

Angel Abós Catalán

Funcionamiento psicológico en
docentes de educación
secundaria: influencia de las
variables motivacionales y efectos
de un programa de actividad física

Departamento

Expresión Musical, Plástica y Corporal

Director/es

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Tesis Doctoral

**FUNCIONAMIENTO PSICOLÓGICO EN DOCENTES
DE EDUCACIÓN SECUNDARIA: INFLUENCIA DE
LAS VARIABLES MOTIVACIONALES Y EFECTOS
DE UN PROGRAMA DE ACTIVIDAD FÍSICA**

Autor

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**PSYCHOLOGICAL FUNCTIONING IN SECONDARY
SCHOOL TEACHERS: INFLUENCE OF
MOTIVATIONAL VARIABLES AND EFFECTS OF A
PHYSICAL ACTIVITY PROGRAM**

Autor

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Facultad de Ciencias de la Salud y del Deporte
Departamento de Expresión Musical, Plástica y Corporal

2019

**Funcionamiento psicológico en docentes de
educación secundaria: Influencia de las
variables motivacionales y efectos de un
programa de actividad física**

*Psychological functioning in secondary school
teachers: Influence of motivational variables and
effects of a physical activity program*

ÁNGEL ABÓS CATALÁN

A mis padres, Encarna y Ángel

Gracias



Departamento de
Expresión Musical,
Plástica y Corporal
Universidad Zaragoza

INFORME POSITIVO DE LA TESIS DOCTORAL

D. Luis García González, con DNI 25191264P, Profesor Contratado Doctor de la Facultad de Ciencias de la Salud y del Deporte (Departamento de Expresión Musical, Plástica y Corporal) de la Universidad de Zaragoza y D. José Antonio Julián Clemente, con DNI 18436688A, Profesor Contratado Doctor de la Facultad de Ciencias Sociales y Humanas (Departamento de Expresión Musical, Plástica y Corporal) de la Universidad de Zaragoza, como directores de la tesis doctoral de D. Ángel Abós Catalán, con DNI 73010346C, alumno del Programa de Doctorado en Educación de la Universidad de Zaragoza.

INFORMAN

Que el citado alumno ha realizado la tesis doctoral titulada “Funcionamiento psicológico en docentes de Educación Secundaria: influencia de las variables motivacionales y efectos de un programa de actividad física” / “Psychological functioning in secondary school teachers: influence of motivational variables and effects of a physical activity program”. Dicha tesis doctoral, correspondiente con el proyecto de tesis doctoral aprobado por la Comisión Académica del Programa de Doctorado en Educación con fecha 23 de junio de 2015, ha sido realizada bajo nuestra dirección y cumple con los requisitos y condiciones exigidas para que sea presentada y defendida como tesis doctoral con mención internacional. Asimismo, ambos directores autorizamos para que dicha tesis doctoral sea presentada como compendio de publicaciones.

Para que conste a los efectos oportunos, firmamos el presente INFORME POSITIVO en Huesca, a 11 de junio de 2019.

Fdo. Luis García González

Fdo. José Antonio Julián Clemente

AGRADECIMIENTOS

AGRADECIMIENTOS

Desde que, allá por octubre de 2014, realicé mi primera matrícula en el programa doctoral, he tenido que enfrentarme en numerosas ocasiones a la típica pregunta: *“Oye Ángel, ¿y es difícil eso de hacer un doctorado?”*. Al principio, obviamente, no lo tenía muy claro: *“Bueno, no sé... depende...”*. Lógicamente, influyen muchos factores: interés, dedicación, recursos, etc. Cinco años después puedo afirmar con total rotundidad que el factor más importante para realizar –con garantías de éxito– una tesis doctoral es la compañía. Es decir, las personas de las que te rodeas. O más bien, que te rodean. Quizás ahora decirlo a “toro pasado” sea más sencillo, pero he sido un gran afortunado. No podría haber tenido mejores compañeros de “viaje”. Por ello, a todos los que me habéis acompañado durante este proceso, de una forma u otra, **¡muchas gracias!** Y sí, habéis hecho que fuera fácil.

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Luis, quien bien me conoce, sabe todo lo que significas para mí. En 2013, aterricé en Huesca, procedente de otra universidad y tuve la suerte de cruzarme contigo en el camino en el Máster de Profesorado. Cuantas veces habré pensado lo diferente que hubiera sido todo este proceso sin ti. Quizás, ni habría tenido un comienzo. Gracias, en primer lugar, por contagiarme tus ganas de investigar, por ofrecerme la posibilidad de realizar una tesis doctoral y por ayudarme a conseguir una ayuda predoctoral, lo cual, ha allanado el camino. Gracias también por orientarme y enseñarme, paso a paso, a comprender este mundo de la investigación, en ocasiones tan apasionante, pero en otras tan injusto y poco gratificante. Gracias por transmitirme tu pasión por la didáctica del deporte y la Educación Física, dándome cada vez más autonomía en el diseño y desarrollo de las clases de Acción Docente y Fundamentos. En especial, gracias por todo tu tiempo, llamadas, skypes, e incluso por abrirme la puerta de tu casa cuando lo

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TABLAS Y FIGURAS

RELACIÓN DE TABLAS Y FIGURAS DE LA TESIS DOCTORAL

***Nota:** a continuación se listan las Tablas y Figuras que aparecen a lo largo de toda la tesis doctoral. Debido al formato de compendio de publicaciones (i.e., se han incluido artículos originales), se he decidido reiniciar la numeración de las Tablas y Figuras en cada uno de los apartados de la tesis, así como en cada uno de los siete estudios.

Relación de Tablas

Compendio de publicaciones

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CONSIDERACIONES PRELIMINARES

Consideraciones preliminares

- 1) La presente tesis doctoral es un compendio de siete artículos científicos, de los cuales, cinco de ellos han sido publicados, mientras los otros dos, a fecha de depósito, se encuentran sometidos a revisión por pares.
- 2) En acuerdo con la Real Academia Española (RAE) y la mayoría de lingüistas, quienes aprueban el uso de determinadas palabras que engloban personas tanto de género masculino como femenino, y con el único objeto de simplificar la legibilidad, se ha utilizado el masculino genérico a lo largo del presente documento. Así, términos como “docentes”, “profesorado”, “alumnado”, o “estudiantes”, entre otros, pueden englobar tanto al género masculino como al género femenino. De este modo, se anticipa que bajo ningún concepto se pretende realizar una desconsideración ni hacia el género femenino ni hacia cualquier otra identidad de género.
- 3) Para el desarrollo escrito de los distintos apartados que componen la presente tesis doctoral se han seguido las normas de la Asociación Psicológica Americana (APA, 6ª Edición).
- 4) Siguiendo a la normativa de la Escuela de Doctorado de la Universidad de Zaragoza para optar al título de Doctor con mención internacional, el resumen (*abstract*) y conclusiones (*conclusions*) de la presente tesis doctoral han sido redactados en español y en inglés. Asimismo, los objetivos (*aims*) también han sido redactados en ambos idiomas. Finalmente, dado que los siete artículos científicos que componen la tesis doctoral han sido publicados o sometidos a revisión en revistas científicas internacionales, el apartado de resultados y discusión (*results and discussion*), que integra estos siete estudios, ha sido redactado íntegramente en inglés.
- 5) Por último, es importante señalar que a lo largo de la presente tesis doctoral se ha usado, en ocasiones, la primera persona del plural por deferencia a los miembros del grupo de investigación que han participado activamente durante todo el desarrollo del proyecto.

Proyecto de investigación

La presente tesis doctoral, así como los artículos científicos que la componen, se enmarca dentro del proyecto I+D+i: “Promoción de la salud y el bienestar del alumnado y profesorado de Educación Secundaria Obligatoria a través del programa integral de intervención *Sigue la Huella*” (EDU2013-42048-R). Dicho proyecto, fue financiado por el Ministerio de Economía y Competitividad del Gobierno de España (ver Anexo I) y tuvo como Investigador Principal al Dr. José Antonio Julián Clemente. Asimismo, es importante destacar que el proyecto contó con el aval para su desarrollo de la Dirección General de Política Educativa y Educación Permanente del Departamento de Educación, Universidad, Cultura y Deporte del Gobierno de Aragón, considerándolo de interés científico para la Comunidad Autónoma de Aragón (ver Anexo II).

Ayudas o becas recibidas

El doctorando, Ángel Abós Catalán, ha sido beneficiario de un contrato predoctoral de 48 meses para Personal Docente Investigador del Gobierno de Aragón. Dicho contrato fue obtenido en concurrencia competitiva (ORDEN de 21 de octubre de 2015, de la Consejera de Innovación, Investigación y Universidad. Boletín Oficial de Aragón).

Asimismo, ha recibido ayudas económicas de la “Fundación Empresa Universidad de Zaragoza (FEUZ)”, del “Programa CAI-Ibercaja para estancias de investigación”, y de la “Universidad de Zaragoza (Erasmus +)”, para la realización de estancias de investigación en la Universidad de Gante (Bélgica; 14 de enero de 2017 a 30 de abril de 2017; 23 de marzo de 2019 al 5 de abril de 2019) y la Universidad de York (Reino Unido; 16 de enero de 2018 a 18 de marzo de 2018).

Siglas y acrónimos

Con el objetivo de facilitar la legibilidad del documento, a continuación se detallan las abreviaturas de algunas palabras que se repiten con cierta frecuencia a lo largo la tesis doctoral.

Abreviatura	Significado
AGT	Achievement Goal Theory
AVE	Average Variance Extracted
BPN	Basic Psychological Needs
CEICA	Comité de Ética de la Investigación de la Comunidad Autónoma de Aragón
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CI	Confidence interval
CM	Comparison Model
CR	Composite Reliability
DF	Degrees of Freedom
DT	Desviación típica
ECVI	Expected Cross-Validation Index
EFA	Exploratory Factor Analysis
EFYPAF	Educación Física y Promoción de la Actividad Física
ESEM	Exploratory Structural Equation Modeling
ESO	Educación Secundaria Obligatoria
ID	Identity Cards
IES	Instituto de Enseñanza Secundaria
ITC	International Test Commission
LTPA	Leisure-Time Physical Activity
M	Media / Means
MANOVA	Multivariate Analyses of Variance
MBI	Maslach Burnout Inventory

MINECO	Ministerio de Economía y Competitividad
ML	Maximum Likelihood
MLR	Robust Maximum Likelihood
NPB	Necesidades Psicológicas Básicas
OMS	Organización Mundial de la Salud
OP	Observed Power
PA	Physical Activity
RMSEA	Root Mean Square Error of Approximation
SD	Standard deviation
SDT	Self-Determination Theory
SE	Standard Error
SEM	Structural Equation Modeling
SPSS	Statistical Package for Social Sciences
SRMR	Standardized Root Mean Square Residual
TAD	Teoría de la Autodeterminación
TLI	Tucker-Lewis Index
WLSMV	Weighted Least Squares Mean and Variance

COMPENDIO DE PUBLICACIONES

Compendio de publicaciones

La presente tesis doctoral es un compendio de siete trabajos científicos. Cinco de ellos, han sido previamente publicados, mientras que los otros dos, a fecha de depósito de la tesis doctoral se encuentran sometidos a revisión por pares. En la Tabla 1 se muestra la referencia completa de cada uno de los artículos así como el capítulo de la tesis dentro del cual se encuentran ubicados. Asimismo, es importante señalar que aunque todos los artículos de la presente tesis doctoral están enfocados hacia un objetivo general, cada uno de ellos puede ser leído y entendido de manera independiente.

Tabla 1. Compendio de artículos científicos que componen la tesis doctoral.

Estudio	Referencia bibliográfica completa
Capítulo I: Validación española y adaptación al contexto docente de cuatro escalas asociadas al funcionamiento psicológico del profesorado	
Estudio 1	Abós, Á. , Sevil, J., Martín-Albo, J., Aibar, A., y García-González, L. (2018). Validation evidence of the Motivation for Teaching Scale in Secondary Education. <i>The Spanish Journal of Psychology</i> , 21, e9. http://doi.org/10.1017/sjp.2018.11 .
Estudio 2	Abós, Á. , Sevil, J., Julián, J. A., Martín-Albo, J., y García-González, L. (2018). Spanish validation of the Basic Psychological Needs at Work Scale: A measure to predict teachers' well-being in the workplace. <i>International Journal for Educational and Vocational Guidance</i> , 18(2), 127–148. http://doi.org/10.1007/s10775-017-9351-4 .
Estudio 3	Abós, Á. , Sevil, J., Martín-Albo, J., Julián, J. A., y García-González, L. (2018). An integrative framework to validate the Need-Supportive Teaching Style Scale (NSTSS) in secondary teachers through exploratory structural equation modeling. <i>Contemporary Educational Psychology</i> , 52, 48–60. http://doi.org/10.1016/j.cedpsych.2018.01.001 .
Estudio 4	Abós, Á. , Sevil-Serrano, J., Montero-Marín, J., Julián-Clemente, J. A., y García-González, L. Examining the psychometric properties of the Burnout Clinical Subtype Questionnaire (BCSQ-12) in secondary school teachers. <i>Current Psychology</i> . Submitted.
Capítulo II: Análisis de los procesos motivacionales y funcionamiento psicológico del profesorado	
Estudio 5	Abós, Á. , Haerens, L., Sevil, J., Aelterman, N., y García-González, L. (2018). Teachers' motivation in relation to their psychological functioning and interpersonal style: a variable- and person-centered approach. <i>Teaching and Teacher Education</i> , 74, 21–34. http://doi.org/10.1016/j.tate.2018.04.010 .
Estudio 6	Abós, Á. , Sevil-Serrano, J., Haerens, L., Aelterman, N., y García-González, L. (2019). Towards a more refined understanding of the interplay between burnout and engagement among secondary school teachers: A person-centered perspective. <i>Learning and Individual Differences</i> , 72, 69–79. http://doi.org/10.1016/J.LINDIF.2019.04.008 .
Capítulo III: Diseño, desarrollo y evaluación de un programa de intervención de actividad física para mejorar el funcionamiento psicológico del profesorado	
Estudio 7	Abós, Á. , Sevil-Serrano, J., Julián, J. A., Generelo, E., y García-González, L. Improving teachers' work-related outcomes through a group-based physical activity intervention during leisure-time. <i>The Journal of Experimental Education</i> . Submitted.

RESUMEN /

ABSTRACT

Resumen / Abstract***Resumen***

Los procesos motivacionales y el funcionamiento psicológico del profesorado, resultan fundamentales no solo en términos de salud, sino también para un correcto desempeño de la profesión. Sin embargo, durante las dos últimas décadas ha emergido un cuerpo considerable de investigaciones que apuntan al profesorado de Educación Secundaria como uno de los colectivos laborales más afectados por estrés, burnout y otros trastornos físicos y psicológicos tanto a nivel nacional como internacional. Inversamente, en los últimos años, los niveles de satisfacción laboral y compromiso por la docencia han registrado en algunos países desarrollados -entre ellos España- los niveles más bajos desde 1990. Todo ello, ha derivado además en un incremento de bajas laborales e intención de abandono de la profesión docente. Ante esta preocupante situación en la que se encuentra inmerso el profesorado de Educación Secundaria, parece justificada la investigación que abogue por encontrar soluciones centradas en la mejora de su bienestar y funcionamiento psicológico en el trabajo.

Para ello, la teoría de la autodeterminación (TAD) postula la existencia de tres necesidades psicológicas básicas (NPB; autonomía, competencia y relaciones sociales), las cuales en el caso de ser satisfechas, pueden dar lugar a una motivación autodeterminada hacia la realización de una actividad, por ejemplo la docencia. A su vez, la TAD sostiene que esta motivación autodeterminada influye en una serie de consecuencias afectivas, cognitivas y comportamentales, entre las que se enmarcan el funcionamiento psicológico del profesorado o su estilo de enseñanza. Paralelamente, los beneficios sociales, físicos y psicológicos de la práctica regular de actividad física en trabajadores han sido ampliamente demostrados empíricamente por distintos mecanismos teóricos.

Siguiendo la TAD y confiando en los beneficios de la práctica de la actividad física, los tres objetivos generales planteados en la presente tesis doctoral son: (1) validar y adaptar al español y al contexto del profesorado diferentes cuestionarios destinados a la medición de la motivación por la enseñanza, la satisfacción de las NPB, el estilo docente y el burnout (estudios 1, 2, 3 y 4); (2) analizar los procesos motivacionales y el funcionamiento psicológico del profesorado de Educación Secundaria mediante una doble perspectiva centrada en la variable y centrada en la

persona (estudios 5 y 6); y (3) diseñar, implementar y evaluar los efectos de un programa de intervención basado en la práctica de actividad física en el tiempo libre y con compañeros de trabajo para la mejora del funcionamiento psicológico del profesorado de Educación Secundaria (estudio 7). Para llevarlos a cabo, participaron 584 profesores de Educación Secundaria ($M = 45.05 \pm 8.97$; 56.5% mujeres) pertenecientes a 106 centros de enseñanza (74.4% públicos) de la Comunidad Autónoma de Aragón. Además se recogieron dos muestras de 106 docentes de Educación Secundaria cada una ($M = 45.50 \pm 8.80$; 41.5% mujeres y; $M = 46.10 \pm 8.81$; 40.6% mujeres) pertenecientes a dos centros de enseñanza públicos de la ciudad de Huesca, las cuales fueron utilizadas para el estudio de intervención (estudio 7) y complementariamente para abordar objetivos secundarios de otros estudios (estudios 2 y 4). Las variables evaluadas fueron satisfacción de las NPB, motivación autodeterminada, burnout, ansiedad, depresión, calidad del sueño, compromiso, satisfacción laboral y estilo docente. Además se evaluaron otras variables sociodemográficas como el género, la experiencia o el tipo de centro, entre otras.

En respuesta al primero objetivo, los cuatro primeros estudios muestran que la Escala de Motivación por la Enseñanza en Educación Secundaria (EME-ES), la Escala de Necesidades Psicológicas Básicas en el Trabajo (BPNWS-Sp), la *Need-Supportive Teaching Style Scale* (NSTSS) y la *Burnout Clinical Subtype Questionnaire* (BCSQ-12) son instrumentos con adecuadas propiedades psicométricas, válidos, fiables e invariantes para evaluar dichos constructos en el profesorado de Educación Secundaria. Además, las profesoras mujeres, los docentes que ejercen en centros públicos y los más experimentados (i.e., > 16 años), tienen más posibilidades de sufrir algún subtipo de burnout.

En respuesta al segundo objetivo, la presente tesis doctoral muestra la importancia de los procesos motivacionales para un correcto desempeño de la profesión docente. En primer lugar, se subraya la necesidad de satisfacer las tres NPB del profesorado para alcanzar una motivación autodeterminada por la enseñanza y evitar formas de motivación controladas y ausentes de regulación (i.e., desmotivación). En particular, parece fundamental nutrir la competencia y la autonomía. En segundo lugar, mientras la motivación autónoma resulta imprescindible para un adecuado funcionamiento psicológico del profesorado y para implementar estilos de enseñanza más adaptativos, la desmotivación conduce hacia un patrón de consecuencias opuesto.

Respecto a la motivación controlada, mientras puede derivar en consecuencias adaptativas como el compromiso por la docencia, también conduce a un mayor riesgo de burnout y de adoptar estilos docentes basados en el clima ego. Por otro lado, el estudio 6 de la presente tesis doctoral demuestra que la propuesta de burnout de Farber y el compromiso por la docencia no representan dos extremos perfectos del mismo continuo. Así, de cinco perfiles identificados, tres de ellos muestran la coexistencia entre el burnout frenético y el compromiso. Además, el profesorado caracterizado por niveles moderados-altos de compromiso muestra el patrón de respuesta (físico y psicológico) más adaptativo. Lo contrario ocurre con el profesorado con altos niveles de burnout sin desafíos y desgastado. No obstante, lo más destacable es que el profesorado con niveles altos de compromiso, si además experimenta altos niveles de burnout frenético, está en riesgo de sufrir ansiedad, depresión y baja calidad del sueño.

En respuesta al tercer objetivo, el estudio de intervención llevado a cabo demuestra que realizar dos sesiones de actividad física de una hora de duración, en el tiempo libre, y con compañeros de trabajo del mismo centro educativo a lo largo de un curso académico, mejora las relaciones sociales del profesorado, su satisfacción laboral y los factores de compromiso de vigor y absorción. Sin embargo, dicho programa de actividad física de 32 sesiones, no es eficaz para mejorar ninguno de los tres subtipos de burnout ni para mejorar la dedicación.

En conclusión, este conjunto de resultados denota la necesidad de diseñar e implementar estrategias basadas en el apoyo a las tres NPB del profesorado que conduzcan a una motivación autónoma, rehusando de motivaciones docentes originadas por presiones –internas o externas– o sin regulación. A lo largo de los siete estudios se aportan distintas ideas basadas en la teoría para que la administración educativa, los equipos directivos y los propios docentes puedan tenerlas en cuenta e implementarlas con el propósito de optimizar sus procesos motivacionales, su funcionamiento psicológico en el trabajo, y por consiguiente, la calidad de la enseñanza. Además, estas iniciativas deberían complementarse con la práctica de actividad física con compañeros de trabajo, la cual, parece configurarse como una estrategia eficaz para la mejora del compromiso por la docencia y la satisfacción laboral. Por lo tanto, la administración educativa debería responsabilizarse de diseñar, organizar, ofrecer y dinamizar estos programas de actividad física, los cuales deben estar adaptados al contexto de cada centro y a las necesidades particulares del profesorado.

Abstract

Teachers' motivational processes and psychological functioning are fundamental not only for their health, but also for their actual job performance. However, a large body of research has emerged over the last two decades that points to secondary school teaching as one of the professions most affected, at both a national and international level, by stress, burnout, and other physical and psychological disorders. Conversely, in recent years, the levels of job satisfaction and teaching engagement in some developed countries, including Spain, have registered the lowest levels since 1990. Consequently, all these factors have also provoked an increase in teachers' sick leave and intention to quit their jobs. Faced with this worrying situation that secondary school teachers are immersed in, research that seeks solutions geared towards improving teachers' well-being and psychological functioning at work seems to be justified.

To do this, the self-determination theory (SDT) postulates the existence of three basic psychological needs (BPN) -autonomy, competence and relatedness-, which, if satisfied, may facilitate self-determined motivation towards an activity, for example teaching. Simultaneously, SDT argues that self-determined motivation influences a set of affective, cognitive, and behavioral outcomes, which include teachers' psychological functioning or their teaching styles. In parallel, the social, physical and psychological benefits of regular physical activity have been empirically demonstrated at length in workers through different theoretical mechanisms.

According to the tenets of SDT (Deci and Ryan, 1985), and considering the benefits of physical activity, the three general aims of the present doctoral thesis are the following: (1) To validate and adapt different questionnaires to Spanish and to the context of secondary school teachers with the aim of measuring their motivation for teaching, BPN satisfaction, interpersonal teaching style and burnout (studies 1, 2, 3 y 4); (2) To analyze motivational processes and the psychological functioning of secondary school teachers through a double variable- and person-centered approach (studies 5 y 6); (3) To design, implement, and assess the effects of a leisure-time physical activity intervention program with work colleagues with focus on improving the psychological functioning of secondary school teachers (study 7). To carry the aims out, 584 secondary school teachers ($M = 45.05 \pm 8.97$, 56.5% females) belonging to 106 different secondary schools (74.4% state or public schools) from the Region of Aragon participated in the program. In addition, two samples of 106 secondary school teachers

were collected ($M = 45.50 \pm 8.80$, 41.5% females and $M = 46.10 \pm 8.81$, 40.6% females) belonging to two public secondary schools from the city of Huesca. These were used for the intervention study (study 7) and also to address secondary aims of other studies (studies 2 and 4). The variables measured were BPN satisfaction, self-determined motivation, burnout, anxiety, depression, sleep quality, engagement, job satisfaction and teaching style. In addition, other sociodemographic variables such as gender, teaching experience or type of school, among others, were measured.

As regards to the first aim, the first four studies show that the Motivation for Teaching Scale in Secondary Education (EME-ES), the Basic Psychological Needs at Work Scale (BPNWS-Sp), the Need-Supportive Teaching Style Scale (NSTSS) and the Burnout Clinical Subtype Questionnaire (BCSQ-12) are valid, reliable, and invariant scales with adequate psychometric properties, to assess these constructs in secondary school teachers. In addition, female teachers, state school teachers, and experienced teachers (i.e., > 16 years), are more likely to experience some burnout subtype.

With regard to the second aim, this doctoral thesis demonstrates the importance of motivational processes for the correct performance of the teaching profession. First, the relevance of satisfying three BPNs in teachers is highlighted, to achieve self-determined motivation for teaching as well as to avoid controlled motivation and amotivation. In particular, it seems fundamental to satisfy the need for competence and the need for autonomy. Second, whereas autonomous motivation is essential for adequate teacher psychological functioning, and to implement more adaptive teaching styles, amotivation leads to an opposite pattern of outcomes. Regarding controlled motivation, although it may drive to adaptive outcomes such as engagement for teaching, it also leads to a higher risk of suffering burnout and adopting an ego climate-based teaching style. On the other hand, the present doctoral thesis (i.e., study 6) shows that Farber's burnout proposal and engagement for teaching do not represent two perfect endpoints of the same continuum. Of five identified profiles, three of them show the coexistence of frenetic burnout and engagement. In addition, teachers characterized by moderate-high levels of engagement show the most adaptive response pattern (physical and psychological). The opposite occurs with teachers characterized by high levels of underchallenged burnout and wornout burnout. However, it is important to note that if teachers, characterized by high levels of engagement, also experience high levels of

frenetic burnout, they are more likely to suffer anxiety, depression, and poor sleep quality.

As regards to the third aim, the intervention study shows that developing two leisure-time physical activity sessions of one hour, with work colleagues from the same school throughout one academic year, improves teachers' need for relatedness, their job satisfaction and their engagement factors of vigor and absorption. However, this 32-session physical activity program is not effective to improve any of the three subtypes of burnout or dedication.

To conclude, this set of results denotes the need to design and implement teachers' need-supportive based strategies that lead to autonomous motivation, avoiding teachers' motivations originated by pressures -internal or external- or without regulation. Throughout the seven studies, different ideas based on the theory are provided so that the educational administration, school boards and the teachers themselves can take them into account and implement them with the aim of optimizing their motivational processes, their psychological functioning at work, and consequently, their teaching quality. In addition, these initiatives should be complemented with the practice of physical activity with work-colleagues, which seems to be an effective strategy for improving engagement in teaching and job satisfaction. Therefore, the educational administration should be responsible for designing, organizing, offering, and encouraging these physical activity programs, which should be adapted to the context of each school and to the particular needs of teachers.

UNIDAD TEMÁTICA

1. Justificación de la unidad temática

De manera general, la presente tesis doctoral tiene como propósito arrojar nueva luz y expandir el conocimiento científico sobre los procesos motivacionales y el funcionamiento psicológico del profesorado de Educación Secundaria. Para ello, siguiendo los postulados de la teoría de la autodeterminación (TAD; Deci & Ryan, 1985, 2000, 2002; Ryan & Deci, 2000, 2009, 2017) y confiando en los efectos positivos de la actividad física, plantea tres objetivos generales –señalados en el apartado correspondiente– y siete trabajos científicos dirigidos a 1) la obtención de cuestionarios validados en español para la medición de constructos motivacionales en el profesorado, 2) la comprensión de los procesos motivacionales y el funcionamiento psicológico del profesorado, y 3) la mejora del funcionamiento psicológico del profesorado a través de la actividad física. Los siete artículos científicos, a su vez, están organizados en tres Capítulos (ver apartado 5) que pretenden dar respuesta a sendos objetivos generales de la tesis doctoral.

El Capítulo I contiene cuatro estudios, los cuales tienen como denominador común la validación de escalas al español y al contexto laboral del profesorado de Educación Secundaria. El estudio 1, aunando dos escalas previamente validadas en otros idiomas y contextos, aporta la validación de la Escala de Motivación por la Enseñanza en Educación Secundaria (EME-ES). Para ello, además de probar su estructura factorial, se analiza su fiabilidad, la invarianza por género y tipo de centro y la validez nomológica. El estudio 2, contribuye a la validación de la Escala de Necesidades Básicas en el Trabajo (BPNWS-Sp), siendo el primer instrumento en español destinado a la medición de este constructo en el profesorado de Educación Secundaria. Además, aporta un modelo de validez nomológica que ayuda a mejorar la comprensión del funcionamiento psicológico del profesorado. Para ello, establece asociaciones entre las necesidades psicológicas básicas (NPB), el compromiso y el burnout en el trabajo. El estudio 3, a partir de la Escala de Clima Motivacional en Educación Física (Soini, Liukkonen, Watt, Yli-Piipari, y Jaakkola, 2014), propone y valida la *Need-Supportive Teaching Style Scale* (NSTSS), un cuestionario válido y fiable para la evaluación de la percepción del profesorado de su estilo interpersonal docente. Además, contribuye a ampliar el conocimiento sobre la relevancia que el estilo interpersonal docente puede tener en su propia motivación laboral así como en su funcionamiento psicológico. El estudio 4, prueba la estructural factorial y fiabilidad de

la *Burnout Clinical Subtype Questionnaire* (BCSQ-12) en el profesorado de Educación Secundaria. Partiendo de la propuesta de Burnout de Farber (1990, 2000), la contribución de estudio se basa en la validación de una escala, válida y fiable que permite evaluar tres subtipos de burnout docente (i.e., sobrecargado, falta de desarrollo y negligente). Además, demuestra como el género, el tipo de centro y la experiencia pueden influir sobre el burnout del profesorado de Educación Secundaria.

La validación de estas cuatro escalas permite analizar los procesos motivacionales del profesorado de manera precisa y rigurosa, dando paso a el siguiente Capítulo de la tesis doctoral. De hecho, el Capítulo II, contiene dos estudios, en los que además de utilizarse las escalas validadas en el Capítulo I, se profundiza desde diferentes enfoques en el análisis del funcionamiento psicológico del profesorado de Educación Secundaria. El estudio 5, utilizando una doble perspectiva centrada en variable y centrada en la persona, ahonda en el análisis de la motivación del profesorado de Educación Secundaria. Por un lado, mediante un modelo de ecuaciones estructurales muestra como la satisfacción de las NPB del profesorado debe ser nutrida para incentivar las formas de motivación más autodeterminadas y obtener consecuencias relacionadas con un funcionamiento laboral más adaptativo. Por otro lado, este estudio amplía la investigación en el contexto docente al identificar cuatro perfiles motivacionales, los cuales a su vez, se asocian diferentemente con las NPB, el burnout, el compromiso y el estilo interpersonal docente. El estudio 6, desde un enfoque centrado en la persona, proporciona nueva evidencia demostrando que algunos subtipos de burnout pueden coexistir con el compromiso en el profesorado de Educación Secundaria. De hecho, de los cinco perfiles identificados, tres de ellos muestran la coexistencia entre ambos constructos. Además, demuestra hasta que punto cada perfil se asocia con un patrón más o menos adaptativo para la salud física y psicológica del profesorado.

Profundizar en la mejora del conocimiento científico acerca de cómo los diferentes constructos motivacionales pueden afectar a la salud física y psicológica del profesorado de Educación secundaria abre el camino hacia el tercer y último Capítulo de la tesis doctoral. El Capítulo III, contiene un estudio que ahonda en los efectos de la actividad física sobre el funcionamiento psicológico del profesorado. Así, el estudio 7, describe un programa de intervención basado en 32 sesiones de actividad física, el cual se desarrolla con compañeros de trabajo y en el tiempo libre a lo largo de un curso

académico. Dicho programa de intervención, además, se basa en la TAD para aplicar una estrategias que apoyan las NPB del profesorado con la intención de no solo estimular su práctica de actividad física, sino también sus procesos motivacionales. Este estudio, de hecho, no solo proporciona un programa de intervención sostenible, viable y saludable para mejorar la salud física del profesorado, sino también una manera de abordar el creciente problema del escaso compromiso y satisfacción laboral del profesorado de Educación Secundaria.

Como se puede valorar, cada uno de los siete estudios mencionados posee entidad propia y puede ser leído y comprendido de manera independiente. No obstante, existen entre ellos una serie de nexos o denominadores comunes que justifican su presentación como unidad temática en la presente tesis doctoral. En primer lugar, los siete estudios están centrados sobre una población específica, el profesorado de Educación Secundaria. En segundo lugar, todos ellos responden a una necesidad común, que no es otra que aportar evidencias para mejorar el contexto laboral de este colectivo, y por lo tanto, la calidad educativa que pueda ofrecer el sistema. En tercer lugar, los siete estudios responden al propósito general de la tesis doctoral expandiendo el conocimiento científico previo sobre los procesos motivacionales y el funcionamiento psicológico de esta población. Finalmente, todos los estudios se apoyan en el mismo marco teórico (i.e., la TAD) para postular sus hipótesis, plantear los objetivos y abordar las preguntas de investigación pertinentes.

A continuación, en el segundo apartado o epígrafe de la tesis se expone una breve introducción teórica sobre el contexto y el estado actual del profesorado de Educación Secundaria. Además, también se explica el concepto de funcionamiento psicológico desde la perspectiva de la TAD, así como sus variables relacionadas. Seguidamente, se detallan los mecanismos que justifican que la actividad física puede tener efectos en el funcionamiento psicológico del profesorado. En el tercer apartado se exponen los objetivos generales de la tesis doctoral y de los siete estudios que la componen. En el cuarto apartado se explica de forma general y resumida la metodología llevada a cabo para el desarrollo de los estudios. En el quinto apartado se adjuntan los siete estudios previamente mencionados de manera íntegra. Finalmente, en los apartados sexto, séptimo y octavo se exponen, respectivamente, las limitaciones y perspectivas de investigación, conclusiones y principales contribuciones de la tesis doctoral.

INTRODUCCIÓN GENERAL

2. Introducción general

“Intenso es el término que yo utilizaría para describir un día en la escuela. Muy intenso. Y cargado con todos los detalles”. (Skaalvik y Skaalvik, 2015, p.185).

Profesora de Educación Secundaria, 57 años, Noruega.

2.1. Contexto y estado actual del profesorado de Educación Secundaria

El funcionamiento psicológico del profesorado de Educación Secundaria se ha convertido en los últimos años en un factor prioritario de estudio (Collie y Martin, 2017; Collie, Shapka, Perry y Martin, 2016). Las reformas y cambios de las leyes educativas, junto a los recortes económicos experimentados en diferentes países Europeos, incluyendo España, han afectado a la experiencia motivacional y al desempeño profesional del profesorado (Anaya y López, 2014; Betoret, 2006; Skaalvik y Skaalvik, 2015). En este sentido, recientes investigaciones han identificado un conjunto de fuentes de estrés laboral que influyen sobre la salud física y psicológica del profesorado. Algunas de las más comunes en Educación Secundaria son, por ejemplo, el mal comportamiento de los adolescentes, la ratio de estudiantes por aula, la gran diversidad y heterogeneidad del alumnado, el escaso reconocimiento o apoyo social, la falta de toma de decisiones, la carga de trabajo o los numerosos conflictos con los padres, con los compañeros de trabajo e incluso con la administración educativa (Aloe, Shisler, Norris, Nickerson y Rinker, 2014; Betoret, 2009; Shernoff, Mehta, Atkins, Torf y Spencer, 2011; Skaalvik y Skaalvik, 2015).

De este modo, no es de extrañar que investigaciones a nivel nacional e internacional hayan señalado que el profesorado percibe su trabajo como una profesión agitada y altamente estresante (Betoret, 2009; Betoret y Artiga, 2010; Shernoff et al., 2011; Skaalvik y Skaalvik, 2015, 2017b). De hecho, existen estudios que argumentan que este colectivo profesional experimenta un mayor estrés y burnout que otras profesiones (Garrick et al., 2014; Innstrand, Langballe, Falkum y Aasland, 2011), alcanzando, en el caso del profesorado de Educación Secundaria tasas de prevalencia hasta del 35% (García-Carmona, Marín y Aguayo, 2018; Quattrin et al., 2010; Rodríguez-Mantilla y Fernández-Díaz, 2011). En la misma línea, recientes estudios señalan una elevada intención de dejar su trabajo como docente en los próximos años (Høigaard, Giske y Sundsli, 2012; Klassen y Chiu, 2011; Ryan et al., 2017). Este contexto convulso del profesorado de Educación Secundaria, también ha impactado

negativamente a su satisfacción y compromiso por la docencia (Markow y Pieters, 2012; Skaalvik y Skaalvik, 2015, 2016). En España, por ejemplo, un estudio longitudinal con más de 4000 docentes de diferentes etapas educativas demostró que la satisfacción laboral había descendido en un 25% desde principios del siglo XXI, siendo el profesorado de Educación Secundaria el más afectado (Anaya y López, 2014).

Esta situación laboral que caracteriza al profesorado de Educación Secundaria puede desencadenar consecuencias poco adaptativas para su salud física y su funcionamiento psicológico, como por ejemplo, burnout, ansiedad, depresión o baja calidad del sueño (Gluschkoff et al., 2016; Skaalvik y Skaalvik, 2016; Yu, Wang, Zhai, Dai y Yang, 2015). Además de estos problemas intrapersonales, las bajas por enfermedad, los conflictos con compañeros y la alta intención de abandono puede conllevar altos costes organizacionales y económicos para la administración educativa (Moriana y Herruzo, 2006; Rabasa, Figueiredo-Ferraz, Gil-Monte y Llorca-Pellicer, 2016; Ryan et al., 2017; Skaalvik y Skaalvik, 2016). Estas consecuencias, en su conjunto, además de afectar negativamente al desempeño laboral del profesorado, pueden conducir a una baja motivación y rendimiento académico de los estudiantes (Klusmann, Richter y Lüdtke, 2016; Shen et al., 2015).

Ante esta descripción de una parte de la realidad docente, parece necesario continuar ahondando en la problemática con el objetivo de identificar soluciones efectivas que partan de evidencias científicas rigurosas y específicas. Para poder llevar a cabo este plan, el primer paso exige escalas validadas al español y al contexto docente con las que poder realizar mediciones efectivas y fiables de los constructos psicológicos relacionados con la conducta del profesorado. En segundo lugar, es preciso conocer en profundidad los antecedentes y las consecuencias de los procesos motivacionales del profesorado, así como su importancia para el desarrollo de un funcionamiento psicológico adaptativo. Por último, una vez obtenidos los instrumentos adecuados y habiendo comprendido la conducta del profesorado, es necesario diseñar, aplicar y evaluar programas de intervención con estrategias concretas y específicas destinados a mejorar el funcionamiento psicológico de este colectivo. Para ello, la presente tesis doctoral se apoya en el marco teórico de la TAD (Deci y Ryan, 1985) y en los beneficios directos e indirectos que la práctica de actividad física desencadena sobre la salud física, social y psicológica de los individuos (Eime, Young, Harvey, Charity y Payne, 2013).

2.2. Funcionamiento psicológico del profesorado de Educación Secundaria desde la teoría de la autodeterminación

El funcionamiento psicológico del profesorado puede describirse como una experiencia continua de bienestar en relación con su trabajo como docente (Collie y Martin, 2017; Collie et al., 2016). Este constructo, el cual envuelve a otros conceptos psicológicos más definidos de la profesión docente como el burnout, el compromiso o la satisfacción laboral, está estrechamente relacionado con la experiencia motivacional del profesorado y puede ser fundamental para un correcto desempeño de la profesión (Aldrup, Klusmann y Lüdtke, 2017; Collie, Granziera y Martin, 2018). Por ejemplo, un docente puede tener razones para esforzarse en la realización de su trabajo por el valor que la enseñanza tiene para él o para ella. Del mismo modo, este esfuerzo, también puede ser debido a presiones externas (e.g., equipos directivos, administración) o movido por el deseo interno de obtener una aprobación social de los demás (e.g., alumnado, padres, compañeros). En ambas situaciones, el profesorado aunará esfuerzos para realizar sus tareas, aunque cada experiencia motivacional podrá desencadenar un funcionamiento psicológico con repercusiones muy diferentes.

Para profundizar en la influencia que los procesos motivacionales pueden tener sobre el funcionamiento psicológico del profesorado, la presente tesis doctoral confía en el marco teórico de la TAD (Deci y Ryan, 1985, 2000, 2002; Ryan y Deci, 2000, 2009, 2017). Esta teoría se configura como un marco de referencia para explicar los procesos que subyacen la conducta del individuo, así como el crecimiento y el bienestar personal (Ryan y Deci, 2017). De este modo, numerosas investigaciones en el contexto educativo, y concretamente en el contexto laboral del profesorado se han apoyado durante más de tres décadas en este entramado teórico para comprender los procesos motivacionales que pueden influenciar el funcionamiento psicológico (Aldrup et al., 2017; Fernet, Chanal y Guay, 2017; Fernet, Senécal, Guay, Marsh y Dowson, 2008; Gorozidis y Papaioannou, 2014; Gorozidis y Papaioannou, 2016; Pelletier y Rocchi, 2015; Pelletier, Séguin-Lévesque y Legault, 2002; Roth, 2014; Sánchez-Oliva, Sánchez-Miguel, Pulido, López-Chamorro y Cuevas, 2014; Van den Berghe et al., 2014).

2.2.1. Necesidades psicológicas básicas

La TAD (Deci y Ryan, 1985, 2000, 2002; Ryan y Deci, 2000, 2009, 2017) sostiene la existencia de tres necesidades humanas, innatas y universales (i.e.,

autonomía, competencia y relaciones sociales), las cuales, en el caso de ser nutridas o satisfechas pueden facilitar el crecimiento global del individuo (Vansteenkiste y Ryan, 2013), así como un óptimo desarrollo psicológico y bienestar personal (Deci y Ryan, 2000; Ryan y Deci, 2017) (Figura 1).

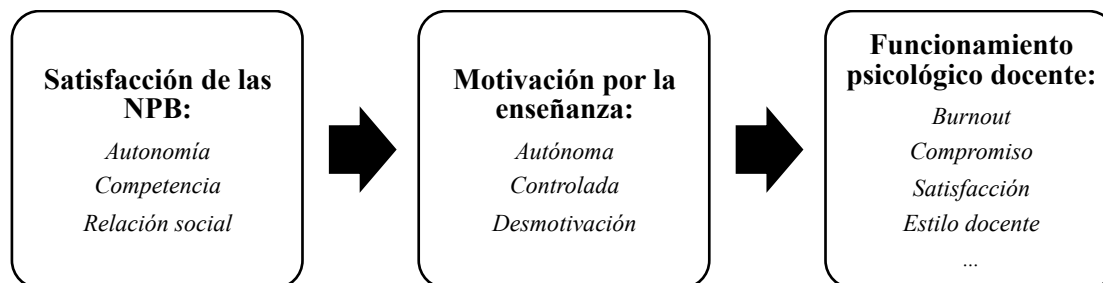


Figura 1. Secuencia resumida de la TAD, adaptada a las variables de la tesis doctoral. Fuente: Elaboración propia.

La autonomía se refiere al deseo de las personas de sentirse el origen de sus acciones (Deci y Ryan, 2000). Por ejemplo, en el contexto docente, la necesidad de autonomía podría nutrirse cuando el profesorado percibiese que puede elegir y responsabilizarse de las labores concernientes al desarrollo de su centro educativo y al proceso de enseñanza. La competencia hace referencia a la sensación de las personas de percibirse eficaces ante una tarea en un contexto determinado (White, 1959). Así, el profesorado podría ver satisfecha su necesidad de competencia cuando percibiese que posee los recursos personales suficientes para afrontar con éxito sus múltiples tareas laborales (e.g., docencia, evaluaciones, reuniones con padres, resolver conflictos, entre otras). Finalmente, la relación social se refiere a la importancia de la inclusión social y de tener relaciones interpersonales positivas (Ryan y Deci, 2017). De este modo, si el profesorado experimentase relaciones estrechas y cálidas con sus compañeros de trabajo y con el alumnado podría ver nutrida su necesidad de relación social.

2.2.2. Motivación autodeterminada

La secuencia de la TAD (Deci y Ryan, 1985, 2000, 2002; Ryan y Deci, 2000, 2009, 2017) sostiene que el comportamiento humano puede estar desmotivado, extrínsecamente motivado o intrínsecamente motivado para realizar una determinada actividad. Esto, entre otros factores, estará determinado en gran medida por el grado de satisfacción de las tres NPB (i.e., autonomía, competencia y relaciones sociales) (Deci y Ryan, 2000). Asimismo, como sugiere la Figura 1, el tipo de motivación por la que un

sujeto realiza una actividad desencadenará diferentes consecuencias afectivas, cognitivas y comportamentales (Ryan y Deci, 2017). Este proceso, puede ser estudiado a lo largo de un continuo motivacional (Figura 2) que muestra las diferentes regulaciones del comportamiento humano de menor a mayor nivel de autodeterminación (Ryan y Deci, 2000).

