tener una percepción compartida por el grupo de un líder que ofrece apoyo social y clarifica las tareas, potencia el incremento de los niveles de autoeficacia y reduce los niveles de tecnostrain de los seguidores.

(4) Consecuencias de la experiencia de tecnoestrés

Por último, el segundo estudio empírico (capítulo 3) aporta implicaciones teóricas importantes relacionadas el proceso de etiología del tecnoestrés y sus consecuencias. En este sentido, nuestros resultados muestran el papel del tecnoestrés como predictor directo de la autoeficia que resulta desencadenantes del burnout en profesores de secundaria, utilizando un diseño longitudinal. En todo este proceso, la clave está en que la autoeficia juega un papel decisivo como mediadora entre el tecnoestrés y el burnout. Así, basándonos en la Teoría Cognitiva Social de Bandura (2001) el tecnoestrés puede actuar como una fuente de autoeficacia, en el sentido de que se considera un estado afectivo negativo que provocaría en el docente que usa TIC bajos niveles de autoeficacia. Y sería esta falta de autoeficacia profesional la que desarrollaría el burnout (Llorens et al, 2005). De esta manera, se muestra el papel fundamental que juega la autoeficacia en este proceso entre tecnoestrés y sus consecuencias a largo plazo

Implicaciones Prácticas

Esta tesis ofrece un capitulo teórico (capitulo 1) donde se presentan las estrategias de prevención e intervención que permiten eliminar/reducir el tecnoestrés. Se explican las diferentes clasificaciones de la prevención-intervención (Salanova et al.,

2009c) en función a dos dimensiones clave: (1) el foco y (2) el objetivo de la intervención. En este sentido, el concepto de *foco de la intervención* se refiere "a quién va dirigida" la intervención, y se diferencian aquí las estrategias centradas en el sistema social (usuarios de la tecnología y organización) y/o en el sistema técnico (tecnología). Las estrategias centradas en el sistema social, y en particular sobre los usuarios de la tecnología, tratan de aumentar los recursos personales de los usuarios en el manejo de la tecnología. Por otro lado, las estrategias centradas en la organización se basan fundamentalmente en mejoras en la organización del trabajo con tecnologías (reducción de demandas y aumento de recursos tecnológicos). Finalmente, las estrategias centradas en el sistema técnico se centran en el diseño de tecnologías más amigables y más usables. La revisión de las diferentes estrategias de prevención e intervención nos ayudan a entender cómo mejorar y optimizar el trabajo mediado con ICT para reducir los niveles de tecnoestrés.

Por otro lado, ofrece una visión práctica de los antecedentes y consecuencias del tecnoestres en el trabajo. En este sentido, los resultados obtenidos en los diferentes estudios empíricos pueden ser utilizados por la Dirección de Recursos Humanos con el fin mejorar el ambiente laboral (recursos y demandas laborales) y recursos personales de los trabajadores. En concreto, desde la organización se pueden llevar a cabo acciones para aumentar los niveles de recursos personales como fuente de bienestar que ayude a involucrarse más en el trabajo y por lo tanto a reducir los niveles de burnout o tecnostrain o aumentar los niveles de engagement. En consecuencia, se propone que las creencias de eficacia se deben desarrollar en entornos de trabajo con el fin de influir en la percepción de las demandas de trabajo más retadoras y menos amenazantes, y prevenir consecuencias psicosociales negativas, y con ello contribuimos a desarrollar un el ambiente saludable de trabajo.

En este sentido, la clave de la intervención y optimización del bienestar de los empleados que utilizan TIC en su trabajo diario pasa por desarrollar en el empleado las creencias que es capaz de desarrollar con éxito su trabajo y que esta situación está bajo su control. Para ello, se puede ofrecer formación necesaria para promocionar las creencias de autoeficacia. Para el diseño de las acciones formativas, hay que tener en cuenta las claves teóricas para la construcción de la eficacia (Bandura,1997, 1999): role-playing para proporcionar experiencias de éxito, modelos de desempeño mediante el aprendizaje vicario, coaching y persuasión verbal y sobretodo la reducción de estados afectivos negativos como el tecnoestrés (para más información ver Salanova, 2003).