Autodeterminación de la conducta						
Tipo de motivación	Desmotivación	Motivación extrínseca				Motivación intrínseca
Tipo de regulación	Sin regulación	Regulación externa	Regulación introyectada	Regulación identificada	Regulación integrada	Regulación intrínseca
Locus de causalidad	Impersonal	Externo	Algo externo	Algo interno	Interno	Interno
Atributos	Incompetencia No valorado No control No intención	Recompensas externas Obediencia Castigos	Implicación ego Aprobación Autocontrol	Importancia personal Valor de la actividad	Congruencia Síntesis con uno mismo	Interés Disfrute Satisfacción inherente

Figura 2. Continuo de autodeterminación de la conducta. Fuente: Modificado a partir de Deci y Ryan (2000).

En este sentido, la TAD postula que la forma menos autodeterminada es la desmotivación. La desmotivación, implica una escasa o nula valoración de la actividad, la cual suele ir acompañada de una ausencia de competencia y una falta de expectativas para alcanzar el resultado u objetivo deseado (Deci y Ryan, 2002). En este estado motivacional, un individuo no encuentra ningún motivo -intrínseco o extrínseco- para hacer una actividad, y no entiende que beneficios puede obtener al realizarla (Deci y Ryan, 2000). Por ejemplo, un docente desmotivado sería aquel que no comprende las razones por las que continuar dedicándose a la enseñanza, dado que cree que su labor y sus esfuerzos no sirven para nada.

Cuando este comportamiento desmotivado, adquiere un significado –externo o interno– dirigido a conseguir un determinado fin, se convierte en una actividad extrínsecamente motivada. De menor a mayor nivel de autodeterminación, la motivación extrínseca abarca cuatro regulaciones: regulación externa, regulación introyectada, regulación identificada y regulación integrada (Ryan y Deci, 2000). La regulación externa se refiere a la realización de una actividad para conseguir una

recompensa externa o evitar un castigo (Deci y Ryan, 2000). Por ejemplo, un docente que únicamente se esfuerza en su trabajo por si recibiese una inspección de la administración educativa. La regulación introyectada tiene lugar cuando el sujeto realiza una determinada tarea para evitar sentimientos de culpa o ansiedad (Deci y Ryan, 2002). Este sería el caso de un docente que únicamente prepara sus clases para evitar sentirse culpable. La regulación identificada tiene su origen en aquellos comportamientos en los que el sujeto otorga un valor personal a lo que hace debido a que piensa que puede ser relevante para su desarrollo personal (Deci y Ryan, 2000). Por ejemplo, un docente con regulación identificada preparará sus clases y se esforzará en hacer bien su trabajo porque está convencido de que su labor puede ser importante. Por último, la regulación integrada es el tipo de motivación extrínseca más autodeterminada y tiene lugar cuando los motivos de realización de una actividad son congruentes con los valores y las necesidades de un individuo (Deci y Ryan, 2002). Por ejemplo, un docente con una regulación integrada sería aquel que intenta hacer bien su trabajo porque enseñar y educar forma parte de su estilo de vida.

En el extremo más autodeterminado del continuum se sitúa la motivación intrínseca (Deci y Ryan, 2000). Este tipo de motivación se caracteriza por la ausencia de reforzamientos externos para desarrollar una actividad, siendo la principal razón la satisfacción, el interés y el placer inherente derivada de la misma. Por ejemplo, un docente motivado intrínsecamente es aquel que siente vocación por enseñar y disfruta haciéndolo, lo que le lleva a preparar sus clases y formarse continuamente para mejorar su desempeño y el aprendizaje de sus estudiantes.

En los últimos años, debido al alto grado de autodeterminación que poseen algunas formas de motivación externa como la regulación integrada y la regulación identificada, las cuales, además de relacionarse positivamente con la motivación intrínseca, se han visto asociadas con compartimentos positivos en diferentes estudios con profesores (Carson y Chase, 2009; Fernet et al., 2008; Gorozidis y Papaioannou, 2014), ha llevado a algunos autores a sugerir otras formas de agrupar dichas regulaciones (Roth, 2014). En este sentido, como se puede apreciar en la Figura 2 del presente apartado, recientes estudios conducidos bajo la TAD han denominado como motivación autónoma a la motivación intrínseca, regulación integrada y regulación inidentificada, mientras que la regulación introyectada y externa han sido denominadas como motivación controlada (Haerens, Aelterman, Vansteenkiste, Soenens y Van

Petegem, 2015; Roth, 2014; Roth, Assor, Kanat-Maymon y Kaplan, 2007; Van den Berghe et al., 2013, 2014).

Para que el profesorado internalice completamente sus comportamientos, es decir, esté motivado autónomamente en su trabajo, es crucial que sus tres NPB estén satisfechas (Deci y Ryan, 2000; Roth, 2014). A pesar de que la autonomía, la competencia y la relación social son determinantes para un adecuado desarrollo, recientes estudios han demostrado que la autonomía es la NPB que puede predecir con más fuerza los comportamientos más autodeterminados en docentes (Collie et al., 2016; Van den Berghe et al., 2014). Las asociaciones entre la satisfacción de las NPB y la motivación controlada no han sido tan concluyentes. Mientras algunos estudios con docentes han encontrado que la autonomía y la competencia predicen negativamente la motivación controlada (Jansen in de Wal, den Brok, Hooijer, Martens y van den Beemt, 2014), otros han encontrado relaciones no significativas (Collie et al., 2016) e incluso positivas (Carson y Chase, 2009). Respecto a las relaciones sociales, algunos estudios han demostrado que esta necesidad predice positivamente la motivación controlada (Carson y Chase, 2009; Jansen in de Wal et al., 2014), mientras que otros no han hallado significación entre ambas variables (Van den Berghe et al., 2014). Finalmente, respecto a la desmotivación, la TAD sostiene que la satisfacción de las tres NPB predice negativamente las conductas desmotivadas o sin regulación de los individuos (Ryan y Deci, 2017). Sin embargo, en el contexto del profesorado no existen demasiados estudios que hayan abordado esta relación. De hecho, mientras Carson y Chase (2009) demostraron que la autonomía y la competencia predecían negativamente la desmotivación, la relación social no mostró una asociación significativa. Las distintas regulaciones motivacionales, a su vez, pueden explicar consecuencias. A continuación ahondaremos en el análisis de estas relaciones.

2.2.3. Consecuencias relacionadas con el trabajo docente

En línea con la TAD (Deci y Ryan, 1985, 2000, 2002; Ryan y Deci, 2000, 2009, 2017) numerosas investigaciones con docentes han demostrado la relación entre la motivación por la enseñanza y diferentes consecuencias relacionadas con el trabajo (Pelletier y Rocchi, 2015; Roth, 2014). En particular, las formas de motivación más autodeterminadas se han relacionado positivamente con consecuencias adaptativas como el compromiso (Cheon, Reeve, Yu y Jang, 2014; Jansen in de Wal et al., 2014), la satisfacción (Nie, Chua, Yeung, Ryan y Chan, 2015; Richards, Washburn, Carson y

Hemphill, 2017) o un estilo interpersonal docente adaptativo (Cheon, Reeve, Lee y Lee, 2018; Pelletier et al., 2002) y negativamente con consecuencias como el burnout (Fernet et al., 2017; Van den Berghe et al., 2013), la ansiedad y la depresión (Ng et al., 2012; Ryan y Connell, 1989).

Igualmente, la motivación controlada se ha relacionado positivamente con consecuencias negativas como el burnout (Eyal y Roth, 2011; Van den Berghe et al., 2014). Sin embargo, las asociaciones de la motivación controlada con consecuencias más adaptativas como la satisfacción (Nie et al., 2015), el compromiso (Fernet, Austin y Vallerand, 2012), o un estilo docente basado en el apoyo a las NPB (Van den Berghe et al., 2014) ha sido menos concluyente. Así, parece ser que la motivación controlada, aunque no siempre conduce a un bajo desempeño, si que parece estar relacionada con un funcionamiento psicológico de riesgo, sobre todo a largo plazo (Reeve, 2002; Roth, 2014). Es decir, cuando el profesorado invierte esfuerzos en su trabajo debido a motivaciones autónomas, esos esfuerzos se acompañan de sentimientos de vitalidad y energía. Por el contrario, los esfuerzos del profesorado originados por motivaciones controladas, aunque pueden derivar en un compromiso elevado, también son acompañados de sentimientos de ansiedad y burnout (Moller, Deci y Ryan, 2006; Ryan y Deci, 2009).

Si bien el profesorado con una motivación controlada no siempre invierte menos esfuerzo en su trabajo, este no sería el caso del profesorado desmotivado (Roth, 2014; Ryan y Deci, 2009). De este modo, la desmotivación ha mostrado, de manera consistente, relaciones negativas con consecuencias adaptativas para el funcionamiento psicológico del profesorado como la satisfacción laboral (Nie et al., 2015), la vitalidad (Cuevas, Ntoumanis, Fernandez-Bustos y Bartholomew, 2018) o la autoeficacia (Fernet et al., 2008), mientras que ha mostrado asociaciones positivas con el burnout (Cuevas et al., 2018; Fernet et al., 2008), el estrés docente (Nie et al., 2015) o un estilo interpersonal docente orientado hacia el ego (Butler, 2014). No obstante, la investigación sobre desmotivación en el contexto del profesorado es mucho más reducida que los estudios que abordan la motivación autónoma y controlada. A continuación, profundizaremos en las consecuencias más significativas de la presente tesis doctoral.

2.2.3.1. *Burnout y otras variables asociadas*

El síndrome de burnout lleva estudiándose en diferentes profesiones desde hace más de 40 años (Freudenberger, 1974), incluyendo el profesorado (Aloe, Amo y Shanahan, 2014; Aloe, Shisler, et al., 2014; García-Carmona et al., 2018). Desde mayo de 2019, la Organización Mundial de la Salud (OMS, 2019) ha incluido este síndrome en la clasificación internacional de enfermedades asociadas al trabajo (CIE11-QD85; síndrome de desgaste ocupacional), conceptualizándolo como resultado del estrés crónico en el lugar trabajo que no ha sido gestionado con éxito. Para su estudio, los investigadores han utilizado diferentes propuestas durante las últimas décadas (Farber, 2000; Gil-Monte, 2005; Maslach y Jackson, 1986; Pines y Aronson, 1988), siendo la más empleada la desarrollada por Maslach y Jackson a través del cuestionario *Maslach Burnout Inventory* (MBI; Maslach y Jackson, 1986; Maslach, Jackson y Leiter, 1996). Según el MBI, el burnout se caracteriza por sentimientos de agotamiento (i.e., sensación de estar emocionalmente fatigado), cinismo (i.e., comportamiento distante hacia el trabajo y hacia los compañeros) y baja realización personal (i.e., sensación de ineficacia en el trabajo).

A pesar de haber sido ampliamente utilizado, el MBI está basado en un marco teórico inespecífico que no identifica las características de cada caso, contemplando el burnout como un síndrome con síntomas relativamente consistentes en todos los individuos (Montero-Marín, García-Campayo, Mera y del Hoyo, 2009). Este hecho, además de incrementar la dificultad de identificar los diferentes tipos de burnout experimentados por el profesorado, así como sus variables asociadas, también puede dificultar el diseño de estrategias específicas para su prevención (Montero-Marín et al., 2009). Para superar esta limitación, la presente tesis doctoral confía en la propuesta de burnout de Farber (Farber, 1990, 1991, 2000), la cual, desde un punto de vista más aplicado, identificó en docentes tres subtipos de burnout basados en diferentes formas de responder al estrés laboral: frenético, sin desafíos y desgastado. Unos años más tarde, esta definición de burnout fue estructurada y sistematizada mediante la *Burnout Clinical Subtype Questionnaire* (BCSQ-36; Montero-Marín y García-Campayo 2010). Así, el subtipo frenético lo caracterizan aquellos docentes que para tener éxito en sus tareas invierten una cantidad irracional de tiempo y esfuerzo, incluso arriesgando su salud (Farber, 2000; Montero-Marín et al., 2009). El subtipo sin desafíos lo caracterizan aquellos docentes que experimentan condiciones laborales no estimulantes, monótonas

y rutinarias. Como resultado, muestran indiferencia y realizan sus tareas de manera superficial porque piensan que su esfuerzo no será reconocido (Farber, 2000; Montero-Marín y García-Campayo, 2010). Finalmente, el subtipo desgastado lo caracterizan aquellos docentes que no se sienten reconocidos por la administración educativa y los directores y sienten que han perdido el control sobre la mayoría de sus tareas. En consecuencia, este tipo de docentes desgastados no dedica apenas esfuerzo a su trabajo dejando de lado todas sus responsabilidades (Farber, 2000; Montero-Marín et al., 2009).

Además de confiar en estos subtipos de burnout, la presente tesis doctoral también confía en los subtipos de sobrecarga, falta de desarrollo y abandono, los cuales, fueron extraídos respectivamente de las definiciones de frenético, sin desafíos y desgastado (BCSQ-12; Montero-Marín, Skapinakis, Araya, Gili y García-Campayo, 2011a). En el contexto laboral docente, el subtipo sobrecarga lo experimentan aquellos docentes que arriesgan su salud en la búsqueda de los resultados deseados. El subtipo falta de desarrollo lo caracterizan aquellos docentes que experimentan pocas oportunidades de crecimiento en su trabajo y desearían tener otras responsabilidades o incluso otro trabajo. Finalmente, el subtipo abandono representa a aquellos docentes que, ante cualquier dificultad, se rinden o se muestran indiferentes (Montero-Marín, Monticelli, et al., 2011; Montero-Marín, Skapinakis, et al., 2011a).

Diferentes estudios sustentados por la TAD han demostrado que la satisfacción de las NPB predice negativamente el burnout del profesorado (Fernet, Austin, Trépanier y Dussault, 2013; Kaplan y Madjar, 2017; Van den Berghe et al., 2014). En la misma línea, el profesorado motivado de forma autónoma ha demostrado menor riesgo de experimentar este síndrome, mientras que lo opuesto ha sido cierto para la motivación controlada y desmotivación (Cuevas et al., 2018; Eyal y Roth, 2011; Van den Berghe et al., 2014). Con respecto a otras variables estudiadas en la presente tesis doctoral, diferentes estudios han revelado que el burnout docente puede conducir a resultados de ansiedad (Bianchi, Boffy, Hingray, Truchot y Laurent, 2013; Moriana y Herruzo, 2006), depresión (Moriana y Herruzo, 2006; Shin, Noh, Jang, Park y Lee, 2013), trastornos del sueño (Bianchi et al., 2013; Gluschkoff et al., 2016) e incluso la intención de dejar el trabajo (Høigaard et al., 2012; Ryan et al., 2017; Skaalvik y Skaalvik, 2016; 2017). Sin embargo, hasta la fecha de depósito de la presente tesis doctoral y para nuestro conocimiento, todas estas asociaciones han sido abordadas utilizando la definición clásica de burnout de Maslach.

2.2.3.2. *Compromiso y satisfacción por el trabajo*

Desde hace aproximadamente dos décadas, además de prestar notable atención a las consecuencias relacionadas con un funcionamiento psicológico no deseado del profesorado (i.e., burnout, estrés, ansiedad, etc.), diferentes autores, desde el marco de la psicología positiva, comenzaron a estudiar consecuencias centradas en las fortalezas y el funcionamiento óptimo del individuo (e.g., compromiso, satisfacción, etc.; Seligman y Csikszentmihalyi, 2014). De este marco de psicología positiva emerge el concepto de compromiso por el trabajo o *work engagement* (Bakker y Demerouti, 2008; Simbula, Guglielmi, Schaufeli y Depolo, 2013). La presente tesis doctoral, en línea con numerosos estudios que han abordado este concepto en el ámbito laboral (Bakker y Albrecht, 2018), confía en la *Utrecht Work Engagement Scale* (Schaufeli, Martínez, Marques-Pinto, Salanova y Bakker, 2002; Schaufeli, Salanova, González-Romá y Bakker, 2002) para evaluar el compromiso del profesorado. Según estos autores, el compromiso se caracteriza por un elevado nivel de energía y de identificación con el trabajo, siendo definido como un estado mental positivo multifactorial compuesto por vigor, dedicación y absorción (Schaufeli, Martínez, et al., 2002; Schaufeli, Salanova, et al., 2002). En el contexto laboral docente, el vigor lo caracteriza el profesorado con una elevada energía y resiliencia mental para afrontar sus múltiples tareas, así como con una alta persistencia ante las dificultades. La dedicación la muestran los docentes envueltos por su trabajo y con gran entusiasmo, inspiración, orgullo y vocación por su profesión. Finalmente, la absorción se refleja el profesorado que posee un sentimiento de fluidez y concentración en su trabajo, lo que conlleva a la sensación de que la jornada laboral pase muy rápido (Hakanen, Bakker y Schaufeli, 2006).

Paralelamente, otro de los conceptos relacionados con un funcionamiento psicológico adaptativo del profesorado que ha ido ganando atención en los últimos años ha sido el de satisfacción por el trabajo o *job satisfaction* (Klassen y Chiu, 2010; Lent et al., 2011; Markow y Pieters, 2012; Richards et al., 2017; Skaalvik y Skaalvik, 2011a). La satisfacción por el trabajo se define como los juicios evaluativos que un individuo hace respecto a sus roles laborales (Weiss, 2002). Dichos juicios, pueden ser entendidos a lo largo de un continuo de satisfacción, yendo desde lo más positivos (i.e., satisfacción plena por el trabajo), hasta los más negativos (i.e., insatisfacción por el trabajo). Es decir, la satisfacción y la insatisfacción no dos variables dicotómicas, sino más bien extremos del mismo continuo (Richards et al., 2017). Además, en la literatura se pueden

identificar dos tipologías de satisfacción laboral: la satisfacción global (i.e., satisfacción general con el trabajo) y la satisfacción por facetas (i.e., satisfacción en relación a elementos específicos de cada trabajo como salario, horarios, etc.) (Judge, Thoresen, Bono y Patton, 2001). La presente tesis doctoral, en línea con otros estudios en profesorado (Skaalvik y Skaalvik, 2011a, 2017a) confía en un enfoque de la satisfacción global por el trabajo.

Siguiendo la TAD, diferentes estudios con profesorado han demostrado una asociación positiva entre la satisfacción de las tres NPB con el compromiso y la satisfacción laboral (Collie et al., 2016; Klassen, Perry y Frenzel, 2012; Lee y Nie, 2014; Ruiz-Quiles, Moreno-Murcia y Vera-Lacárce, 2015). Igualmente, como se ha mencionado anteriormente, el profesorado con una motivación autónoma ha demostrado estar más comprometido y más satisfecho con su trabajo (Cheon et al., 2014; Collie et al., 2016; Jansen in de Wal et al., 2014; Nie et al., 2015). Las asociaciones entre la motivación controlada, el compromiso y la satisfacción han sido menos concluyentes, mostrando relaciones positivas, negativas o no significativas (Collie et al., 2016; Fernet et al., 2012; Nie et al., 2015) En cambio, la desmotivación docente ha conducido de manera consistente a una insatisfacción laboral (Nie et al., 2015). Con respecto a otras variables relacionadas con el funcionamiento psicológico del profesorado y que también han sido abordadas en la presente tesis doctoral, diferentes estudios han demostrado que el compromiso y la satisfacción laboral se asocian negativamente con la ansiedad y la depresión (Simbula et al., 2013), la intención de dejar el trabajo (Høigaard et al., 2012; Skaalvik y Skaalvik, 2016) y con trastornos del sueño (Garrick et al., 2014).

2.2.3.3. Estilo interpersonal docente

Para analizar el estilo docente, la presente tesis doctoral se basa en un marco teórico compuesto por variables de la TAD (Deci y Ryan, 1985; Ryan y Deci, 2017) y la teoría de las metas de logro (Nicholls, 1989). Ambas teorías motivacionales se han consolidado como dos referentes para explicar la importancia del estilo interpersonal docente en el aula (Aelterman, Vansteenkiste, Van den Berghe, De Meyer y Haerens, 2014; Butler, 2007; Cheon et al., 2014; Han, Yin y Wang, 2016), el cual puede definirse como aquellas estrategias adoptadas por el profesorado con el objetivo de estimular el proceso de aprendizaje, la motivación y el desarrollo personal de sus estudiantes (Reeve, 2009).

Por un lado, para la TAD, el estilo interpersonal docente puede diferir en el grado en que el profesorado apoya las tres NPB de sus estudiantes (Ryan y Deci, 2017). El apoyo a la autonomía se caracteriza por proporcionar oportunidades de elección a los estudiantes, seguir su ritmo de aprendizaje y explicar la relevancia de las tareas (Jang, Reeve y Deci, 2010). El apoyo a las relaciones sociales se caracteriza por mostrar una relación sincera y estrecha hacia los estudiantes, preocuparse por sus inquietudes y facilitar la cooperación mediante las tareas (Leenknecht, Wijnia, Loyens y Rikers, 2017). El apoyo a la competencia se caracteriza por proporcionar una retroalimentación positiva e interrogativa, valorar el progreso y abordar las tareas con una estructura clara y definida para el alumnado (Jang et al., 2010). En este sentido, algunas facetas del apoyo a la competencia están alineadas con las bases principales de un estilo basado en el clima motivacional, el cual está sustentado por la teoría de las metas de logro (Butler, 2014; Nicholls, 1989). El clima motivacional orientado a la tarea se caracteriza por enfatizar el aprendizaje, el esfuerzo y el progreso individual en lugar del rendimiento y la comparación social, lo cual sería propio del clima motivacional orientado al ego (Butler, 2014).

Hasta la fecha, y para nuestro conocimiento, no existen muchos estudios que hayan abordado las asociaciones entre la motivación del profesorado por su trabajo y su estilo interpersonal docente. No obstante, algunos de ellos han señalado una relación positiva entre la motivación autónoma del profesorado y los estilos docentes basados en el apoyo a las NPB (Cheon et al., 2014; Taylor, Ntoumanis y Standage, 2008; Van den Berghe et al., 2014) y el clima motivacional orientado a la tarea (Parker, Martin, Colmar y Liem, 2012). Sin embargo, la motivación controlada no ha mostrado una relación significativa hacia un estilo de apoyo a las NPB (Van den Berghe et al., 2014). Finalmente, no existen estudios que hayan abordado las relaciones entre la desmotivación del profesorado y la su estilo de enseñanza.

No obstante, recientes estudios desarrollados desde ambos marcos teóricos han mostrado como el estilo interpersonal docente, además de influir directamente sobre los procesos motivacionales del alumnado (Cheon, Reeve y Song, 2016; Fernandez-Rio, Méndez-Giménez y Cecchini Estrada, 2014; Fin, Moreno-Murcia, León, Baretta y Júnior, 2019; Fin, Moreno-Murcia, León, Baretta y Nodari Júnior, 2018; Núñez, Fernández, León y Grijalvo, 2015), también puede repercutir sobre la motivación docente (Jang, Kim y Reeve, 2012; Pelletier y Rocchi, 2015; Reeve, 2013) y otras

consecuencias relacionadas con su funcionamiento psicológico como el burnout y el compromiso por la enseñanza (Cheon et al., 2014; Han et al., 2016; Retelsdorf, Butler, Streblow y Schiefele, 2010; Van den Berghe et al., 2014).

2.2.4. Efectos de la actividad física sobre el funcionamiento psicológico del profesorado

Los beneficios de la actividad física sobre la salud física, social y psicológica han sido ampliamente demostrados (Bize, Johnson y Plotnikoff, 2007; Cheng et al., 2018; Eime et al., 2013). Sin embargo, aunque existen numerosas evidencias que demuestran los efectos de la actividad física sobre el funcionamiento psicológico (Bogaert, De Martelaer, Deforche, Clarys y Zinzen, 2014, 2015; Naczenski, de Vries, van Hooff y Kompier, 2017; White et al., 2017), los diferentes mecanismos teóricos para explicar esta asociación no han sido totalmente concluyentes por si mismos (Ginoux, Isoard-gautheur y Sarrazin, 2019).

En primer lugar, es ampliamente sabido que practicar actividad física se relaciona con una mejor salud física, reduciendo múltiples factores de riesgo de padecer enfermedades (Moore et al., 2016; Pedersen y Saltin, 2015). Si esto es así, parece lógico pensar que la práctica de actividad física, a través de una mejora de la salud física, también pueda beneficiar indirectamente el funcionamiento psicológico de los trabajadores (Sui, Smith, Fagan, Rollo y Prapavessis, 2019). Por ejemplo, dos estudios recientes han demostrado que, después de haber instalado escritorios con pedales en oficinas durante cinco meses, los trabajadores mejoraron su salud física, lo que causó además mejoras en diferentes consecuencias relacionadas con su funcionamiento psicológico como el compromiso y la motivación por su trabajo (Torbeyns et al., 2016; Torbeyns, de Geus, Bailey, Decroix y Meeusen, 2017). Igualmente, revisiones sistemáticas y estudios longitudinales han demostrado asociaciones negativas entre la salud física de los trabajadores, el absentismo laboral (Darr y Johns, 2008) y el burnout en el trabajo (Kim, Ji y Kao, 2011).

En segundo lugar, los beneficios de la práctica regular de actividad física sobre diferentes consecuencias relacionadas con la salud social de los trabajadores también han sido documentados. De acuerdo con la hipótesis de interacción social (Ransford, 1982; Teychenne, Ball y Salmon, 2008), las relaciones sociales que emergen entre quienes practican actividad física grupal pueden contribuir a tratar diferentes problemas

de salud física y mental, reduciendo además los sentimientos de soledad (Pels y Kleinert, 2016). Paralelamente, siguiendo la TAD (Deci y Ryan, 1985; Ryan y Deci, 2017), la realización de actividad física con compañeros de trabajo ofrece múltiples oportunidades de interacción social que ayudan a crear un sentido de pertenencia hacia el grupo (Bruton, Vurnakes, Martin, Perry y Henderson, 2012). Consecuentemente, estas oportunidades de interacción social pueden mejorar su satisfacción de relación social afectando a la mejora del clima del lugar de trabajo y a su satisfacción laboral (Andersen et al., 2015; Arrogi, Schotte, Bogaerts, Boen y Seghers, 2017).

En tercer lugar, la investigación empírica también ha demostrado que la práctica de actividad física regular puede contribuir a la reducción del estrés laboral (Klaperski, von Dawans, Heinrichs y Fuchs, 2014). Realizar actividad física conduce a adaptaciones biológicas que afectan a los patrones de sedación y reducen la presión arterial de los individuos. Estas adaptaciones disminuyen las respuestas fisiológicas a los factores estresantes, tanto los relacionados con la actividad física como los relacionados con la vida en general, incluyendo el trabajo (Klaperski, von Dawans, Heinrichs y Fuchs, 2013; Sothman, 2006). En este sentido, este mecanismo de amortiguación del estrés ha sido fundamental no solo para prevenir el burnout y la intención de dejar el trabajo, sino también para mejorar el compromiso laboral del profesorado (Gluschkoff et al., 2016; Skaalvik y Skaalvik, 2016). De manera similar, una amplia gama de estudios basados en procesos de recuperación del estrés laboral señalan que la práctica de actividad es un factor clave para recuperarse del agotamiento laboral y optimizar los niveles de compromiso (Feuerhahn, Sonnentag y Woll, 2014; Sonnentag, Venz y Casper, 2017). Finalmente, la actividad física regular induce cambios en algunos neurotransmisores y neuromoduladores como la noradrenalina, la dopamina y la serotonina, lo que fisiológicamente conduce a un mejor funcionamiento psicológico, reduciendo el burnout e incrementando el humor y la energía (Schuch et al., 2016).

En su conjunto, esta serie de mecanismos físicos, sociales y fisiológicos parecen ser útiles para postular que la práctica de actividad física de forma regular y en grupo puede desencadenar efectos positivos sobre el funcionamiento psicológico del profesorado.

OBJETIVOS /

AIMS

3. Objetivos / Aims

Teniendo en cuenta los antecedentes encontrados en la literatura científica, en línea con la TAD (Deci y Ryan, 1985, 2000, 2002; Ryan y Deci, 2000, 2009, 2017) y considerando los beneficios de la práctica de actividad física, los tres objetivos generales de la presente tesis doctoral son los siguientes:

- 1) Validar y adaptar al español y al contexto del profesorado de Educación Secundaria cuatro escalas relacionadas con el funcionamiento psicológico docente destinadas a la medición de los constructos de motivación por la enseñanza, satisfacción de las NPB, estilo interpersonal docente y burnout.
- 2) Analizar los procesos motivacionales y el funcionamiento psicológico del profesorado de Educación Secundaria mediante un doble enfoque centrado en la variable y centrado en la persona.
- 3) Diseñar, implementar y evaluar los efectos de un programa de intervención basado en la práctica de actividad física en el tiempo libre y compañeros de trabajo para la mejora del funcionamiento psicológico del profesorado de Educación Secundaria.

Asimismo, parece necesario señalar los objetivos principales de cada uno de los siete artículos científicos que componen la tesis doctoral. El objetivo general 1 engloba los cuatro primeros estudios recogidos en el Capítulo I de la presente tesis doctoral. Sus objetivos son:

- **Estudio 1:** Elaborar y validar una escala en Español con adecuadas propiedades psicométricas, fiable, válida e invariante destinada a la evaluación de la motivación por la enseñanza en el profesorado de Educación Secundaria.
- **Estudio 2:** Validar al español la Escala de Necesidades Psicológicas Básicas en el Trabajo, analizando su fiabilidad, validez e invarianza para evaluar dicho constructo en el profesorado de Educación Secundaria.
- **Estudio 3:** Adaptar y validar al español y al contexto del profesorado de Educación Secundaria una escala fiable, válida e invariante destinada evaluar la percepción de del profesorado de su estilo interpersonal docente.
- **Estudio 4:** Examinar la estructura factorial, fiabilidad y validez de la *Burnout Clinical Subtype Questionnaire* (BCSQ-12) en el profesorado de Educación

Secundaria y analizar las diferencias en los subtipos de burnout en función del género, el tipo de centro y la experiencia.

El objetivo general 2, a su vez, engloba los estudios 5 y 6, los cuales están enmarcados en el Capítulo II de la tesis doctoral. Los objetivos de ambos estudios son:

- **Estudio 5:** Examinar la motivación por la enseñanza del profesorado de Educación Secundaria, sus antecedentes y sus consecuencias utilizando un doble enfoque centrado en la variable y centrado en la persona.
- **Estudio 6:** Analizar la coexistencia entre el burnout y el compromiso del profesorado de Educación Secundaria e identificar hasta que punto cada perfil docente resulta más o menos adaptativo con respecto a un conjunto de consecuencias psicológicas y físicas.

Finalmente, el objetivo general 3 envuelve el estudio 7, el cual a su vez está enmarcado en el Capítulo III. Dicho estudio, tiene como objetivo:

- **Estudio 7:** Examinar los efectos de un programa de intervención de actividad física en el tiempo libre con compañeros trabajo sobre las relaciones sociales, el compromiso, la satisfacción laboral y el burnout en el trabajo.

3. *Aims*

Taking past research found in scientific literature into account, in line with the tenets of SDT (Deci & Ryan, 1985, 2000, 2002; Ryan & Deci, 2000, 2009, 2017), and considering the benefits of physical activity, the three general aims of the present doctoral thesis are the following:

- 1) To validate and adapt four scales, related to the psychological functioning of teachers, to Spanish and to the context of secondary school teachers, with the aim of measuring the constructs of motivation for teaching, BPN satisfaction, interpersonal teaching style, and burnout.
- 2) To analyze motivational processes and the psychological functioning of secondary school teachers through a double variable- and person-centered approach.
- 3) To design, implement, and assess the effects of a leisure-time physical activity intervention program with work colleagues with focus on improving the psychological functioning of secondary school teachers.

In addition, it also seems necessary to underline the main aims of the seven scientific manuscripts that comprise this doctoral thesis. In this sense, general aim 1 involves the first four studies included in Chapter I of this doctoral thesis. The aims of the mentioned first four studies are the following:

- ***Study 1:*** To elaborate and validate a reliable, valid, and invariant scale in Spanish with adequate psychometric properties, aimed at measuring motivation for teaching in secondary school teachers.
- ***Study 2:*** To validate a Spanish-version of the Basic Psychological Needs at Work Scale, analyzing the reliability, validity, and measurement invariance in secondary school teachers.
- ***Study 3:*** To adapt and validate a reliable, valid and invariant scale to Spanish, to evaluate secondary school teachers' perception of their teaching interpersonal styles.
- ***Study 4:*** To examine the factor structure, reliability and validity of the Burnout Clinical Subtype Questionnaire (BCSQ-12) in secondary school teachers and to

analyze differences in the burnout subtypes in terms of gender, type of school, and teaching experience.

General aim 2 involves studies 5 and 6, which are included in Chapter II of this doctoral thesis. The aims of both studies are the following:

- **Study 5:** To examine secondary school teachers' motivation for teaching, its background and outcomes by using a variable- and a person-centered approach.
- **Study 6:** To analyze the coexistence of burnout and engagement in secondary school teachers, and identify to what extent the teachers' profiles are more or less adaptive with regard to a set of psychological and physical outcomes.

Finally, general aim 3 involves study 7, that is placed in Chapter III of this doctoral thesis. The aim of this study 7 is the following:

- **Study 7:** To examine the effects of a leisure-time physical activity intervention program with work colleagues on the need for relatedness, engagement, job satisfaction, and burnout at work.

METODOLOGÍA GENERAL

4. Metodología general

De acuerdo con la normativa específica de tesis por compendio de publicaciones de la Universidad de Zaragoza, a continuación se detalla la metodología general utilizada para el desarrollo del proyecto de investigación I+D+i (EDU2013-42048-R), sobre el cual se han desarrollado los siete estudios científicos que componen la presente tesis doctoral. No obstante, es preciso señalar que en los siete estudios científicos aparece una descripción específica y detallada de la metodología utilizada (i.e., diseño, procedimiento, participantes, variables e instrumentos, análisis de datos, entre otros) para abordar cada uno de ellos.

4.1. Aspectos éticos

Para su desarrollo, el presente proyecto siguió las directrices éticas generales de la Declaración de Helsinki (2013) respecto a la interacción con seres humanos, consentimiento y confidencialidad de las respuestas. Asimismo, el proyecto contó con el dictamen ético favorable para su desarrollo, el cual fue emitido por el Comité de Ética de la Investigación de la Comunidad Autónoma de Aragón (CEICA) en la reunión celebrada el día 25 de noviembre de 2015, Acta N.º C.P.19/2015 (C.I. PI13/0283) (ver Anexo III).

4.2. Diseño del proyecto

Para abordar los objetivos generales 1 y 2 correspondientes a los estudios enmarcados en los Capítulos I y II de la presente tesis doctoral se llevó a cabo un diseño ex post facto, descriptivo y correlacional de corte transversal basado en la técnica de encuestación (Fontes de Gracia et al., 2010). Para abordar el objetivo general 3, y por lo tanto el estudio de intervención enmarcado en el Capítulo III de la tesis doctoral, el diseño desarrollado fue cuasi-experimental con mediciones pre-test y post-test.

4.3. Procedimiento general

En lo que respecta a los estudios enmarcados en los Capítulos I y II de la presente tesis doctoral, el procedimiento general fue el siguiente. De forma previa al comienzo del proyecto se solicitó a la Consejería de Educación del Gobierno de Aragón el consentimiento para su desarrollo. Después de haber obtenido su visto bueno y disposición a colaborar en el proyecto, comenzó la planificación para acometer una

recogida de datos que, con los recursos que se disponían, pudiese garantizar una muestra rigurosa y lo más representativa posible.

Con el objetivo de facilitar el acceso a la totalidad de los centros de Educación Secundaria de la Comunidad Autónoma de Aragón, la recogida de datos fue informatizada. Este proceso de informatización, además, ayudó a garantizar el anonimato de los participantes y a evitar valores perdidos, dado que no era posible finalizar el cuestionario si el docente no había cumplimentado todas las respuestas. El desarrollo de dicha plataforma online fue realizado por una empresa informática, quien se encargó de elaborar el soporte virtual siguiendo las directrices metodológicas y teóricas aportadas por los responsables del proyecto de investigación. Una vez desarrollada y de forma previa a su puesta en marcha, la plataforma online fue revisada por cuatro miembros del grupo de investigación responsable del proyecto. Después de obtener su aceptación, el cuestionario online, con la ayuda de Consejería de Educación del Gobierno de Aragón y otras instituciones educativas, fue enviado a todo el profesorado de Educación Secundaria de la Comunidad Autónoma de Aragón en activo durante el curso 2014-2015. De este modo, cada docente recibió en su correo electrónico el enlace web para acceder al cuestionario, junto con unas instrucciones para cumplimentarlo correctamente y una breve explicación de los objetivos generales proyecto. Además, en dicho correo se remarcó que las respuestas serían anónimas y se garantizó su confidencialidad. Finalmente, por si algún docente deseaba obtener información más detallada del proyecto, se añadieron los datos de contacto del investigador principal (i.e., teléfono y correo electrónico). Cada vez que un docente cumplimentaba el cuestionario, los datos eran grabados automáticamente en una base de datos informática a la cual tenía acceso únicamente el investigador principal. Con el objetivo de reducir el sesgo temporal entre respuestas, la plataforma virtual estuvo activa por un periodo 30 días.

Con el propósito de obtener una muestra más amplia que permitiese abordar todos los objetivos del proyecto, se repartieron paralelamente cuestionarios en papel durante los 30 días que permaneció disponible la plataforma virtual por los centros más representativos de las tres provincias de la Comunidad Autónoma de Aragón. Pasados los 30 días, los cuestionarios fueron recogidos en cada uno de los centros para ser volcados en la misma base de datos que aglutinaba las respuestas del profesorado que había contestado al cuestionario mediante la plataforma online. Esta tarea fue realizada

por una única persona con el objetivo de evitar confusiones y eliminar aquellos cuestionarios incompletos o respondidos erróneamente.

Por otra parte, con respecto al estudio de intervención enmarcado en el Capítulo III de la tesis doctoral, el procedimiento fue el siguiente. Antes de comenzar el estudio se seleccionaron dos centros educativos de Educación Secundaria con características similares (i.e., titularidad del centro, tamaño, número de profesores, horarios e instalaciones). Seguidamente, se contactó con sendos equipos directivos para informales de los objetivos del estudio y solicitar su predisposición a participar en el proyecto. Una vez obtenida su aprobación, se informó a todos los docentes que trabajaban en ambos centros durante el curso académico 2015/2016 sobre la naturaleza y los objetivos del estudio, así como sobre los requisitos y los beneficios de participar en el mismo. De igual modo, antes de comenzar el programa de intervención, se recordó a los participantes que su anonimato estaría garantizado en la futura divulgación científica del estudio. La recogida de datos del pre-test se llevó a cabo una semana antes de que comenzase el programa de intervención, mientras que la recogida de datos del post-test se realizó una semana después de finalizar dicho programa. Para el presente estudio, debido a que la muestra estaba mucho más localizada y era más accesible, los cuestionarios fueron administrados íntegramente en formato papel. El profesorado contó con cinco días hábiles para completar el cuestionario y depositarlo en un buzón ubicado en la sala de profesores cada centro. Pasados los cinco días –tanto después del pre-test como del post-test–, los cuestionarios fueron recogidos en ambos centros y fueron volcados en una base de datos diferente a la de los estudios anteriores. Dicha labor fue realizada por una única persona con el objetivo de evitar confusiones y eliminar todos los cuestionarios incompletos o respondidos erróneamente.

4.4. Muestreo y participantes

Para el desarrollo del proyecto de investigación se realizaron tres recogidas de datos siguiendo un muestreo no probabilístico por elección/accidental (Fontes de Gracia et al., 2010). A pesar de no poseer el rigor de un muestreo probabilístico, este tipo de muestreo se considera de una alta validez externa por la búsqueda del investigador de asegurar una muestra lo más representativa posible (Fontes de Gracia et al., 2010).

En la Tabla 1 del presente epígrafe se recogen las principales características de las tres muestras, respecto al número de participantes, género, edad y experiencia. La

primera toma de datos (i.e., transversal; $n = 584$) fue llevada a cabo en mayo de 2015. La segunda toma de datos (i.e., longitudinal I, pre-test, $n = 106$) se llevó a cabo en noviembre de 2015. Finalmente, la tercera toma de datos (longitudinal II, post-test, $n = 106$) tuvo lugar en junio de 2016.

Tabla 1. Número de docentes, género, edad media y experiencia laboral media de las tres tomas de datos.

	Muestra transversal	Muestra longitudinal	
		Longitudinal I pre-test	Longitudinal II post-test
<i>n</i>	584	106	106
<i>Género</i>	330 mujeres, 254 hombres	44 mujeres, 62 hombres	43 mujeres, 63 hombres
<i>Edad media</i>	45.04 ($DT = 8.97$)	45.50 ($DT = 8.80$)	46.10 ($DT = 8.81$)
<i>Experiencia media</i>	17.55 ($DT = 10.26$)	20.81 ($DT = 10.72$)	21.10 ($DT = 10.52$)

Aunque las muestras aparecen descritas en los siete estudios científicos que dan lugar a esta tesis por compendio de publicaciones, a continuación se describen con más detalle los participantes que compusieron cada una de ellas:

- **Muestra transversal ($n = 584$):** De la totalidad del profesorado de Educación Secundaria que se encontraba en activo en la Comunidad Autónoma de Aragón en el curso académico 2014/2015, la primera recogida de datos se compuso de 584 docentes provenientes de 106 centros de enseñanza diferentes (81 públicos, 25 concertados). Los criterios de inclusión del estudio fueron: haber trabajado como docente durante el curso académico 2014/2015 en un centro de Educación Secundaria de la Comunidad Autónoma de Aragón y haber respondido correctamente a la totalidad de las preguntas del cuestionario. Los participantes tenían una edad media 45.04 ($DT = 8.97$) años y habían trabajado como docentes de Educación Secundaria una media de 17.55 ($DT = 10.26$) años. Asimismo, de los 584, el 56.5% eran mujeres (i.e., 330), el 71.2% impartía docencia en centros públicos (i.e., 416) y el 100% enseñaban en centros de Educación Secundaria mixtos. Respecto al área de enseñanza en la cual impartían docencia, la proporción fue la siguiente: el 29% enseñaba asignaturas relacionadas con el área de Humanidades (e.g., idiomas extranjeros, lengua y literatura, etc.), el 19% enseñaba asignaturas del área de Ciencias Sociales (e.g., geografía, historia, economía, etc.),

el 26% enseñaba asignaturas correspondientes a el área de Ciencias Científico-Técnicas (e.g., matemáticas, biología, química, etc.), el 19% impartía asignaturas del área de Ciencias Artísticas y Corporales (e.g., educación física, música, artes plásticas, etc.), y el 7% restante enseñaba materias en dos o más áreas diferentes. Finalmente, respecto a la ubicación geográfica, 300 trabajaban en centros de Educación Secundaria de la provincia de Zaragoza, 145 en la provincia de Huesca y los 139 restantes en la provincia de Teruel.

- ***Muestra longitudinal I pre-test (n = 106)***: Con el objetivo de realizar la segunda toma de datos, todos los docentes de Educación Secundaria ($n = 216$) pertenecientes a dos centros educativos públicos de la ciudad de Huesca fueron invitados a participar en el estudio. De los 216 posibles, una muestra de 106 decidieron completar los cuestionarios, perteneciendo 58 de ellos a un centro educativo y los 48 restantes al otro. Los 106 participantes de esta muestra tenían una edad media 45.50 ($DT = 8.80$) años y habían trabajado como docentes de Educación Secundaria una media de 20.81 ($DT = 10.72$) años. Asimismo, el 41.5% eran mujeres (i.e., 44) y el 100% enseñaban en centros de Educación Secundaria mixtos.
- ***Muestra longitudinal II post-test (n = 106)***: Finalmente, con el objetivo de realizar la tercera y última toma de datos de la tesis doctoral, se volvió a invitar a todos los docentes de Educación Secundaria ($n = 216$) pertenecientes a los dos centros educativos públicos, los cuales habían sido previamente invitados en la toma de datos anterior. Aunque en esta ocasión el número global de los docentes que cumplieron el cuestionario fue el mismo (i.e., 106), 62 pertenecieron a un centro educativo y los 44 restantes al otro. La edad media de los 106 docentes de esta tercera muestra fue de 46.10 ($DT = 8.81$) años. Su experiencia laboral media como docentes de Educación Secundaria fue de 21.10 ($DT = 10.52$) años. Respecto al género, el 40.6% fueron mujeres (i.e., 43) y el 100% enseñaban en centros de Educación Secundaria mixtos.

4.5. Variables e instrumentos

Para llevar a cabo los seis estudios enmarcados en los Capítulos I y II de la presente tesis doctoral se midieron las variables recogidas en la Tabla 2 del presente apartado. Más adelante, en cada uno de los artículos se explica con más detalle los instrumentos utilizados para su medición:

Tabla 2. Variables, factores e instrumentos utilizados en la muestra transversal de la tesis doctoral.

Variables y factores	Instrumentos utilizados
Satisfacción de las necesidades psicológicas básicas en el trabajo - <i>Autonomía, competencia y relaciones sociales</i>	<i>Basic Psychological Needs at Work Scale</i> (Brien et al., 2012) ^a <i>Spanish-version of the Basic Psychological Needs at Work Scale Spanish Version</i> (Abós, Sevil, Julián, Martín-Albo y García-González, 2018)
Motivación por enseñar - <i>Motivación intrínseca, regulación identificada, regulación introyectada, regulación externa y desmotivación</i>	<i>Self-Regulation Questionnaire-Academic</i> (Soenens, Sierens, Vansteenkiste, Dochy y Goossens, 2012) <i>Work Extrinsic and Extrinsic Motivation Scale</i> (Tremblay, Blanchard, Taylor, Pelletier y Villeneuve, 2009) ^a <i>Motivation for Teaching Scale in Secondary Education</i> (Abós, Sevil, Martín-Albo, Aibar y García-González, 2018)
Burnout en el trabajo - <i>Frenético, sin desafíos y desgastado</i> - <i>Sobrecarga, falta de desarrollo y abandono</i>	<i>Burnout Clinical Subtype Questionnaire</i> (Montero-Marín y García-Campayo, 2010; Montero-Marín, Skapinakis, Araya, Gili y García-Campayo, 2011b) ^a <i>Short-version of Burnout Clinical Subtype Questionnaire in Teachers</i> (Abós, Sevil-Serrano, Montero-Marín, Julián-Clemente y García-González, Submitted)
Ansiedad y depresión - <i>Ansiedad y depresión</i>	<i>Hospital Anxiety and Depression Scale</i> (Quintana et al., 2003)
Calidad el sueño - <i>Calidad del sueño</i>	<i>Pittsburgh Sleep Quality Index</i> (Macias y Royuela, 1996)
Compromiso con el trabajo - <i>Vigor, dedicación y absorción</i>	<i>Utrecht Work Engagement Scale</i> (Schaufeli, Martinez, et al., 2002)
Satisfacción por el trabajo - <i>Satisfacción por el trabajo</i>	<i>Teacher Job Satisfaction Scale</i> (Skaalvik y Skaalvik, 2011b)
Estilo interpersonal docente - <i>Apoyo a la autonomía, apoyo a las relaciones sociales, apoyo al clima tarea y apoyo al clima ego</i>	<i>Motivational Climate in Physical Education Scale</i> (Soini et al., 2014) ^a <i>Need-Supportive Teaching Style Scale</i> (Abós, Sevil, Martín-Albo, Julián y García-González, 2018)

Notas: a = En gris los cuestionarios y su referencia de las cuatro escalas adaptadas y validadas al español y al contexto laboral del profesorado de Educación Secundaria en la presente tesis doctoral

Asimismo, junto a las variables recogidas en la Tabla anterior, en esta toma de datos también se midieron las siguientes variables sociodemográficas: género, edad, formación académica (estudios primarios, secundarios, universitarios, doctorado), experiencia docente, tipo de contrato (interino, funcionario), nombre, provincia (Zaragoza, Huesca, Teruel) y titularidad del centro de trabajo (público, concertado, privado), área de enseñanza (Humanidades, Ciencias Sociales, Ciencias Científico-Técnicas, Ciencias Artísticas y Corporales, dos o más áreas diferentes), e intención de abandono de la profesión (sí, no).

Por otra parte, para poder abordar el estudio 7 de intervención, se evaluaron las variables recogidas en la Tabla 3 de este apartado. Además, algunas variables de esta toma de datos también fueron utilizadas parcialmente y después de haber valorado el riesgo de error en los estudios 2 y 4 del Capítulo I.

Tabla 3. Variables, factores e instrumentos utilizados en la muestra longitudinal de la tesis doctoral.

Variables y factores	Instrumentos utilizados
Satisfacción de las necesidades psicológicas básicas en el trabajo - <i>Autonomía, competencia y relaciones sociales</i>	<i>Basic Psychological Needs at Work Scale</i> (Brien et al., 2012) ^a <i>Spanish-version of the Basic Psychological Needs at Work Scale Spanish Version</i> (Abós, Sevil, Julián, et al., 2018)
Burnout en el trabajo - <i>Sobrecarga, falta de desarrollo y abandono</i>	<i>Burnout Clinical Subtype Questionnaire</i> (Montero-Marín et al., 2011) ^a <i>Short-version of Burnout Clinical Subtype Questionnaire in Teachers</i> (Abós et al., Submitted)
Compromiso con el trabajo - <i>Vigor, dedicación y absorción</i>	<i>Utrecht Work Engagement Scale</i> (Schaufeli, Martinez, et al., 2002)
Satisfacción por el trabajo - <i>Satisfacción por el trabajo</i>	<i>Teacher Job Satisfaction Scale</i> (Skaalvik y Skaalvik, 2011b)

Notas: a = En gris los cuestionarios y su referencia de las escalas adaptadas y validadas al español y al contexto laboral del profesorado de Educación Secundaria en la presente tesis doctoral

Junto a las variables recogidas en la Tabla anterior, en esta toma de datos longitudinal se evaluaron las siguientes variables sociodemográficas: género, edad, situación familiar (con pareja estable, sin pareja), número de hijos, experiencia docente, tipo de contrato (interino, funcionario), tipo de jornada (completa, parcial), área de enseñanza (Humanidades, Ciencias Sociales, Ciencias Científico-Técnicas, Ciencias Artísticas y Corporales, dos o más áreas diferentes) y años de trabajo en el mismo centro.

4.6. Programa de intervención: “El Sierra se Mueve”

En línea con el objetivo general 3 de la tesis doctoral, se diseñó, desarrolló y evaluó un programa de intervención basado en la práctica de actividad física destinado a mejorar el funcionamiento psicológico del profesorado. Como centro experimental, se eligió el Instituto de Educación Secundaria (IES) Sierra de Guara, ubicado en la ciudad de Huesca. Por este motivo, el programa de intervención recibió el nombre de “El Sierra se mueve”. A continuación, se explica en que consistió dicho programa de intervención. No obstante, se puede encontrar más información de “El Sierra se mueve” en el estudio 7 de la tesis doctoral, el cual está centrado principalmente en la descripción y evaluación del mismo.



Figura 1. Logo utilizado durante el programa de intervención de actividad física.

El programa de intervención “El Sierra se mueve” consistió en la realización de 32 sesiones de actividad física, las cuales tuvieron como protagonistas a compañeros de trabajo del mismo centro educativo, el IES Sierra de Guara. Con el objetivo de animar y fomentar la participación al programa, de forma previa al inicio de la intervención, todos los posibles participantes recibieron información sobre los múltiples beneficios que conlleva la práctica regular de actividad física. De las 32 sesiones de actividad física, 10 tuvieron una orientación cooperativa-lúdica (31%), 11 estuvieron orientadas hacia contenidos de fitness y fuerza muscular (34%), siete estuvieron protagonizadas por la realización de contenidos aeróbicos (22%) y las cuatro restantes fueron

actividades de espalda sana (13%). Los tres primeros tipos de sesiones (i.e., sesiones cooperativas-lúdicas, de fitness y aeróbicas) fueron seleccionadas como contenidos principales debido a la eficacia demostrada en intervenciones previas de actividad física con otro tipo de trabajadores (Bretland y Thorsteinsson, 2015; Bruton et al., 2012; Gerber et al., 2013). Además, como consecuencia del dolor de espalda experimentado y manifestado por algunos docentes en el último trimestre del curso escolar, se decidió, a petición del profesorado, añadir cuatro sesiones de prevención hacia esta dolencia.



Figura 2. Ejemplos de los cuatro tipos de sesiones de actividad física realizados en la intervención.

De forma breve, la temporalización y desarrollo de las sesiones consintió en lo siguiente. Las primeras sesiones se basaron generalmente en actividades cooperativas y lúdicas con el objetivo de crear un ambiente de amistad y de confianza entre el profesorado participante. Más adelante, estas sesiones cooperativas y lúdicas se combinaron con sesiones de fuerza, coincidiendo con la llegada de los meses de invierno (i.e., de diciembre a febrero). Esta decisión fue tomada porque tanto las sesiones de juegos cooperativos como las de fuerza se llevaban a cabo en espacios *indoor*. Con la llegada de la primavera (i.e., de marzo a mayo), las sesiones de fuerza

comenzaron a combinarse con sesiones aeróbicas, las cuales fueron desarrolladas al aire libre. En dichas sesiones aeróbicas se fue incrementando progresivamente la dificultad y la intensidad. Finalmente, se realizaron cuatro sesiones de espalda sana en los últimos dos meses de la intervención (i.e., mayo y junio). Para dotar de recursos al profesorado, se elaboró y se les entregó un dossier que contenía 38 ejercicios destinados a la prevención de los dolores de espalda. Para realizar los ejercicios no se precisaba de ningún tipo de material. Además se aportaban rutinas de entre ocho y 10 ejercicios de 15 minutos para poderlos realizar en el día a día. Este dossier fue puesto en práctica durante las sesiones para que el profesorado adquiriese la autonomía suficiente para su posterior aplicación. Asimismo, al finalizar cada una de las 32 sesiones de actividad física se realizó una breve discusión grupal acerca de los beneficios que podrían tener los ejercicios realizados en cada sesión. Esta rutina se llevó a cabo con la intención de concienciar al profesorado acerca de la importancia de llevar un estilo de vida saludable a través de la práctica regular de actividad física.

IES SIERRA DE GUARA **16**



ESPALDA SANA

DOSSIER DE EJERCICIOS;

El presente dossier contiene 38 ejercicios destinados a la prevención de los dolores de espalda para el profesorado. Los ejercicios se dividen en tres tipos; movilidad, tonificación y estiramiento. Para realizarlos no se necesita ningún tipo de material y pueden realizarse cómodamente en cualquier lugar (casa, trabajo, al aire libre...). Realizar rutinas de 8-10 ejercicios que combinen las tres tipologías propuestas puede ayudarte a mejorar tu bienestar y calidad de vida. Únicamente necesitaras reservarte 10-15 minutos al día para ello.

El sierra se mueve

Grupo de Investigación EFYPAF



1. EJERCICIOS DE MOVILIDAD

MOVILIDAD 1	NOMBRE: Remo
DESCRIPCIÓN:	
Posición inicial: de rodillas, espalda recta y brazos estirados hacia delante.	
Realización del movimiento: flexiona los brazos hacia atrás, llevando el pecho ligeramente hacia delante.	
SERIES: 1	REPETICIONES: 10-15
REPRESENTACIÓN GRÁFICA	
	
OBSERVACIONES: Puedes realizarlo agarrando un palo (escoba, pica...) con las manos. También puedes realizarlo sentado en una silla o de pie.	


MOVILIDAD 2	NOMBRE: Remo lateral
DESCRIPCIÓN:	
Posición inicial: de rodillas, espalda recta y brazos estirados hacia delante.	
Realización del movimiento: realiza una tracción simulando la acción de empujar agua hacia atrás. Vuelve a la posición inicial y realízalo hacia el otro lado.	
SERIES: 1	REPETICIONES: 10 (izq) + 10 (der)
REPRESENTACIÓN GRÁFICA	
	
OBSERVACIONES: También puedes realizarlo sentado en una silla o de pie.	

Figura 3. Ejemplo de la portada y parte del contenido del dossier de espalda sana elaborado para el profesorado.

Todas las sesiones de actividad física se llevaron a cabo entre los meses de noviembre de 2015 y junio 2016. Dichas sesiones, se realizaron habitualmente dos veces por semana (i.e., martes y jueves) en un horario no laboral previamente consensuado con las participantes (i.e., de 17:00 a 18:00). Asimismo, el profesorado era informado a través de carteles informativos, los cuales se difundían en el centro educativo (e.g., buzones, sala de profesores, etc.), sobre las actividades que se realizaban semanalmente. Para el desarrollo de dichas sesiones se utilizaron las propias instalaciones del centro educativo, de la Universidad de Zaragoza, así como espacios exteriores de la ciudad de Huesca. Siguiendo el calendario académico, el programa de intervención fue interrumpido durante las vacaciones de Navidad y de Semana Santa. Además, es importante señalar que todas las sesiones se desarrollaron bajo la supervisión de un profesional Graduado en Ciencias de la Actividad Física y del Deporte.

¡EL SIERRA SE MUEVE!

"programa saludable de mantenimiento"



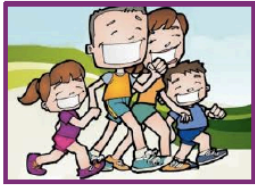
PROFESOR/A del IES SIERRA DE GUARA...

¡TE PROPONEMOS UN RETO!

A por las 2 Horas de caminata

Después de haber realizado caminatas de 4km, 6km y 8,5 km... ¡Es hora de superarnos!

- **¿Cuándo?** El martes día 10 de Mayo a las 17:00 (2 h aprox)
- **¿Dónde?** Saldremos desde el Gimnasio del Sierra de Guara.
- **¿Qué necesitas?** Únicamente ropa deportiva (Agua opcional)
- **¿Objetivo?** Realizar una caminata divertida por los alrededores de Salas con tus compañeros de trabajo durante 2 horas para intentar realizar la mayor distancia posible.



¿Llegaremos a los 9,5 km? ¡Anímate!

PARA MÁS INFORMACIÓN: EQUIPO DIRECTIVO o aabosc@unizar.es (ACTIVIDAD GRATUITA)




Figura 4. Ejemplo de difusión realizada sobre una de las actividades del programa de intervención.

Finalmente, es importante destacar que la intervención también fue diseñada para apoyar las tres NPB hacia la práctica de actividad física del profesorado participante con el objetivo crear adherencia y estimular la participación. Recientes

estudios han demostrado que un entorno caracterizado por apoyar la autonomía, la competencia y las relaciones sociales puede tener el potencial no solo de iniciar el comportamiento hacia la actividad física, sino también de mantenerlo (Kwasnicka, Dombrowski, White y Sniehotta, 2016; Rodrigues et al., 2018; Teixeira, Carraça, Markland, Silva y Ryan, 2012). En el diseño de las estrategias participaron diferentes miembros del grupo de investigación Educación Física y Promoción de la Actividad Física (EFYPAF), los cuales eran expertos en la TAD y en la aplicación de programas de intervención. Por ejemplo, para apoyar la autonomía, el profesional de la actividad física animó al profesorado a que, en función de sus intereses y motivaciones, eligiese y sugiriese el tipo de actividades que deseaba realizar (e.g., espalda sana), el tipo de música que quería escuchar, o cuando y donde quería llevar a cabo las sesiones (Ng et al., 2012). Para apoyar a su competencia hacia la actividad física, como se observa en la siguiente Figura, el profesorado recibió un feedback positivo y constructivo antes, durante y después de realizar las sesiones (Teixeira et al., 2012).



Figura 5. Ejemplo de feedback positivo después de la realización de una sesión aeróbica.

Asimismo, con el objetivo de apoyar las relaciones sociales de los participantes en el contexto de la actividad física, dicho profesional de la actividad física intentó ser

siempre empático, cercano, buen oyente y paciente, creando un clima de confianza durante el desarrollo de las sesiones (Teixeira et al., 2012). Del mismo modo, se realizaron sesiones cooperativas y se diseñaron las tareas para que todos los participantes interactuaran unos con otros. En el artículo 7 de la presente tesis doctoral (ver Tablas 2 y 3 de dicho artículo) se puede encontrar más información sobre las estrategias aplicadas y el desarrollo de las sesiones.

4.7. Análisis estadísticos

En el presente apartado se describen de forma resumida los análisis estadísticos más relevantes que se ejecutaron para desarrollar los siete estudios de la tesis doctoral. Sin embargo, en cada uno de los artículos incluidos en la tesis existe un apartado de plan de análisis, donde si se desea, se puede consultar la información de manera más detallada y específica.

Para realizar todos los análisis de la tesis doctoral se utilizaron los paquetes estadísticos SPSS IBM, AMOS y Mplus. El nivel de significación fue $p < .05$. De manera general, en los siete estudios se analizaron los estadísticos descriptivos (M y DT) de las variables incluidas. Igualmente, se analizaron las correlaciones entre los ítems o las variables incluidas en dichos estudios utilizando el coeficiente de correlación de Pearson para las variables ordinales y el coeficiente de rho Spearman para las variables categóricas.

Para analizar la consistencia interna de las escalas utilizadas, en algunos estudios (i.e., 1, 4, 5 y 7) se utilizó el alpha de Cronbach (α). Además, en otros estudios (i.e., 1, 2, 3, 4 y 6) también se reportó la fiabilidad compuesta a través de la omega de McDonald (ω) (McDonald, 1970), la cual tiene en cuenta el error de medida y, a diferencia del alpha de Cronbach, no asume cargas factoriales igualitarias para todos los ítems (Dunn, Baguley y Brunnsden, 2014). Finalmente, de forma complementaria al índice omega (ω), en los estudios 1 y 2 también se calculó la Varianza Media Extractada (Fornell y Larcker, 1981), la cual mide la cantidad de varianza capturada por el factor, con respecto a la cantidad de varianza capturada por el error de medida.

Con el propósito de analizar la estructura factorial de las escalas utilizadas en los diferentes estudios se llevaron a cabo análisis factoriales confirmatorios (en inglés, CFA) y modelos de ecuaciones estructurales exploratorios (en inglés, ESEM). El modelo ESEM (utilizado específicamente en los estudios 1, 3 y 4), a diferencia del

modelo CFA (utilizado en todos los estudios, excepto en el 7), puede proporcionar avances metodológicos al permitir estimar libremente las cargas factoriales cruzadas entre los ítems y el resto de factores (Asparouhov y Muthén, 2009). Esta información puede resultar útil para comprender con más precisión la estructura factorial de un constructo. Sin embargo, también es importante tener en cuenta que el modelo CFA, al ser más parsimonioso, en ocasiones puede resultar más adecuado que el modelo ESEM (Marsh, Morin, Parker y Kaur, 2014).

Del mismo modo, para calcular la validez concurrente o nomológica en los estudios de validación (estudios 1, 2, 3 y 4), o en aquellos estudios que se utilizó un enfoque centrado en la variable (estudio 5), se llevaron a cabo análisis de correlaciones latentes y modelos de ecuaciones estructurales (en inglés SEM). Para ejecutar los modelos CFA, ESEM y SEM se utilizaron los estimadores más comunes en las investigaciones en ciencias sociales que se basan en escalas tipo Likert: el *Weighted Least Squares Mean and Variance* (WLSMV) o el *Robust Maximum Likelihood* (MLR), los cuales son útiles para controlar la desviación de la normalidad multivariada (Lei, 2009).

Para evaluar los modelos CFA, ESEM y SEM se utilizaron los siguientes parámetros de bondad de ajuste: *comparative fit index* (CFI), *Tucker-Lewis Index* (TLI), y el *root mean square error of approximation* (RMSEA). Además, puntualmente se utilizó en algunos estudios el *standardized root mean square residual* (SRMR) y el *expected cross-validation index* (ECVI). Valores superiores a 0.90 y 0.95 para el CFI y el TLI indicaron índices de ajuste adecuados y excelentes, respectivamente (Marsh, Hau y Wen, 2004; Marsh et al., 2014). Valores inferiores a 0.08 y 0.06 para el RMSEA y el SRMR se consideraron, respectivamente, adecuados y excelentes (Marsh et al., 2004, 2014). Respecto al ECVI, los valores inferiores (en la comparación entre dos modelos), indicaron mejor ajuste (Marôco, 2010). El test chi-cuadrado (χ^2), aunque fue reportado en algunos estudios, no fue, por lo general, decisivo en la evaluación de los modelos debido a su sensibilidad al tamaño muestral.

En los estudios de validación 1, 2 y 3, también se calculó la invarianza de medición de las escalas respecto a variables sociodemográficas de posible influencia (i.e., género y tipo de centro). Para ello, se utilizaron análisis factoriales confirmatorios multigrupo (estudio 1) y la secuencia de pruebas de invarianza factorial (estudios 2 y 3), la cual consiste en testar la invarianza configural para posteriormente añadir

restricciones hasta que se rechaza el modelo de invarianza (Millsap, 2011; Morin, Arens y Marsh, 2016). Con respecto a la evaluación de los modelos de invarianza, cada modelo de la secuencia se comparó con su modelo anterior atendiendo los índices CFI, TLI y RMSEA. Los descensos superiores de 0.010 en CFI y TLI, y los aumentos mayores de 0.015 en RMSEA indicaron una ausencia de invarianza (Chen, 2007).

Con respecto a los estudios basados en un enfoque centrado en la persona (en inglés, *person-centered approach*), para obtener los perfiles motivacionales (estudio 5) y los perfiles de burnout y compromiso (estudio 6), se llevaron a cabo análisis de conglomerados o *cluster* mediante el procedimiento de dos pasos, el cual adopta una combinación de métodos de agrupamiento jerárquicos y no jerárquicos (Garson, 2014). Para retener el número de *cluster* fue importante la interpretación de los resultados así como la varianza explicada, la cual debía ser superior al 50% en cada dimensión introducida (Aguinis, Gottfredson y Joo, 2013; Milligan y Cooper, 1985). Además, se utilizó un método de validación cruzada de doble división para examinar la estabilidad de la solución retenida. El coeficiente utilizado para valorar que las dos mitades eran estables fue la Kappa de Cohen (K), la cual debía mostrar al menos un valor de acuerdo superior a 0.60 (Asendorpf, Borkenau, Ostendorf y Van Aken, 2001).

Seguidamente, en ambos estudios se realizó un análisis de varianza multivariante (MANOVA). Estos análisis, utilizando la solución de *cluster* retenida como variable independiente, permitieron examinar las diferencias entre los *cluster* en función de otras variables dependientes. Para la inspección de las diferencias significativas se aplicaron las pruebas post hoc mediante el método de Bonferroni. Los tamaños del efecto, basados en eta cuadrado parcial (η_p^2), superiores a 0.01, 0.06 y 0.14 se consideraron respectivamente, pequeños, medianos y grandes (Cohen, 1988).

Finalmente, en el estudio 7, para evaluar los efectos del programa de actividad física se realizó un MANOVA 2x2 (tiempo x grupo) con medidas repetidas en un factor (tiempo, pre-test y post-test). Del mismo modo, se examinaron las comparaciones intragrupo y entre-grupos utilizando la corrección de Bonferroni.

RESULTADOS Y DISCUSIÓN /
RESULTS AND DISCUSSION

5. Resultados y discusión / Results and discussion

Siguiendo la normativa de tesis por compendio de publicaciones de la Universidad de Zaragoza, los resultados y discusión de la presente tesis doctoral se presentan a continuación respetando el formato original de los artículos científicos publicados, aceptados o sometidos a revisión por pares.

Como se ha mencionado anteriormente, los siete estudios que componen la tesis doctoral han sido enmarcados en tres capítulos. El Capítulo I, titulado “Validación española y adaptación al contexto docente de cuatro escalas asociadas al funcionamiento psicológico del profesorado” engloba los cuatro primeros estudios. En el Capítulo II, titulado “Análisis de los procesos motivacionales y funcionamiento psicológico del profesorado” se presentan los estudios 5 y 6. Finalmente, en el Capítulo III, titulado “Diseño, desarrollo y evaluación de un programa de intervención de actividad física para mejorar el funcionamiento psicológico del profesorado”, se expone el estudio 7. Debido a que todos los artículos han sido publicados, aceptados o sometidos en revistas internacionales indexadas en JCR, los siete estudios se presentan en inglés.

5.1. CAPÍTULO I: Validación española y adaptación al contexto docente de cuatro escalas asociadas al funcionamiento psicológico del profesorado

5.1.1. Estudio 1: Validation evidence of the Motivation for Teaching Scale in Secondary Education

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Validation Evidence of the Motivation for Teaching Scale in Secondary Education

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Abstract. Grounded in self-determination theory, the aim of this study was to develop a scale with adequate psychometric properties to assess motivation for teaching and to explain some outcomes of secondary education teachers at work. The sample comprised 584 secondary education teachers. Analyses supported the five-factor model (intrinsic motivation, identified regulation, introjected regulation, external regulation and amotivation) and indicated the presence of a continuum of self-determination. Evidence of reliability was provided by Cronbach's alpha, composite reliability and average variance extracted. Multigroup confirmatory factor analyses supported the partial invariance (configural and metric) of the scale in different sub-samples, in terms of gender and type of school. Concurrent validity was analyzed by a structural equation modeling that explained 71% of the work dedication variance and 69% of the boredom at work variance. Work dedication was positively predicted by intrinsic motivation ($\beta = .56, p < .001$) and external regulation ($\beta = .29, p < .001$) and negatively predicted by introjected regulation ($\beta = -.22, p < .001$) and amotivation ($\beta = -.49, p < .001$). Boredom at work was negatively predicted by intrinsic motivation ($\beta = -.28, p < .005$) and positively predicted by amotivation ($\beta = .68, p < .001$). The Motivation for Teaching Scale in Secondary Education (Spanish acronym EME-ES, *Escala de Motivación por la Enseñanza en Educación Secundaria*) is discussed as a valid and reliable instrument. This is the first specific scale in the work context of secondary teachers that has integrated the five-factor structure together with their dedication and boredom at work.

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Keywords: motivation, self-determination, teaching, validation.

Motivation for teaching can be understood as how teachers behave with respect to their teaching work. It is a factor that may intervene directly in the teaching-learning process and that may subsequently affect education quality (Roth, Assor, Kanat-Maymon, & Kaplan, 2007; Viseu, de Jesus, Rus, & Canavarró, 2016). Motivation for teaching seems crucial for optimal professional development, given that highly motivated teachers are characterized by greater engagement (Cheon, Reeve, Yu, & Jang, 2014), lower burnout (van den Berghe et al., 2014) and greater work dedication (Thoonen, Slegers, Oort, Peetsma, & Geijsel, 2011). Motivated teachers also have a more progressive and flexible view of changes in the educational system (Han & Yin, 2016). In addition, motivation for teaching can enhance their students' motivation (Pelletier, Séguin-Lévesque, & Legault, 2002). However, despite evidence that supports its relevance, teachers show higher levels of stress and burnout than other professions (Kinman, Wray, & Strange, 2011), and secondary education teachers are the ones that express less satisfaction with their work (Anaya & López, 2014).

Traditionally, studies of teachers' motivation have been underestimated in the research community, compared with studies of students' motivation (Viseu et al., 2016). However, over the last two decades, the worsening of working conditions together with the continuous changes in education laws has led many researchers to study this subject in greater depth (Watt & Richardson, 2015). The first studies that analyzed teachers' motivation looked for the reasons why the teaching profession was chosen (Han & Yin, 2016). However, over the last ten years, studies that seek an explanation to motivation for teaching, as well as the causes and outcomes of this motivation, have increased (Viseu et al., 2016). This increasing scientific interest in motivation for teaching has been addressed from different theoretical frameworks (e.g., expectancy-value theory or achievement goal theory) (Watt & Richardson, 2015). However, the self-determination theory (SDT) (Deci & Ryan, 1985) is the most commonly used framework to analyze teachers' motivational processes (e.g., Cheon et al., 2014; Roth et al., 2007; Thoonen et al., 2011).

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Theoretical Framework: SDT

According to SDT, human behavior can be amotivated, extrinsically motivated or intrinsically motivated. The various types of motivation can predict a number of cognitive, affective, and behavioral outcomes in teachers (Roth et al., 2007). This process can be studied throughout a continuum that explains the different behavioral regulations, from the least internalized to the most self-determined. Thus, the least self-determined type of motivation, amotivation, is characterized by a lack of competence and intention to engage in a conduct, together with a lack of expectancy to reach the desired result (e.g., teachers who do not understand why they should continue teaching as they think that the work they do is useless) (Deci & Ryan, 1985).

Going from a lower to a higher level of self-determination, extrinsic motivation can be differentiated into external, introjected, identified, and integrated regulation (Deci & Ryan, 1985). External regulation refers to carrying out an activity to achieve rewards or to avoid punishment (e.g., teachers who teach because they get longer holidays and a good salary). Introjected regulation characterizes those conducts carried out to avoid feelings of blame (e.g., teachers who prepare the classes so as not to feel worse about themselves). Identified regulation reflects those tasks where individuals place value on what they do because they believe that it may be important (e.g., teachers who believe their work may be important for their own personal and professional development, and for that of their students). This continuum of self-determination is followed by integrated regulation, although some previous SDT-based research studies recommend not examining it because of the difficulty in distinguishing between identified and integrated regulations using self-report scales (e.g., Blais, Lachance, Vallerand, Brière, & Riddle, 1993; Roth et al., 2007). Finally, intrinsic motivation is the most self-determined form of motivation. This is characterized by a lack of external reinforcements to develop a task, the main reason being inherent satisfaction derived from the teaching activity (e.g., teachers who do their work for the pleasure it produces for them) (Deci & Ryan, 1985). Based on previous research (e.g., Joe, Hiver, & Al-Hoorie, 2017), in this study, the term *less self-determined forms of motivation* has been used to refer to introjected and external regulations, and the term *more self-determined forms of motivation* to refer to intrinsic motivation and identified regulation.

A substantial body of research, grounded in SDT, has shown that more self-determined forms of motivation can facilitate positive outcomes such as teaching engagement (Cheon et al., 2014) and teachers' intention to continue learning and to get involved in innovation

projects (Gorozidis & Papaioannou, 2014; Thoonen et al., 2011) as well as to avoid exhaustion (Fernet, Guay, Senécal, & Austin, 2012; Roth et al., 2007). There are, in turn, studies that have addressed the negative outcomes of teachers' less self-determined forms of motivation and amotivation, finding a positive relationship with burnout (Fernet, Senécal, Guay, Marsh, & Dowson, 2008), teaching exhaustion (Eyal & Roth, 2011), and with their lack of interest in participating in training and in implementing innovations (Gorozidis & Papaioannou, 2014). Likewise, Fernet et al. (2008) found a negative relationship between less self-determined forms of motivation and amotivation, and teachers' self-efficacy.

Existing measures of teachers' self-determined motivation

Conversely, some SDT-based studies that have evaluated teachers' self-determined motivation toward their work (e.g., Pelletier et al., 2002) have done so through general working context-oriented measures, such as the *Work Motivation Inventory* (Blais et al., 1993) or the *Work Extrinsic and Intrinsic Motivation Scale* (Tremblay, Blanchard, Taylor, Pelletier, & Villeneuve, 2009). This type of assessment may be too universal to obtain an accurate vision of motivation for teaching and it may have been a potential limitation in the findings (Fernet et al., 2008; Roth et al., 2007). To overcome this limitation, Roth et al. (2007), following Ryan and Connell (1989) and Pelletier et al. (2002), developed the *Autonomous Motivation for Teaching*. Likewise, based on the Dutch version (Vansteenkiste, Sierens, Soenens, Luyckx, & Lens, 2009) of the *Self-Regulation Questionnaire-Academic* (SRQA) (Ryan & Connell, 1989), Soenens, Sierens, Vansteenkiste, Dochy and Goossens (2012) carried out an adaptation of this scale to the teaching context to measure motivation for teaching. Both instruments, that is, the one proposed by Roth et al. (2007) and the one proposed by Soenens et al. (2012), comprised 16 items that assessed four types of motivation (external, introjected, identified and intrinsic), presenting adequate psychometric properties. However, the main limitation of these instruments was that they were not validated within the teaching context. The sample size used was limited and the reliability analyses were not very high, some factors being below .70. Likewise, these two instruments did not take the amotivation subscale into account to assess motivation for teaching.

Based on the six specific tasks that comprise teaching work (class preparation, teaching, student evaluation, classroom management, administrative tasks, and complementary tasks), Fernet et al. (2008) developed the *Work Task Motivation Scale for Teachers* (WTMST), which measures amotivation for teaching. It also

evaluates the other factors included in the *Autonomous Motivation for Teaching* scale (Roth et al., 2007) and in the scale proposed by Soenens et al. (2012). The only disadvantage is the number of items (90, 15 in each task), which means that its full application is very tedious.

However, the WTMST, in a general and shortened version on teaching work, with 15 items, has been validated in the context of different countries, such as Canada (Fernet et al., 2012), Greece (Gorozidis & Papaioannou, 2012) and Spain (Ruiz-Quiles, Moreno-Murcia, & Vera, 2015). A sample of 161 teachers was used for this short version of the scale in Spanish, going from Primary School through to University. However, there is scientific literature that argues the existence of specific demands in teaching work at each educational stage (Anaya & López, 2014). For example, teaching younger students may require less cognitive demands for teachers (Burke & Greenglass, 1989). In addition, there are studies that hold that secondary students have less interest, so motivating them can be a very demanding task for teachers (Antoniou, Ploumpi, & Ntalla, 2013). Besides, problems of discipline, aggressions, insults and constant confrontations with teachers are accentuated in secondary education (Otero-López, Castro, Villardefrancos, & Santiago, 2009). These increasing demands in secondary education could influence teachers' responses regarding their motivation for teaching.

Objective and hypothesis

To our knowledge, grounded in SDT, there is no instrument in Spanish that assesses motivation for teaching in the specific stage of secondary education¹. Moreover, the current study adds further evidence by examining the role of teachers' motivation in dedication and boredom at work. The general purpose of the study was to develop a reliable and valid scale, with adequate psychometric properties, to evaluate motivation for teaching in secondary education. Moreover, this scale could help explain some work outcomes. Thus, three hypotheses were put forward.

First, in line with previous validation studies on motivation for teaching scales (Fernet et al. 2008; Fernet et al., 2012; Gorozidis & Papaioannou, 2012; Ruiz-Quiles et al., 2015), it is hypothesized that the EME-ES (Spanish acronym for Motivation for Teaching Scale

in Secondary Education/*Escala de Motivación por la Enseñanza en Educación Secundaria*) will adapt to the five-factor structure proposed by the SDT, showing adequate psychometric properties and invariance across gender and type of school. Recent studies recommend reporting invariance (at least metric; Cheung & Rensvold, 2002) in factors such as gender, age or other important socio-demographic characteristics such as type of school (e.g., Ayman & Korabik, 2010; Lukaszewski & Stone, 2012). Indeed, past studies have shown that female teachers present higher levels of intrinsic motivation and identified regulation, and lower levels of introjected and external regulation and amotivation toward teaching than their male counterparts (Fernet et al., 2008; Nie, Chua, Yeung, Ryan, & Chan, 2015). Several studies have also suggested that the type of school could affect teachers' work motivation processes, particularly in Spain (Gil-Flores, 2016; Latorre & Saéz, 2009). For example, Latorre & Saéz (2009) showed that teachers in state schools reported less motivation than teachers in non-state schools. Therefore, to evaluate teacher motivation, developing an invariant scale in terms of gender and type of school (Cheung & Rensvold, 2002) seems to be necessary.

Second, according to the SDT and previous studies that have analyzed more self-determined forms of motivation and teachers' outcomes (e.g., Cheon et al., 2014; Fernet et al., 2012; Gorozidis & Papaioannou, 2014; Roth et al., 2007; Thoonen et al., 2011), it is hypothesized that intrinsic motivation and identified regulation will significantly and positively affect work dedication, and will significantly and negatively affect boredom at work.

Last, but not least, grounded in SDT and past studies that have analyzed less self-determined forms of motivation, amotivation and teachers' outcomes (e.g., Eyal & Roth, 2011; Fernet et al., 2008; Fernet, et al., 2012; Gorozidis & Papaioannou, 2014), it is hypothesized that introjected regulation, external regulation and amotivation will significantly and positively affect boredom at work, and will significantly and negatively affect work dedication.

Method

Participants

Table 1 shows the final distribution of the sample, which comprises 584 teachers ($M_{\text{age}} = 45.04$; $SD = 8.97$) with 17.55 years' average working experience ($SD = 10.26$). Simple random sampling was used, ensuring the representativeness of the sample for the Aragon district-territory (Spain). The inclusion criteria were: Having worked as a teacher during the 2014/2015 academic year at a Secondary School in Aragon, and having answered all the questions.

¹Secondary education, in the Spanish educational system, includes two levels. The first one is called *Compulsory Secondary Education* (Spanish acronym, ESO) and consists of four academic years. The second is called *Baccalaureate* and consists of two academic years that allow access to vocational education and training, and to the university. Teachers who work in secondary education can teach in ESO and Baccalaureate.

Table 1. Characteristics of the Final Study Sample ($n = 584$)

		N	Age		Experience	
			M	SD	M	SD
Gender	Male	254	45.97	9.06	18.73	10.71
	Female	330	44.32	8.84	16.65	8.83
Type of school	State	416	45.34	8.70	17.83	10.03
	Non-State	168	44.15	8.88	16.05	9.43

Procedure

First, the consent of the Aragon Education Council was obtained, which also provided information about contact details of the secondary teachers in Aragon. Online data collection, through e-mails and web-based surveys, was carried out to access all schools in Aragon, preserving participant anonymity. The virtual platform was reviewed by the group of experts who solved errors of understanding and operation before it was launched. After approval, each teacher received an e-mail with a brief explanation of the study, the link for them to access the questionnaire and the contact details of the main researcher in case they wanted to obtain more information. The virtual platform was active for 30 days.

Variables and instruments

Motivation for teaching

The *Motivation for Teaching Scale in Secondary Education* (henceforth, Spanish acronym, EME-ES) (Table 2) was devised to measure motivation for teaching. This scale was headed: "I get involved in teaching, because.../ *Me involucro en la enseñanza, porque...*" followed by 19 items that measure five factors: Intrinsic motivation, identified regulation, introjected regulation, external regulation and amotivation. All the factors comprised four items except for amotivation (three). Responses were provided on a 5-point Likert-type scale ranging from 1 (Strongly Disagree/*Totalmente en desacuerdo*) to 5 (Strongly Agree/*Totalmente de acuerdo*).

Two previously validated instruments were used to devise the EME-ES. To measure intrinsic and extrinsic motivation (integrated, identified and external regulation) for teaching, the Spanish translation of an adaptation of the SRQA (Ryan & Connell, 1989), proposed by Soenens et al. (2012), was used. This version showed adequate psychometric properties in previous studies with 317 Belgian teachers (Soenens et al., 2012). In parallel, due to the lack of an amotivation factor in this questionnaire, the items that measure this factor in the *Work Extrinsic and Intrinsic Motivation Scale* (Tremblay et al., 2009) were selected, adapting them to the teaching work context.

For the Spanish adaptation and translation, the guidelines of the *International Test Commission* (ITC) (Muñiz, Elosua, & Hambleton, 2013) were followed. Firstly, a group of experts in SDT with a high English language level carried out the initial translation of each of the items separately into Spanish. Then a native bilingual translator translated the questionnaire into the original language to ensure that the items maintained the structure and meaning of the original scales. Finally, the items were submitted to a content validity assessment by four experts with extensive training in SDT and the validation of instruments, who estimated the adaptation of the items to the constructs they referred to, and adapted them to the Secondary Education teaching work context. Furthermore, the items were formulated in a positive manner, except for the amotivation factor, as the nature of the amotivation construct is negative (i.e., amotivation reflects a lack of motivation). Therefore, a wording in the same vein (i.e., negative) may help understand the amotivation items (Muñiz et al., 2013).

Work dedication

The five items corresponding to the dedication factor (e.g., "I am enthusiastic about my work") from the Spanish version of the *Utrecht Work Engagement Scale* (Schaufeli, Martínez, Marques-Pinto, Salanova, & Bakker, 2002) were used to measure work dedication. Responses were provided on a 6-point Likert-type scale ranging from 0 (*Never*) to 6 (*Always*). This subscale showed adequate psychometric properties ($\alpha \geq .86$) in previous studies with teachers (Høigaard, Giske, & Sundsli, 2012). In the current study, a confirmatory factor analysis (CFA) was performed showing adequate goodness-of-fit ($\chi^2 = 18.047$; $df = 5$; $\chi^2/df = 3.609$, $p < .001$; RMSEA = .067; CFI = .987; TLI = .975).

Boredom at work

The four items that measure boredom at work (e.g., "I feel my work is mechanical and routine") from the Spanish version of the *Burnout Clinical Subtype Questionnaire* (Montero-Marín & García-Campayo, 2010) were used to measure boredom at work. Responses were registered on a 7-point Likert scale ranging from 1 (*Totally disagree*) to 7 (*Totally agree*). In the present study, a CFA was performed showing adequate goodness-of-fit ($\chi^2 = 6.285$; $df = 2$; $\chi^2/df = 3.142$, $p < .001$; RMSEA = .061; CFI = .991; TLI = .973).

Data analysis

A descriptive analysis of the items was conducted for the construct validity of the EME-ES. Then, a CFA was

Table 2. Item Descriptive Statistics, Asymmetry, Kurtosis and Standardized Values of the EME-ES

		Descriptive statistics				Standardized values		
		M	SD	As	k	Λ	SE	R ²
Intrinsic motivation	1. I am very interested in teaching. <i>Estoy muy interesado en la enseñanza.</i>	4.37	0.70	-1.27	2.77	.87	.01	.76
	5. Teaching is fun. <i>Enseñar es divertido.</i>	4.13	0.78	-1.04	1.65	.65	.02	.43
	8. I find teaching fun. <i>Encuentro la enseñanza divertida.</i>	4.03	0.85	-0.88	0.77	.70	.02	.49
	14. I think teaching is a pleasant activity. <i>La enseñanza me parece una actividad agradable.</i>	4.20	0.80	-1.24	2.23	.84	.01	.70
Identified regulation	2. Teaching helps me learn new things. <i>Enseñar me ayuda a aprender cosas nuevas.</i>	4.46	0.67	-1.50	3.84	.87	.01	.76
	3. I think it is very valuable for me as a person. <i>Creo que es muy valioso para mí como persona.</i>	4.34	0.74	-1.28	2.46	.90	.01	.81
	13. This is an important personal choice for me. <i>Ésta es una elección personal importante para mí.</i>	4.19	0.79	-1.16	2.15	.81	.01	.66
	16. I believe that it is an important objective in my life. <i>Creo que es un objetivo importante en mi vida.</i>	4.01	0.88	-1.09	1.60	.77	.02	.59
Introjected regulation	4. I want others to think that I am a good teacher. <i>Quiero que otros piensen que soy un buen docente.</i>	3.68	0.93	-0.47	0.16	.28	.04	.08
	9. On the contrary, I would feel guilty. <i>De lo contrario, me sentiría culpable.</i>	2.72	1.17	0.09	-0.84	.80	.02	.64
	11. On the contrary, I would be disappointed with myself. <i>De lo contrario, estaría decepcionado conmigo mismo.</i>	2.90	1.27	-0.06	-1.15	.61	.02	.37
	12. I want to give others the impression that I am a good teacher. <i>Quiero dar la impresión a otros/as de ser un buen docente.</i>	2.75	1.13	-0.04	-0.92	.68	.02	.44
External regulation	6. It is assumed that I should do this. <i>Se supone que debo hacerlo.</i>	2.63	1.14	0.23	-0.78	.62	.03	.38
	7. Others (colleagues, headmaster/mistress, etc.) place pressure on me to do this. <i>Otros (compañeros/as, director/a, etc.) me presionan para hacerlo.</i>	1.77	0.83	0.97	0.82	.81	.02	.66
	10. I feel forced to do so by others (colleagues, headmaster/mistress, etc). <i>Me veo obligado a hacerlo por los demás (compañeros/as, director/a, etc).</i>	1.83	0.86	0.90	0.45	.83	.02	.69
	15. I am expected to do it. <i>Se espera que yo lo haga.</i>	2.69	1.21	0.07	-1.03	.58	.02	.34
Amotivation	17. I do not know; I feel that I am wasting time when I give the class. <i>No lo sé, siento que estoy perdiendo el tiempo cuando doy clase.</i>	1.77	0.90	1.29	1.63	.78	.02	.60
	18. I do not do much because I do not think that making an effort in teaching is worthwhile. <i>Hago poco porque yo no creo que en la enseñanza valga la pena hacer esfuerzos.</i>	1.38	0.65	2.20	6.93	.84	.02	.70
	19. I do not know why I am a teacher; it is useless work. <i>No sé por qué me dedico a la enseñanza, es un trabajo inútil.</i>	1.31	0.65	2.62	8.23	.91	.02	.82

Note: As = Asymmetry; k = Kurtosis; λ = Standardized factor loadings; SE = Standard error; R² = Explained variance. All parameters were significant ($p < .001$). The standardized values of the 19 items correspond to Model 2. In italics the items of the original version of the EME-ES created in Spanish.