Por otro lado, las organizaciones deben promocionar el papel del líder para el desarrollo de empleados y organizaciones saludables. En particular, el estudio multinivel nos indican que la percepción que tiene el grupo sobre el líder influye sobre los niveles de autoeficacia y experiencia de tecnoestrés de sus seguidores. En este sentido, el liderazgo puede mejorar la percepción de autoeficacia de los seguidores a través de juegos de rol para promover las experiencias exitosas, expresando evaluaciones positivas y comunicaciones más alta expectativa de rendimiento, reduciendo los estados afectivos negativos del uso de las TIC en el trabajo con técnicas de relajación o prácticas de meditación, predicar con el ejemplo demostrando una conducta correcta. De este modo, si los empleados tiene una percepción compartida de un líder que ofrece apoyo social, clarifica tareas o muestra confianza en su capacidad para cumplir con esas expectativas contribuye a facilitar la identificación social del seguidor con su grupo (Walumbwa et al., 2011, 2008) y aumentar los niveles de autoeficacia y reducir el tecnoestrés.

Finalmente, estas aportaciones practicas contribuyen a generas puestos de trabajo ‘positivos’ y empleados ‘positivos’ desde el marco de la Psicología de la Salud Ocupacional Positiva (Salanova et al., 2012).

Limitaciones, fortalezas y retos para la investigación futura

La tesis actual ha resuelto cuestiones previas que existían en la investigación del tecnoestrés, pero a pesar de las aportaciones también presentan una serie de limitaciones que se han de intentar superar en futuros estudios. La primera limitación se refiere a la utilización de muestras de conveniencia e todos los estudios. Las muestras podrían no ser representativas, y es difícil saber si los resultados obtenidos se deben a la composición de la muestra o a los factores controlados del estudio. En consecuencia, los resultados podrían estas sesgados por las características de la muestras. No obstante, contamos con una muestra compuesta por trabajadores de diferentes sectores que utilizan TICs en su trabajo diario (p.e., profesores de secundaria y de universidad, banqueros, administrativos, etc.) y de dos países (i.e., España y Uruguay), este hecho puede reducir el impacto de utilizar muestras de conveniencia. Pero no obstante, en la investigación futura podríamos contar con muestras de usuarios que utilizan la tecnología de manera intensiva, como pueden ser los teletrabajadores.

La segunda limitación, es que la autoeficacia no ha sido específica en tecnología, se ha utilizado la autoeficacia profesional en todos los estudios empíricos de estas tesis. Nuestro interés de utilizar la autoeficacia profesional se debe a que la muestra está formada por trabajadores que utilizan las TICs como una herramienta más del trabajo, y no son usuarios intensivos de las tecnologías. En este sentido, creemos que la autoeficacia profesional es una autoeficacia especifica dada su habilidad por desarrollar el propio rol laboral en función del puesto y del sector correspondiente de forma correcta (Cherniss, 1993).

La última limitación de esta tesis doctoral se refiere al concepto de tecnoestrés. Aunque en muchos capítulos se hable de tecnoestrés en un modo general, esta tesis se ha centrado en estudiar el tecnostrain como la experiencia más tradicional del tecnoestrés. Otro desafío de la investigación implica desarrollar más estudios empíricos para comprender los antecedentes y consecuencias de la tecnoadicción.

Finalmente, esta tesis como partida a futuras líneas de investigación, debería incluir recursos personales necesarios para desarrollar con éxitos tareas con TICs, como pueden ser la autoeficacia específica con TIC y competencia mental. Por otro lado, ampliar el Modelo RED analizando más demandas laborales en contextos tecnológicos, para conocer sus características como demandas reto o amenaza. Además, sería interesante ampliar estudios transnivel para estudiar los recursos personales y experiencias de tecnoestrés a nivel de grupal (por ejemplo, la eficacia colectiva y la percepción compartida de tencoestrés).

Nota final

Esta tesis comenzó con la realización de varias preguntas de investigación sobre el tecnoestrés, que tenían que ser respondidas estudio por estudio. Como el objetivo principal de este trabajo, se esperaba obtener una comprensión en profundidad de que variables influían en el proceso de tecnoestrés. Con esta tesis, es posible afirmar que he contribuido a la comprensión del fenómeno del tecnoestrés mediante el análisis de sus principales dimensiones (en este caso, el tecnostrain), sus antecedentes y consecuencias. Por un lado, esta tesis proporciona a los profesionales información relevante acerca del tecnoestrés, que se deben utilizar para disminuir el efecto nocivo de las tecnológicas en las empresas y como optimizar estas tecnológicas. Por otro lado, los investigadores tienen que ser conscientes de que es muy importante continuar en el avance del estudio

del fenómeno de tecnoestrés, sobre todo porque es necesario contribuir al enriquecimiento de la salud psicosocial de los trabajadores.

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