Table 3. Descriptive Statistics, Asymmetry, Kurtosis, Reliability and Latent Correlations for the Study Variables

	Range	M	SD	As	k	1	2	3	4	5	6	7
1. Intrinsic motivation	1–5	4.18	0.63	–0.93	1.39	1	.91**	.09	–.37**	–.73**	.60**	–.53**
2. Identified regulation	1–5	4.25	0.62	–1.10	2.11		1	.15*	–.26**	–.66**	.55**	–.48**
3. Introjected regulation	1–5	3.01	0.80	–0.05	–0.44			1	.66**	.26**	–.02	.04*
4. External regulation	1–5	2.23	0.78	0.18	–0.39				1	.67**	–.19**	.26**
5. Amotivation	1–5	1.49	0.60	1.48	2.91					1	–.53**	.59**
6. Work dedication	0–6	4.17	1.12	–0.57	–0.75						1	–.54**
7. Boredom at work	1–7	2.22	1.20	1.05	1.18							1
Cronbach's Alpha (α)						.82	.82	.68	.76	.73	.90	.90
CR						.85	.91	.70	.81	.88	.92	.94
AVE						.59	.70	.39	.52	.71	.69	.79

Note: * $p < .005$; ** $p < .001$.

performed using the weighted least squares mean and variance adjusted estimator (WLSMV). This estimator was selected because multivariate normality deviations are common in social sciences, and, using the standard maximum likelihood (ML) estimation method, they increase the value of chi-square (χ^2) and underestimate that of standard errors (Finney & DiStefano, 2006). The self-determination continuum was verified by latent correlations between the five factors of the EME-ES. Later on, three multi-group CFA were conducted to test the invariance of the measurement model, verifying stability in different groups (odd and even subsamples, gender, and type of school). Finally, reliability was verified, using Cronbach's alpha coefficient, as well as the composite reliability (CR) and the average variance extracted (AVE) coefficient through factor loadings and the measurement errors originating from the CFA. Regarding concurrent validity, a latent correlation analysis was conducted between the EME-ES factors and the CFA factors of work dedication and boredom at work. Afterwards, a structural equation modeling (SEM) was carried out to verify this theoretical sequence. The statistical software programs used were Mplus 7.0, SPSS 22 and AMOS 19.

Because the chi-square (χ^2) could be oversensitive to sample size, the assessment of the (CFA and SEM) models relied on the following goodness-of-fit indices: The root mean square error of approximation (RMSEA), the comparative fit index (CFI), the Tucker Lewis index (TLI) and the expected cross-validation index (ECVI). With respect to RMSEA, values of .08 or less are considered as acceptable (Marôco, 2014), and with respect to CFI and TLI, values greater than .90 and .95 indicate appropriate and excellent fit to the data, respectively. Finally, lower values of ECVI indicate better fit (Marôco, 2014).

Results

Construct validity

Item descriptive statistics

The item descriptive statistics are shown in Table 2, with means of between 1.31 (Item 19) and 4.46 (Item 2). Although the deviation from univariate normality does not affect the weighted least square estimators if the values of the items are below three in asymmetry and 10 in Kurtosis (Marôco, 2014), the univariate normality of the data was verified with the Kolmogorov-Smirnov test. Adequate values were obtained.

Subscale descriptive statistics and latent correlation analyses

As observed in Table 3, the intrinsic motivation means ($M = 4.18$) and identified regulation means ($M = 4.25$) were the highest, while the amotivation subscale ($M = 1.49$) presented the lowest mean, followed by external regulation ($M = 2.23$). Likewise, the correlations between the nearest factors were significant and positive. With respect to latent correlations between opposing factors of the continuum (intrinsic motivation and amotivation), a stronger negative correlation was found ($r = -.73$, $p < .001$) than between other closer factors (intrinsic motivation and external regulation, $r = -.23$, $p < .001$).

Measurement model: confirmatory factor analyses

Multivariate normality was verified by means of the Mardia multivariate index, obtaining values that did not represent any critical disadvantage for the CFA. As observed in Table 4, the model 1² did not show an adequate level of fit in all indices (RMSEA = .121).

²Model 1 of the EME-ES represents the five-factor CFA (i.e., intrinsic motivation, identified regulation, introjected regulation, external regulation and amotivation) with no interrelated items.

Table 4. Fit Indices of the Models Analyzed

Model/Test	χ^2	<i>df</i>	<i>p</i>	χ^2/df	RMSEA	CFI	TLI	ECVI
Model 1	1360.797	142	.001	9.583	.121	.922	.906	2.702
Model 2	762.227	129	.001	5.483	.080	.960	.951	1.688

Note: χ^2 = scaled chi-square test of exact fit; *df* = degrees of freedom; RMSEA = root mean square error of approximation; CFI = comparative fit index; TLI = Tucker-Lewis index; ECVI = expected cross-validation index.

Consequently, following the recommendations of Finney and DiStefano (2006), the fits were carried out in agreement with the modification indices. The highest values were observed among the item correlations of the same factors, respecting the five-factor structure. Thus, Items 5 and 8, 4 and 12, and 6 and 15, belonging to the factors of intrinsic motivation, introjected regulation and external regulation, respectively, were inter-related. Moreover, the wording of the correlated items presented notorious semantic similarities, which could support the modification choices. Finally, after analyzing the differences in ECVI between both models, Model 2 was accepted, as it significantly improved on the fit indices of Model 1.

Multigroup confirmatory factor analyses

The invariance of the EME-ES (Table 5) was verified with three multi-group CFA. In the first, participants were randomly divided into two homogeneous subsamples (n^1 = even; n^2 = odd) with the same number of individuals (292). In the second, gender was selected as the criterion, and the sample was divided between male (n = 254) and female (n = 330). Finally, in the third, the type of school was used as the criterion, and the teachers were divided into state schools (n = 416) and non-state (associated and private) (n = 168). Three progressively more restrictive models were run for each of the three groups: (1) configural invariance; (2) metric invariance (i.e., invariance of factor loadings/cross-loadings); and (3) strong measurement (i.e., invariance of factor loadings/cross-loadings, and intercepts).

The nested models were evaluated via consideration of changes (Δ) in goodness-of-fit indices, with increases in CFI and TLI of at least .010, indicating a lack of invariance (Cheung & Rensvold, 2002). As observed in Table 5, configural and metric invariance did not exceed the cutoff recommendations in the three multi-group CFA for CFI ($\Delta > .01$) or Δ TLI ($\Delta > .01$). However, these cutoff recommendations were exceeded for the random odd and even subsamples, gender and type of school in the next step (i.e., strong invariance). Nevertheless, although full invariance for the EME-ES cannot be supported across random samples, gender, and type of school, partial invariance (i.e., configural and metric) may be sufficient condition for a meaningful cross-group comparison (Cheung & Rensvold, 2002).

Reliability

As observed in Table 3, Cronbach’s alpha values were acceptable in all factors ($\alpha > .70$), with the exception of introjected regulation ($\alpha = .68$). Although this value is very close to .70, it can be considered acceptable due to the small number of items (i.e., four) that comprise it (Dunn, Baguley, & Brunnsden, 2014). CR values were satisfactory in all factors with results of over .70. With respect to AVE, acceptable values were obtained in all factors ($> .50$), with the exception of introjected regulation (AVE = .39), although it was close to recommended values (Dunn et al., 2014). This could be explained by Item 8, pertaining to introjected regulation, which presented a weak factor loading ($\beta = .28$).

Table 5. Fit Indices of the Model Tested for the Invariance Analyses

Invariance analyses	Model	χ^2	<i>df</i>	<i>p</i>	χ^2/df	RMSEA	CFI	TLI	Δ CFI	Δ TLI
Odd and even subsamples	Configural invariance	1037.56	330	.001	3.14	.08	.958	.957	–	–
	Metric Invariance	994.20	344	.001	2.89	.08	.961	.962	+0.003	+0.005
Gender subsamples	Configural invariance	1088.23	330	.001	3.29	.09	.954	.953	–	–
	Metric Invariance	1053.85	344	.001	3.06	.08	.957	.957	+0.003	+0.004
Type of school subsamples	Configural invariance	1019.14	330	.001	3.08	.08	.950	.948	–	–
	Metric Invariance	992.34	344	.001	2.88	.08	.953	.954	+0.003	+0.004

Note: χ^2 = scaled chi-square test of exact fit; *df* = degrees of freedom; RMSEA = root mean square error of approximation; CFI = comparative fit index; TLI = Tucker-Lewis index; Δ CFI = change in comparative fit index. The latent factors of the EME-ES are based on Model 2 (see measurement model section).

Concurrent validity

Latent correlation analyses

First, CFA factors representing work dedication and boredom were added to the CFA model for the EME-ES. As observed in Table 3, the latent correlations between work dedication and boredom at work with the EME-ES factors were consistent with SDT, with the exception of introjected regulation that did not significantly correlate to work dedication.

Structural equation model

Second, based on the hypothesized measurement model (Figure 1) of the EME-ES, the SEM of the scale was analyzed with the outcomes of work dedication and boredom at work. Following the recommendations of Marôco (2014), the goodness-of-fit indices were good ($\chi^2 = 1176.221$; $df = 326$; $\chi^2/df = 3.608$; $p < .001$; RMSEA = .067; CFI = .968; TLI = .963). As observed in Figure 2, all EME-ES factors significantly explained one of the two outcomes, with the exception of identified regulation. The proposed model explained 71% of the work dedication variance and 69% of the boredom at work variance.

Discussion

The purpose of this study was to devise a scale (EME-ES) with adequate psychometric properties to assess motivation for teaching in Secondary Education teachers.

To our knowledge, this is the first study that, specifically in the secondary teacher work context of Aragon, has integrated the five-factor structure proposed by the SDT together with teachers' dedication and boredom at work. The first hypothesis put forward referred to the construct validity, while the second and third hypotheses responded to concurrent validity.

Regarding construct validity, it was put forward that the EME-ES would adapt to the five-factor structure, showing adequate psychometric properties. Thus, findings support the psychometric adaptation of the EME-ES within the secondary education work context of Aragon. Firstly, the item and subscale descriptive and correlation analyses showed the presence of the self-determination continuum in line with SDT. Correlations between adjacent factors (e.g., intrinsic motivation and identified regulation) were significant, strong and positive. In contrast, opposing factors (i.e., intrinsic motivation and amotivation) presented higher negative correlations than other closer regulations in the continuum (e.g., intrinsic motivation and external regulation). All of this seems to reinforce the correct translation and adaptation of the items of the EME-ES, as well as their adaptation to the factors with which they were identified. Secondly, the results of the CFA confirm the 19-item and five-factor structure, in agreement with the theoretical model proposed by the SDT. This five-factor model of self-determined motivation is consistent with those previously used in the teaching context in different countries (Fernet et al., 2012; Gorizidis &

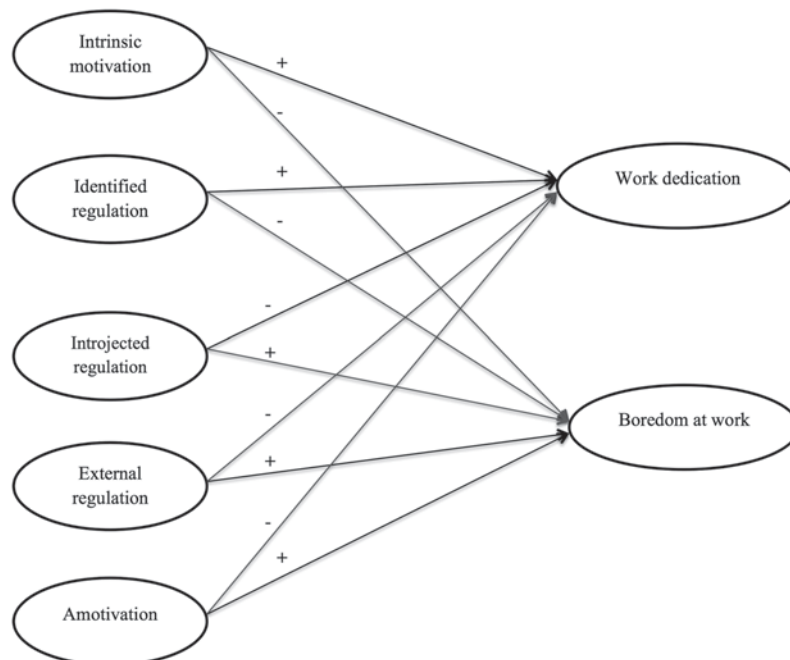


Figure 1. Hypothesized Structural Model of the EME-ES and Work Outcomes.

Note: Signs in relations between variables in agreement with the proposed hypotheses

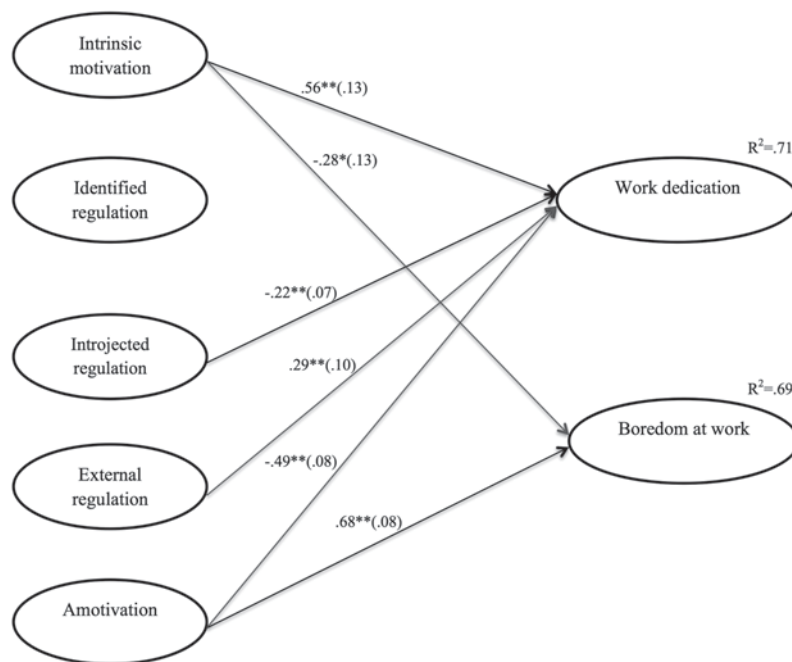


Figure 2. Structural Model of the EME-ES and Work Outcomes.

Note: * $p < .005$; ** $p < .001$; the standardized regression weight is over arrows; the standard error is reported in brackets; R^2 over latent variable; The latent factors of the EME-ES are based on Model 2 (see measurement model section)

Papaioannou, 2012) and more specifically in the Spanish teaching work context (Ruiz-Quiles et al., 2015). Thus, the indices reported by the EME-ES seem to establish the validity of the scale to evaluate the motivation of secondary education teachers because both RMSEA and CFI have adequate values.

Thirdly, the Cronbach’s alpha values obtained in the EME-ES were acceptable in all factors, similarly to the WTMST in its Spanish version (Ruiz-Quiles et al., 2015). However, this parameter can be biased by the number of items used to calculate it (Dunn et al., 2014), so to palliate this bias, CR and AVE indices were provided in this study. These were acceptable, too, with the exception of the AVE introjected regulation value, which was, nevertheless, very close to recommended values. These adequate psychometric values could be explained because the EME-ES is designed for secondary education teachers, who possess distinguishing characteristics that could demand an individualized instrument to assess their motivation (Anaya & López, 2014; Antoniou et al., 2013; Burke & Greenglass, 1989; Otero-López et al., 2009). Finally, the three multi-group CFA present the EME-ES as a partially invariant (i.e., configural and metric) instrument in different samples of teachers, by gender and type of school. These findings are highlighted because of the influence that gender and type of school could have on teachers’ motivation and other work outcomes (Fernet et al., 2008; Gil-Flores, 2016; Nie et al., 2015).

With respect to concurrent validity, it was put forward that more self-determined forms of motivation would significantly and positively explain work dedication, and significantly and negatively explain boredom at work, while less self-determined forms of motivation and amotivation would explain these outcomes in the opposite direction. The results of the latent correlations analyses showed strong and significant correlations between the majority of the motivational regulations of the EME-ES and work dedication and boredom at work, based on the tenets of SDT. These findings are consistent with other research studies that have positively associated more self-determined forms of motivation with teaching engagement (Cheon et al., 2014), comprised, among other factors, of work dedication. Likewise, Collie, Shapka, Perry and Martin (2016) showed a positive relationship between intrinsic motivation for teaching and enjoyment of the teaching activity. This variable is considered to be the opposite to boredom at work (Montero-Marín & García-Campayo, 2010). Likewise, other studies on motivation for teaching indicate that intrinsic motivation and identified regulation are positively related to job satisfaction and teachers’ self-efficacy (Fernet et al., 2008; Ruiz-Quiles et al., 2015), and negatively related to teachers’ exhaustion (Fernet et al., 2008; Fernet et al., 2012). Consistent with our results, past studies have shown that introjected and external regulation are positively related to teachers’ exhaustion and positively related

to teacher's self-efficacy (Fernet et al., 2008). Finally, Dörnyei and Ushioda (2011) pointed out that teachers' amotivation may be caused by the repetitive routine of contents, leading to boredom at work.

With respect to the SEM, the goodness-of-fit indices were adequate. However, the hypotheses put forward were partially met as some outcomes of motivation for teaching were not significantly explained by all the motivational regulations. As set forth, and in line with other studies that explained similar variables (Eyal & Roth, 2011), intrinsic motivation positively explained work dedication and negatively explained boredom at work, while amotivation did the opposite. Likewise, introjected regulation, as a less self-determined form of motivation, was negatively related to work dedication. In contrast, in the structural model, we found an unexpected positive relationship between external regulation and work dedication, although latent correlations between manifest variables were opposing. This association could be explained by the importance that external reasons, such as pressure and expectations of headmasters and colleagues, may have on the actual work dedication. To illustrate this, some teachers might perceive the pressure placed on them by headmasters or colleagues, as an effort made by these agents to do some activities or to take part in interdisciplinary projects that would improve the students' learning process and that would, at the same time, stimulate them to improve their teaching. Under those particular circumstances, the pressure placed by headmasters or others teachers may even be interpreted as stimulating and encouraging for their work dedication. In this vein, other studies have indicated that a profile with a high quantity of motivation, characterized by high levels of more self-determined forms of motivation and also high levels of less self-determined forms of motivation, may facilitate positive outcomes such as acting as a buffer to burnout (van den Berghe et al., 2014). However, more studies are considered necessary to analyze the motivational profiles, adopting a person-centered approach, and other outcomes in this group to obtain a more solid explanation to the findings.

Finally, contrary to our hypothesis, identified regulation did not significantly explain either of the two outcomes that were introduced in the model. A possible explanation is that teachers may get involved in teaching due to personal and/or vocational choices and according to their individual values. These reasons could turn their work into a lifestyle, keeping the teachers' minds off the different challenges (dedication) and routines (boredom) that their work may represent on a daily basis. However, more research on the topic seems necessary. Another possible justification could be found in latent correlations, where intrinsic motivation was highly correlated with identified regulation.

This could suggest a discriminant validity problem justified by the high vocational character of teaching work as suggested by past studies with identified regulation (e.g., Roth et al., 2007). Thus, the inclusion of qualitative techniques such as interviews or observing teaching behavior could contribute to establishing relations between some, until now more unknown, variables in this group. All of this would make it easier to obtain a more complete overview of motivation for teaching (Han & Yin, 2016). However, the represented model explains a high percentage of both outcomes, supporting the concurrent validity of the EME-ES. All of this reinforces the use of the EME-ES as an instrument that has a certain capacity to explain some outcomes related to the motivation of secondary education teachers.

Some limitations and perspectives should be taken into consideration. It must be pointed out that, in relation to the sample of the present study, full invariance for the EME-ES could not be supported. As new avenues of research, future studies should test full invariance again and should compile longitudinal data to be able to assess the time stability of the scale. Importantly, the SEM was conducted with cross-sectional data and causality in relationships cannot be inferred. Moreover, more research on less self-determined forms of motivation seems to be needed in order to assess their impact on different work outcomes. Previous studies suggested that teachers could combine several reasons to teach (van den Berghe et al., 2014). It would be interesting to establish teachers' motivational profiles to analyze how resulting profiles differ in outcomes such as dedication and boredom at work. In addition, the relationship shown between external regulation and dedication to work in latent correlations is not congruent with the SEM findings. Perhaps in the future, other studies could analyze this relationship across longitudinal designs to try to explain if dedication should be interpreted as an outcome or as an antecedent of motivation for teaching.

To conclude, the EME-ES presents adequate psychometric properties, reliability and partial invariance across gender and type of school to assess motivation for teaching in secondary education teachers from the Aragon district-territory. In addition, concurrent validity findings of this study could increase knowledge about the relevance of motivation for teaching in several outcomes related to well-being at work.

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5.1.2. Estudio 2: Spanish validation of the Basic Psychological Needs at Work Scale: A measure to predict teachers' well-being in the workplace

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Spanish validation of the Basic Psychological Needs at Work Scale: A measure to predict teachers' well-being in the workplace

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Abstract The present study aimed to validate a Spanish-version of the Basic Psychological Needs at Work Scale (BPNWS-Sp) and to examine the associations between needs satisfaction and engagement and burnout in secondary education teachers. Using a sample of 584 secondary education teachers, the results supported the three-factor model, composite reliability, measurement invariance, and nomological validity of the BPNWS-Sp. This study contributes to validating the first instrument in Spanish to measure the satisfaction of the three BPNs separately in secondary education teachers. The measurement of teachers' BPNs could effectively provide guidance for school policies to improve teaching and learning.

Keywords Secondary education teachers · Basic psychological needs · Teacher well-being

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Résumé. Validation espagnole de l'échelle des besoins psychologiques basiques au travail: Une mesure de prédiction du bien-être au travail. Le but de cette étude est de valider une version espagnole de l'échelle des besoins psychologiques basiques au travail (BPNWS-Sp) et d'examiner les associations de la satisfaction des besoins et de l'engagement avec le burnout chez les enseignants du degré secondaire. L'échantillon se composait de 584 enseignants du degré secondaire, les résultats étaient favorables au modèle de trois facteurs, à la fiabilité de construit, à l'invariance de mesure et la validité nomologique du BPNWS-Sp. Cette étude contribue à la validation du premier instrument espagnol pour mesurer individuellement les trois besoins psychologiques basiques chez les enseignants du degré secondaire. Cet instrument pourrait fournir des indications sur les polices scolaires de manière à améliorer l'enseignement et l'apprentissage.

Zusammenfassung. Spanische Validierung der Skala der psychologischen Grundbedürfnisse an der Arbeit: Ein Mittel um das Wohlbefinden von Lehrern am Arbeitsplatz vorherzusagen. Das Ziel der Studie war es, eine spanische Version der Skala der psychologischen Grundbedürfnisse an der Arbeit (BPNWS-Sp) zu validieren und die Zusammenhänge zwischen Bedürfnisbefriedigung, Engagement und Burn-out bei Lehrern der Sekundarstufe zu überprüfen. Die Resultate, die auf einer Befragung von 584 Sekundarlehrern beruhen, unterstützen das Dreifaktoren Modell, kongenerische Reliabilität, Messungsinvarianz, und nomologische Validität von der BPNWS-Sp. Diese Studie trägt dazu bei, das erste Instrument auf Spanisch zu validieren, welches die Befriedigung von den drei psychologischen Grundbedürfnissen bei Sekundarlehrern auf separate Weise misst. Die Erhebung der psychologischen Grundbedürfnisse von Lehrern könnte als Orientierung für Schulvereinbarungen dienen, um das Unterrichten und Lernen zu verbessern.

Resumen. Validación española de la Escala de Necesidades Psicológicas Básicas en el trabajo: Una medida para la predicción del bienestar docente en el puesto de trabajo. El presente estudio pretende validar la versión española de la Escala de Necesidades Psicológicas Básicas en el trabajo (BPNWS-Sp) y examinar la asociación entre la satisfacción de las necesidades, el compromiso y el *burnout* en el profesorado de educación secundaria. Utilizando una muestra de 584 profesores de secundaria, los resultados dieron soporte al modelo de tres factores, a la fiabilidad del constructo, a la invariancia de medida y a la validez nomológica de la BPNWS-Sp. Este estudio contribuye a la validación del primer instrumento en español para la medición de la satisfacción de las tres necesidades psicológicas básicas de manera separada en el profesorado de secundaria. La escala de las necesidades psicológicas básicas en el profesorado puede contribuir eficazmente en la creación de políticas escolares que faciliten la mejora tanto de la enseñanza como del aprendizaje.

Introduction

The concept of need is one of the most traditional terms used to explain the behavior of people at work. Chronologically, Murray (1938) was the first researcher to claim the existence of some acquired needs such as social recognition and power. Unlike Murray, Maslow (1954) supported the presence of five innate and hierarchically organized needs, noteworthy among which is self-realization. However, the proposal that has received the greatest scientific backing to explain the basic needs was put forward by Deci and Ryan (1985, 2000), and it is decisive in order to understand behavior at work.

Self-determination theory and teachers

During the last few years, the number of studies about teachers' well-being has increased considerably (e.g., Collie & Martin, 2017; Janke, Nitsche, & Dickhäuser, 2015; Van den Berghe et al., 2014) under the self-determination framework (SDT; Deci & Ryan, 1985, 2000). SDT defines the needs for autonomy, competence, and relatedness as the three innate and universal psychological needs that human beings must satisfy to optimize their personal development, their well-being, and their health. *Autonomy* refers to people's desire to feel they are the origin of their actions. *Competence* refers to people's perceived ability when faced with a situation in a specific context. Finally, *relatedness* refers to the importance of social inclusion and of having positive interpersonal relations (Deci & Ryan, 2000).

In this sense, SDT (Deci & Ryan, 1985) puts forward that the three basic psychological needs (BPNs) at work must be satisfied in order to develop greater self-determined teaching motivation (Janke et al., 2015; Ruiz-Quiles, Moreno-Murcia, & Vera, 2015). One factor that may influence teachers' experienced need satisfaction is the support of BPN by the educational administration, headmasters, other teachers, and students (Boudrias et al., 2014; Deci, Olafsen, & Ryan, 2017). Thus, teachers, who perceive that they can choose and assume responsibility for actions concerning school development and the teaching process (*autonomy need*), perceive they have sufficient resources to successfully cope with their working demands (*competence need*), and feel more integrated with the rest of their colleagues (*relatedness need*), may be more intrinsically motivated towards their work.

Moreover, teachers' BPN satisfaction can influence the classroom management styles and students' achievements (Marshik, Ashton, & Algina, 2016). Likewise, past studies with teachers have shown that the satisfaction of the three BPNs is positively correlated to a needs-supportive teaching style (Van den Berghe et al., 2014) and with a teaching style centered on students learning (Janke et al., 2015). In addition, satisfying the BPNs could be determinant for teachers' psychological health (Boudrias et al., 2014; Brien et al., 2012; Desrumaux et al., 2015), as recent research has indicated a positive relationship between BPN satisfaction and optimism (Boudrias et al., 2014; Brien et al., 2012; Desrumaux et al., 2015), job

satisfaction (Ruiz-Quiles et al., 2015), and enjoyment at work (Klassen, Perry, & Frenzel, 2012).

Teachers' well-being: Engagement and burnout

Engagement and burnout have been analyzed as the most relevant indicators of teachers' well-being at the workplace (Parker, Martin, Colmar, & Liem, 2012). On one hand, engagement is characterized by a high level of energy and identification with work, and it is defined as a positive multifactorial mental state made up of vigor, dedication, and absorption (Schaufeli, Martínez, Marques-Pinto, Salanova, & Bakker, 2002). Within the teaching context, vigor is characterized by teachers with high energy levels and resilience. Dedication is shown by teachers who are involved in their work and are very enthusiastic about their profession. Finally, absorption is reflected by teachers who have a feeling of flow and concentration in their work.

On the other hand, burnout is characterized as a syndrome that can be expressed gradually and in a differentiated manner depending on the context where it originates (Montero-Marín, Skapinakis, Araya, Gili, & García-Campayo, 2011). Thus, three factors have been defined in order to understand it: overload, lack of development, and neglect. These result from prolonged exposure to chronic stress in a particular workplace (Montero-Marín et al., 2011). Within the teaching context, overload is characterized by teachers who neglect their personal lives to seek good results in their work. Lack of development is shown in teachers who perceive difficulties to progress and who wish to do other jobs to be able to promote their occupational skills. Finally, neglect is characterized by teachers who are not very engaged and who are indifferent to any situation in their work (Montero-Marín et al., 2011). These burnout factors are explained by Montero-Marín et al. (2011) as being very similar to the traditional components of the syndrome indicated by Maslach and Jackson (1986) (i.e., exhaustion, depersonalization, and inefficacy). However, the traditional definition of Maslach and Jackson (1986) tends to unify burnout, possibly generalizing the results encountered, making it difficult to deal with them.

Teachers' basic psychological needs

Based on the SDT, numerous studies have associated the satisfaction of the BPNs with workers' engagement and burnout (Van den Broeck, Ferris, Chang, & Rosen, 2016). However, in the teaching context, and to our knowledge, there is only one study that has analyzed the relationship between the satisfaction of the three BPNs and engagement at work (Klassen et al., 2012). Thus, with a sample of 455 teachers, Klassen et al. (2012) showed how the satisfaction of the three BPNs significantly explained engagement at work. However, whilst autonomy and competence positively explained engagement, relatedness to colleagues explained it negatively. In this regard, more studies that analyze the role played by the relatedness need in teachers' engagement at work seems necessary.

In addition, recent studies have found a negative relationship in teachers between the satisfaction of the three BPNs and burnout at work. Thus, with a sample of 201

teachers, Van den Berghe et al. (2014) found significant and negative correlations between the satisfaction of the three BPNs, exhaustion, and depersonalization. Likewise, in this study, efficacy was significantly and positively correlated to the three BPNs. These findings indicate the importance that the satisfaction of the three BPNs could have on teachers' well-being and psychological health. Moreover, a study conducted by Sevil, Aibar, Abós and García-González (2017) showed that teachers' BPN satisfaction was positively related to student motivation and achievement.

Measurement of the basic psychological needs in teachers

Grounded in SDT, numerous instruments have been designed to assess the satisfaction of the BPNs in different contexts. In the work context, some of the most commonly used scales have been the Intrinsic Need Satisfaction (INS; Leone, 1995, in Baard, Deci, & Ryan, 2004), the Work-Related Basic Need Satisfaction (W-BNS; Van den Broeck, Vansteenkiste, De Witte, Soenens, & Lens, 2010), and the Basic Psychological Needs at Work Scale (BPNWS; Brien et al., 2012). The INS (Baard et al., 2004) contains 23 items, seven of which represent autonomy satisfaction, eight competence satisfaction, and eight relatedness satisfaction. It was used with North American bank workers and showed adequate psychometric properties (See further information Baard et al., 2004). The W-BNS (Van den Broeck et al., 2010) was an ad hoc creation that included both basic need satisfaction and frustration items using Dutch-speaking Belgian workers. Whereas the need satisfaction items showed a good fit for the data, the psychometric properties relating to need frustration items were not so good (See further information Van den Broeck et al., 2010). A possible explanation could be that the need frustration items were based on an absence of need satisfaction (e.g., "At work, I can talk with people about things that really matter to me"). Other authors (e.g., Brien et al., 2012) recommended positive statements (e.g., "I feel other people dislike me") of the Psychological Need Thwarting Scale (PNTS; Bartholomew, Ntoumanis, Ryan, & Thøgersen-Ntoumani, 2011) in order to measure the frustration of the BPNs, rather than negative statements of satisfaction of the BPNs (e.g., Van den Broeck et al., 2010).

The development of the BPNWS (Brien et al., 2012) was based on three different scales. Items referring to autonomy were selected from Morin's (2002) scale. The items related to competence, despite being ad hoc creations of Brien et al. (2012), were inspired by the INS (Baard et al., 2004). Finally, relatedness items were taken directly from the perceived social relatedness scale (Échelle du Sentiment d'appartenance Sociale, ÉSAS; Richer & Vallerand, 1998). The BPNWS (Brien et al., 2012), apart from being validated in French with 271 Canadian workers, was simultaneously validated with a joint sample of 488 Canadian and 363 French teachers from different education levels. They found good psychometric properties in a work context with specific characteristics such as teaching. It thus became the first instrument, according to SDT, to evaluate the satisfaction of BPNs in the teaching context. This scale has also been used by other researchers in their respective studies with teachers (Boudrias et al., 2014; Desrumaux et al., 2015). Recently, Sánchez-Oliva et al. (2016) adapted the BPNWS version to Portuguese in

a specific sample of 366 exercise professionals, showing good psychometric properties.

However, despite the appropriate properties shown by the BPNWS (Brien et al., 2012) in later research studies, the authors suggested, within the limitations of the validation study, some perspectives to refute and extend the findings. Thus, Brien et al. (2012) sustain that the explanatory capacity of each one of the BPNs that have other outcomes should be examined, highlighting the need to be validated in other cultures and languages. Furthermore, they point out the importance of longitudinal designs that can test the stability of the scale.

The present study

To the authors' knowledge, there are no instruments in Spanish that, from the viewpoint of the SDT, exclusively measure the satisfaction of the three BPNs in Spanish secondary education teachers. Importantly, although there are different Spanish-speaking countries around the world, the present study focuses on the educational context of Spain, particularly on secondary education teachers. Thus, grounded in this framework, the aim of this study was to validate the BPNWS (called, in Spanish, BPWNS-Sp) in secondary education teachers. A subsequent aim was to examine the associations between teachers' experienced need satisfaction and engagement and burnout at work.

Based on the tenets of SDT and past studies that have measured the three BPNs separately using the BPNWS (e.g., Boudrias et al., 2014; Brien et al., 2012; Desrumaux et al., 2015; Sánchez-Oliva et al., 2016), we expected the BPNWS-Sp to show adequate psychometric properties for the three-factor structure. In addition, previous research recommends that validation studies should report invariance in terms of gender, age or other socio-demographic characteristics such as type of work center (Ayman & Korabik, 2010). A recent meta-analysis of basic psychological needs at work (Van den Broeck et al., 2016) reported that women tend to have higher levels of relatedness than men, although no differences in terms of autonomy and competence were found. Previous studies have measured invariance across gender of BPN satisfaction in professional and exercise participants (Sánchez-Oliva et al., 2016; Vlachopoulos, 2008), but there are no studies that have measured invariance across teachers' gender in terms of BPN satisfaction.

In Spain, another factor that could affect teachers' motivational processes in their work is the type of school (i.e., state or private) (Gil-Flores, 2016, Latorre & Sáez, 2009). Private school teachers report greater social recognition than state school teachers (Latorre & Sáez, 2009). However, a larger number of subjects to teach, more job hours, less income, or less job stability could negatively determine the well-being of teachers who work in private schools (Latorre & Sáez, 2009). Therefore, to be able to diagnose effectively possible differences between groups (i.e., gender, type of center) affecting teachers' BPN satisfaction, it is first necessary to develop invariant scales across these factors (Sánchez-Oliva et al., 2016). So, we further hypothesized that the BPNWS-Sp would be invariant across gender, type of school, and time.

This study aims to increase knowledge about the relationship between teachers' BPNs and their well-being at work to be able to effectively detect some factors that

could affect their work conditions. Consistent with past studies on teachers, we further expected that teachers' BPNs would significantly and positively relate to engagement (Klassen et al., 2012) and negatively to burnout at work (Van den Berghe et al., 2014).

Method

Participants

Initially, 584 secondary education teachers ($M_{\text{age}} = 45.04$; $SD = 8.97$) with mean working experience in teaching of 17.55 years ($SD = 10.26$) participated in the study. Then, to calculate stability across time, a second longitudinal sample was added with 79 secondary education teachers ($M_{\text{age}} = 46.46$; $SD = 8.04$) who had mean working experience of 18.61 years ($SD = 9.54$). Table 1 shows the characteristics of both samples related to gender, type of school, and regional (Aragon) and national (Spain) statistics concerning secondary education teachers working during the 2014/2015 academic year.

Procedure

An instrumental quantitative study was performed. The guidelines of the Declaration of Helsinki (2013) were followed for its development, with respect to consent and the confidentiality of replies. Cross-sectional data were collected over an online platform that remained active for 30 days. An e-mail was sent to all the 7418 secondary education teachers from the Aragon region (Spain) working during the 2014/2015 year. Teachers received a brief explanation of the study, the link for them to access the questionnaire, and the contact data of the main researcher in case they wanted to obtain more information. The response rate was 8%.

Table 1 Characteristics of the study samples and regional and national statistics concerning secondary education teachers working during the 2014/2015 academic year

	Study samples		Regional/national statistics*	
	$n_{\text{cross-sectional}} = 584$	Aragon = 79	Aragon = 7417	Spain = 262,279
Gender				
Men	254 (43.5%)	31 (32.4%)	3231	112,505
Women	330 (56.5%)	48 (67.6%)	4186	149,774
Type of school				
State	416 (71.2%)	79 (100%)	5279	199,746
Private	168 (28.8%)	0 (0%)	2138	62,533

* Regional (Aragon) and national (Spain) statistics correspond to the 2014/2015 academic year. These were provided by the Ministry of Education, Culture, and Sport (<http://www.mecd.gob.es>)

A complementary longitudinal data collection was conducted to calculate invariance of the BPNWS-Sp across time. Two secondary education centers were contacted to obtain their consent. After obtaining their approval, the cross-sectional sampling was conducted twice (seven-month interval) with the 106 teachers who were working during the 2015/2016 academic year in both educational centers. The interval between the two measurements was seven months (November 2015, May 2016). This interval-duration could be justified by the nature of the two educational centers and the work situation reality of Spanish secondary education teachers. In Spain, teachers are subject to a high workload in their daily work (Anaya & López, 2014). Thus, a shorter interval could have generated discomfort for the participants, triggering biased responses from the BPNWS-Sp. The response rate in terms of longitudinal data was 75%.

Variables and instruments

The Spanish version of the Utrecht Work Engagement Scale (Schaufeli et al., 2002) was used to measure teacher engagement. This scale comprises 17 items and three factors. Six items assess vigor (e.g., “When working I feel strong and vigorous”), five assess dedication (e.g., “I am enthusiastic about my work”), and six assess absorption (e.g., “When I am working, I forget everything else around me”). Responses were provided on a 6-point Likert-type scale ranging from 0 (*never*) to 6 (*always*). This scale showed adequate psychometric properties in previous studies with teachers (e.g., Nerstad, Richardsen, & Martinussen, 2010). In this study, a CFA was performed indicating adequate goodness-of-fit ($\chi^2/df = 4.12$, $p < .001$; CFI = .967; TLI = .963), except for RMSEA (= .010) that was close to recommendations, similarly to the results of Nerstad et al. (2010). However, the composite reliability analysis of the study sample obtained omega (ω) values of .88 for vigor, .92 for dedication, and .86 for absorption.

The Spanish version of the Burnout Clinical Subtype Questionnaire (BCSQ-12; Montero-Marín et al., 2011) was used to measure teacher burnout. This questionnaire is comprised of 12 items and distributed into three factors with four items each: overload (e.g., “I overlook my own needs to fulfill work demands”), lack of development (e.g., “My work does not offer me opportunities to develop my skills”), and neglect (e.g., “I give up in response to difficulties in my work”). Responses were registered on a 7-point Likert scale ranging from 1 (*totally disagree*) to 7 (*totally agree*). A CFA was performed showing adequate goodness-of-fit ($\chi^2/df = 2.94$, $p < .001$; RMSEA = .058; CFI = .994; TLI = .993). The composite reliability analysis of the study sample obtained omega (ω) values of .90 for overload, .92 for lack of development, and .92 for neglect.

A Spanish translation (BPNWS-Sp) of the BPNWS (Brien et al., 2012) was used to measure satisfaction of BPNs in the teachers’ work. The scale is comprised of 12 items, preceded by the sentence “At work in the school...”, and distributed into three factors with four items each, which measure the satisfaction of autonomy, of competence, and of relatedness. The Spanish wording and English translation of the 12 items can be seen in “Appendix”. Responses were provided on a 6-point Likert-type scale ranging from 0 (*strongly disagree*) to 6 (*strongly agree*).

The BPNWS-Sp was translated in agreement with Muñiz, Elosua, and Hambleton (2013). The original version of the BPNWS was translated into Spanish by two expert researchers in SDT and with a high level of French. Then, the two individual translations were reviewed and a final version was agreed upon. Finally, a native translator did a back translation of the version in Spanish to verify that there were no significant differences in the wording of the items compared with the original version.

Data analysis

Factorial structure

The descriptive statistics were calculated with SPSS 20. The rest of the models were calculated with Mplus 7.3. Exploratory Structural Equation Modelings (ESEM) and Confirmatory Factor Analysis (CFA) were conducted to test the factorial structure of the BPNWS-Sp. Following recommendations by Marsh, Morin, Parker, and Kaur (2014), ESEM models were estimated. Thus, all rotated loadings were freely estimated, subject to typical constraints imposed on the unrotated factor solution for identification purposes. An oblique Geomin rotation was chosen with an epsilon value of 0.5 (Marsh et al., 2014). CFA models were estimated according to the independent cluster model. Therefore, it was possible to load each item on a single factor, and the three factors were correlated. Standardized factor loadings (λ) and uniquenesses were reported (δ) for ESEM and CFA models.

Scale score reliability estimates were computed using two complementary parameters. First, composite reliability was calculated using McDonald's (1970) $\omega = (\sum|\lambda_i|)^2 / (\sum|\lambda_i|^2 + \sum\delta_{ii})$ where λ_i are the standardized factor loadings and δ_{ii} , the standardized item uniquenesses. In comparison with traditional scale score reliability estimates, such as Cronbach's alpha, ω has the advantage of taking into account the strength of association between items and constructs (λ_i), as well as item-specific measurement errors (δ_{ii}) (Dunn, Baguley, & Brunnsden, 2014). Fornell and Larcker's measure of average variance extracted (Fornell & Larcker, 1981) was applied as a complementary measure of omega's composite reliability. The average variance extracted measures the amount of variance that is captured by the construct in relation to the amount of variance due to measurement error. When the average variance extracted is less than .50, the convergent validity of the construct is questionable.

Measurement invariance and stability

The BPNWS-Sp invariance was tested across gender and type of school. Four progressively more restrictive models were run for each of the two factors: (1) configural invariance; (2) weak invariance (i.e., invariance of the factor loadings/cross-loadings); (3) strong measurement (i.e., invariance of the factor loadings/cross-loadings, and intercepts); and (4) strict invariance (i.e., invariance of the factor loadings/cross-loadings, intercepts, and uniquenesses). These four steps assess the presence of different types of measurement biases and are sufficient to accept that the measurement properties of an instrument are the same across groups (Chen,

2007). In addition, stability across time of the BPNWS-Sp was verified with a second longitudinal sample (seven month-interval; see the procedure section) by means of a test–retest correlation.

Nomological validity

To verify the nomological validity, the latent correlations analyses were computed between the BPNWS-Sp factors and the factors of engagement and burnout at work. Afterwards, a structural equation modeling (SEM) was carried out to corroborate this theoretic sequence. The standardized regression weights (β) and explained variance (R^2) were reported.

Goodness-of-fit

The assessment of the models (i.e., ESEM, CFA, and SEM) was based on the following goodness-of-fit indices: the root mean square error of approximation (RMSEA), the comparative fit index (CFI), and the Tucker–Lewis Index (TLI). Following the recommendations for interpreting these indices, lower values than .08 and .06 for RMSEA are considered acceptable and excellent, respectively (Marsh et al., 2014). In addition, for both CFI and TLI, values greater than .90 and .95 indicate adequate and excellent fit to the data, respectively (Marsh et al., 2014). Regarding the measurement invariance, the nested models were compared via consideration of changes (Δ) in goodness-of-fit indices, with increases in RMSEA of at least .015 or decreases in CFI and TLI of at least .010 indicates a lack of invariance (Chen, 2007). It is important to keep in mind that goodness-of-fit indices corrected for parsimony (TLI, RMSEA) can improve with the addition of model constraints. However, these improvements should be considered to be random.

Results

Factor structure and reliability

The descriptive statistics and item correlations for teachers' responses to the BPNWS-Sp are reported in Table 2.

The goodness-of-fit statistics of the alternative measurement models estimated are reported in Table 3. The ESEM (i.e. preliminary) and CFA (i.e. preliminary) were verified with three factors of the BPNWS-Sp. The initial model obtained in both did not show adequate values for the ratio χ^2/df and RMSEA (Marsh et al., 2014). As an alternative, a standardized error interaction per factor, obtained from the highest modification indices, was added to preliminary models (CFA and ESEM). As observed in Table 3, the final ESEM (Δ RMSEA < .015; Δ CFI < .01; TLI < .01) and final CFA (Δ RMSEA < .015; Δ CFI < .01; TLI < .01) showed a significantly better goodness-of-fit than their previous models. Therefore, this second proposal was accepted as final model of the BPNWS-Sp.

Table 2 Descriptive statistics and correlations for the items

	1	2	3	4	5	6	7	8	9	10	11	12
1. AS1	1											
2. AS2	.76	1										
3. AS3	.65	.69	1									
4. AS4	.56	.64	.57	1								
5. CS1	.32	.33	.41	.39	1							
6. CS2	.19	.20	.26	.22	.63	1						
8. CS3	.24	.28	.33	.30	.59	.73	1					
9. CS4	.26	.28	.32	.28	.47	.52	.51	1				
10. RS1	.29	.29	.28	.32	.24	.25	.28	.31	1			
11. RS2	.30	.29	.33	.29	.22	.19	.24	.35	.86	1		
12. RS3	.28	.29	.33	.33	.22	.14	.21	.30	.69	.79	1	
12. RS4	.21	.19	.22	.25	.18	.13	.14	.30	.55	.61	.70	1
<i>M</i>	4.68	4.66	4.90	4.73	5.16	5.16	5.13	4.58	4.78	4.79	4.61	4.14
<i>SD</i>	1.00	0.96	0.89	1.00	0.70	0.69	0.66	0.86	0.99	0.95	1.05	1.16

All correlations are significant at the $p < .001$ level

AS = autonomy satisfaction, *CS* = competence satisfaction, *RS* = relatedness satisfaction

Table 3 Fit indices for the analyzed models

	χ^2	<i>df</i>	χ^2/df	RMSEA [90% CI]	CFI	TLI
Preliminary model						
M1. ESEM	302.14*	33	9.15	0.118 [0.106–0.131]	.986	.973
M2. CFA	419.19*	51	8.12	0.110 [0.108–0.120]	.981	.976
Final model						
M3. ESEM	92.28*	30	3.07	0.060 [0.046–0.074]	.997	.993
M4. CFA	197.31*	48	4.11	0.071 [0.066–0.080]	.992	.990

Items related in models 3 and 4, 1 and 2 (autonomy), 6 and 7 (competence), 11 and 12 (relatedness)

CFA = confirmatory factor analyses, ESEM = exploratory structural equation modeling, χ^2 = Chi square, *df* = degrees of freedom, RMSEA = root mean square error of approximation, 90% CI = 90% confidence interval of the RMSEA, CFI = comparative fit index, TLI = Tucker–Lewis index

* $p < .01$

Thus, the parameter estimates associated with these final models are reported in Table 4. The ESEM was carried out first, as this might prove to be helpful in revealing sources of misfit in psychometric measures that would otherwise remain hidden in CFA (Marsh et al., 2014). As observed in Table 4, the 12 items appeared to be extremely well-defined in their own factor, although it was relatedness satisfaction that showed the highest factor loadings ($M = 0.82$; $\lambda = .67-.97$), followed by autonomy satisfaction ($M = 0.78$; $\lambda = .63-.91$) and competence satisfaction ($M = 0.77$; $\lambda = .59-.93$). Likewise, none of the items showed factor loadings greater than .20, in other factors. In parallel, in the subsequent CFA, all

Table 4 Standardized factor loadings (λ) and uniquenesses (δ) for the final ESEM and CFA solutions

Indicator	Final ESEM				Final CFA	
	As	Cs	Rs		λ	δ
	λ	λ	λ	δ		
Autonomy satisfaction						
1	.85**	.02	.06*	.23	.81**	.35
2	.91**	.04*	.01	.14	.85**	.28
3	.76**	.14	.07*	.28	.89**	.21
4	.63**	.14	.14**	.43	.79**	.37
Competence satisfaction						
5	.20**	.72**	.03	.31	.90**	.81
6	-.02	.93**	.00	.14	.78**	.61
7	.07*	.85**	.05*	.19	.81**	.66
8	.09*	.59**	.19**	.49	.77**	.60
Relatedness satisfaction						
9	.06*	.11**	.85**	.18	.91**	.83
10	.06*	.03*	.97**	.04	.99**	.90
11	.09**	.02	.81**	.28	.85**	.72
12	.00	.04	.67**	.53	.67**	.45

Italics = target factor loadings

AS = autonomy satisfaction,

CS = competence satisfaction,

RS = relatedness satisfaction

* $p < .05$

** $p < .001$

items were well-defined by significant and high factors loadings ($M = 83.5$; $\lambda = .67-.99$; $p < .01$). Because the analysis revealed similar fit indexes for both ESEM and CFA final models ($\Delta RMSEA < .0015$; $\Delta CFI < .01$; $TLI < .01$), and the ESEM model is less parsimonious than the CFA model, scale score reliability, invariance, and nomological validity were computed from the CFA standardized parameter.

Scale score reliability estimates were computed using omega coefficients of composite reliability and average variance extracted. Thus, the BPNWS-Sp composite reliability was good for the satisfaction of competence ($\omega = .89$) and excellent for autonomy ($\omega = .90$) and relatedness ($\omega = .92$). Regarding average variance extracted, the BPNWS-Sp showed adequate values in the three BPNs, being .70, .67, and .74, for the satisfaction of autonomy, competence, and relatedness, respectively.

Measurement invariance and stability

The invariance of the BPNWS-Sp was tested across gender (i.e., men = 254, women = 330) and type of school (i.e., state = 416, private = 168) based on the CFA model. The results from gender invariance tests (i.e., M4.1–M4.4) and type of school invariance tests (i.e., M4.5–M4.8) are shown in Table 5. Starting with a configural model, invariance constraints were progressively added to the factor loadings (i.e., weak invariance), intercepts (i.e., strong invariance), and uniquenesses (i.e., strict invariance). With regards to gender, it is relevant that all of these increasingly restrictive models provided an excellent level of approximate fit to the

Table 5 Invariance tests across gender and type of school for the BPNWS-Sp

Model	χ^2	df	RMSEA [90% CI]	CFI	TLI	CM	Δ RMSEA	Δ CFI	Δ TLI
Measurement invariance gender									
M4.1. Configural invariance	186.22*	96	0.057 [0.044–0.069]	0.964	0.950	–	–	–	–
M4.2. Weak invariance	205.11*	111	0.054 [0.042–0.066]	0.962	0.955	M4.1	–0.003	–0.002	+0.005
M4.3. Strong invariance	236.01*	122	0.057 [0.046–0.067]	0.954	0.951	M4.2	+0.003	–0.008	–0.004
M4.4. Strict invariance	276.51*	130	0.062 [0.042–0.064]	0.942	0.941	M4.3	+0.005	–0.012	–0.010
Measurement invariance type of school									
M4.5. Configural invariance	189.48*	96	0.058 [0.046–0.070]	0.962	0.948	–	–	–	–
M4.6. Weak invariance	211.52*	111	0.056 [0.044–0.067]	0.959	0.952	M4.1	–0.002	–0.003	+0.004
M4.7. Strong invariance	242.43*	122	0.058 [0.047–0.069]	0.951	0.947	M4.2	+ 0.002	–0.008	–0.005
M4.8. Strict invariance	261.25*	130	0.059 [0.048–0.069]	0.947	0.946	M4.7	+0.001	–0.004	–0.001

χ^2 = Chi square, df = degrees of freedom, RMSEA = root mean square error of approximation, 90% CI = 90% confidence interval of the RMSEA, CFI = comparative fit index, TLI = Tucker–Lewis index, CM = comparison model, Δ = change in fit information relative to the CM

* $p < .01$

data (CFI > .95, TLI > .95 and RMSEA > .06), except the strict invariance model (i. e., M4.4), which was situated very close to the cutoff. The configural, weak, and strong invariance did not exceed the cutoff recommendations for RMSEA ($\Delta > .015$), CFI ($\Delta > .01$), and Δ TLI ($\Delta > .01$). As observed in Table 5, only strict invariance showed a decrease that slightly exceeded the recommended cutoff for CFI ($=.012$) and was close to the guidelines. Nonetheless, the cutoffs for TLI and RMSEA were not exceeded, supporting the invariance across gender for the BPNWS-Sp in secondary education teachers.

The invariance results for type of school showed a similar fit for the data. In this sense, all invariance models, from the configural to the strict model, obtained an adequate goodness-of-fit showing indices that were very close, either above or below, to the recommendations. Moreover, none of these steps exceeded the recommended increment limits for RMSEA ($\Delta > .015$), CFI ($\Delta > .01$), and Δ TLI ($\Delta > .01$), supporting the complete invariance of the BPNWS-Sp across the type of school.

Finally, stability across time was calculated through the test–retest correlations analysis using a complementary longitudinal sample comprised of 79 secondary education teachers. After a 7-month interval, the test–retest correlations were .76 for autonomy satisfaction, .61 for competence satisfaction, and .81 for relatedness, indicating acceptable stability across time of the BPNWS-Sp in secondary education teachers.

Nomological validity

First, a latent correlation analysis was conducted to pre-analyze the BPNWS-Sp nomological validity (Table 6). CFA factors representing engagement at work (i.e., vigor, dedication, and absorption) and its opposite, burnout at work (i.e., overload, lack of development, and neglect), were added to the CFA model for the BPNWS-sp. All latent correlations obtained were statistically significant, showing consistency with SDT (i.e., positively with engagement at work and negatively with burnout at work).

Second, starting again with the CFA model and taking the hypotheses put forward as references, an SEM was performed showing adequate goodness-of-fit

Table 6 Latent correlations between BPNWS-Sp factors, engagement, and burnout at work

CFA solution	Autonomy satisfaction	Competence satisfaction	Relatedness satisfaction
Engagement at work			
Vigor	.41	.61	.35
Dedication	.48	.69	.42
Absorption	.37	.56	.34
Burnout at work			
Overload	-.22	-.16	-.24
Lack of development	-.44	-.35	-.36
Neglect	-.39	-.57	-.32

All correlations are significant at the $p < .001$ level

indices ($\chi^2/df = 4.40, p < .001$; RMSEA = .07; 90% CI = .07–.08; CFI = .944; TLI = .938) (Marsh et al., 2014). In agreement with the SDT, as observed in Figure 1, the three BPNs significantly explained the majority of the factors of teacher engagement and burnout at work. Figure 1 shows the explained variance (R^2) of all the outcomes, which varied between 7% (overload) and 49% (dedication). Therefore, latent correlations and SEM seem to provide support to the nomological validity of the BPNWS-Sp to explain engagement and burnout at work in secondary education teachers.

Discussion

The Spanish validation of the BPNWS (BPNWS-Sp) could become an instrument that will help reflect the improvement of teachers’ working conditions, given the evidence that indicates the importance of satisfying the three BPNs within the work context. Thus, taking the perspectives of the initial validation of the BPNWS (Brien et al., 2012) as reference and under the theoretical framework of the SDT, the objective was to validate the BPNWS-Sp into Spanish for secondary education teachers. In addition, the current study aimed to improve the knowledge of teachers’ well-being by examining the associations between teachers’ experienced need satisfaction and engagement and burnout at work.

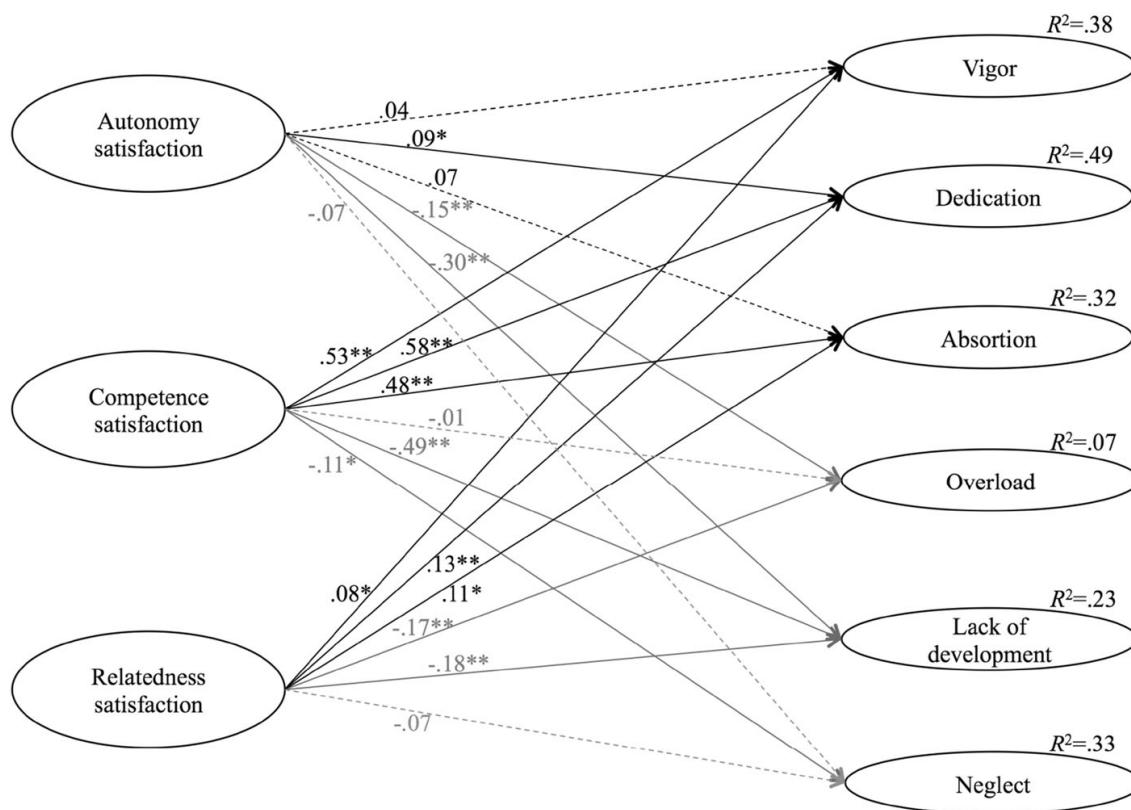


Figure 1 Structural equation modeling of the BPNWS-Sp with engagement and burnout at work. *Black arrows* identify a positive explanation, *grey arrows* identify a negative explanation, *dotted arrows* identify a non-significant explanation, R^2 over latent variable. * $p < .05$, ** $p < .01$

The goodness-of-fit indices of the ESEM and CFA models of the BPNWS-Sp reveal a three-factor structure with four items per factor that adapts to the Basic Psychological Needs Theory (BPNT) (Deci & Ryan, 2000), in a similar manner to the CFAs obtained with French and Canadian teachers in the validation study of the BPNWS (Brien et al., 2012). The ESEM results indicated how all items of the BPNWS-Sp had a greater cross loading weight in their own factor than in the rest. These results suggest that assessing the satisfaction of the three BPNs separately may be more relevant in secondary education teachers than assessing a global need satisfaction factor, as it occurs in some research studies (e.g., Janke et al., 2015). Returning our attention to the final CFA model, all the factor loadings were statistically significant, thus considerably contributing to the assessment of the construct. Regarding BPNWS-Sp score reliability, the results are in agreement with the initial validation of the scale (BPNWS; Brien et al., 2012), and with other studies that have used the BPNWS with French-speaking teachers (Boudrias et al., 2014; Desrumaux et al., 2015). However, in these studies, only Cronbach's alpha was used as an indicator of internal consistency. In addition, Cronbach's alpha could be biased by the number of items, so only using this indicator as proof of internal consistency (Dunn et al., 2014) does not seem advisable. In this sense, unlike previous studies that have used the BPNWS, the composite reliability was computed using omega and the average variance extracted in this validation, obtaining good results in the three BPNs, which strengthens and sustains the reliability of the BPNWS-Sp (Dunn et al., 2014).

Likewise, the multigroup confirmatory analyses also confirm the invariance of the BPNWS-Sp with respect to gender and type of school, which are the two factors that may influence teachers' motivation (Gil-Flores, 2016; Latorre & Sáez, 2009). This could represent an advance in the development of the BPNWS in secondary education teachers, because in the initial validation (Brien et al., 2012) the invariance was only tested between two samples belonging to different countries. However, Brien et al. (2012) did not take into account some variables which may affect teachers' motivational processes. Moreover, based on one of the limitations provided by Brien et al. (2012) in the validation of the BPNWS, stability across time was calculated, obtaining a good test–retest reliability in the three factors. This, together with the results obtained from the ESEM and CFA, support the hypotheses put forward in the study, and defend the internal validity and reliability of the BPNWS-Sp.

Regarding the nomological validity of positive outcomes of the BPNWS-Sp, the latent correlational results showed significant and positive relations between the three BPNs and teacher engagement at work, consistent with theoretical tenets of the SDT. These findings are in agreement with those found by Brien et al. (2012) in the original validation of the BPNWS, where the teachers' satisfaction of the three BPNs was positively related to optimism, intrinsic motivation, well-being, and justice. Similarly, Boudrias et al. (2014) and Desrumaux et al. (2015) found significant and positive relations between the satisfaction of the three BPNs and well-being at the workplace in two studies with French-speaking teachers that used the BPNWS (Brien et al., 2012). With respect to the results obtained in the SEM in this study, the three BPNs positively explained some factors of teacher engagement.

The findings obtained in the teachers' autonomy and competence are in agreement with those shown by Klassen et al. (2012) with Canadian teachers. However, whilst Klassen et al. (2012) showed autonomy as the most influential need to predict teacher engagement, the results obtained in this study indicate the possible importance of satisfying teacher competence. These differences could be the result of Klassen et al. (2012) having used an instrument to measure the BPNs that was not specific to the teaching context (Brien et al., 2012), a professional field where perceived competence may be essential for adequate performance (Collie & Martin 2017). Finally, regarding relatedness, the findings obtained in this study are contrary to those obtained by Klassen et al. (2012), where relatedness negatively explained teacher engagement. However, the results obtained in the SEM of this research are in line with those of the SDT, maintaining the importance that satisfying the three BPNs may have for adequate teacher engagement.

In connection with the predictive capacity of the negative outcomes of the BPNWS-Sp, the latent correlations established between satisfying the three BPNs and teacher burnout are in agreement with the theoretical framework of the SDT (Deci & Ryan, 2000). These findings are in line with previous research studies that have used the French version of the BPNWS (Brien et al., 2012) with teachers, which found a negative relationship between BPNs and anxiety (Boudrias et al., 2014; Desrumaux et al., 2015). Likewise, the results are similar to those obtained by Van den Berghe et al. (2014), where the satisfaction of the three BPNs was negatively associated with teacher burnout. Regarding the results of the SEM of this study, the strong predictive and negative value of competence towards neglect is noteworthy. Thus, the results confirm the initial hypothesis and indicate that if the teachers' BPNs are satisfied, especially the competence need, this could increase their engagement and prevent burnout at work, reducing the behavioral indifference in the workplace (Montero-Marín et al., 2011).

Implication for practice

Recent research reveals that teachers are the most important factor in influencing student learning (Marshik et al., 2016). Therefore, teachers' health and satisfaction at work should be a priority factor to improve the educational system. However, in Spain, teachers have experienced a pronounced decrease in their well-being at work, especially secondary education teachers (Anaya & López, 2014).

Working in a school context where the three BPNs are supported by the school environment relates positively to teachers' BPN satisfaction and well-being (Baard et al., 2004; Lee & Nie, 2014). Validating the BPNWS-Sp could prove helpful to know to what extent teachers have satisfied their BPNs, one of the most relevant antecedents of their well-being (Klassen et al., 2012). So, if through the BPNWS-Sp, teachers, headmasters, and the educational administration can know which BPNs need to be further supported, strategies focused on improving their autonomy, competence, and/or relatedness satisfaction at work could be designed and implemented.

To illustrate this, the educational administration could support the teachers' need for autonomy by developing a more open and consensual curriculum with them and

providing higher quality resources in classrooms. Similarly, headmasters could support autonomy by providing academic freedom in teaching, asking, and listening to teachers' concerns and being more flexible with regard to developing curricular and extracurricular activities based on common interests of both teachers and students. Providing the opportunity to attend conferences and offering courses funded by the educational administration to stimulate professional development (e. g., training in BPN support towards their students) could support teachers' need for competence. Likewise, both school policy makers and headmasters could provide positive feedback about the efforts that teachers put into their work to satisfy their competence need. Finally, relatedness satisfaction can be nurtured through support from the educational administration and headmasters to the performance of interdisciplinary projects. In this way, the relationships between teachers who belong to different areas and students from different courses can be supported, creating a friendlier working environment in schools.

Limitations of the study and implications for future research

However, some limitations and perspectives must be taken into consideration. Firstly, the BPNWS-Sp items related to relatedness satisfaction refer exclusively to the teachers' relationship with their co-workers. A new avenue of research could be to elaborate and adapt new items to assess teachers' relatedness satisfaction with other significant agents of the school environment (i.e., headmasters, students, or parents). It would allow the school policy makers to know to what extent the teachers' relationships with other agents could be relevant for their well-being, and elaborate more adapted school policy strategies in order to satisfy this BPN. Secondly, the BPNWS-Sp has been validated into Spanish to be used with secondary education teachers from the Aragon region (Spain). Further research is needed to examine this scale at other education levels and in other Spanish-speaking countries (i.e., South American countries). In addition, due to the nature of the BPNWS-Sp items, future research could examine the validity of the BPNWS-Sp to measure the satisfaction of BPNs in other professions and in other Spanish workers. Thirdly, although the explanatory capacity of the BPNWS-SP shows evidence of positive and negative outcomes such as burnout and engagement at work, the SEM of the present study was conducted with cross-sectional data, and causality in relationships cannot be inferred. Future studies using longitudinal or experimental designs are needed to extend these findings and to examine the causal and long-term effects of teachers' BPN satisfaction on different outcomes at the workplace. Finally, the seven-month interval to test BPNWS-Sp invariance across time could also interfere in the stability of each dimension (i.e., autonomy, competence, relatedness). Future research should test the stability of the scale with a shorter interval between the first and the second measure.

Conclusion

To conclude, the Spanish version of the BPNWS (BPNWS-Sp) seems valid and reliable to assess the satisfaction of the three BPNs in secondary education teachers. It can also be used as an instrument to examine and predict health and well-being in the workplace. These results have important practical implications in the school context that should be taken into account to satisfy teachers' BPNs. Finally, although this scale was tested with a sample of secondary education teachers, the nature of the items allows future researchers to examine the need satisfaction with other Spanish-speaking workers. Similarly, this study proposes a valid and reliable Spanish measure of need satisfaction at work that could contribute to the feasibility of cross-cultural studies conducted across Spanish-speaking countries.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Appendix

See Table 7.

Table 7 Spanish and English versions of the BPNWS

Spanish version (BPNWS-Sp)	English version (BPNWS; Brien et al., 2012)
1. Mi trabajo me permite tomar decisiones	1. My work allows me to make decisions
2. Puedo tomar mis propias decisiones para resolver problemas relacionados con el trabajo	2. I can use my judgment when solving work-related problems
3. Puedo asumir responsabilidades en mi trabajo	3. I can take on responsibilities at my job
4. En mi trabajo, me siento libre para realizar las tareas a mi manera.	4. At my work, I feel free to execute my tasks in my own way.
5. Tengo la capacidad de hacer bien mi trabajo	5. I have the ability to do my work well
6. Me siento competente en el trabajo	6. I feel competent at work
7. Soy capaz de resolver problemas en el trabajo	7. I am able to solve problems at work.
8. Tengo éxito en mi trabajo	8. I succeed in my work
9. Cuando estoy con los compañeros/as de mi trabajo, me siento comprendido/a	9. When I'm with the people from my work environment, I feel understood
10. Cuando estoy con los compañeros/as de mi trabajo, me siento escuchado/a	10. When I'm with the people from my work environment, I feel heard
11. Cuando estoy con los compañeros/as de mi trabajo, siento que puedo confiar en ellos/as	11. When I'm with the people from my work environment, I feel as though I can trust them
12. Cuando estoy con los compañeros/as de mi trabajo, siento que soy un amigo/a para ellos	12. When I'm with the people from my work environment, I feel I am a friend to them

Autonomy satisfaction = items 1–4, Competence satisfaction = items 5–8, Relatedness satisfaction = items 9–12

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5.1.3. Estudio 3: An integrative framework to validate the Need-Supportive Teaching Style Scale (NSTSS) in secondary teachers through exploratory structural equation modeling

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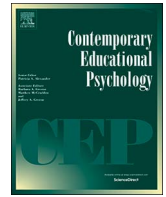
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An integrative framework to validate the Need-Supportive Teaching Style Scale (NSTSS) in secondary teachers through exploratory structural equation modeling

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ABSTRACT

Grounded in self-determination theory and achievement goal theory, the objective of this study was to validate the Need-Supportive Teaching Style Scale (NSTSS) to evaluate teachers' perception of their interpersonal styles. Using an adaptation to teachers of the items of the Motivational Climate in Physical Education Scale (MCPES) validated in students, the NSTSS proposed a four-factor structure, made up of task climate support, ego climate support, autonomy support and relatedness support. With a sample of 584 secondary teachers, the results obtained from the confirmatory factor analysis (CFA) and from the exploratory structural equation modeling (ESEM) supported the four-factor structure for the NSTSS. The results also supported composite reliability, measurement invariance across gender and type of school (public or private), as well as nomological validity (in relation to measures of motivation to teach, engagement at work and burnout at work) of NSTSS ratings. The results are discussed by arguing the importance that creating a scale to evaluate teachers' perception of their need-supportive teaching styles using an integrative approach may have, discussing theoretical, methodological and practical contributions.

1. Introduction

Following from Reeve (2009), interpersonal teaching styles can be defined as strategies that teachers adopt to stimulate their students' learning process, motivation and personal development. Thus, self-determination theory (SDT; Deci & Ryan, 1985; Ryan & Deci, 2000) and achievement goal theory (AGT; Nicholls, 1989) have become consolidated as two of the most commonly used theoretical frameworks to explain the importance of an interpersonal teaching style in the classroom (e.g., Aelterman, Vansteenkiste, Van den Berghe, De Meyer, & Haerens, 2014; Butler, 2007; Cheon, Reeve, Yu, & Jang, 2014; Han, Yin, & Wang, 2016).

Recent studies, based on both theoretical frameworks, have shown that student perception of teachers' interpersonal styles was positively related to student motivation (e.g., Cheon, Reeve, & Song, 2016). Moreover, previous studies have shown that teachers' perception of

their interpersonal styles was positively related to their motivation (e.g., Jang, Kim, & Reeve, 2012; Reeve, 2013), as well as to other outcomes associated with teachers' work (e.g., burnout, engagement, interest in teaching; Cheon et al., 2014; Han et al., 2016; Retelsdorf, Butler, Streblov, & Schiefele, 2010; Van den Berghe et al., 2014). This is where the classroom emerges as a key element of reciprocity, becoming a shared social context where both students' and teachers' attitudes converge. Thus, Pelletier, Séguin-Lévesque, and Legault (2002) suggested that the motivation and outcomes that teachers generate in their own students could also have a reciprocal influence on teaching motivation, providing feedback for their interpersonal styles (see Fig. 1). This hypothetical sequence was later empirically demonstrated in the educational context (Jang et al., 2012; Reeve, 2013) and extended by Pelletier and Rocchi (2015, p. 112), always under SDT framework (Deci & Ryan, 1985). Therefore, the present study suggests the integration of AGT (Nicholls, 1989) into the aforementioned theoretical

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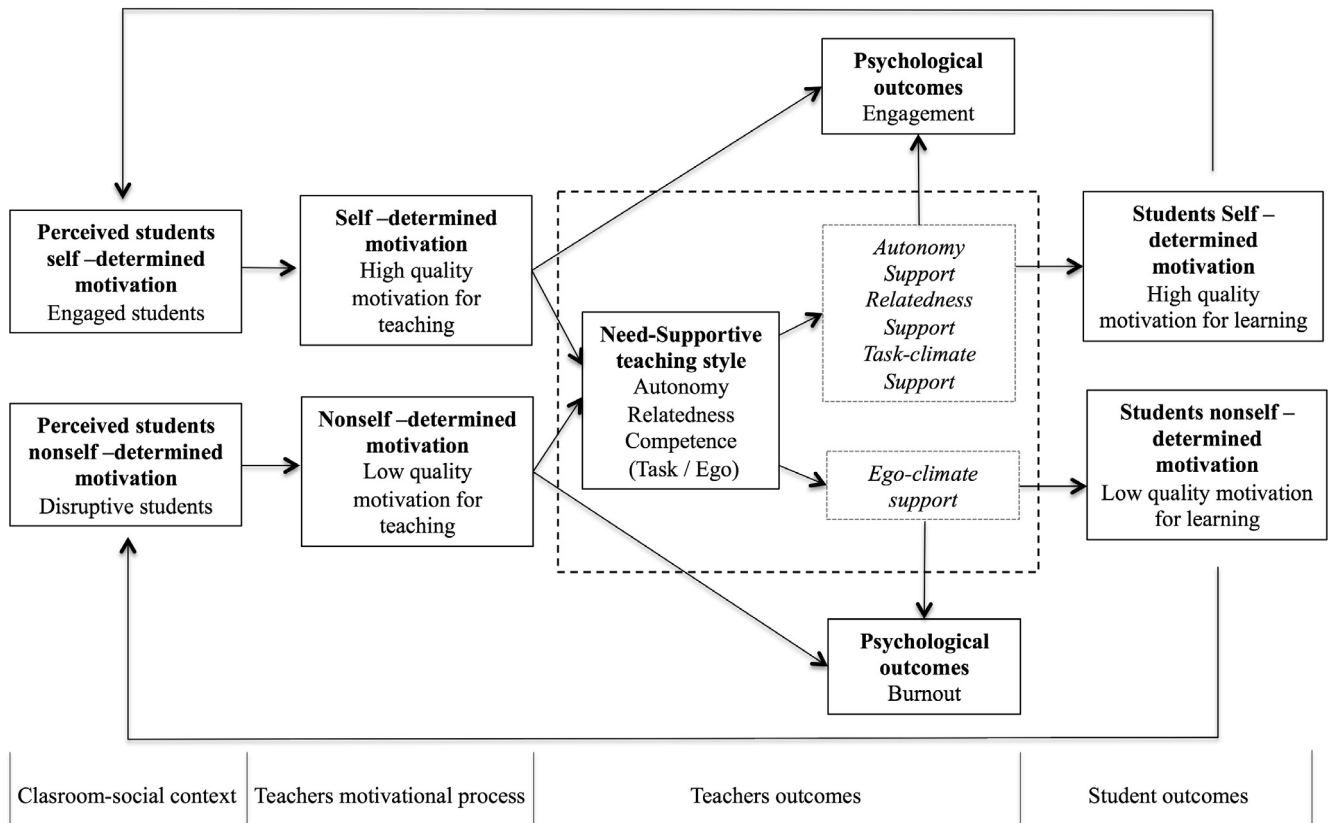


Fig. 1. A process model of the effects of the classroom as a social context on teachers' motivation, need-supportive teaching style, teachers' psychological outcomes and students' outcomes: integration of AGT into the SDT framework suggested by Pelletier et al. (2002) and extended by Pelletier and Rocchi (2015).

sequence (see Fig. 1), to increase knowledge about the importance that an interpersonal teaching style could have on the actual teachers as well as on the students.

This article seeks to fill this gap in literature, adapting a scale that accurately examines teachers' perspective of their interpersonal teaching styles. Previous studies have assessed the interpersonal teaching style using an integrated theoretical framework (i.e., SDT and AGT), but focusing exclusively on the student perspective. Thus, Soini, Liukkonen, Watt, Yli-Piipari, and Jaakkola (2014) developed and validated the Motivational Climate in the Physical Education Scale (MCPES) that assesses the interpersonal teaching style of physical education teachers from the student perspective. Using the items and the four-factor structure based on the integrated theoretical framework (i.e., SDT and AGT) proposed in MCPES, the present study aims to adapt the items to teachers, and validate the Need-Supportive Teaching Style Scale (NSTSS). This scale could provide some advances in the optimization of work and study environments in schools. For instance, an effective evaluation of interpersonal teaching styles could help to design specific strategies to support autonomy, relatedness and a task climate towards students. This could have an impact on students' academic achievement and discipline (e.g., Taylor & Ntoumanis, 2007) and on teachers' motivation and well-being (e.g., Cheon et al., 2014; Reeve, 2013), which has been so affected in recent years (Anaya & López, 2014).

1.1. Self-determination theory

SDT proposes that people have innate psychological needs (autonomy, relatedness and competence), which, when supported, are associated with motivation, engagement and well-being (Deci & Ryan, 1985; Ryan & Deci, 2000). Autonomy satisfaction refers to people's need to feel they are the causal agents of their actions. Relatedness

satisfaction refers to people's need to belong to a group of peers and to have positive interpersonal relationships. Competence satisfaction refers to people's need to believe they are effective faced with a situation in a certain context.

In the educational context, following from SDT, need-supportive teaching style involves the provision of autonomy support, relatedness and competence (Tessier, Sarrazin, & Ntoumanis, 2010; Van den Berghe, Cardon, Tallir, Kirk, & Haerens, 2016). Firstly, in a school context, teachers can support autonomy by involving students in decision-making and showing interest in their feelings and preferences (Reeve, 1998). Likewise, encouraging students to freely express their feelings, allowing criticism and accepting it, even when this is negative, is typical of a teacher who supports autonomy (Cheon & Reeve, 2015). Secondly, teachers can support their students' relatedness through tasks that facilitate cooperation and by organizing heterogeneous groups of students (Aelterman et al., 2014). Likewise, relatedness support is characterized by an environment where teachers work closely with their students, showing personal concern and interest in them (Tessier et al., 2010). Finally, teachers can support their students' competence in the classroom by using positive and interrogative feedback focused on personal progress (Jang, Reeve, & Deci, 2010). Competence support is also fostered through a structured learning environment where tasks are adapted to the students' level of skill (Jang et al., 2010). In this regard, many studies in line with SDT have shown a positive relationship between need-supportive teaching style and autonomous motivation in students (Ntoumanis, 2005; Taylor & Ntoumanis, 2007), which, in turn, is positively related to more adaptive outcomes in students (e.g., behavioral engagement, interest; Aelterman et al., 2014; Cheon & Reeve, 2015; Cheon et al., 2016; Jang et al., 2010; Van den Berghe et al., 2016).

1.2. Achievement goal theory

AGT was initially developed by Nicholls (1984) to assess individuals' goals in achievement situations, based on a dichotomous model. This initial model was comprised of two qualitatively distinct types of competence: mastery/task (i.e., to demonstrate competence relative to oneself) and performance/ego (i.e., to demonstrate ability relative to others; for further information, see Ames, 1992; Nicholls, 1989). Elliot and Harackiewicz (1996) and Elliot and McGregor (2001) extended this dichotomous model to a trichotomous model by bifurcating the performance/ego goal into two different constructs (i.e., performance-approach and performance-avoidance; for further information, see Elliot & Harackiewicz, 1996), and then to a 2×2 model (i.e., performance-approach, performance-avoidance, mastery-approach, and mastery-avoidance; for further information, see Elliot and McGregor, 2001). Over the last few years, the 2×2 model has been extended to a 3×2 model by bifurcating mastery/task goals into separate task-based and self-based categories (for further information, see Elliot, Murayama, & Pekrun, 2011). Although numerous studies had assessed students' perception of the motivational climate developed by teachers, research on teachers' perspective of their teaching style is still fairly scarce (Butler, 2014). For a first approximation to the integration of both theoretical frameworks in terms of teachers' perspective (i.e., AGT and SDT), in this study, we propose an integrative model that is comprised of the dichotomous model (i.e., mastery/task vs performance/ego) and two dimensions of the interpersonal teaching style through the tenets of SDT.

Grounded in the dichotomous model proposed by AGT (Nicholls, 1989), an individual's main motive is to demonstrate competence or ability when involved in an achievement context (e.g., classroom). The AGT includes two main elements: goal orientation (i.e., perception of an individual's competence towards an activity) and motivational climate (i.e., perception of social environment). Thus, depending on how success is defined by the social context, to achieve a certain activity, an individual's orientation can be modified (i.e., mastery/task-oriented vs performance/ego-oriented). In the school context, teachers can emerge as decisive social agents in managing their students' orientations by creating a certain motivational climate (i.e., mastery or task-involving climate vs performance or ego-involving climate; Senko, Hulleman, & Harackiewicz, 2011). Teachers can also generate a task-involving climate when they manage, reinforce and evaluate student success in terms of effort and individual achievement and improvement. In this vein, different studies in the educational context have shown a positive association between task-involving climate and students' autonomous motivation, engagement and responsibility (Fernández-Río, Méndez-Giménez, & Cecchini, 2014; Han et al., 2016). In contrast, teachers can generate an ego-involving climate when they manage, reinforce and evaluate their students' success in comparison with the performance of other students. Consequently, in the school context, ego-involving climate has been associated with controlled motivation, boredom and lack of discipline of students in class (Fernández-Río et al., 2014; Moreno, Jiménez, Gil, Aspano, & Torrero, 2011).

1.3. A theoretically integrated and motivational teaching environment

The dimensions of the interpersonal teaching style proposed by SDT (i.e., autonomy support, relatedness support and competence support) and AGT (i.e., task climate support and ego climate support) have been studied independently for many years (Morgan, 2016). Yet, recent studies in the educational context have started to integrate both theoretical frameworks (i.e., SDT and AGT) for a better understanding of student motivation (e.g., Abós, Sevil, Julián, Abarca-Sos, & García-González, 2016; Jaakkola, Wang, Soini, & Liukkonen, 2015; Sevil, Abós, Aibar, Julián, & García-González, 2016; Soini et al., 2014). The integration of these two theoretical frameworks could increase the understanding of the repercussions that an interpersonal teaching style

may have on student motivation and on the motivation of the teachers themselves (Morgan, 2016). However, for an acceptable integration, it is important to identify some constructs that have different nuances depending on the theory.

Related to the above, to explain motivational processes, both SDT and AGT are based on perceived competence (although SDT also includes autonomy and relatedness; Jaakkola et al., 2015; Soini et al., 2014). However, while the AGT differentiates the way of understanding perceived competence in a certain activity, depending on the motivational climate created in a certain context (i.e., task = competence is to better oneself; ego = competence is to be better than the rest), SDT does not establish this difference. This could be a key aspect to motivate students and the teachers themselves (Morgan, 2016; Soini et al., 2014). To illustrate this, teachers can place emphasis on effort and personal improvement (e.g., you must improve your own skills) or on normative comparisons between students (e.g., you must be better than your peers) in the lessons. If competence is supported by focusing student achievement on individual improvement, the outcomes in terms of school environment could be very different than when teachers support student competence by guiding their achievements to surpass other peers.

As observed in Fig. 1, integrating AGT into the motivational sequence of SDT (Pelletier & Rocchi, 2015; Pelletier et al., 2002), to analyze reciprocity between teacher motivation and student motivation, could provide a better understanding of the mechanisms involved in the class: (a) teachers who develop a task climate can foster positive and adaptive outcomes in their students (e.g., enjoyment, predisposition towards the teaching unit; Abós et al., 2016; Jaakkola et al., 2015), which, since they occur in the classroom, could increase teachers' motivation and reinforce their interpersonal teaching styles (Reeve, 2013); (b) teachers who develop an ego climate may trigger negative and disadaptive outcomes in the classroom (e.g., amotivation, boredom; Abós et al., 2016; Sevil et al., 2016), which, in turn, could cause less self-determined motivation in teachers (Fernet, Guay, Senécal, & Austin, 2012). Thus, the complementary nature of these two theoretical frameworks may provide a breakthrough in the evaluation of teacher perception of the need-supportive style based on a multi-dimensional and integrated approach (Morgan, 2016).

1.4. The present study

Grounded in SDT, there are no self-reported instruments that evaluate teachers' perception of their interpersonal teaching styles. Regarding AGT, there are only two instruments that evaluate teacher perception of goal orientations for teaching (Goal Orientations for Teaching, see further information Butler, 2007; and Achievement Goal Questionnaire for Teachers, for further information, see Mascaret, Elliot, & Cury, 2015). However, there are no instruments, either, that evaluate the teachers' perception of the interpersonal styles they generate in the classroom, following a theoretical framework that integrates both theories. Therefore, based on the perspective of an integrated theoretical framework (i.e., SDT and AGT), and using and adapting the items of the MCPES to the teaching context, the objective of this study was to validate the Need-Supportive Teaching Style Scale (NSTSS) to evaluate teachers' perception of their interpersonal styles. Importantly, an effective evaluation of the interpersonal teaching style through the NSTSS could identify some teaching shortcomings of secondary teachers, and design more specific strategies to improve their performance in the classroom. First, this could affect students' motivation and their discipline in the classroom. Second, this may reciprocally affect teachers' well-being at work and their motivation to teach, converting schools into a friendlier environment to study and work.

1.4.1. Four-factor structure

Recently, Soini et al. (2014) have developed the MCPES, which evaluates student perception of the need-supportive teaching style,

based on the integration of SDT and AGT. Soini et al. (2014) selected and adapted items from the Learning and Performance Orientations in Physical Education Classes Questionnaire (LAPOPEQ; Papaioannou, 1994) and the Perceived Motivational Climate in Sport Questionnaire (PMCSQ; Seifriz, Duda, & Chi, 1992; Walling, Duda, & Chi, 1993). The LAPOPEQ (Papaioannou, 1994) revealed a two factor-structure called Learning (task-orientation) and Performance dimension (ego-orientation). The PMCSQ (Seifriz et al., 1992; Walling et al., 1993) revealed two predominant dimensions named Mastery climate (task-involving) and Performance climate (ego-involving). As a result, Soini et al. (2014) proposed a four-factor structure with 18 items, representing perceived autonomy support, relatedness support, task climate and ego climate. The last two factors reflected perceived support to the perception of competence that integrates the SDT. Although the structure of the items of the MCPES may be the same in teachers, some of the items may have to be adapted for this specific context. Therefore, the items of the MCPES were adapted to teachers to validate the NSTSS proposed in the present study (for further information, see Need-Supportive Teaching Style section). Thus, following from Soini et al. (2014), the first hypothesis suggests that a four-factor structure (i.e., task climate support, ego climate support, autonomy support and relatedness support) will emerge for the secondary teachers' responses to the NSTSS, showing acceptable psychometric properties.

1.4.2. Generalizability of the NSTSS structure across gender and type of school

Previous scales, which assessed student perception of the interpersonal teaching style (i.e., MCPES; Soini et al., 2014), did not examine measurement invariance. Furthermore, in the scales used to develop the MCPES (i.e., LAPOPEQ and PMCSQ) measurement invariance was not evaluated, either. Yet, it is well known that a key condition to ensure an acceptable psychometric validation of a scale is to show the extent to which the psychometric properties found in a sample can be generalized to other subgroups (Millsap, 2011). Thus, some authors suggest carrying out systematic tests of measurement invariance conducted across predetermined and meaningful subgroups of participants (Millsap, 2011; Morin, Meyer, Creusier, & Biétry, 2015). In this sense, recent studies recommend reporting invariance in factors such as gender, age or other sociodemographic characteristics, one of which could be the type of school (i.e., public or private) (e.g., Ayman & Korabik, 2010; Lukaszewski & Stone, 2012). Indeed, a meta-analysis reported that females tended to adopt a more democratic or participatory style and a less autocratic or directive style than males (Van Engen & Willemsen, 2004). Likewise, a recent study showed that female teachers reported higher scores in the autonomy-supportive style, and lower scores in the controlling style than their male counterparts (Reeve et al., 2014). Further, the type of school (i.e., state or private) could affect teachers' motivational processes and consequently their interpersonal teaching styles, especially in Spain (Gil-Flores, 2016; Latorre & Sáez, 2009). Teachers working in public schools report less social recognition than teachers working in private schools (Latorre & Sáez, 2009). Yet, a larger number of teaching subjects and longer working hours could negatively determine the interpersonal teaching styles of teachers who work in private schools (Latorre & Sáez, 2009). Therefore, to be able to effectively diagnose possible differences between groups (i.e., gender, type of school) that affect teachers' interpersonal teaching styles, it is advisable to firstly develop invariant scales across these factors. Consequently, the second hypothesis suggests that the NSTSS will remain invariant regardless of the teachers' gender or type of school.

1.4.3. Nomological validity of the NSTSS

Research in SDT has suggested that the interpersonal teaching style adopted in the classroom can be influenced by teacher motivation (Pelletier et al., 2002). According to SDT, teachers could have different reasons to engage in their work. Some teachers may experience

satisfaction in the tasks they carry out and think that their work could be important for their personal development and for the development of their students (autonomous motivation; comprised of intrinsic motivation and identified regulation). Other teachers may teach to seek social approval or to avoid feelings of blame (controlled motivation; comprised of introjected and external regulation). Finally, teachers may not understand why they teach given that they believe that their work falls on deaf ears (amotivation) (Ryan & Deci, 2000). Recent studies have indicated how the interpersonal teaching style can be related to teacher behavior outcomes, such as engagement (i.e., teachers who show a high level of energy and identification with their work) and burnout (i.e., teachers who show severe exhaustion caused by chronic exposure to stress at work), (e.g., Cheon et al., 2014; Parker, Martin, Colmar, & Liem, 2012), which can fully illustrate their occupational well-being (Van den Broeck, Ferris, Chang, & Rosen, 2016).

Consequently, two hypotheses were proposed to verify the nomological validity of the NSTSS with different variables that have an influence on teachers' interpersonal styles (see further information Pelletier & Rocchi, 2015; Pelletier et al., 2002). Consistent with previous studies, the third hypothesis proposes that teacher perception of task climate support, autonomy support and relatedness support will be significantly and positively related to autonomous motivation and engagement, and significantly and negatively related to controlled motivation, amotivation and burnout of teachers at work. Finally, the fourth hypothesis suggests that teacher perception of ego climate support will be significantly and positively related to controlled motivation, amotivation and burnout, and significantly and negatively related to autonomous motivation and engagement of teachers at work.

2. Method

2.1. Participants and procedures

An instrumental quantitative study was conducted following the guidelines of the Declaration of Helsinki (2013) with respect to consent and the confidentiality of answers. Data were compiled over an online platform that was active for 30 days. All secondary teachers (i.e., 6393) working during the 2014/2015 academic year in Aragon region (Spain) were sent an e-mail with access details, together with a brief explanation of the study and the contact data of the main researcher in case they wanted to obtain more information. The response rate was 10% (i.e., 584 Spanish secondary teachers). The total study sample included exactly the same percentage of teachers of both genders (43% males, 57% females) as samples that include all secondary teachers of Aragon region. Further, the study sample represented a wide variety of ages (25 to 66; $M = 45.04$), and ranges of teaching experience (1 to 45 years; $M = 17.55$). Finally, most of the teachers from the study sample worked in public schools (71%), but teachers who worked in private schools (29%) were also represented. These percentages are the same for the sample that includes all secondary teachers of Aragon region. These statistics were provided by the Ministry of Education, Culture and Sport (for further information, see <http://www.mecd.gob.es>).

As testing the integrity of these two theoretical frameworks to assess teachers' perception of their interpersonal teaching styles was something new, a preliminary study was performed (Morin & Maïano, 2011). Thus, approximately 33% of the teachers were randomly selected using the SPSS software. The percentages, in terms of gender and school type of the total sample of secondary teachers in Aragon, were also taken into account. As a result, 184 teachers (88 males, 96 females), 140 of whom worked at public schools, formed part of the preliminary study. The other 400 teachers (166 males, 234 females), 276 of whom worked at public schools, comprised the sample of the main study. Approval for this study was obtained from the University's research ethics committee.

2.2. Measures

2.2.1. Need-Supportive Teaching Style

The Need-Supportive Teaching Style Scale (NSTSS) was drawn up based on the four-factor structure with 18 items proposed by [Soini et al. \(2014\)](#) to evaluate teachers' perception of their interpersonal styles. The steps below were followed to construct the NSTSS: (1) translation into Spanish, (2) adaptation to the teacher work context; (3) preliminary study; and (4) definite version.

Firstly, the procedures of the International Test Commission ([Muñiz, Elosua, & Hambleton, 2013](#)) were followed to translate the original version of the MCPES into Spanish. Thus, the original 18 items were translated independently by two bilingual experts. Any discrepancies in the translation between the two versions were discussed to develop an initial Spanish version of the MCPES. Then, a third bilingual translator, who did not participate in the first translation, translated the initial Spanish version of the MCPES back into English again. This back-translated version was compared with the original version of the MCPES, eliminating any inconsistencies that had arisen to obtain two identical versions.

Secondly, after obtaining the definite version of the MCPES in Spanish, the items were subject to a contextual adaptation to evaluate teachers' perception of their interpersonal teaching styles. A group of four expert researchers with extensive training in the theoretical frameworks of the NSTSS (i.e., SDT and AGT) were involved in this process. Two of the experts had at least twenty years' teaching experience in Physical Education and Sport Pedagogy, having published a large body of research related to both frameworks. One of the experts had published the validation of several instruments related to both frameworks. Finally, one of the researchers was an expert in the PE curriculum in Spain and was qualified in the design of instruments to identify strategies associated with motivational climates created by teachers. One of the four expert researchers conducted a first adaptation of the items to the Secondary Education teaching context. To do so, students' perception of the interpersonal teaching style (e.g., MCPES: Students have significant freedom to make choices during lessons; Learning new things makes me want to learn more) was slightly transformed to convert it into teachers' perception of their interpersonal teaching styles (e.g., NSTSS: My students have significant freedom to make choices during my lessons; I try to get my students to learn new things, so they want to learn more). Then, a second expert carefully read the items and made slight modifications in agreement with the first expert. Finally, the other two experts separately classified the items into the constructs that they referred to. The degree of agreement between them was 100%. After obtaining the approval of the four experts, a first version of the NSTSS, which maintained the four-factor structure (i.e., task climate support, ego climate support, autonomy support and relatedness support) and number of items (i.e., 18) of the MCPES ([Soini et al., 2014](#)) was obtained, but translated into Spanish and adapted to the teacher working context.

Thirdly, as described below in the results section, this first 18-item version was evaluated in a preliminary study with 184 secondary teachers, obtaining some limited factor loadings in three of the items (see [Table 2](#)), which were finally eliminated.

As a final step, the NSTSS was once again evaluated with a sample of 400 teachers, obtaining satisfactory results, which are described below. Thus, the definite version of the NSTSS (see [Table 1](#)) was comprised of 15 items that measured task climate support (items 1 to 5), ego climate support (items 6 to 8), autonomy support (items 9 to 12), and relatedness support (items 12 to 15). Responses were provided on a 5-point Likert-type scale ranging from 1 ("Strongly Disagree") to 5 ("Strongly Agree").

2.2.2. Motivation to teach

Autonomous motivation, controlled motivation and amotivation were measured.

An adaptation of the Self-Regulation Questionnaire–Academic ([Ryan & Connell, 1989](#)) to the teaching context, carried out by [Soenens, Sierens, Vansteenkiste, Dochy, and Goossens \(2012\)](#) was used to measure autonomous motivation and controlled motivation. This adaptation to the teaching context, carried out by [Soenens et al. \(2012\)](#), showed adequate psychometric properties with 317 Belgian teachers. This scale includes 16 items that assess teacher autonomous motivation (eight items; e.g., "I am very interested in teaching") and controlled motivation (eight items; e.g., "I want others to think I'm a good teacher"). In addition, three items from the Work Extrinsic and Intrinsic Motivation Scale ([Tremblay, Blanchard, Taylor, Pelletier, & Villeneuve, 2009](#)) were used to measure amotivation (e.g., "I don't know, I feel like I'm wasting time when I teach"). These three items were slightly adapted to the teaching context (i.e., substituting the word "work" for "teach"). The stem for this set of items (i.e., autonomous motivation, controlled motivation and amotivation) was "I get involved in teaching..." and responses were provided on a 5-point Likert-type scale ranging from 1 ("Strongly Disagree") to 5 ("Strongly Agree"). A CFA was performed showing adequate goodness-of-fit ($\chi^2/df = 5.48$, $p < .001$; CFI = 0.961; TLI = 0.958; RMSEA = 0.080). The composite reliability analysis of the study sample obtained omega (ω) values of 0.92 for autonomous motivation, 0.84 for controlled motivation and 0.88 for amotivation. All items were translated from English to Spanish, the participants' mother tongue, using the same procedure as the above instrument ([Muñiz et al., 2013](#)).

2.2.3. Engagement at work

Vigor, dedication, and absorption were measured using the Spanish version ([Schaufeli, Martínez, Marques-Pinto, Salanova, & Bakker, 2002](#)) of the Utrecht Work Engagement Scale ([Schaufeli, Salanova, González-Romá, & Bakker, 2002](#)). This scale includes 17 items assessing respondents' vigor (six items; e.g., "When working I feel strong and vigorous"), dedication (five items; e.g., "I am enthusiastic about my work") and absorption (six items; e.g., "When I am working, I forget everything else around me"). Responses were provided on a 6-point Likert-type scale ranging from 0 (Never) to 6 (Always). This scale showed adequate psychometric properties in previous studies with teachers ([Nerstad, Richardsen, & Martinussen, 2010](#)). In this study, a CFA was performed indicating adequate goodness-of-fit ($\chi^2/df = 4.12$, $p < .001$; CFI = 0.967; TLI = 0.963), except for RMSEA (=0.010) that was close to recommendations, similarly to the results of [Nerstad et al. \(2010\)](#). However, the composite reliability analysis of the study sample obtained omega (ω) values of 0.88 for vigor, 0.92 for dedication and 0.86 for absorption.

2.2.4. Burnout at work

Overload, lack of development and neglect were measured using the Spanish version of the Burnout Clinical Subtype Questionnaire (BCSQ-12; [Montero-Marín, Skapinakis, Araya, Gili, & García-Campayo, 2011](#)) validated with 826 university workers. This questionnaire comprises 12 items and is distributed into three factors with four items each one: overload (e.g., "I overlook my own needs to fulfill work demands"), lack of development (e.g., "My work does not offer me opportunities to develop my skills") and neglect (e.g., "I give up in response to difficulties in my work"). Responses are registered on a 7-point Likert scale ranging from 1 (Totally disagree) to 7 (Totally agree). This scale showed adequate psychometric properties in previous studies with secondary teachers ([Abós, Sevil, Julián, Martín-Albo & García-González, 2017](#)). In the present study, a CFA was performed showing adequate goodness-of-fit ($\chi^2/df = 2.94$, $p < .001$; RMSEA = 0.058; CFI = 0.994; TLI = 0.993). The composite reliability analysis of the study sample obtained omega (ω) values of 0.90 for overload, 0.92 for lack of development and 0.92 for neglect.

Table 1
Spanish and English versions of the Need-Supportive Teaching Style Scale.

Spanish version (NSTSS)	English version (NSTSS) ^a
1. Para mí es importante que los estudiantes lo hagan lo mejor posible durante las clases	1. For me, it is important for students to try their best during lessons
2. Intento que mis alumnos aprendan cosas nuevas para que quieran aprender más	2. I try to get my students to learn new things so they want to learn more
3. Lo más importante es que mis alumnos progresen cada año en sus propias destrezas	3. What's most important is for my students to progress every year in their own skills
4. Es importante para mí que los estudiantes traten de mejorar sus propias destrezas	4. For me, it is important for students try to improve their own skills
5. Trato de que los estudiantes sigan intentándolo a pesar de que cometan errores	5. I try to get students to keep trying even though they make mistakes
6. Es importante para mí que mis estudiantes demuestren que son mejores unos que otros en mi clase	6. For me, it is important for students to show that they are better than others in my class
7. Trato de que mis estudiantes lo hagan mejor que sus otros compañeros/as	7. I try to get my students to do better than their other classmates
8. Intento que mis estudiantes compitan entre sí para hacerlo mejor durante las clases	8. I try to get my students to compete with each other to do it better during classes
9. Mis estudiantes tienen un papel importante en la toma de decisiones en mis clases	9. My students have a significant role in decision making in my classes
10. Mis estudiantes tienen la libertad de tomar decisiones durante mis clases	10. My students have significant freedom to make choices during my lessons
11. Doy la oportunidad a los estudiantes de seleccionar las actividades de acuerdo a sus propios intereses	11. I give students the opportunity to select activities according to their own interests
12. Es importante para mí que mis estudiantes puedan participar en el desarrollo de la clase (organizativo, elección de tareas, etc.)	12. It is important for me for my students to be able to participate in the development of the class (organization, choice of tasks, etc.)
13. Para mí, es importante que mis estudiantes estén unidos en las distintas unidades didácticas que desarrollamos durante el curso	13. For me, it is important for my students to be united in the different teaching units that we develop throughout the course
14. Intento que mis estudiantes realmente trabajen juntos como un equipo en mis clases	14. I try to get my students to really “work together” as a team in my lessons
15. Intento que durante mis clases mis estudiantes se junten para trabajar	15. I try to get my students to “pull together” to work during my lessons

Note: items 1 to 5 = Task climate support; 6 to 8 = Ego climate support; 9 to 12 = Autonomy support; 13 to 15 = Relatedness support.

^a English version has not been validated.

2.3. Data analysis

2.3.1. Model estimation

Confirmatory Factor Analysis (CFA) and Exploratory Structural Equation Modelings (ESEM) were calculated with Mplus 7.3 (Muthén & Muthén, 2016). The distribution of the item responses was previously tested to correctly choose the estimator. Because all the items recorded all possible responses (i.e., 1, 2, 3, 4 or 5), data were treated as continuous. Thus, Robust Maximum Likelihood (MLR), which provides fit indices and standard errors that are robust to non-normality and to the Likert nature of items including five or more response categories, was chosen as the estimator (Finney & DiStefano, 2013). CFA models were estimated according to the independent cluster model, with each item being allowed to load on a single factor, and all four factors being allowed to correlate (Sánchez-Oliva et al., 2016). The ESEM models were estimated with an oblique target rotation (Asparouhov & Muthén, 2009), which allows specifying target and non-target factor loadings in a confirmatory manner. All cross-loadings were specified to be close to zero, while all main loadings were freely estimated (Morin et al., 2015). Standardized factor loadings (λ) and the uniquenesses (δ) of each item were reported for all models. On the other hand, scale score reliability estimates were computed using McDonald's (1970) $\omega = (\sum|\lambda_i|)^2 / ((\sum|\lambda_i|)^2 + \sum\delta_{ii})$ where λ_i are the standardized factor loadings, and δ_{ii} the standardized item uniquenesses. In comparison with traditional scale score reliability estimates, such as Cronbach's alpha, ω has the advantage of considering the strength of association between items and constructs (λ_i), as well as item-specific measurement errors (δ_{ii}) (Dunn, Baguley, & Brunsten, 2014).

2.3.2. Measurement invariance

Measurement invariance of the NSTSS was conducted in the next sequence to verify the presence of different types of measurement biases in the group context (i.e., gender and type of school) comparisons (Guay, Morin, Litalien, Valois, & Vallerand, 2015; Sánchez-Oliva et al., 2016): (1) configural invariance indicates whether the same factor model (i.e., with the same pattern of free/fixed parameters) is supported across groups, before adding constraints; (2) weak invariance (i.e., factor loadings/cross-loadings) assesses whether the latent constructs are defined in the same manner by their items across groups. Therefore, weak invariance is assessed by adding equality constraints to the factor loadings across groups; (3) strong invariance (i.e., factor loadings/cross-loadings, and intercepts) assesses whether mean

differences in observed scores can be explained by mean differences at construct level. Adding equality constraints to all thresholds across groups assesses this assumption. Strong invariance represents a prerequisite to the full comparison of latent means across groups; (4) strict invariance (i.e., factor loadings/cross-loadings, intercepts, and uniquenesses) assesses whether item-level measurement errors are comparable across groups. Adding equality constraints to item uniquenesses across groups tests this assumption (i.e., fixing them to one in all groups). In each sequence of invariance, the preceding model served as reference. The aforementioned four steps assess the presence of different types of measurement biases and are sufficient to accept that the measurement properties of an instrument are the same across groups (Guay et al., 2015).

Further, the next two steps can be useful to identify the presence of meaningful and unbiased group differences that occur at latent variance, covariance and mean level (Sánchez-Oliva et al., 2016): (5) latent variance-covariance invariance (i.e., factor loadings/cross-loadings, intercepts, uniquenesses, and latent variances-covariances) assesses whether the full variance/covariance matrix is also invariant across groups. Adding equality constraints to the factor covariances and fixing all factor variances to one in all groups tests this assumption; (6) latent means invariance (i.e., factor loadings/cross-loadings, intercepts, uniquenesses, latent variances-covariances, and latent means) represents the last step to assume complete measurement invariance. The latent means estimated in the comparison group represent mean-level differences between groups (because the latent means were fixed to zero in the reference group in the previous models). Therefore, the significance test associated with these latent means indicates whether they differ significantly from the other group (Guay et al., 2015).

2.3.3. Nomological validity

An analysis of latent correlations was conducted to evaluate the nomological validity of the NSTSS. This was done by using the final model of the NSTSS and adding latent CFA factors that referred to motivation for teaching (i.e., autonomous motivation, controlled motivation and amotivation), to engagement at work (i.e., vigor, dedication and absorption), and to burnout at work (i.e., overload, lack of development and neglect).

2.3.4. Goodness-of-fit assessment

The assessment of the models (CFA and ESEM) was based on the following goodness-of-fit indices: chi-square statistics (χ^2), comparative

fit index (CFI), Tucker-Lewis Index (TLI) and the root mean square error of approximation (RMSEA). Regarding χ^2 , non-significant values are considered as adequate. It is important to keep in mind that χ^2 tends to be oversensitive to sample size and minor model misspecifications. Further, values of 0.08 and 0.06 or less for RMSEA are considered, respectively, as adequate and excellent (Marsh, Hau, & Wen, 2004), while for CFI and TLI, values of over 0.90 and 0.95 indicate adequate and excellent fit indices of the model, respectively (Marsh et al., 2004). Regarding the evaluation of the invariance models, each model was compared with its previous step by considering the changes (Δ) in the fit indices. The χ^2 difference tests¹ ($p < .05$), decreases of more than 0.010 in CFI and TLI, and increases of over 0.015 in RMSEA indicate that the hypothesis of invariance should be rejected (Chen, 2007). Importantly, χ^2 tests tend to be even more problematic than the χ^2 itself. We reported both because they can provide additional and useful information. Yet, it is advisable to predominantly focus on independent sample size indices (i.e., CFI, TLI, RMSEA) to judge measurement invariance models (Chen, 2007; Cheung & Rensvold, 2002). Furthermore, it should be indicated that parsimony fit indices such as TLI and RMSEA could improve in more restricted models. In conjunction, when MLR is used as an estimator, χ^2 and CFI may improve in the more restricted models when the MLR correction factors differ. However, these improvements must be considered as random (Sánchez-Oliva et al., 2016).

2.4. Preliminary findings

To eliminate any errors that might arise in the NSTSS validation process, a preliminary factorial study was performed with a sample of 184 secondary teachers. Following the recommendations of Marsh et al. (2009), first, a CFA was conducted to verify the advisability of the hypothetical four-factor and 18-item structure, which was hoped to be obtained from the teachers' answers to the NSTSS. As observed in Table 2, the preliminary CFA model showed factor loadings (λ) of over 0.50 in most of the items (except in items 7, 11 and 15). However, the fit indices of the preliminary CFA model were not acceptable ($\chi^2 = 648.21, p < .001$; CFI = 0.812; TLI = 0.777; RMSEA = 0.093).

Consequently, an ESEM was decided upon as this type of analysis may be helpful to understand certain parametric misfits that could remain hidden if only a CFA were carried out (Guay et al., 2015; Morin, Marsh, & Nagengast, 2013). Thus, from an exploratory approach, the ESEM provides cross-loadings that permit observing the least significant or most problematic items (Asparouhov & Muthén, 2009). In this sense, although the results of the preliminary ESEM model showed a better fit in comparison with the previous preliminary CFA model, acceptable values were only obtained in the CFI (0.926) and in the RMSEA (0.063) indices. The values obtained in the TLI (0.870) were unacceptable. Consequently, to identify any problematic items that might be affecting the fit of the NSTSS, two criteria were taken into account (Appleton, Ntoumanis, Quedsted, Viladrich, & Duda, 2016): (a) eliminating items with low factor loading (i.e., $\lambda < 0.40$), and (b) eliminating items with a higher cross loading than that obtained in its own factor (i.e., $|\lambda| > \lambda$). In agreement with both criteria, items 7, 11 and 15, corresponding to the factors of ego climate support, autonomy support and relatedness support, respectively, were eliminated. Item 7 ($\lambda_7 = 0.34$; i.e., "During lessons, students mainly compare their performance with that of others") was eliminated as it showed a factor loading (λ) of less than 0.40. In conjunction, items ($\lambda_{11} = 0.19 < |\lambda_{11Tcs}| = 0.41$; i.e., "I

Table 2 Standardized factor loadings (λ) and uniquenesses (δ) for the preliminary CFA and ESEM solutions.

Indicator	Preliminary CFA (18)		Preliminary ESEM (18)				
	λ	δ	Tcs λ	Eos λ	As λ	Rs λ	δ
<i>Task climate support</i>							
1	0.68	0.54	0.72	<i>0.03</i>	-0.10	<i>0.03</i>	0.52
2	0.69	0.53	0.67	<i>0.01</i>	<i>0.04</i>	<i>0.03</i>	0.53
3	0.74	0.45	0.70	<i>0.01</i>	-0.03	<i>0.11</i>	0.46
4	0.72	0.48	0.67	-0.06	0.09	<i>0.03</i>	0.47
5	0.53	0.72	0.53	-0.10	<i>0.05</i>	<i>0.09</i>	0.68
<i>Ego climate support</i>							
6	0.75	0.43	-0.02	0.75	-0.08	<i>0.06</i>	0.42
7	0.32	0.89	<i>0.06</i>	0.34	0.13	-0.13	0.86
8	0.79	0.37	<i>0.02</i>	0.78	-0.04	<i>0.07</i>	0.40
9	0.51	0.72	<i>0.02</i>	0.53	0.14	-0.07	0.70
<i>Autonomy support</i>							
10	0.61	0.61	0.05	<i>0.05</i>	0.59	-0.01	0.63
11	0.34	0.88	0.41	-0.02	0.19	<i>0.03</i>	0.73
12	0.63	0.60	-0.03	<i>0.04</i>	0.63	<i>0.03</i>	0.60
13	0.64	0.59	-0.17	-0.01	0.64	0.10	0.57
14	0.67	0.55	-0.11	-0.03	0.70	<i>0.05</i>	0.52
<i>Relatedness support</i>							
15	0.47	0.77	0.52	-0.07	0.21	0.03	0.55
16	0.62	0.61	0.08	<i>0.03</i>	0.13	0.50	0.65
17	0.70	0.51	-0.05	-0.01	-0.09	0.97	0.15
18	0.71	0.49	<i>0.07</i>	<i>0.01</i>	0.15	0.54	0.57

Note: Preliminary CFA (18) = Preliminary confirmatory factor analyses model 18 items; Preliminary ESEM (18) = Preliminary exploratory structural equation modeling model 18 items; Tcs = Task climate support; Ecs = Ego climate support; As = Autonomy support; Rs = Relatedness support; bold = target factor loadings. Non-significant parameters ($p \geq .05$) are marked in italics.

give students the opportunity to affect the way lessons are run") and 15 ($\lambda_{15} = 0.03 < |\lambda_{15As}| = 0.21 < |\lambda_{15Tcs}| = 0.52$; i.e., "I try to get my students to have a good sense of integration") represented the two elimination criteria (i.e., $\lambda < 0.40$ and $\lambda < |\lambda|$). In this sense, the cross-loadings obtained in items 11 and 15 could suggest their inclusion in the task climate support factor. However, after analyzing their wording, it was decided to eliminate them as the factor loading fell on other constructs that did not fully include their real meaning.

2.5. Factor structure and reliability

Based on the final four-factor and 15-item model, factorial structure, reliability, measurement invariance and nomological validity of the NSTSS were evaluated with a second sample of 400 secondary teachers. The descriptive statistics and correlations of the 15 items can be observed in Table 3.

The goodness-of-fit indices of the estimated alternative measurement models, based on these answers, are presented in Table 4. Overall, the definite CFA and ESEM models showed an adequate level of fit (CFI and TLI ≥ 0.900 ; RMSEA ≤ 0.080). As observed in Table 4, the comparison between the CFA and ESEM models was very similar. However, to ensure the best choice of model, it is advisable to complement the fit indices with a comparison of the estimated parameters (Sánchez-Oliva et al., 2016). Thus, the factor loadings (λ), uniquenesses (δ) and composite reliability (ω) of the factors, respect to the CFA and ESEM models, can be observed in Table 5. In the CFA model, all the factors were well-defined, showing high and significant factor loadings ($\lambda = 0.50-0.80$; $M = 0.67$; $p < .01$). Further, because the purpose of using the NSTSS was to discover the influence that teachers' perception of their interpersonal teaching styles has on their motivational process and their well-being, and not to evaluate high-stakes testing (e.g., psychological illness) or teacher employment decisions (e.g., dismissals of teachers), the composite reliability coefficients were considered as

¹ The scaling correction composite needed to be considered in the calculation of chi-square difference tests because the present study used MLR as estimator (Morin & Maïano, 2011). The difference in the log likelihood of the nested models was interpreted as chi-square with the same degrees of freedom as the difference in free parameters among models. Then, the difference was divided by its scaling correction composite, cd , where: (i) $cd = (p0 \times c0 \times p1 \times c1) / (p0 \times p1)$ (ii) $p0$ and $p1$ were the number of free parameters in the nested and comparison models; and (iii) $c0$ and $c1$ were the scaling correction factors for the nested and comparison models.

Table 3
Descriptive statistics and correlations for the items.

Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Tcs	–														
2. Tcs	0.54**	–													
3. Tcs	0.49**	0.52**	–												
4. Tcs	0.46**	0.45**	0.57**	–											
5. Tcs	0.39**	0.34**	0.29**	0.43**	–										
6.Ecs	–0.11**	–0.13**	–0.11**	–0.18**	–0.23**	–									
7. Ecs	–0.07	–0.09*	–0.10*	–0.11**	–0.15**	0.61**	–								
8.Ecs	–0.03	0.02	–0.07	–0.09*	–0.13**	0.35**	0.39**	–							
9. As	0.09*	0.19**	0.19**	0.19**	0.14**	0.04	0.02	0.05	–						
10. As	0.07	0.13**	0.12**	0.17**	0.13**	–0.00	0.05	–0.10**	0.46**	–					
11. As	0.02	0.09*	0.08*	0.11**	0.06	–0.01	0.05	0.06	0.34**	0.38**	–				
12. As	0.04	0.15**	0.10*	0.16**	0.10*	–0.03	–0.01	–0.08*	0.39**	0.38**	0.53**	–			
13. Rs	0.18**	0.23**	0.24**	0.22**	0.21**	–0.02	0.02	0.05	0.25**	0.24**	0.28**	0.30**	–		
14. Rs	0.14**	0.18**	0.24**	0.20**	0.19**	–0.01	0.03	–0.03	0.22**	0.24**	0.29**	0.28**	0.49**	–	
15. Rs	0.13**	0.19**	0.23**	0.24**	0.27**	–0.01	–0.01	0.02	0.24**	0.35**	0.28**	0.25**	0.40**	0.56**	–
M	4.54	4.57	4.55	4.54	4.59	1.80	2.01	2.31	3.52	3.54	2.67	3.27	3.51	3.17	3.71
SD	0.59	0.58	0.57	0.58	0.58	0.86	0.94	1.02	0.85	0.91	1.07	0.98	0.88	1.07	0.94

Note: Tcs = Task climate support; Ecs = Ego climate support; As = Autonomy support; Rs = Relatedness support; M = Mean; SD = Standard Deviation.

* $p < .05$.

** $p < .01$.

Table 4
Goodness-of-fit statistics of the confirmatory factor analyses and exploratory structural equation models.

Model	χ^2 (df)	CFI	TLI	RMSEA [90% CI]	CM	$\Delta\chi^2$ (df)	Δ CFI	Δ TLI	Δ RMSEA	
M1. CFA	212.44* (84)	0.941	0.927	0.051 [0.043–0.060]	–	–	–	–	–	
M2. ESEM	136.15* (51)	0.961	0.920	0.053 [0.043–0.064]	M1	76.94 (33)*	+0.020	–0.007	+0.002	
Invariance across gender										
M3. Configural Invariance	215.29* (102)	0.950	0.900	0.049 [0.039–0.058]	–	–	–	–	–	
M4. Weak Invariance	252.68* (146)	0.953	0.932	0.050 [0.039–0.060]	M3	50.63 (44)*	+0.032	+0.010	+0.001	
M5. Strong Invariance	274.96* (157)	0.948	0.930	0.051 [0.041–0.061]	M4	17.63 (11)*	–0.005	–0.002	+0.001	
M6. Strict Invariance	292.42* (172)	0.947	0.935	0.049 [0.039–0.058]	M5	31.42 (15)	–0.001	+0.005	–0.002	
M7. Variance-covariance invariance	308.08* (182)	0.944	0.936	0.049 [0.039–0.058]	M6	15.75 (10)	–0.003	+0.001	0.000	
M8. Latent mean invariance	311.08* (186)	0.945	0.938	0.048 [0.038–0.057]	M7	2.96 (4)	+0.001	+0.002	–0.001	
Invariance across type of school										
M9. Configural Invariance	168.50* (102)	0.966	0.939	0.047 [0.034–0.060]	–	–	–	–	–	
M10. Weak Invariance	242.32* (146)	0.957	0.938	0.048 [0.037–0.058]	M8	73.76 (44)*	–0.009	–0.001	+0.001	
M11. Strong Invariance	253.80* (157)	0.948	0.930	0.046 [0.035–0.056]	M9	11.37 (11)*	–0.009	–0.008	–0.002	
M12. Strict Invariance	262.19* (172)	0.960	0.951	0.042 [0.032–0.052]	M10	12.94 (15)	+0.012	+0.021	–0.004	
M13. Variance-covariance invariance	270.65* (182)	0.960	0.954	0.041 [0.030–0.051]	M11	11.79 (10)*	0.000	+0.003	–0.001	
M14. Latent mean invariance	279.98* (186)	0.958	0.953	0.042 [0.031–0.051]	M12	9.33 (4)	–0.002	–0.001	+0.001	

Note: CFA = Confirmatory factor analyses; ESEM = Exploratory structural equation modeling; χ^2 = Scaled chi-square test of exact fit; df = Degrees of freedom; CFI = Comparative fit index; TLI = Tucker-Lewis index; RMSEA = Root mean square error of approximation; 90% CI = 90% Confidence interval of the RMSEA; CM = Comparison model; Δ = Change in fit information relative to the CM; Var-Cov = Variance – Covariance.

* $p < .01$.

adequate ($\omega = 0.75\text{--}0.92$; $M = 0.80$), providing the NSTSS with acceptable confirmatory robustness.

Consistent with these results, the ESEM model revealed high and significant factor loadings in all items. Furthermore, the cross-loadings were not greater than 0.15 in any of the three factors, mainly showing a non-significant value. Thus, it can be observed how the task climate support factor seems to be globally well-defined ($\lambda = 0.46\text{--}0.75$; $M = 0.67$; $p < .01$) showing considerable superiority with respect to the cross-loadings ($|\lambda| = -0.15\text{--}0.09$; $M = 0.05$). In this regard, although items 1 ($|\lambda_{Autonomy\ support}| = -0.09$) and 5 ($|\lambda_{Ego\ climate\ support}| = -0.15$) showed significant cross-loadings in other factors, both can be considered weak. With respect to ego climate support factor loadings ($\lambda = 0.48\text{--}0.78$; $M = 0.68$; $p < .01$), the results were very similar to task climate. In conjunction, the factor loadings obtained very low values ($|\lambda| = -0.08\text{--}0.14$; $M = 0.05$), and only item 8 showed a significant value in another factor ($|\lambda_{Autonomy\ support}| = 0.14$), although with a very low weight. The autonomy support factor, although showing slightly lower factor loadings than the rest of the factors ($\lambda = 0.57\text{--}0.71$; $M = 0.63$; $p < .01$), was very well-defined as it did not show significant cross-loadings in any of the other factors. Finally,

the relatedness support factor revealed high and significant factor loadings ($\lambda = 0.49\text{--}0.93$; $M = 0.68$; $p < .01$) and weak cross-loadings ($|\lambda| = -0.08$ to 0.12 ; $M = 0.06$). In this sense, only item 13 showed significant values in other factors ($|\lambda_{Task\ climate\ support}| = 0.10$; $|\lambda_{Autonomy\ support}| = 0.12$) although with weak cross-loadings. Thus, the final 15-item version of the NSTSS seems to support the four-factor structure of the scale. Consistent with these results, the ESEM model showed excellent composite reliability for task climate support ($\omega = 0.93$), and acceptable composite reliability for ego climate support ($\omega = 0.75$), autonomy support ($\omega = 0.75$) and relatedness support ($\omega = 0.78$), slightly improving the indices revealed by the CFA model. Finally, the latent correlations of the CFA and ESEM models are reported in the bottom section of Table 5.

In this sense, although the use of the ESEM (when CFA and ESEM reveal similar fit indexes) seems to be less advantageous because the ESEM model is less parsimonious than the CFA model, the ESEM model can provide a more exact representation of the factor loadings, contributing to a better interpretation of the construct (Morin et al., 2013). Thus, the subsequent steps (i.e., measurement invariance and nomological validity) to validate the NSTSS were taken using the ESEM model,

Table 5
Standardized factor loadings (λ) and uniquenesses (δ) and latent factor correlations for the CFA and ESEM solutions.

Indicator	M1. CFA (15 items)		M2. ESEM (15 items)				
	λ	δ	Tcs λ	Eos λ	As λ	Rs λ	δ
<i>Task climate support</i>							
1	0.68	0.54	0.75	<i>0.05</i>	<i>-0.09</i>	<i>-0.04</i>	0.48
2	0.69	0.53	0.71	<i>0.03</i>	<i>0.05</i>	<i>-0.04</i>	0.50
3	0.74	0.45	0.72	<i>0.02</i>	<i>-0.04</i>	<i>0.07</i>	0.46
4	0.72	0.48	0.69	<i>-0.04</i>	<i>0.07</i>	<i>-0.01</i>	0.49
5	0.53	0.72	0.46	<i>-0.15</i>	<i>0.01</i>	<i>0.10</i>	0.70
ω	0.92		0.93				
<i>Ego climate support</i>							
6	0.76	0.42	<i>-0.04</i>	0.77	<i>-0.06</i>	<i>0.03</i>	0.39
7	0.80	0.36	<i>0.01</i>	0.78	<i>-0.02</i>	<i>0.04</i>	0.38
8	0.50	0.75	<i>0.02</i>	0.48	0.14	<i>-0.08</i>	0.75
ω	0.75		0.75				
<i>Autonomy support</i>							
9	0.59	0.65	<i>0.11</i>	<i>0.05</i>	0.57	<i>-0.03</i>	0.64
10	0.62	0.61	<i>0.03</i>	<i>0.03</i>	0.59	<i>0.02</i>	0.62
11	0.67	0.55	<i>-0.09</i>	<i>-0.01</i>	0.65	<i>0.07</i>	0.54
12	0.69	0.52	<i>-0.04</i>	<i>-0.04</i>	0.71	<i>0.01</i>	0.50
ω	0.76				0.76		
<i>Relatedness support</i>							
13	0.63	0.60	0.10	<i>0.03</i>	0.12	0.49	0.62
14	0.77	0.40	<i>-0.05</i>	<i>0.01</i>	<i>-0.08</i>	0.93	0.25
15	0.71	0.49	<i>0.04</i>	<i>-0.01</i>	<i>0.08</i>	0.61	0.54
ω	0.76					0.78	
Task climate support			Tcs	Eos	As	Rs	
Ego climate support			-	-0.20	0.26	0.38	
Autonomy support			-0.22	-	0.05	0.02	
Relatedness support			0.26	0.04	-	0.52	
			0.42	0.01	0.58	-	

Note: CFA (15) = Confirmatory factor analyses model 15 items; ESEM (15) = Exploratory factor analyses model 15 items; Tcs = Task climate support; Eos = Ego climate support; As = Autonomy support; Rs = Relatedness support; bold = Target factor loadings. Non-significant parameters ($p \geq .05$) are marked in italics. CFA latent correlations are displayed below the diagonal and ESEM latent correlations are displayed below the diagonal.

based on a confirmatory approach and following the recommendations of Guay et al. (2015).

2.6. Measurement invariance

To ensure that between-group NSTSS-based comparisons are meaningful, it needs to be shown that the measurement scales are psychometrically equivalent across different subsamples (Millsap, 2011). To this end, based on the ESEM solution, a series of measurement invariance tests were conducted across gender (166 males, 234 females; models M3 to M8) and type of school (276 public, 124 private; models M9 to M14). The findings from these models are reported in the bottom section of Table 4. Results from the measurement invariance tests conducted according to teacher gender and type of school were extremely similar and showed that: (1) some of the χ^2 difference tests were non-significant; (2) the CFI, TLI, and RMSEA showed adequate model fit in all models; (3) the Δ CFI and Δ TLI never indicated a decrease of more than 0.010; (4) the Δ RMSEA never showed an increase of more than 0.015; (5) the fit indices that control model parsimony were better at the end of the sequence than at the beginning (gender: TLI = 0.900 to 0.938, RMSEA = 0.049 to 0.048; type of school: TLI = 0.939 to 0.953, RMSEA = 0.047 to 0.042). It should be noted that some changes in χ^2 tests were significant. However, the remaining changes in the CFI, TLI and RMSEA indices, which are considered more adequate to evaluate measurement invariance models because they are independent of sample size and minor model misspecifications, were considered acceptable. These results clearly confirm the complete

Table 6
Latent correlations between NSTSS factors, motivation to teach, engagement and burnout at work.

	Task climate support	Ego climate support	Autonomy support	Relatedness support
<i>Motivation to teach</i>				
Autonomous motivation	0.38**	-0.17**	0.30**	0.32**
Controlled motivation	-0.09	0.38**	-0.09	-0.11
Amotivation	-0.36**	0.32**	-0.19**	-0.23**
<i>Engagement at work</i>				
Vigor	0.33**	-0.08	0.27**	0.29**
Dedication	0.35**	-0.13*	0.28**	0.34**
Absorption	0.34**	-0.06	0.26**	0.27**
<i>Burnout at work</i>				
Overload	0.01	0.18**	0.03	-0.04
Lack of development	-0.19**	0.24**	-0.12*	-0.16**
Neglect	-0.36**	0.25**	-0.17**	-0.23**

* $p < .05$.
** $p < .01$.

measurement invariance of the NSTSS across gender and type of school.

2.7. Nomological validity

As a final step, and based on the ESEM model, the nomological validity of the NSTSS was evaluated with respect to the variables of motivation to teach, engagement at work and burnout. So, to obtain the latent variable correlations, the CFAs of these variables were added to the ESEM model. These latent correlations are reported in Table 6. Firstly, task climate support, autonomy support and relatedness support were significantly and positively correlated with autonomous motivation, and significantly and negatively correlated with amotivation. Furthermore, ego climate support was significantly and negatively correlated with autonomous motivation, and significantly and positively correlated with teachers' controlled motivation and amotivation. Secondly, task climate support, autonomy support and relatedness support were significantly and positively correlated with the three engagement-at-work factors (i.e., vigor, dedication and absorption). In contrast, ego climate support was only significantly and negatively correlated with teachers' dedication. Finally, task climate support, autonomy support and relatedness support were significantly and negatively correlated with teachers' lack of development and neglect. In conjunction, ego climate support was significantly and positively correlated with the three teacher burnout factors (i.e., overload, lack of development and neglect). Altogether, these results support the nomological validity of the NSTSS.

3. Discussion

The well-being and job satisfaction of secondary teachers has sharply decreased in recent years (Anaya & López, 2014). Intervention programs aimed at improving need-supportive teaching styles in the classroom could not just improve student motivation (e.g., Cheon & Reeve, 2015; Ntoumanis, 2005), but also the school environment (e.g., Fernández-Río et al., 2014), teacher well-being and motivation to teach (e.g., Jang et al., 2012). To design effective professional development programs, aimed at enhancing teachers' need-supportive teaching styles, it seems necessary to evaluate a valid and reliable scale to capture a supportive teaching style. Thus far, there are no instruments that evaluate teachers' perception of the interpersonal style they develop in the classroom in agreement with a theoretical framework that integrates the tenets of SDT and AGT. Therefore, the aim of this study, after adapting the items of the MCPES to the teaching context, was to

validate the NSTSS to evaluate teachers' perception of their interpersonal styles. To do so, four hypotheses were proposed, related to the factorial structure and reliability, measurement invariance and the nomological validity of the NSTSS.

3.1. Four-factor structure and reliability (Hypothesis 1)

Firstly, considering the validation carried out by [Soini et al. \(2014\)](#) of the MCPES in students, the first hypothesis suggested that a four-factor structure (i.e., task climate support, ego climate support, autonomy support and relatedness support) could also emerge based on teachers' answers to the NSTSS. The results of the preliminary study suggested eliminating three items as the factor loadings were too low or because they had very high cross-loadings. So, after eliminating these items in the preliminary study, the CFA and ESEM models of the final sample of teachers ($n = 400$) showed acceptable values of goodness-of-fit indices, indicating satisfactory construct validity of the four-factor model of the NSTSS in line with the previous validation in students (i.e., MCPES; [Soini et al., 2014](#)). The results of the factor loadings of the CFA model showed high values ($\lambda > 0.50$) supporting the relationship of each item with its previously hypothesized latent factor. These results were reinforced with those found in the ESEM model. Thus, in the ESEM model, all items showed high factor loadings with their relative latent factor. Furthermore, the observation of cross-loadings suggested that none of the items could be loading on the other latent factors. In most of the cases, the cross-loadings were low and not significant. At a methodological level, the use of the ESEM to evaluate the four-factor structure of the NSTSS, which is strongly emerging in social and educational sciences ([Mauro, Gomes, Almeida, & Núñez, 2017](#)), could contribute to guiding future validation studies with teachers.

Likewise, considering the main objective of the NSTSS, the reliability results were acceptable for all latent factors. Social science studies usually report the reliability of their instruments based on Cronbach's alpha (e.g., [Soini et al., 2014](#)), which can be biased by the number of items that make up each latent factor ([Dunn et al., 2014](#)). In this sense, recent studies have argued the possible superiority of calculating the omega index (ω), supporting its use in validation studies (e.g., [Sánchez-Oliva et al., 2016](#)). The methodological contribution of the present study, in terms of composite reliability, is also important to note, and this is something that future validation research studies should adopt. Overall, the 15 items of the NSTSS adequately explain the meaning of the latent factor they belong to, supporting the four-factor structure of the scale and its reliability. This further provides a specific and useful scale to capture a supportive (i.e., task climate support, autonomy support and relatedness support) as well as a thwarting interpersonal behavior (i.e., ego climate support).

3.2. Measurement invariance of the NSTSS (Hypothesis 2)

Secondly, following the recommendations made in organizational literature to improve the generalizability of the instruments (e.g., [Ayman & Korabik, 2010](#); [Lukaszewski & Stone, 2012](#)), the second hypothesis of this study suggested that the NSTSS would be invariant to teachers' answers, regardless of their gender (i.e., male or female), and type of school (i.e., public or private). The results found supported the complete invariance of NSTSS across gender and type of school. This could represent a theoretical and methodological advance in the development of the scale to evaluate teachers' perception of their interpersonal styles (i.e., NSTSS), because in the initial validation of student perception of teachers' interpersonal styles (i.e., MCPES; [Soini et al., 2014](#)), measurement invariance was not examined. Furthermore, these findings must be highlighted because of the influence that both gender and type of school may have on the development of teachers' motivational processes and, therefore, on their interpersonal teaching styles ([Gil-Flores, 2016](#); [Latorre & Sáez, 2009](#); [Reeve et al., 2014](#)). Importantly, if we want to examine teachers' interpersonal styles to

evaluate their influence on their motivation to teach, the first step is to do it with invariant scales across teacher gender and type of school, such as the NSTSS.

3.3. Nomological validity of the NSTSS (Hypotheses 3 and 4)

Thirdly, to evaluate the nomological validity of the scale, the third and fourth hypotheses purported to show the relationship of the four factors of the NSTSS with motivation to teaching, as well as with teacher engagement and burnout at work. Regarding the third hypothesis, the results of this study indicated that task climate, autonomy and relatedness support were positively related to autonomous motivation and to teacher engagement. Overall, these three interpersonal teaching style factors were negatively related to teacher amotivation and burnout. These results are in line with previous studies that have indicated the positive relationship of teacher task climate support with interest in teaching and teacher engagement ([Butler & Shibaz, 2014](#); [Han et al., 2016](#); [Parker et al., 2012](#)), and the negative relationship with teacher burnout ([Parker et al., 2012](#)). However, to date, no studies have analyzed the direct relationship between teacher perception of task climate support and motivation to teaching. As a theoretical contribution, the creation of a scale based on an integrated theoretical framework (i.e., SDT & AGT) such as the NSTSS may help study this relationship and its direction. This could be relevant to improve the understanding of both teacher and student motivation processes. Nonetheless, although there is no previous evidence, these results could be explained by following the integrated sequence proposed in [Fig. 1](#). Thus, task climate support, as it generates positive outcomes in students, could reciprocally influence teaching motivation, as well as other behavioral outcomes such as interpersonal style, which could be associated with psychological behaviors related to well-being (i.e., engagement and burnout; [Pelletier & Rocchi, 2015](#)). This again emphasizes the importance that the NSTSS could have to improve school environments.

The results of this study are also in line with other previous studies which, grounded in SDT, have indicated the positive relationship between autonomy support and relatedness support, and the autonomous motivation of teachers ([Cheon et al., 2014](#); [Pelletier et al., 2002](#); [Taylor, Ntoumanis, & Standage, 2008](#); [Van den Berghe et al., 2014](#)). Consistent with these results, several studies ([Cheon et al., 2014](#); [Van den Berghe et al., 2014](#)) have shown a negative relationship between a need-supportive teaching style and teacher burnout. A possible justification of the results found is that a need-supportive teaching style can generate greater motivation and positive outcomes in students ([Abós et al., 2016](#)). At the same time, teachers themselves should benefit because a reciprocal relationship between students and teachers in classroom functioning and outcomes has been empirically confirmed ([Jang et al., 2012](#); [Reeve, 2013](#)). This highlights the relevance that the evaluation, through the NSTSS, of teacher interpersonal styles could have in preventing negative outcomes both in students and in teachers. In addition, consistent with past work ([Van den Berghe et al., 2014](#)), controlled motivation was not significantly related to task climate, autonomy or relatedness support. A potential explanation for these results could be that supportive-teaching styles would reciprocally influence teachers' autonomous motivation, but would not cause the emergence of external reasons to put an effort into teaching (i.e., controlled motivation). Likewise, the significant and negative correlations found in this study between amotivation and task climate, autonomy and relatedness support, suggest the importance that autonomous motivation may have on avoiding teaching styles that may have a negative impact on student motivation as well as on the motivation of the teachers themselves.

Finally, regarding the fourth hypothesis, the results of this study also showed that ego climate support was negatively related to teachers' autonomous motivation. Regarding engagement factors, while ego climate support was negatively related to dedication at work, no relationships between ego climate support and vigor and absorption

were found. These findings suggest, according to past studies centered on the analysis of work engagement (e.g., Bakker & Demerouti, 2008), that the adoption of an interpersonal teaching style focused on student success compared with other students' performance (i.e., ego climate support) could frustrate teachers' challenges and their feelings of enthusiasm (i.e., dedication). However, the adoption of an ego climate support would not affect teachers' energy (i.e., vigor) or their concentration (i.e., absorption) on developing teaching tasks. Furthermore, consistent with previous works (Papaioannou & Christodoulidis, 2007; Parker et al., 2012; Retelsdorf et al., 2010) ego climate support was positively related to teachers' controlled motivation, amotivation and burnout. One possible justification of the results found is that, if teachers encourage interpersonal competition and comparisons in the classroom, this may generate more negative outcomes in students (Abós et al., 2016; Fernández-Río et al., 2014; Moreno et al., 2011; Sevil et al., 2016). Reciprocally, these maladaptive outcomes in students may give rise to lower autonomous motivation and more controlled motivation and amotivation of teachers, as well as outcomes such as burnout and exhaustion (Fernet et al., 2012; Van den Berghe et al., 2014). Consequently, the results of this study sustain the nomological validity of the NSTSS, showing a significant relationship with three variables (i.e., motivation to teaching, engagement and burnout at work), which, according to scientific literature, are considered to have a considerable influence on teacher well-being (e.g., Han & Yin, 2016; Viseu, de Jesus, Rus, & Canavarro, 2016).

4. Limitations and directions for future research

Some limitations must be borne in mind when the results of this study are considered. First, this study was based on a sample of Spanish secondary teachers, which restricts the generalizability of the results to other languages. Therefore, future studies should test the theoretical structure of the NSTSS at other teaching levels and in other countries with different languages. Thus, cross-cultural studies could be conducted that would test the invariance of interpersonal teaching styles in different cultures. Second, the low response rate (i.e., 10%) can introduce bias which may reduce generalizability of the results. A possible explanation of the low rates found in our study could be the question types asked in the questionnaire or the moment when we collected the information (i.e., the third semester of the academic year). Future studies should take these limitations into account in order to obtain a more representative sample size of the population to thus increase the generalizability of the NSTSS, verifying the evidence found in the present study. Third, this study only evaluates teacher perception of task climate support, ego climate support, autonomy support, and relatedness support. Future research studies could design a questionnaire to perform the complementary evaluation of the controlling style and thwarting of relatedness. Likewise, including the perspective of avoidance derived from AGT (i.e., 2×2 or 3×2 model; Elliot & McGregor, 2001; Mascret et al., 2015) could be a new and interesting avenue of research. Moreover, it could be interesting to complement teachers' perception of their need-supportive behavior (i.e., NSTSS) with students' perception of teachers' need-supportive behavior (e.g., Soini et al., 2014), as well as observational measures to compare the differences between different instruments (e.g., Smith et al., 2015). Fourth, this study only analyzed the relationship between interpersonal teaching style and teacher motivation, engagement and burnout. Future studies should verify the sequence proposed in Fig. 1 by examining the relationship between NSTSS and student motivation and outcomes. In addition, all measures to examine the nomological validity (i.e., motivation, engagement and burnout) of the NSTSS come from self-report questionnaires. This could lead to a mono-method bias that measures response style characteristics rather than expected relationships between constructs. Introducing other types of measures could be a new avenue of research. Last, but not least, due to the cross-sectional nature of the study, it was not possible to determine the direction of causality

between the NSTSS and the converging measures. As a result, it seems important that future studies that use the NSTSS should be able to evaluate, by means of longitudinal designs, the extent to which teachers' answers to the NSTSS may show fluctuations with the passage of time.

5. Conclusion

To conclude, this study proposes a valid and reliable scale to assess teachers' perception of their interpersonal teaching styles in a sample of secondary teachers using an integrated theoretical framework. Likewise, at a theoretical level, the results of this study contribute to the integration of SDT and AGT to capture a supportive and thwarting interpersonal behavior. Further, results of the measurement invariance indicate that the NSTSS could be used across teachers of different genders and from different types of school. The nomological validity findings of this study support the use of the NSTSS as an instrument to predict teacher motivation, engagement and burnout at the workplace. In addition, this study may increase knowledge about the relevance of interpersonal teaching styles in teacher motivation and in psychological outcomes related to well-being at work, such as engagement and burnout. Secondary school policy-makers should consider designing continuous professional development programs that focus on training need-supportive teaching. This could have an impact on students' and teachers' motivation, fostering student and teacher engagement at school, and on learning.

Conflict of Interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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5.1.4. Estudio 4: Examining the psychometric properties of the Burnout Clinical Subtype Questionnaire (BCSQ-12) in secondary school teachers

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Examining the psychometric properties of the Burnout Clinical Subtype Questionnaire (BCSQ-12) in secondary school teachers

Abstract

Based on Farber's burnout proposal, the first aim of this study was to examine the psychometric properties of the short version of the Burnout Clinical Subtype Questionnaire (BCSQ-12) in secondary school teachers. The second aim of the study was to examine possible differences in the burnout subtypes in terms of gender, type of school, and teaching experience. Two different samples of 584 ($M=45.04$; 43% males) and 106 ($M=45.50$; 40% males) secondary school teachers participated in the study. Results obtained from both the exploratory structural equation modeling (ESEM) and the confirmatory factor analysis (CFA) supported the three-factor structure of the BCSQ-12, comprised of overload, lack of development, and neglect. Further, the BCSQ-12 showed adequate composite reliability. The negative relationships between the three-factor structure of burnout, teachers' basic psychological need satisfaction, and teachers' job satisfaction provide evidence of the nomological validity of BCSQ-12. Finally, female teachers, state school teachers, and experienced teachers reported a greater risk of suffering one or more of these three burnout subtypes. Theoretical, methodological, and practical contributions of the BCSQ-12 are discussed, highlighting the importance of assessing the three burnout subtypes separately.

Keywords: teachers; BCSQ-12; burnout subtypes; prevention strategies; basic psychological needs.

1. Introduction

The burnout syndrome is one of the major public health problems worldwide, in particular in human service professions (García-Carmona et al. 2018; Innstrand et al. 2011). In the teaching context, burnout leads to ensuing emotional and psychological costs for teachers (e.g., high stress, low satisfaction, anxiety or sleep problems; Gluschkoff et al. 2016; Skaalvik and Skaalvik 2016; Yu et al. 2015), but it also causes organizational costs for schools and educational administrations (e.g., low job performance and high absenteeism; Lackritz 2004; Moriana and Herruzo 2006; Ryan et al. 2017). Further, teacher burnout has also been related to how teachers interact with

their students, which becomes a key factor in students' motivation and academic achievement (Abós et al. 2018c; Klusmann et al. 2016).

All these consequences have made teacher burnout an increasing concern, not only for many researchers, interested in identifying sociodemographic and psychological characteristics that affect burnout, but also for school stakeholders, interested in the well-being of teachers (von der Embse et al. 2016). One of the most effective ways of reducing burnout is to design, implement, and evaluate specific strategies and intervention programs aimed at preventing it (Iancu et al. 2017). It is important, therefore, to measure burnout via an instrument that focuses on the characteristics of the teaching profession and that is able to differentiate between the burnout subtypes they may experience. To do so, the present study relies on Farber's (1990, 1991, 2000) proposal, which was initially raised in an educational setting, to examine the psychometric properties in secondary school teachers of the short version of the Burnout Clinical Subtype Questionnaire (BCSQ-12) developed by Montero-Marín et al. (2011c).

1.1. Burnout models and definitions

Since workers affected by burnout came to light through observations by Freudenberger (1974), numerous descriptions of this syndrome have been found in literature (Farber 2000; Gil-Monte 2005; Maslach and Jackson 1986; Pines and Aronson 1988). However, it was not until a decade later when the evaluation of burnout became available, through the development of one of the most popular scales, the Maslach Burnout Inventory (MBI; Maslach and Jackson 1986). In its most recent version (Maslach et al. 1996), the MBI considers burnout as a prolonged response to chronic stressors at work and it is defined by the three dimensions of exhaustion (i.e., feelings of being emotionally overextended, depletion, and fatigue), cynicism (i.e., a development of distant behavior toward work and colleagues), and inefficacy (i.e., the feeling of not conducting tasks adequately). The MBI has been used in numerous working populations to measure burnout. In fact, it has been slightly adapted to better fit different professional profiles such as human services (MBI-HSS), educators (MBI-ES), and even students (MBI-SS) (see Maslach et al. 1996). However, all these versions are based on a general framework that is unable to capture the specific characteristics of each particular case (Montero-Marín et al. 2009). Further, they contemplate burnout as a syndrome with relatively consistent symptoms in all individuals as a response to chronic

stress at work (Montero-Marín et al. 2009). This not only increases the difficulty of identifying different types of burnout experienced by teachers, but it also hinders addressing specific strategies to cope with the burnout subtypes.

1.2. A burnout model to capture teaching job characteristics

According to Farber (1990), the burnout prevention strategies to be applied should be based on the characteristics and symptoms experienced by each person. That is, a level of specification in the treatment, attending to individual differences, that would need to consider the provenance of the feelings of frustration and stress factors experienced, the resources to cope with them, and the symptoms manifested (Farber 2000). Thus, from a more phenomenological point of view than the one provided by Maslach's definition, three different burnout subtypes were tentatively proposed by Farber (1990, 1991, 2000). This theoretical framework could be more accurate for examining teacher burnout because it emerges specifically within –among others– an educational setting.

The three original subtypes proposed by Farber (1990, 1991, 2000) are frenetic, underchallenged, and wornout, which were structured and systematized in a typological definition by Montero-Marín et al. (2009) according to the level of dedication at work, to respond to chronic stress and frustration as a classification criterion. The *frenetic* subtype, characterized by investing a large amount of time at work, is common of people who are highly involved, ambitious, and overloaded. The *underchallenged* subtype, typified by feelings of indifference, boredom, and lack of personal development, is common of people who perform routine tasks. The *wornout* subtype, characterized by the feeling of losing control over results, the perception of lack of recognition of self-efforts, and neglecting responsibilities, is common of people who experience a rigid organizational structure at work (Montero-Marín and García-Campayo 2010; Montero-Marín et al. 2009). This burnout definition was operationalized by means of the Burnout Clinical Subtype Questionnaire (BCSQ-36; Montero-Marín and García-Campayo 2010), which is helpful to specifically examine the burnout subtypes and to design specific strategies depending on individual characteristics. This is workable because the BCSQ-36 provides a larger framework, overcoming the limitations of MBI, which, although three-dimensional, is at the same time more broadly oriented towards a unified definition of the syndrome (Montero-Marín et al. 2012).

A short version of the BCSQ-36 has also been developed (BCSQ-12; Montero-Marín et al. 2011c), which is able to present the typological perspective of the BCSQ-36 with a more parsimonious structure. It is more manageable to administer, with better psychometric properties, and its completion is less time-consuming. The BCSQ-12 comprises overload, lack of development, and neglect factors, belonging, respectively, to the burnout subtypes identified by the BCSQ-36 (i.e., frenetic, underchallenged, and wornout). In the teaching context, *overload* is usually suffered by teachers who put too much time and effort into their work at the expense of their own health and personal life. *Lack of development* is experienced by teachers who work superficially because they perceive that it is very difficult to develop their personal skills, and their intention is to change jobs. Finally, teachers who experience *neglect* give up quickly in stressful situations because they perceive they do not have sufficient resources to teach and no longer care about their responsibilities.

The BCSQ-12 has been previously tested in different contexts and populations, such as university workers (Montero-Marín et al. 2011c; including teaching and research staff, administration and service personnel, and scholarship holders), dental students (Montero-Marín et al. 2011b), or primary healthcare physicians (Montero-Marín et al. 2015). In all of them, it has proved to be a reliable tool to discriminate the three burnout subtypes. However, to date, the BCSQ-12 has not specifically been validated in secondary school teachers. Considering that teaching is one of the professions whose daily schedules include a higher workload (Skaalvik and Skaalvik 2015), the shortness of the BCSQ-12 could be an added point in favor of measuring burnout in the teaching context.

1.3. Correlates associated with teacher burnout

The study of burnout correlates seems critical to develop prevention strategies to reduce its incidence. On the one hand, grounded in self-determination theory (SDT; Deci and Ryan, 1985, 2000, 2002), satisfying the basic psychological needs (BPNs) for autonomy, competence, and relatedness is essential to reach optimal personal functioning (e.g., low burnout at work). Autonomy refers to people's need to feel they are the causal agents of their own actions (Ryan and Deci 2017). Competence refers to perceived ability when someone is faced with a situation that threatens an important goal (White 1959). Finally, relatedness refers to the individual's aspiration to maintain close and positive interpersonal relationships with his/her social environment and feel

part of it (Deci and Ryan 2000). According to SDT principles, numerous studies have associated the satisfaction of the BPNs with work-related outcomes (Van den Broeck et al. 2016). With regard to the teaching context, past studies conducted with the MBI have shown that teachers, whose three BPNs have been satisfied, report less feelings of burnout (Kaplan and Madjar 2017; Van den Berghe et al. 2014) and greater job satisfaction (Collie et al. 2016; Lee and Nie 2014). Further, in a recent research study with secondary school teachers (Abós et al. 2018a), based on Farber's burnout approach, the needs for autonomy and relatedness were negatively related to the feelings of overload and lack of development, whereas the need for competence was negatively associated with the feelings of neglect and lack of development. Overall, these results indicate that teachers' BPN satisfaction not only fosters their human development, but it is also vital for feeling positive at work (i.e., with less burnout and high job satisfaction). Given that the satisfaction of autonomy, competence, and relatedness might help to buffer against the adversity of burnout in secondary school teachers, further studies based on Farber's burnout approach are required.

On the other hand, it is also important to study some sociodemographic correlates that may affect teacher burnout. In this sense, manifold studies based on Maslach's model have examined how sociodemographic and labor characteristics may affect burnout at work (e.g., Brewer and Shapard 2004; Purvanova and Muros 2010). In particular, gender, the type of school, and years of experience have been identified as some of the most relevant factors related to teacher burnout. Regarding gender, past studies have shown that female teachers experience higher emotional exhaustion than their male counterparts, while the opposite is true for feelings of cynicism (Antoniou et al. 2013; Betoret and Artiga 2010). With regard to type of school, results found are inconsistent. For example, in the study conducted by Solera et al. (2017), teachers who worked in state schools experienced greater feelings of burnout than those working in non-state schools. However, Arias-Gallegos and Jiménez-Barrios (2013) showed that when state school teachers were compared to non-state school teachers, the former experienced higher feelings of cynicism and inefficacy, while no differences were found in terms of exhaustion. Finally, teaching experience has been reported as a highly influential characteristic in the development of burnout, but results to date do not seem to be consistent, either. Whereas some studies have indicated that as teachers gain more experience, they suffer greater feelings of exhaustion, and they perceive themselves to

be less efficient at work (e.g., Betoret and Artiga 2010), others have found opposite results (e.g., Fisher 2011; Lau et al. 2005). Integrating both results, these studies seem to suggest an inverted U relationship between teaching experience and burnout. Hence, further research on differences in burnout in terms of gender, type of school, and teaching experience is warranted, not only to identify the groups that have a greater risk of suffering one of these three burnout subtypes, but also to design more effective burnout prevention strategies.

Furthermore, research in the influence of sociodemographic characteristics on the burnout subtypes operationalized by Montero-Marín and colleagues (2009, 2010, 2011b, c) is quite scarce. To date, and to the authors' knowledge, only one study has examined the differences in the prevalence of burnout subtypes in university workers in terms of gender and work experience (Montero-Marín et al. 2011a). This abovementioned study showed that males have greater feelings of lack of development than females, whereas no differences were found between genders in overload and neglect. In terms of work experience, the most experienced workers suffer from greater feelings of neglect than novice workers, whereas no differences were found between them in terms of overload and lack of development. Given the limited number of studies based on Farber's burnout approach and sociodemographic characteristics, further studies on secondary school teachers are needed to identify the groups that have a greater risk of suffering one of these three burnout subtypes.

1.4. The present study

1.4.1. Factor structure, composite reliability, and nomological validity of the BCSQ-12 in teachers

The aim of this study was to analyze the factor structure, composite reliability, and nomological validity of the BCSQ-12 in secondary school teachers. The three-factor structure (i.e., overload, lack of development, and neglect) of BCSQ-12 has been previously validated in university workers (Montero-Marín et al. 2011c), dental students (Montero-Marín et al. 2011b), and primary care physicians (Montero-Marín et al. 2015) via Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) procedures. For decades, EFA and CFA have been considered appropriate to study the psychometric properties of measurement instruments. However, whereas EFA models are suitable for a preliminary exploratory step, their inclusion in predictive models is not allowed (Ferrando and Lorenzo-Seva 2014). Similarly, in CFA models, cross-

loadings between items and non-target factors are fixed at zero, which may cause biased estimates of factor correlations (Asparouhov et al. 2015).

To overcome these methodological limitations, together with CFA, an exploratory structural equation modeling (ESEM) was conducted in the present study to reinvestigate the factor structure of the BCSQ-12 in teachers. ESEM is based on integrating classical EFA with CFA procedures, providing methodological advances for EFA models that were limited to CFA and SEM models (e.g., goodness-of-fit assessment, nomological validity; Asparouhov and Muthén 2009). Further, ESEM provides methodological advances for CFA models by using oblique target rotation, which permits, not only the estimation of models in a confirmatory way, but also the free estimation of all cross-loadings between items and non-target factors (Asparouhov and Muthén 2009). Yet, it is important to note that ESEM may not always be the best solution to examine the factor structure of an instrument, and it may present some limitations. Given that CFA produces more parsimonious models, when the ESEM model does not fit significantly better than the CFA model, and does not report smaller factor correlations (i.e., the inclusion of cross-loadings in ESEM, although minimal, tends to reduce the correlations between latent factors), the CFA solution would be more suitable (Marsh et al. 2014). In addition, ESEM models commonly need larger sample sizes than CFA to maintain precision when they are conducted. Finally, despite this seemingly being a less important detail, the truth is that ESEM research has been growing in recent years and, therefore, it has less research background and evidence than CFA (Joshanloo and Lamers, 2016). The combination of ESEM and CFA models can provide help to obtain a broader view of the examined construct (i.e., Farber's burnout subtypes). Consequently, based on both the ESEM and CFA models, the first hypothesis suggests that a three-factor structure (i.e., overload, lack of development, and neglect) would emerge for secondary teachers' responses to the BCSQ-12, showing acceptable psychometric properties.

Another important step in the validation process of an instrument is to examine its association with theoretically related constructs (i.e., nomological validity). So, according to SDT (Ryan and Deci, 2017) and past studies in teachers (e.g., Abós et al. 2018a; Collie et al. 2016; Van den Berghe et al. 2014), the second hypothesis suggests that autonomy, competence, and relatedness satisfaction will show negative relationships with burnout subtypes, and positive relationships with job satisfaction.

Teachers' job satisfaction (i.e., a positive work-related outcome), included in the study, may even help to prove if both types of work-related outcomes (job satisfaction and burnout), according to SDT, are inversely related to their psychosocial antecedents of autonomy, competence, and relatedness satisfaction (i.e., job satisfaction in a positive way, whilst burnout subtypes are so in a negative way).

1.4.2. Gender, type of school, and work experience differences in teacher burnout

A secondary aim of this study was to examine the possible differences in burnout subtypes (i.e., overload, lack of development, and neglect) depending on teachers' gender, type of school, and teaching experience. Given that, to date, only one study has examined the differences in prevalence of burnout subtypes in university workers in terms of gender and work experience following Farber's burnout subtype model (Montero-Marín et al. 2011a), our third hypothesis is tentative. However, previous studies have noted associations between different burnout models, which could be helpful to drive our hypotheses. In this sense, individuals experience overload when they attempt to increase their rewards by taking on an amount of work that becomes notably excessive (Montero-Marín et al. 2009). This feeling comprises a classic etiological burnout factor (Schaufeli and Bakker, 2004), which in previous research conducted with the BCSQ showed an association with exhaustion (Montero-Marín et al. 2012; Montero-Marín et al. 2011c). Likewise, individuals who experience feelings of lack of development balance rewards by conducting tasks superficially, giving rise to feelings of meaninglessness in the workplace (Montero-Marín et al. 2009). These job feelings may trigger a negative assessment, comprising a risk factor for negative outcomes such as boredom or indifference (Montero-Marín et al. 2012), which are very close to Maslach's burnout dimension of cynicism (Montero-Marín et al. 2012; Montero-Marín et al. 2011c). Finally, the neglect subtype optimizes rewards by reducing efforts as a consequence of the defenselessness learned at work (Montero-Marín et al. 2009). These feelings, which characterize the neglect subtype, are relatively close to Maslach's dimension of lack of efficacy at the workplace (Montero-Marín et al. 2012; Montero-Marín et al. 2011c). Considering these associations, and also taking into account past studies conducted with Farber's proposal (Montero-Marín et al. 2011a) and Maslach's model (e.g., Antoniou et al. 2013; Arias-Gallegos and Jiménez-Barrios, 2013; Betoret and Artiga, 2010; Solera et al. 2017), we would expect to find that: (a) male teachers would obtain less feelings of overload and greater feelings of lack of

development; (b) teachers with more teaching experience would obtain higher levels of neglect than teachers with less experience. Regarding type of school, no hypotheses have been formulated given the inconsistent results found in previous studies.

2. Methods

2.1. Ethical Disclosure

Ethical approval for this study was obtained from the Ethics Committee for Clinical Research of Aragon (CEICA; PI15/0283). The database related to the first sample of 584 teachers comes from a Spanish national research project (EDU2013-42048-R). The main variables included in the initial protocol of this project were: teachers' motivating style, motivational regulations, basic psychological needs, job satisfaction, engagement, and burnout subtypes. Given the limited instruments available in Spanish language, the main aim of this project was to provide to the scientific community with reliable and valid questionnaires to assess this psychological and work-related outcomes among secondary education teachers. Therefore, in order to better address the validations, and given the need to differentiate varied theoretical frameworks and gaps, it was decided to validate these questionnaires separately. The Basic Psychological Needs at Work Scale (Abós et al. 2018a), the Motivation for Teaching Scale (Abós et al. 2018b), and the Need-Supportive Teaching Style Scale (NSTSS) (Abós et al. 2018c) have been previously validated with this sample of 584 teachers. Therefore, this study represents the fourth and final validation study of the aforementioned project. Although it must be acknowledged that these four abovementioned studies have the same sample, it is also true that the nomological validation has been tested in all scales with different variables or even different subsamples. In this sense, the risk of error as a result of partial reports (including errors type I and II) was controlled in the present study by recruiting and using a different and complementary sample (i.e., a second sample of 106 teachers) to address the causal relationships between variables. Finally, it is also important to note that none of the results of this study have been published or presented previously in other studies.

2.2. Participants and procedure

The study was conducted by using two totally differentiated samples of secondary school teachers from the Aragon region (northeast of Spain). Initially, all

secondary school teachers (i.e., 7418) working in the Aragon region were invited to participate in the study. The response rate was 8%, resulting in an intentional sample of 584 teachers who completed the BCSQ-12 with their age, gender, type of school, and teaching experience. The average age of these teachers was 45.05 ($SD=8.97$) years old, representing a wide range of ages from 25 to 66 years old. Likewise, they had been working as teachers for an average of 17.55 ($SD=10.26$) years, ranging from 1 to 45 years' teaching experience. Both genders were also well represented, resulting in 43.4% of male teachers and 56.6% of female teachers. Further, these teachers worked in 106 different secondary schools (81 state schools and 25 non-state schools). Seventy-one percent of the teachers worked in state schools whereas the rest of the teachers worked in non-state schools. Of the total of all secondary school teachers working in the region of Aragon (i.e., 7417), 3231 (i.e., 43.1%) were males and 4186 (i.e., 56.9%) females; 5279 (i.e., 71.1%) worked in state schools and 2138 (29.9%) worked in non-state schools. In this sense, gender and type of school percentages for this sample (i.e., $n=584$) were proportionally equal to the total population of secondary teachers of the region of Aragon. These data statistics were provided by the Spanish Ministry of Education and Vocational Training (see <http://www.educacionyfp.gob.es>).

Furthermore, a second convenience sample of 216 different secondary school teachers, working in two state secondary schools and who did not participate in the first sample, were invited to take part in the study. The response rate was 49%, resulting in a second different intentional sample of 106 teachers who not only completed the BCSQ-12 and sociodemographic characteristics (i.e., age, gender, type of school, and teaching experience), but also filled out validated questionnaires for BPNs and job satisfaction to test the nomological validity of BCSQ-12. This sample also represented a wide variety of ages (from 25 to 64 years old; $M_{age}=45.50$, $SD=8.80$), as well as a wide range of teaching experience (from 2 to 36 years old; $M=20.81$, $SD=10.72$). In addition, the percentage of males (41%) and females (59%) of this second convenience sample was similar to the previous sample (i.e., $n=584$), and to the proportion of secondary teachers of the region of Aragon, equitably representing both genders.

In both data compilations, participants received an explanation of the study goals and a link to access the online questionnaire via e-mail. To start to fill out the questionnaire, teachers had to enter a personal code comprising the first two letters of their surnames and the first two numbers of their Identity Cards (ID). This form of

identification allowed verifying that the first and the second sample were totally different. The time to fill out and submit the questionnaires was 30 days in both samples. Participation was also voluntary, and anonymity was guaranteed in both samples. Nevertheless, compared to the first sample, it also seems important to note that the two secondary schools of the second sample were chosen for convenience reasons. These two secondary schools were relatively close to the university and both were willing to collaborate with the research group, which helped to encourage -but not force- teachers to complete the online questionnaires. Therefore, although the recruitment procedures were the same (i.e., contact via email, 30 days to fill it out), these abovementioned reasons could justify the difference in response rates between samples.

2.3. Measures

2.3.1. The short version of the Burnout Clinical Subtype Questionnaire

The Spanish short-version of the Burnout Clinical Subtype Questionnaire (BCSQ-12; for further information, see Montero-Marín et al. 2011c) was used to assess teacher burnout. This scale includes 12 items (four items per factor) and taps into overload (e.g., “I risk my health when I pursue good results in my work”), lack of development (e.g., “I feel that my work is an obstacle to the development of my abilities”), and neglect (e.g., “When things at work don’t turn out as well as they should, I stop trying”). Responses were registered on a 7-point Likert scale ranging from 1 (“strongly disagree”) to 7 (“strongly agree”). This questionnaire has shown adequate reliability and validity in past research with other working populations (Montero-Marín et al. 2015).

2.3.2. Basic psychological need satisfaction

The Spanish version of the Basic Psychological Needs at Work Scale (Abós et al. 2018a) was used to measure teachers’ BPN satisfaction. This scale includes 12 items (four items per factor) and taps into autonomy satisfaction (e.g., “My work allows me to make decisions”), competence satisfaction (e.g., “I have the ability to do my work well”), and relatedness satisfaction (e.g., “When I’m with the people from my work environment, I feel heard”). Responses were registered on a 6-point Likert scale ranging from 1 (“strongly disagree”) to 6 (“strongly agree”). This scale has shown adequate

reliability and validity in prior research with teachers (e.g., Desrumaux et al. 2015). In the present study, a CFA ($n=106$) was performed showing adequate goodness-of-fit ($\chi^2/df=1.26$, $p<.001$; RMSEA=0.050; SRMR=0.071; CFI=0.973; TLI=0.964). The composite reliability analysis obtained omega (ω) values of .93 for autonomy, .91 for competence, and .89 for relatedness, respectively.

2.3.3. Job satisfaction

A Spanish translation of the Teacher Job Satisfaction Scale (Skaalvik and Skaalvik 2011) was used to measure job satisfaction. This four-item scale is comprised of a single factor (e.g., "Working as a teacher is extremely rewarding"). Responses were given on a 6-point Likert scale from 1 ("strongly disagree") to 6 ("strongly agree"). Evidence of reliability has been shown for this scale in prior research (e.g., Skaalvik and Skaalvik 2014). In the present study, a CFA ($n=106$) was performed showing adequate goodness-of-fit ($\chi^2/df=1.04$, $p<.001$; RMSEA=0.021; SRMR=0.005; CFI=0.99; TLI=0.99). Omega (ω) value for the scale was .92. The four items were translated from English to Spanish using the procedures of the International Test Commission (Muñiz et al. 2013).

2.3.4. Gender, type of school, and teaching experience

Teachers' gender, type of school, and teaching experience were measured as categorical variables. Gender was divided into males and females, and type of school was divided into state and non-state schools. Teaching experience was transformed into three categorical variables following the classification of previous studies (Montero-Marín et al. 2011a). Teachers with less than four years' experience were called "novice", those between five and 16 years, "medium-experienced", and those who had more than 16 years' experience, "experienced".

2.4. Data analysis

2.4.1. Model Estimation

The descriptive statistics were calculated with SPSS 20. ESEM, CFA, and structural equation modeling (SEM) were performed with Mplus 7.4, and estimated with the Robust Maximum Likelihood (MLR) method, which provides standard errors and tests of model fit that are robust to the non-normality distribution of the data. MLR

estimator is also preferred for Likert scales that include five or more answer categories (Rhemtulla et al. 2012). In ESEM, all main loadings were freely estimated, whereas cross-loadings were targeted, but not forced, via oblique target rotation procedure to be as close to zero as possible (Morin et al. 2016b). As per typical CFA specification, items only loaded on their respective factor, cross-loadings were constrained to zero and all three factors were allowed to correlate (Morin et al. 2016a). The standardized factor loadings (λ) and uniqueness terms (δ) of each item were reported for ESEM and CFA models.

The scale score reliability estimates were computed using McDonald's (1970) $\omega = (\sum \lambda_i)^2 / (\sum \lambda_i^2 + \sum \delta_{ii})$. Standardized factor loadings are represented for λ_i and standardized item uniquenesses for δ_{ii} . In contrast to Cronbach's alpha (α), omega (ω) coefficient has the benefit of taking the strength of association between items and constructs (λ_i) into account, as well as item-specific measurement errors (δ_{ii}) (Dunn et al. 2014). Furthermore, a vast body of studies in social sciences has offered considerable support to the use of this reliability parameter (e.g., León et al. 2015). However, because Cronbach's alpha has traditionally been used to assess the internal consistency reliability of the factors, and it has been broadly used in educational and psychological research (Dunn et al. 2014), this coefficient was also reported for the BCSQ-12.

2.4.2. *Nomological Validity*

To test the nomological validity of the BCSQ-12, a SEM was conducted, using the most optimal model and adding latent CFA factors representing BPNs (i.e., autonomy, competence, and relatedness), and job satisfaction. Standardized regression weights (β) and explained variance (R^2) were reported.

2.4.3. *Gender, type of school, and experience differences in teacher burnout*

We conducted three multivariate analyses of variance (MANOVA) to examine differences in the three burnout subtypes (i.e., overload, lack of development, and neglect) using teachers' gender, type of school, and teaching experience as independent variables. If significant differences were found, post-hoc tests were performed by means of Bonferroni's method. Effect size (Partial Eta Square; η_p^2) was reported. Values of

effect size above .01 were considered small, above .06 moderate, and above .14 large (Cohen 1988). Observed power (op) was also reported for each MANOVA.

2.4.4. Model Assessment

Model assessment (ESEM, CFA, and SEM) was based on the following goodness-of-fit indices: comparative fit index (CFI), Tucker-Lewis Index (TLI), the root mean square error of approximation (RMSEA), and the standardized root mean square residual (SRMR). Higher values of 0.90 and 0.95 for CFI and TLI indicate adequate and excellent fit indices, respectively (Marsh et al. 2004). Values of 0.08 and 0.06 or less for RMSEA and SRMR are considered as adequate and excellent, respectively (Marsh et al. 2004). The chi-square test (χ^2), although reported, was not a decisive index in the evaluation of the models because it can be overpowered due to sample size.

3. Results

3.1. BCSQ-12 factor structure (Aim 1)

The results based on descriptive statistics (M and SD , $n=584$) for teachers' responses to BCSQ-12 are reported in Table 1. Correlations showed significant and strong relationships between items of the same factor. Items belonging to the overload factor showed significant and moderate-to-low relationships with the lack of development items, whereas the majority of relationships with the neglect items were non-significant. Lack of development items showed significant and moderate relationships with the neglect items.

The goodness-of-fit indices of the estimated alternative measurement models are reported in Table 2 ($n=584$). The three-factor ESEM and CFA models showed similarities and an excellent level of fit in all indices (CFI and TLI \geq 0.950; RMSEA and SRMR \leq 0.060). At first sight, despite the CFA model not providing a higher level of fit than the ESEM model, the similarities between the goodness-of-fit indices of both models suggest that the use of CFA could be preferable to the use of the ESEM in the BSCQ-12, considering differences in parsimony (i.e., ESEM is less parsimonious than CFA). However, the comparison of goodness-of-fit indices may not be sufficient to choose the most optimal model, needing to be complemented with a comparison of parameter estimates (Morin et al. 2016a).

Table 1 Descriptive statistics and correlations for the items (n=584).

Item	1	2	3	4	5	6	7	8	9	10	11	12
1. Overload 1	-											
2. Overload 2	.59**	-										
3. Overload 3	.67**	.68**	-									
4. Overload 4	.53**	.69**	.69**	-								
5. Lack of development 1	.10*	.14*	.17**	.16**	-							
6. Lack of development 2	.21**	.16**	.25**	.22**	.71**	-						
7. Lack of development 3	.15**	.15*	.20**	.18	.80**	.76**	-					
8. Lack of development 4	.16**	.13*	.19**	.17	.58**	.61**	.64**	-				
9. Neglect 1	.04	.03	.03	.01	.32**	.39**	.35**	.34**	-			
10. Neglect 2	.04	.06	.08*	.09*	.33**	.43**	.42**	.37**	.66**	-		
11. Neglect 3	.03	-.01	.03	.05	.35**	.44**	.39**	.36**	.60**	.73**	-	
12. Neglect 4	.08*	.09*	.10*	.13*	.35**	.44**	.40**	.40**	.62**	.73**	.72**	-
Mean	4.35	3.37	3.32	3.51	2.33	2.25	2.44	2.53	2.20	2.09	1.95	2.19
Standard deviation	1.51	1.52	1.58	1.55	1.59	1.48	1.64	1.58	1.16	1.08	1.02	1.10

*= $p < 0.05$, **= $p < 0.01$.

Table 2 Goodness-of-fit statistics of the ESEM and CFA models (n=584).

Model	χ^2 (df)	CFI	TLI	RMSEA [90% CI]	SRMR	CM	$\Delta\chi^2$ (df)	Δ CFI	Δ TLI	Δ RMSEA	SRMR
M1. Three factor ESEM	63.88* (33)	0.987	0.975	0.040 [0.025-0.055]	0.014	-	-	-	-	-	-
M2. Three-factor CFA	106.30* (51)	0.978	0.971	0.043 [0.031-0.055]	0.031	M1	-42.54 (18)*	-0.009	-0.004	+0.003	-0.017

CFA=Confirmatory factor analyses; ESEM=Exploratory structural equation modeling; χ^2 =Scaled chi-square test of exact fit; df=Degrees of freedom; CFI=Comparative fit index; TLI=Tucker-Lewis index; RMSEA=Root mean square error of approximation; 90% CI=90% Confidence interval of the RMSEA; SRMR=Standardized root mean squared residual; CM=Comparison model; Δ =Change in fit information relative to the CM; * p <0.01.

Factor loadings, (λ) uniquenesses (δ), and composite reliability (ω) of the three-factor ESEM and the three-factor CFA models are reported in Table 3 ($n=584$). First, the three-factor ESEM model showed significant and very high factor loadings in all items. One advantage of the use of ESEM is that it allows us to observe that the cross-loadings were not higher than 0.10 in any of the three burnout subtypes. Importantly, only seven out of 24 cross-loadings were significant, although very low. Comparing the loading factors and the cross-loadings, we observed how the overload factor appeared to be globally well-defined by high factor loadings ($\lambda=0.73-0.86$; $M=0.80$; $p<0.01$) and reasonably low cross-loadings ($|\lambda|=0.00-0.03$; $M=0.01$). In addition, the four items belonging to the overload factor did not show significant cross-loadings in the remaining factors. With respect to lack of development factor loadings ($\lambda=0.64-0.95$; $M=0.82$; $p<0.01$), the results were similar to overload. Cross-loadings also obtained low values ($|\lambda|=0.02-0.10$; $M=0.06$), but items five ($|\lambda_{Overload}|=-0.04$; $|\lambda_{Neglect}|=-0.09$), six ($|\lambda_{Overload}|=0.05$; $|\lambda_{Neglect}|=0.08$), and seven ($|\lambda_{Neglect}|=0.10$) showed significant cross-loadings in other factors. However, comparing these values with the factor loadings, the cross-loadings can be considered notably weak. Finally, the neglect factor revealed significant and high factor loadings ($\lambda=0.72-0.88$; $M=0.82$; $p<0.01$), and reasonably weak cross-loadings ($|\lambda|=0.01-0.05$; $M=0.02$). Consistent with this result, only items 11 ($|\lambda_{Overload}|=-0.05$) and 12 ($|\lambda_{Overload}|=0.05$) showed significant values in other factors, although both obtained very low values. Second, consistent with the three-factor ESEM results, all the factors in the three-factor CFA model were well-defined, indicating significant and very high factor loadings ($\lambda=0.70-0.90$; $M=0.81$; $p<0.01$). More precisely, the three burnout subtypes of overload ($\lambda=0.73-0.87$; $M=0.80$; $p<0.01$), lack of development ($\lambda=0.70-0.92$; $M=0.83$; $p<0.01$), and neglect ($\lambda=0.73-0.87$; $M=0.82$;

$p < 0.01$) resulted very well-defined, even indicating a slight improvement in comparison to the factor loadings showed by the three-factor ESEM model.

Indicator	Three-factor ESEM				Three-factor CFA	
	Overload λ	Lack of development	Neglect λ	δ	λ	δ
Overload						
1	0.73	<i>0.00</i>	- 0.01	0.46	0.73	0.46
2	0.82	- <i>0.03</i>	- <i>0.01</i>	0.33	0.81	0.34
3	0.86	<i>0.03</i>	- <i>0.01</i>	0.24	0.87	0.24
4	0.80	<i>0.01</i>	<i>0.01</i>	0.35	0.80	0.35
ω (α)	0.88				0.88 (0.88)	
Lack of development						
5	- 0.04	0.93	- 0.09	0.24	0.86	0.26
6	0.05	0.77	0.08	0.30	0.83	0.30
7	- <i>0.02</i>	0.95	- <i>0.04</i>	0.14	0.92	0.16
8	<i>0.03</i>	0.64	0.10	0.50	0.70	0.50
ω (α)		0.90			0.90 (0.89)	
Neglect						
9	- <i>0.03</i>	<i>0.03</i>	0.72	0.46	0.73	0.46
10	<i>0.01</i>	- <i>0.01</i>	0.88	0.24	0.87	0.24
11	- 0.05	<i>0.01</i>	0.84	0.29	0.84	0.29
12	0.05	- <i>0.01</i>	0.85	0.28	0.84	0.29
ω (α)			0.90		0.88 (0.90)	
	Overload	Lack of dev.	Neglect			
Overload	-	0.26	0.10			
Lack of dev.	0.26	-	0.54			
Neglect	0.09	0.54	-			

ESEM=Exploratory structural equation modeling; CFA=Confirmatory factor analyses; Bold=Target factor loadings; Non-significant parameters ($p \geq 0.05$) are marked in italics; CFA latent correlations are displayed below the diagonal and ESEM latent correlations are displayed above.

With regard to reliability, both the three-factor ESEM ($\omega_{\text{Overload}}=0.88$, $\omega_{\text{Lack-of-development}}=0.90$, $\omega_{\text{Neglect}}=0.90$; $M=0.89$) and the three-factor CFA ($\omega_{\text{Overload}}=0.88$, $\omega_{\text{Lack-of-development}}=0.90$, $\omega_{\text{Neglect}}=0.88$; $M=0.88$) models showed good to excellent composite reliability, once again reporting equal results for both approaches. In line with this observation, the internal consistencies of the BCSQ-12 were 0.88, 0.89, and 0.90 for overload, lack of development, and neglect, respectively, as indexed by Cronbach alphas. Finally, latent correlations of the ESEM and CFA solutions between the three burnout subtypes are reported at the bottom of Table 3 ($n=584$), resulting in similar findings (ESEM: $|r| = 0.10$ to 0.54 , $M = 0.30$; CFA: $|r| = 0.09$ to 0.54 , $M = 0.29$).

Despite the ESEM solution being able to help to provide a more extensive representation, compared to the CFA solution, as it reports not only factor loadings but also cross-loadings, when both models reveal similar goodness-of-fit indices, factor loadings, factor correlations, and reliability, the CFA should be considered the most suitable solution because it is more parsimonious (Marsh et al. 2014). For this reason, the three-factor CFA model was retained to test the nomological validity of the BCSQ-12 in secondary school teachers.

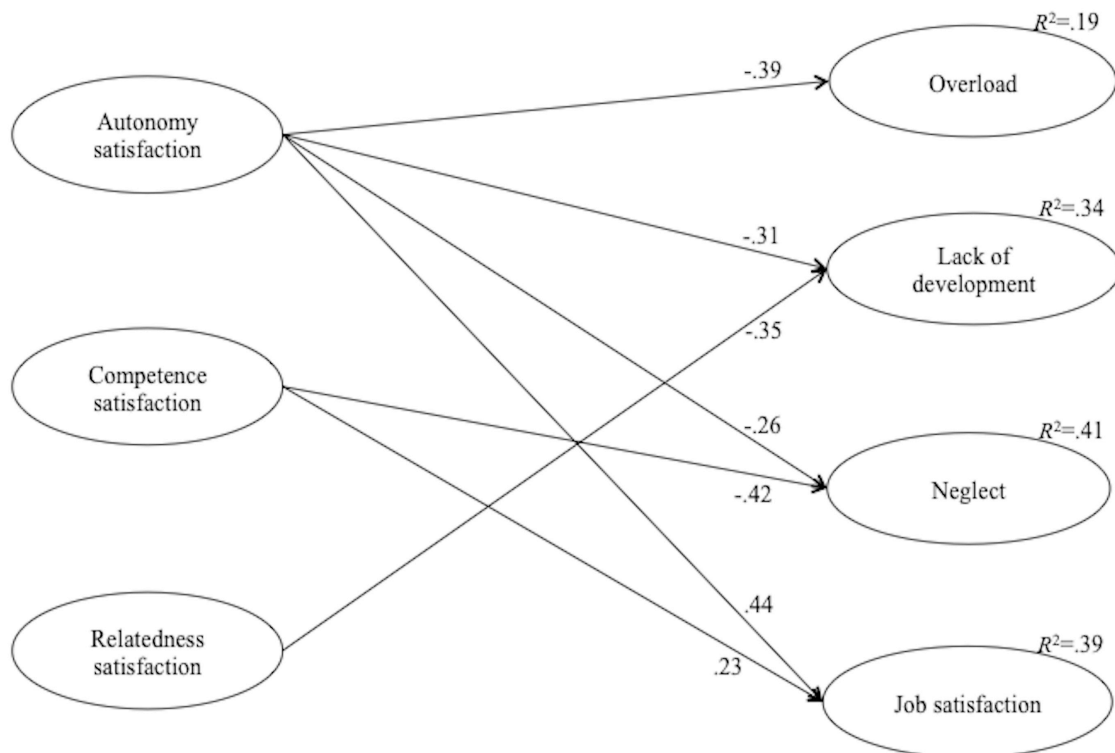


Fig. 1 Structural equation modeling of the BCSQ-12 with BPNs and job satisfaction ($n=106$). R^2 over latent variable. All relationships were significant at $p<0.01$ level

The next step to examine the psychometric properties of the BCSQ-12 in secondary teachers was to assess the nomological validity. Starting with the retained three-factor CFA model and using a different second study sample (i.e., $n=106$), a SEM was conducted, resulting in the following goodness-of-fit indices: $\chi^2/df=1.60$, $p<.001$; RMSEA=0.076; 90% CI=0.064-0.088; SRMR=0.084; CFI=0.978; TLI=0.974. Although the RMSEA -considering 90% CI- and SRMR indices were slightly higher than the recommended cutoff criteria, they were close to being adequate (i.e., ≤ 0.080). In addition, the CFI and TLI showed excellent values. CFA factors representing autonomy, competence, relatedness satisfaction, and job satisfaction were added to the three-factor

CFA model for the BCSQ-12. As observed in Figure 1, we found that overload was only significantly and negatively related to autonomy satisfaction ($\beta=-0.39, p<0.01$). Further, lack of development showed similar significant and negative relationships with autonomy ($\beta=-0.31, p<0.01$) and relatedness satisfaction ($\beta=-0.35, p<0.01$). Yet, neglect showed the highest significant and negative relationship with competence satisfaction ($\beta=-0.42, p<0.01$), while a moderate and negative significant relationship was obtained with autonomy satisfaction ($\beta=-0.26, p<0.01$). Finally, job satisfaction showed an opposite significant relationship with BPNs, particularly with autonomy ($\beta=-0.44, p<0.01$) and competence satisfaction ($\beta=-0.23, p<0.01$).

3.2. Gender, type of school, and teaching experience differences in secondary teacher burnout subtypes (*Aim 2*)

The multivariate effects of gender ($F(3, 580)=6.647, p<.001, \eta_p^2=.033, op=0.974$), type of school ($F(3, 580)=18.420, p<.001, \eta_p^2=.087, op=1.000$), and teaching experience ($F(6, 1156)=5.879, p<.05, \eta_p^2=.030, op=0.954$) were significant. Univariate F-values, effect sizes (η_p^2), observed power (op), and comparisons between groups based on Bonferroni's method, in terms of gender, type of school, and teaching experience, are reported in Table 4 ($n=584$). In terms of gender, female teachers reported significantly higher scores in overload than male teachers, whereas no differences were found in the other burnout subtypes. Regarding type of school, teachers who worked in state schools obtained significantly higher scores in the three burnout subtypes compared to teachers working in non-state schools. Finally, experienced teachers reported significantly higher scores in lack of development and neglect than novice teachers. Further, medium-experienced teachers also reported significantly higher scores in neglect compared to novice teachers. Overload differences between novice, medium-experienced, and experienced teachers were not found.

Table 4 Gender, type school and teaching experience mean scores, F-values, and effect sizes for teacher burnout (n=584).

	Male (i) (n=254)		Female (j) (n=330)		Contrast between groups					
	M	SD	M	SD	Mean difference (i-j)	Standard error	p	F-value ^(1,582)	η_p^2	op
	Overload	3.389	1.292	3.835	1.319	-0.446**	0.109	<.001	16.680	.028
Lack of development	2.441	1.374	2.357	1.386	0.084	0.115	>.05	0.535	.001	0.113
Neglect	2.120	0.958	2.103	0.947	0.016	0.080	>.05	0.042	.000	0.055
Type of school	State (i) (n=416)		Non-state (j) (n=168)		Contrast between groups					
	M	SD	M	SD	Mean difference (i-j)	Standard error	p	F-value ^(1,582)	η_p^2	op
Overload	3.727	1.307	3.430	1.349	0.297*	0.121	<.05	6.067	.010	0.691
Lack of development	2.633	1.456	1.802	0.942	0.831**	0.122	<.001	46.089	.074	1.000
Neglect	2.247	0.971	1.772	0.808	0.475**	0.085	<.001	31.404	.051	1.000
Experience	Novice (i) (n=54)		Medium-experienced (j) (n=235)		Contrast between groups					
	M	SD	M	SD	Mean difference	Standard error	p	F-value ^(2,580)	η_p^2	op
Overload	3.363	1.330	3.644	1.285	0.281	0.201	>.05	1.394	.005	0.300
					i-j	0.198	>.05			
					i-k	0.116	>.05			
					j-k	0.208	>.05			
Lack of development	1.867	1.221	2.336	1.383	-0.468	0.208	>.05	5.632	.019	0.859
					i-j	0.204	<.05			
					i-k	0.120	<.05			
					j-k	0.143	<.05			
Neglect	1.666	0.759	2.112	0.987	-0.448*	0.143	<.05	6.879	.023	0.922
					i-j	0.141	<.05			
					i-k	0.082	>.05			
					j-k					

*= $p < 0.05$, **= $p < 0.01$; η_p^2 =partial eta squared; op=observed power.

4. Discussion

It is well-established that the burnout syndrome is a serious problem, not only for teachers' health but also for the educational system in general. Therefore, designing, implementing, and evaluating strategies to reduce and prevent teacher burnout is becoming a priority for school policymakers (von der Embse et al. 2016). However, the first step would be to validate instruments that can capture and differentiate the burnout subtypes that teachers may experience in a valid, reliable, and operational –in the sense of brief– way. Thus, taking Farber's (1990, 1991, 2000) approach, and its systematized and operationalized definition by Montero-Marín and colleagues (2009, 2010, 2011b, c) as background, the present study examines the psychometric properties of the short version of the BCSQ and some psychological and sociodemographic correlates in secondary school teachers.

4.1. Can the BCSQ-12 be an appropriate scale to measure and identify the different teacher burnout subtypes? (Aim 1)

The first aim of this study was to inspect the factor structure, composite reliability, and nomological validity of the BCSQ-12 in secondary school teachers. Firstly, based on the previous validation of the BCSQ-12 in university workers (Montero-Marín et al. 2011c), dental students (Montero-Marín et al. 2011b), and primary care physicians (Montero-Marín et al. 2015), the first hypothesis suggested that a three-factor structure comprised of overload, lack of development, and neglect could show acceptable psychometric properties in secondary school teachers. Consistent with the referred previous validation studies, the results of both the ESEM and CFA models indicated excellent fit indices, showing satisfactory construct validity of the three-correlated factors model of the BCSQ-12. The three-factor ESEM model showed high factor loadings with their relative latent factor. In addition, all the cross-loadings were very low and most of them were not significant, suggesting that none of the items could be loading on the other latent factors. In line with ESEM results, the three-factor CFA model also reported significant and very high factor loadings in all items, confirming the association of each item with its previously hypothesized latent factor. In addition, when cross-loadings are constrained to be zero (i.e., in the CFA model), the factor correlations can be overinflated, suggesting the potential emergence of a global

dimension (Litalien et al. 2017). However, the latent correlations of the CFA model were equal to the correlations of the ESEM model, offering little support for the global burnout factor in teachers. Perfectly consistent with the theoretical proposal (Farber 1990, 1991, 2000; Montero-Marín et al. 2009, 2010, 2011b, c), these results suggest that the three burnout subtypes should be measured separately in teachers. This methodological combination between the ESEM and CFA models might provide a more refined picture of the three-factor structure of the BCSQ-12 in teachers. In particular, the very high factor loadings obtained in the two models, together with the low, and in some cases non-significant, cross-loadings reported in the ESEM, and consequently, the absence of overinflated factor correlations in CFA, might serve to reinforce the existence of three distinguished subtypes with which secondary school teachers may experience burnout at work. Taken together, these results may also represent a practical contribution to guide future prevention burnout studies in teachers, suggesting that prevention strategies must take the subtype of burnout experienced (i.e., overload, lack of development, and neglect) into account.

Secondly, the omega values (ω) were adequate for the three latent factors in both the three-factor CFA model and the three-factor ESEM model (ω 's $\geq .88$, see Table 3) and, therefore, the first hypothesis was supported. These composite reliability results are in line with previous studies that used the BCSQ in primary healthcare professionals. In particular, Montero-Marín et al. (2016) examined composite reliability of the BCSQ-36 (and, thus, of the BCSQ-12) using a congeneric model, obtaining adequate values in the three burnout subtypes of overload ($R=.81$), lack of development ($R=.86$), and neglect ($R=.86$). In parallel, the present study also shows good-to-excellent Cronbach's alpha values (α 's $\geq .88$, see Table 3) in the three subtypes of burnout, providing additional support for the reliability hypothesis. Consistent with the current study, some previous validation studies of the BCSQ-12 (Montero-Marín et al. 2011b, c) also reported acceptable values in the latent factors reliability based on Cronbach's alpha. More precisely, both in the first validation with university workers (Montero-Marín et al., 2011c), and with dental students (Montero-Marín et al. 2011b), results showed good internal consistency values in terms of Cronbach's alpha for the three burnout subtypes of overload ($\alpha=.87/.85$), lack of development ($\alpha=.87/.81$), and neglect ($\alpha=.85/.82$). In addition, using a sample of primary healthcare professionals, Montero-Marín et al. (2016) reported good internal consistency for the three burnout subtypes of overload

($R=.81$), lack of development ($R=.85$), and neglect ($R=.86$), as indexed by tau-equivalent model of reliability.

The results of both reliability parameters used in the present study (i.e., omega coefficient and Cronbach's alpha) offered good-to-excellent values for the three subtypes of BCSQ-12. In this sense, psychometric research has indicated that when the difference between Cronbach's alpha and omega coefficients is within the range of $-.20$ to $+.20$, and factor loadings are, on average, $\geq .70$, using one or other reliability parameter has no practical consequences (Raykov & Marcoulides, 2015; Viladrich & Angulo-Brunet, 2017). The present study showed that when Cronbach's alpha was used to estimate the reliability of BCSQ-12, the degree of deviation from omega coefficient was lower than $.20$ in the three burnout subtypes. In fact, Cronbach's alpha and omega values were almost the same. Likewise, the retained three-factor CFA showed factor loadings of $\geq .70$ in all BCSQ-12 items. These results suggest that the two reliability parameters could be adequate to guarantee the reliability of BCSQ-12 in teachers. However, it is important to bear in mind that indices obtained by Cronbach's alpha could be biased by the number of items that comprise each latent factor as well as by the sample size (Dunn et al. 2014). In addition, in psychosocial research, questionnaires are rarely one-dimensional, and data are usually provided from different populations or samples. Consequently, the tau-equivalence assumption is also likely to be violated, which could drastically bias Cronbach's alpha values (Dunn et al. 2014; McNeish, 2018). In contrast, a good omega performance is usually achieved even when alpha assumptions are not met. Therefore, there is growing consensus in psychometric literature recommending a switch to the omega coefficient instead of alpha (Dunn et al. 2014; McNeish, 2018; Revelle and Zinbarg, 2009; Trizano-Hermosilla and Alvarado, 2016). In this line, recent psychosocial studies have reinforced the methodological advantages of calculating the omega index (ω) (León et al. 2015; Perreira et al. 2018; Sánchez-Oliva et al. 2017). Thus, it is also important to remark the contribution of the present study in terms of composite reliability (McNeish, 2018). Together with the previous composite reliability (i.e., congeneric reliability) findings, reported by Montero-Marín et al. (2016) in primary healthcare professionals, the present study also provides evidence of composite reliability -via omega values- in a different work-context (i.e., secondary school teachers) for the BCSQ-12.

Thirdly, to examine the nomological validity of BCSQ-12, a second additional hypothesis was formulated aimed at examining the relationships between BPN satisfaction, and the three burnout subtypes and job satisfaction in a different sample of 106 secondary school teachers. It is important to interpret these results with caution given the small sample size and the cross-sectional design, and also because some goodness-of-fit indices (i.e., CI 90% and SRMR) of the SEM showed scarce values. As expected, the need for autonomy showed negative relationships with the three burnout subtypes, in agreement with SDT tenets (Ryan and Deci, 2017). These results seem to suggest that the design of burnout prevention strategies, based on the satisfaction of teachers' autonomy, could be helpful to protect teachers from the three burnout subtypes. Furthermore, the competence need showed a negative relationship with the burnout subtype of neglect. This characteristic of neglect has previously been related to similar self-efficacy perceptions (Montero-Marín et al. 2011b; Montero-Marín and García-Campayo 2010). A possible explanation could be that the perception of competence satisfaction allows teachers to adapt to complex and changing environments that facilitate their teaching responsibilities when they perceive that they do not have sufficient tools to teach. However, contrary to our hypothesis, competence satisfaction did not show a relationship with overload and lack of development. The high number of tasks (e.g., preparation of lessons, assessment, meetings, or extracurricular activities) that Spanish secondary school teachers have to cope with in their work could dilute the positive effects of need for competence on the overload subtype (Skaalvik and Skaalvik, 2015). Likewise, the insufficient professional development opportunities among Spanish teachers could explain the lack of relationship between teachers' competence satisfaction and lack of development (Anaya and López 2014). According to our hypothesis, a negative relationship was found between the need for relatedness and the burnout subtype of lack of development. These results seem to suggest that prevention strategies based on the creation of warm interpersonal relationships among teachers could be helpful to prevent them focusing their attention on feelings of difficulty in making progress at work, and their intentions to change jobs. However, contrary to our expectations, associations between relatedness satisfaction with overload and neglect were not found. That is, although teachers may work in an environment that nurtures their relatedness satisfaction, they still might perceive feelings of overload. One possible explanation could be the high workload in the teaching setting, which has been widely documented as one of the most common

and damaging stressors for their good psychological functioning at work (Shernoff et al. 2011; Skaalvik and Skaalvik 2015). With regard to neglect, it seems that despite having a good job climate with other teachers, these interpersonal relationships may not be determinant to the teaching style and attitude established by the teacher.

Finally, consistent with our hypothesis and previous studies (Collie et al. 2016; Lee and Nie 2014) and SDT (Ryan and Deci, 2017), the autonomy and competence needs showed positive relationships with job satisfaction. Yet, the relatedness need did not show an association with job satisfaction. In line with a recent study conducted by Rothmann and Fouché (2018), these results might suggest that positive outcomes, such as job satisfaction and engagement, are more likely to occur if teachers feel competent and autonomous, while satisfying the relatedness need may not be as important as the other two BPNs to achieve positive outcomes in the teaching profession. One possible explanation could be that the need for relatedness with colleagues could be less important than the need for relatedness with students to experience teachers' adaptive outcomes such as engagement, enjoyment, or enthusiasm (Aldrup et al. 2017; Klassen et al. 2012). Further studies are needed to refute this possible explanation. Despite this result, generally speaking, the relationships between BPN satisfaction and job satisfaction show opposite patterns compared to the three burnout subtypes. Consequently, in line with SDT (Deci and Ryan, 1985, 2000, 2002; Ryan and Deci, 2017), most of the relationships found in this validation study also support the nomological validity of BCSQ-12. The overall results suggest that this scale could be adequate to identify the different burnout subtypes that teachers may experience at work.

4.2. Can teacher burnout be different depending on the gender, type of school, and experience? (*Aim 2*)

A secondary aim of this study was to analyze the differences in the subtypes of overload, lack of development, and neglect, depending on the teachers' gender, type of school, and teaching experience. Regarding teachers' gender, we expected male teachers to obtain less feelings of overload and greater feelings of lack of development compared to their female counterparts. In line with our hypothesis, the results of the present study showed higher scores in overload in female teachers. According to the gender role theory (Eagly and Wood 1982), cultural reasons may explain these differences because

women traditionally tend to express their feelings of fatigue at work (i.e., higher overload), while men generally do not communicate their feelings. Yet, no differences between male and female teachers were found in terms of lack of development. These results are not in line with the previous study conducted by Montero-Marín et al. (2011a), who found higher scores in lack of development in male university workers, suggesting that the role of men has always been linked to higher social expectations in terms of professional developments. In this sense, the lack of promotion opportunities among Spanish secondary school teachers, in their educational system, could explain the lack of differences between males and females in terms of lack of development in the teaching context (Vercambre et al. 2009).

With regard to type of school, considering the inconsistency found in previous studies conducted with the MBI as well as the absence of studies with Farber's burnout approach, no hypotheses were driven. Our results showed that teachers who work in state schools report higher scores in the three burnout subtypes (i.e., overload, lack of development, and neglect) than teachers who work in non-state schools. In line with previous studies conducted in Spanish teachers (Betoret 2009; Betoret and Artiga 2010), one possible explanation is that there are more likely to be teacher stressors in state schools in Spain (e.g., higher ratio of students per classroom, higher cultural diversity of students, and higher levels of student misbehavior and amotivation). Similarly, less feelings of burnout subtypes in non-state schools teachers could be explained because non-state schools teachers may have access to a greater amount of resources (e.g., courses, materials, facilities) to improve or facilitate their teaching. Finally, we expected more experienced teachers to have greater feelings of neglect than teachers with less experience. Consistent with Montero-Marín et al. (2011a), the results of the present study showed that medium-experienced and experienced teachers have greater feelings of neglect than novice teachers. These results indicate that teaching experience may turn out to be a significant risk factor for developing a neglecting attitude at work, suggesting that neglect prevention strategies could be very useful for teachers with more years of teaching experience. Further, the results of the present study also indicated that experienced teachers reported higher scores in lack of development than novice teachers. In Spain, teachers must normally pass several public exams during the first years of their teaching careers before they get a permanent job. This fact could explain why novice teachers showed less feelings of lack of development and neglect because

they still have important goals to achieve in their professional career. On the contrary, teachers who have more experience may perceive that they have fewer opportunities of professional development and challenges in their careers, giving way to negligent behaviors.

Overall, as a practical contribution, these results seem to suggest that prevention strategies to buffer the different subtypes of teacher burnout should pay special attention to high-risk groups such as females (in terms of overload), state school teachers (in terms of the three burnout subtypes), and experienced teachers (in terms of lack of development and neglect). Nevertheless, more research into Farber's burnout subtypes and sociodemographic characteristics is necessary to produce more conclusive evidence.

4.3. Practical implications: specific strategies to prevent teacher burnout

Taking the recognized limitations related to nomological validity into account, but considering our results and previous studies with teachers that have evidenced the critical role of BPN satisfaction as the necessary fuel for adequate functioning at work (Klassen et al. 2012; Roth 2014), some specific prevention strategies could be useful to buffer the distress feelings of different burnout subtypes. Furthermore, this study contributes to previous literature on some sociodemographic characteristics, which could further refine future intervention studies on burnout prevention in teachers. Based on these findings and in accordance with the tenets of SDT (Deci and Ryan, 1985, 2000, 2002; Ryan and Deci, 2017), some practical implications for teachers themselves, but also for headteachers and the educational administration, are proposed.

Teachers who experience overload burnout risk their own health to fulfill their teaching tasks and obligations. In this sense, the results of this study could invite to rethink that prevention strategies, based on supporting teachers' need for autonomy, may help to prevent teacher overload. In line with this claim, previous evidence (Van den Berghe et al. 2013) suggests that the educational administration could support teachers' need for autonomy by developing a more consensual curriculum with teachers, and making higher quality resources available in classrooms to stimulate and facilitate teaching. Likewise, some actions, such as providing teachers with enough freedom in terms of their teaching style, opportunities to participate in interdisciplinary project-based learning, responsibilities in the development of their school's educational projects

or in student assessment, could be adopted by headteachers to support teachers' need for autonomy. Importantly, consistent with the sociodemographic results found, educational administrations and headteachers should be aware that these suggested strategies could be especially important for female and state school teachers.

Teachers who experience lack of development feel that teaching provides insufficient challenges. The results of this study suggest that prevention strategies geared towards supporting teachers' autonomy and relatedness satisfaction may provide help to try to prevent teachers' lack of development. In this sense, in addition to the aforementioned strategies to support teacher autonomy, recent research (Durksen et al. 2017) has shown some ideas on how educational administration and headteachers could support teachers' need for relatedness. For instance, encouraging participation in need-supportive teaching training programs and interdisciplinary projects, and promoting educational innovations could provide new challenges for teachers, but they may also strengthen relationships between teachers from different areas or courses, developing a friendly and warm environment in schools. Likewise, organizing coexistence activities (e.g., sports, recreational, or training activities) outside working hours could allow teachers to get to know their peers in other contexts. Further, it is important to add that prevention strategies that focus on lack of development could be particularly pertinent for state school and experienced teachers.

Teachers who experience neglect feel that they do not have all the desired resources in order to deal with their teaching tasks, and consequently, they do not care anymore about their responsibilities as teachers or the possible related outcomes. The results of this study invite to think that prevention strategies based on supporting the need for autonomy mentioned above and, in particular, prevention strategies based on supporting the need for competence, may help to reduce or prevent teachers' feelings of neglect. In this sense, educational administration and headteachers could support teachers' competence satisfaction by providing opportunities to attend conferences and by giving teachers more positive feedback. Further, training in new methodologies and technologies, which can cope with some teacher stressors (e.g., student misbehavior or amotivation), could increase their feelings of competence (Rothmann and Fouché, 2018). This could be especially useful for stimulating the professional development of the more experienced teachers who commonly feel further removed from the new methodologies and technologies. In this vein, it is important to note that these neglect

burnout prevention strategies could be especially useful for teachers who work in state schools, as well as for medium-experienced and experienced teachers.

4.4. Limitations and directions for future research

There are some limitations to the present study, and, therefore, results should be interpreted with caution. The first limitation is the non-representative nature of the samples investigated. Given that teachers' participation was voluntary, some teachers that experienced high levels of burnout subtypes may, perhaps, have refused to take part of this study. A very low response rate (i.e., 8%) was obtained in the largest sample (i.e., n=584), which could introduce bias. Regarding the second sample (i.e., n=106), although it had a higher response rate (i.e., 49%), it has to be noted that the two secondary schools were selected by convenience. In addition, the school boards of both schools encouraged teachers to participate in the study, which could induce biased response patterns. Consequently, special caution is required when generalizing these results, particularly with the findings obtained in the nomological validity. Future research should overcome these limitations to increase the generalizability of the BCSQ-12. Likewise, participants were native speakers, which may limit their possibilities of generalization. Examining the three-factor structure of the BCSQ-12 in other teachers with different mother tongues should be considered a relevant avenue of research. Further, future research studies would explore the invariance of BCSQ-12 among teachers working in different countries. Second, to assess the ESEM model, the present study used goodness-of-fit indices derived from research conducted with CFA. Consequently, caution is required when interpreting these results. A third limitation of the present study relates to its cross-sectional design, which makes it difficult to estimate the causal effect of BCSQ-12 factors and their correlates. Future longitudinal research will be needed to further unravel the direction of the relationships examined and to shed more light on burnout subtypes. Fourth, this study only examined the associations between the BCSQ-12 dimensions, teachers' BPNs, and their job satisfaction. Future studies should include other relevant correlates, such as teachers' motivation, engagement at work, MBI dimensions, stress, or anxiety to continue expanding the sequence proposed in Figure 1 and report more information about the nomological validity of BCSQ-12 in teachers. Given that other validation studies of our project (i.e., Abós et al. 2018a) have examined similar relationships to those in this study, which could induce a risk related to the multiplicity of analyses, a second sample

was recruited in this study to avoid ethical conflicts. We encourage future studies to conduct broader models, including all four scales validated in our project for a further understanding of teachers' burnout. Fifth, although the MANOVA showed significant overload differences regarding gender and type of school, as well as lack of development and neglect differences regarding teaching experience, the limited scope of these results must be recognized due to the low effect sizes that were found. In addition, given that the categorization of the teaching experience was arbitrary, results should be interpreted with caution. Additionally, further research should examine the influence of other sociodemographic characteristics, such as monthly income, contract type and duration, or familial obligations, on burnout subtypes. Altogether, it could be helpful to design and apply strategies to prevent burnout that should be individually tailored to the perceived risk of each person. Finally, both regarding BPNs and job satisfaction, the measures used to examine the nomological validity of the BCSQ-12 were obtained through self-report questionnaires. This may be attributable to response style characteristics rather than expected associations between factors, inducing a mono-method bias. Future prospective studies should add other types of measures like observations, interviews or discussion groups.

5. Conclusion

The results of the present study suggest that the BCSQ-12 is a valid and reliable questionnaire to measure burnout subtypes (i.e., overload, neglect, and lack of development) in secondary school teachers. These findings suggest that the three burnout subtypes, which were previously identified by Farber (1990, 1991, 2000) and systematized by Montero-Marin and colleagues (2009, 2010, 2011b, c), should be measured separately in teachers. Further, the relationships found between BCSQ-12 subtypes and teachers' BPN satisfaction and job satisfaction also suggest evidence of nomological validity. Finally, female teachers, state schools' teachers, and experienced teachers might be more severely affected by the different burnout subtypes. These findings suggest the need to design and implement strategies to support the satisfaction of teachers' basic psychological needs, which could buffer against the detrimental effects of different burnout subtypes. Given that female teachers, state school teachers, and experienced teachers seem to have a greater risk of suffering one of these three burnout subtypes, particular attention should be paid to these teachers.

Data Availability: The datasets analyzed during the present study are available from the corresponding author on reasonable request.

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5.2. CAPÍTULO II: Análisis de los procesos motivacionales y funcionamiento psicológico del profesorado

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Teachers' motivation in relation to their psychological functioning and interpersonal style: A variable- and person-centered approach

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H I G H L I G H T S

- Highly amotivated teachers display more burn-out and less engagement.
- Highly amotivated teachers adopt a less motivating interpersonal style.
- Autonomously motivated teachers display less burn-out and a more motivating style.
- Teachers who feel pressured are more likely to pressure their students.
- Experienced need satisfaction serves as the fuel for valuing and enjoying teaching.

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The present study investigates how teachers' motivation relates to burnout and engagement, teaching style and need satisfaction at work. A total of 584 secondary teachers completed validated questionnaires. Four profiles were retained in the cluster analysis. Results showed that teachers who were high on autonomous motivation displayed the most optimal pattern of outcomes, whereas teachers who were high on amotivation showed the opposite pattern. Teachers who were high on controlled motivation were engaged in their jobs, yet they had a greater risk of burnout and of establishing an ego climate. Implications for educational policy and practice are discussed.

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1. Introduction

Recently many studies have collected evidence about the high prevalence of burnout among teachers (Aloe, Shisler, Norris, Nickerson, & Rinker, 2014). Many educational practitioners and policy-makers are concerned about these prevalence rates since burnout yields maladaptive outcomes (Cordes & Dougherty, 1993) such as diminished physical health (Hakanen, Bakker, & Schaufeli,

2006), lower emotional well-being (Skaalvik & Skaalvik, 2011), and lower work commitment (Hakanen et al., 2006). In contrast to burnout, teachers' engagement is considered a positive indicator of their physical health, well-being and commitment at work (Parker, Martin, Colmar, & Liem, 2012). Teachers, who have high energy levels and resilience (i.e., vigor), teach with great enthusiasm (i.e., dedication) and experience flow while working (i.e., absorption), are said to be highly engaged in teaching (Schaufeli, Salanova, González-Romá, & Bakker, 2002). Given the manifold negative outcomes related to burnout and the positive aspects of teachers' engagement, the question of which factors are reducing the prevalence of burnout, while positively affecting teachers' engagement at work, arises. Until today, most research has focused on

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organizational (e.g., work overload) and interpersonal correlates (e.g., students' reactions toward the teacher or school principal's leadership), while personal factors such as teachers' motivation at work have received less attention (Fernet, Guay, Senécal, & Austin, 2012; Roth, 2014). As such, the current study focuses on relationships between teachers' motivation and two indicators of their well-being at work, that is, burnout and engagement at work.

Teachers' motivation is not only relevant for their own psychological functioning, but it may also affect the way they interact with their students (Roth, Assor, Kanat-Maymon, & Kaplan, 2007). The present study therefore relies on two prominent and well-validated theoretical frameworks (i.e., Self-Determination Theory and Achievement Goal Theory), to also examine how teachers' motivation relates to their interpersonal style in the classroom. Finally, if teachers' motivation is indeed predictive of their well-being, and the quality of their interpersonal interactions with students, it is crucial to also understand the roots of teachers' motivation. Therefore, the current study also investigates how teachers' experienced need satisfaction at work relates to teachers' motivation.

1.1. Self-determination theory (SDT) and teachers' quality of motivation

Teacher motivation can be understood as the underlying reasons driving teachers' involvement in teaching (Collie & Martin, 2017), which can qualitatively differ in the degree to which they are self-determined (Deci & Ryan, 2000). Autonomous motivation, the most self-determined form of motivation, is typified by a sense of volition and approbation towards specific activities and consists of two types of regulation; intrinsic motivation (i.e., the inherent pleasure and interest derived from the activity) and identified regulation (i.e., the recognition of the values and importance of a behavior) (Deci & Ryan, 2000). Teachers who get involved in their work for personal satisfaction, and the inherent pleasure of teaching is intrinsically motivated, while teachers who believe their teaching is relevant for their personal and professional development or who value being able to teach young people are driven by identified regulation.

Controlled motivation, situated between autonomous motivation and amotivation, is characterized by feelings of pressure to participate in certain activities, and involves introjected regulation (i.e., internal pressure such as a desire to avoid feelings of guilt and feeling better about oneself) and external regulation (i.e., external pressure such as a desire to obtain rewards or to avoid criticism) (Ryan & Deci, 2017). For instance, teachers who prepare their lessons well to avoid feeling bad about themselves constitute an example of introjected regulation, whereas teachers who put effort into their teaching because they get longer holidays are driven by external regulation.

Finally, amotivation is typified by an absence of motivation or a lack of intention to engage in a task because teachers do not expect to achieve results from their efforts (Deci & Ryan, 2002). To illustrate, teachers are amotivated when they do not understand why they have to continue getting involved in teaching, because they think that the activity they do is useless.

1.2. Teachers' motivation and psychological functioning

Furthermore, SDT makes concrete predictions about how different motivational regulations affect the quality of human behavior (Deci & Ryan, 1985). According to SDT, people seek out opportunities for personal growth, development and choice, and organize their actions based on personal goals and interests when they are autonomously motivated (Deci, 1980). In this sense, autonomous motivation is related to enhanced psychological

functioning (Deci, 1980). In contrast, when people display higher levels of controlled motivation, they organize their actions based on pressurizing reasons such as deadlines or surveillance. Although controlled motivated teachers may not necessarily put less energy into their jobs, the feelings of pressure they experience may come with an emotional and psychological cost (Deci & Ryan, 1985), as indexed by higher burnout. When people are high on amotivation, they have the feeling that the outcome of their behaviors is beyond their own control. Amotivation thus finds its roots in a lack of competence, resulting in negative psychological outcomes such as burnout and depression, and would generally go hand in hand with very low levels of engagement (Deci & Ryan, 1985).

Manifold studies have confirmed these theoretical premises. In particular, past studies have shown that teachers who are more autonomously motivated, report fewer symptoms of burnout (Eyal & Roth, 2011; Roth, Assor, Maymon, & Kaplan, 2007), and higher engagement (Cheon, Reeve, Yu, & Jang, 2014; Jansen in de Wal, den Brok, Hooijer, Martens, & van den Beemt, 2014). Teachers who are more controlled motivated report more feelings of burnout (Fernet, Senécal, Guay, Marsh, & Dowson, 2008; Van den Berghe et al., 2013), yet relationships with engagement have been inconsistent so far (Fernet, Austin, & Vallerand, 2012; Jansen in de Wal et al., 2014). While teachers who are highly controlled motivated may not necessarily invest less in their job, this would not be the case for teachers high on amotivation. Highly amotivated teachers have a higher risk of burnout (Fernet et al., 2008), and their engagement in their jobs is very low (Nie, Chua, Yeung, Ryan, & Chan, 2015).

1.3. Teachers' motivation and teaching style

Teachers and students interact with each other on a regular basis, and the quality of their interactions can vary considerably. According to the tenets of SDT, teachers' interpersonal styles can differ in the degree to which they are supportive of students' basic psychological needs (BPN) for autonomy, relatedness and competence (Ryan & Deci, 2017). Autonomy refers to people's needs to feel they are the causal agents of their actions (Deci & Ryan, 2000). Relatedness refers to experienced social inclusion and warm interpersonal relationships (Deci & Ryan, 2000). And competence refers to the perceived ability when faced with a situation that threatens an important goal (White, 1959). The provision of choices, following students' pace of progress, and explaining the relevance of the task are practices that are characteristic of an autonomy-supportive teaching style (McLachlan & Hagger, 2010). Teachers who display sincere concern, facilitate cooperation, and work closely with their students, exemplify a relatedness-supportive style (Leenknecht, Wijnia, Loyens, & Rikers, 2017). And finally, teachers who provide guidance by using positive and interrogative feedback, who focus on students' progress and create clarity on expectations and rules, typify a structuring style (Jang, Reeve, & Deci, 2010). In this sense, some parts of a structuring style (i.e., the progress-oriented focus) align with the main ideas of a task-oriented climate as defined within Achievement Goal Theory (AGT) (Butler, 2014; Nicholls, 1989). Teachers develop a task climate among their students when they emphasize learning, effort and individual progress rather than performance and inter-individual comparison, which would be typical for an ego climate. For instance, when reporting on the results of an assessment task, in a task-oriented climate the teacher would emphasize the progression a student has made, while in an ego climate the teacher would focus on the final results and how well a student has done in relation to other students (Butler, 2014). Past studies have shown that a need-supportive (Van den Berghe, Cardon, Tallir, Kirk, & Haerens, 2016) and task-oriented teaching style is related to more adaptive student outcomes, in contrast to an ego climate, which

relates more strongly to maladaptive student outcomes (Meece, Anderman, & Anderman, 2006).

SDT further posits that the quality of teacher-student interactions may depend on teachers' motivation (Deci & Ryan, 1985). Specifically, teachers who are more autonomously motivated have more available energy, and are more likely to display an, curious and responsive attitude, thus allowing them to interpret the learning environment including students' efforts, suggestions, (mis-)behaviors or complaints as informational rather than as threatening (Deci & Ryan, 1985; Weinstein, Hodgins, & Ryan, 2010). As such, it is assumed that autonomously motivated teachers are more likely to adopt an autonomy-supportive style (e.g., listen to students' voices and preferences), and create a warm (e.g., being caring towards the students) and task-oriented learning environment (e.g., focusing on learning) (Cheon, Reeve, Lee, & Lee, 2018). Teachers who have high controlled motivation are more concerned with demonstrating their abilities (or avoidance of failure) to maintain their self-worth as a teacher (i.e., ego involvement; deCharms, 1968; Nicholls, 1984; Ryan, 1982). Perhaps their own ego-involvement will also transfer into their way of interacting with their students, such that controlled motivated teachers may be more likely to create an ego-oriented climate in which they use inter-individual comparisons rather than a process-oriented focus (i.e., task-climate) to motivate their students (Roth, 2014). Because controlled motivated teachers experience more pressure to teach, they may have a less open view, and less available energy to acknowledge the students' perspectives (i.e., low on autonomy support), or to show warmth and concern (i.e., low on relatedness support) (Retelsdorf & Günther, 2011). Finally, teachers who are highly amotivated, are assumed to just go through their teaching tasks in an automatic manner, while lacking the energy to invest in high-quality interactions with their students, mainly because they do not expect positive outcomes from their efforts. As such, they are assumed to rely on those strategies that require the least energy from them.

The few studies that have investigated how teachers' own motivation relates to their teaching style, indeed pointed to a positive relationship between autonomous motivation and the provision of autonomy support, relatedness support and structure (Cheon et al., 2014; Taylor, Ntoumanis, & Standage, 2008; Van den Berghe et al., 2014), and the establishment of a task climate (Parker et al., 2012). Controlled motivation was unrelated to the provision of autonomy support, relatedness support and structure (Van den Berghe et al., 2014), yet studies relating controlled motivation to the provision of task- or ego-climates are non-existent, and research investigating teachers' amotivation in relation to the provision of need support, or task- or ego-oriented climates is fairly scarce.

1.4. Antecedents of teachers' motivation

If teachers' quality of motivation is related to their psychological and interpersonal functioning, it is crucial to investigate the roots of teachers' motivation. According to SDT, teachers will be more likely to be autonomously motivated if their own BPNs are fulfilled (Deci & Ryan, 2000; Roth, 2014). While teachers can be controlled motivated when they feel connected to their supervisors, colleagues and students (i.e., relatedness satisfaction), or when they have sufficient resources to successfully cope with their job (i.e., competence satisfaction), to fully internalize their behaviors it is crucial that all three needs, and particularly the need for autonomy (i.e., experiencing a sense of psychological freedom and meaningfulness) are satisfied (Deci & Ryan, 2000). Autonomous motivation will thus be fostered if teachers grasp the meaning of teaching and connect it to their personal goals and values (Deci & Ryan, 2000).

Amotivation, on the other hand, is suggested to result from not valuing an activity (i.e., low autonomy) or not feeling competent to do it (i.e., low competence) (Deci & Ryan, 2000).

Past studies have consistently confirmed that autonomy satisfaction is the strongest correlate of autonomous motivation (Collie, Shapka, Perry, & Martin, 2016; Van den Berghe et al., 2014). Yet, in these studies, competence and relatedness have also shown strong and positive relationships with autonomous motivation. Regarding controlled motivation, empirical evidence is not so clear-cut. Some researchers have found negative relationships between autonomy and competence satisfaction and teacher controlled motivation (Jansen in de Wal et al., 2014), while other researchers have found null relationships (Collie et al., 2016), and even positive relationships (Carson & Chase, 2009). Relatedness satisfaction was found to be weakly positively related to controlled motivation in some studies, (Carson & Chase, 2009; Jansen in de Wal et al., 2014), whereas it was unrelated in others (Van den Berghe et al., 2014). As for amotivation, we are aware of only one study among teachers (Carson & Chase, 2009) showing that autonomy and competence satisfaction were moderately and negatively related to teachers' amotivation, whereas relatedness was unrelated.

1.5. The merits of a person-centered approach in addition to a variable-centered approach

Most of the previously cited studies adopted a more traditional variable-centered approach. Although these studies provide valuable insights, they typically study autonomous motivation, controlled motivation and amotivation as separate dimensions, hereby ignoring the dynamic interplay between them. This is unfortunate as recent studies are increasingly arguing that teachers can combine different reasons for putting effort into their teaching (Jansen in de Wal et al., 2014; Van den Berghe et al., 2013, 2014). To illustrate, while some teachers fulfill their tasks because they really enjoy doing it and at the same time feel pressurized to do so, other teachers might have purely autonomous reasons to engage in their jobs.

Grounded in SDT, only three studies, to date, have examined teachers' motivation adopting a person-centered approach based on cluster analyses and none of the three studies included a measure of amotivation (Jansen in de Wal et al., 2014; Van den Berghe et al., 2013, 2014). In the three studies, three similar groups could consistently be retained. A first group primarily put effort into teaching for autonomous reasons and less so for controlled reasons, a second group characterized by relatively high scores on both autonomous and controlled motivation, and finally, a third group primarily put effort into teaching for controlled reasons and less so for autonomous reasons. In addition to these three consistently returning profiles, some studies have also identified a fourth profile. However, this profile was less stable across these studies. For instance, Van den Berghe et al. (2013, 2014) found a group of teachers scoring low on both autonomous and controlled motivation, whereas Jansen in de Wal et al. (2014), found a group of teachers who scored moderately on both types of motivation. Importantly, two recent studies conducted with higher education students (Haerens, Kirk, Cardon, De Bourdeaudhuij, & Vansteenkiste, 2010) and employees (Howard, Gagné, Morin, & Van den Broeck, 2016) that also included amotivation scores, identified a fifth profile characterized by low autonomous motivation, moderate controlled motivation and very high amotivation scores.

The advantage of a person-centered analysis not only lies in the possibility of identifying these naturally occurring combinations of reasons to teach, but it also allows examining whether these groups differ in terms of antecedents and outcomes of teachers'

motivation. According to SDT's qualitative view on motivation, more motivation is not necessarily better if this motivation is less self-determined (Deci & Ryan, 2000). Accordingly, the group characterized by high levels of autonomous motivation and lower levels of controlled motivation or amotivation would display the most adaptive pattern of outcomes. Indeed, studies have shown that this group reports the highest levels of engagement (Jansen in de Wal et al., 2014) and the least feelings of burnout, better quality of teacher-student interactions and greater experienced autonomy and competence satisfaction (Van den Berghe et al., 2014). The opposite can be expected for teachers who are relatively high on amotivation or controlled motivation, who would display the least optimal pattern of outcomes. Yet, teachers who are controlled motivated would still have some available energy (Deci & Ryan, 1985), while teachers who are high on amotivation would have a greater risk of burnout and a lack of energy. Because few studies have included teacher amotivation, evidence supporting this assumption from a person-oriented perspective is currently lacking.

SDT further suggests that it would be better to display low levels of autonomous and controlled motivation, as opposed to being predominantly controlled motivated. Indeed, Van den Berghe et al. (2013, 2014) showed that the low autonomous-controlled motivation group reports significantly less burnout, and higher relatedness support than the controlled motivation group. Yet, no differences were found with respect to autonomy and competence support (Jansen in de Wal et al., 2014; Van den Berghe et al., 2013, 2014). Finally, according to SDT, it would be better to combine high levels of autonomous motivation with lower levels of controlled motivation, than to be high on both. This is because, although controlled motivation may generate engagement at work (i.e., due to external pressures), it can come with an emotional cost as indexed by feelings of burnout. However, no differences between the purely autonomously motivated group and the combined autonomous-controlled group were noted in previous research (Van den Berghe et al., 2014), whereas this would be expected based on theoretical grounds (Deci & Ryan, 1985).

1.6. The present study

The purposes of the present study are threefold. Firstly, we investigate the associations between teachers' motivation, and their burnout and engagement at work. While most studies with teachers have used the Maslach Burnout Inventory (MBI; Maslach, Schaufeli, & Leiter, 2001) to measure burnout, in the current study we rely on Farbers' definition of worn-out (Farber, 1991, 2000). The MBI describes burnout as a result of chronic work-related stress, characterized by emotional exhaustion, cynicism and inefficacy (Maslach et al., 2001), and the worn-out type (Farber, 2000) presents strong relationships with each of these three dimensions (Montero-Marín & García-Campayo, 2010). Worn-out teachers cope with stress by performing their tasks at school in a perfunctory manner (i.e., neglect). In addition, worn-out teachers do not feel they are professionally appreciated or recognized by the administration or principals (i.e., lack of acknowledgement), and they feel they do not have enough resources to solve teaching problems (i.e., lack of control). Based on the tenets of SDT and past studies (Cheon et al., 2014; Eyal & Roth, 2011; Van den Berghe et al., 2013, 2014) we expect teachers' autonomous motivation to be negatively related to worn-out and positive related to engagement at work. As for controlled motivation, we expect positive relationships with worn-out, yet, based on theory (Deci & Ryan, 1985) and previous research (Fernet, Austin, et al., 2012; Jansen in de Wal et al., 2014), insignificant or slightly negative relationships with engagement at work are expected, as teachers who are controlled

motivated might still put some energy into their jobs. For amotivation, we hypothesize finding the strongest positive relationships with worn-out and a strong negative relationship with teachers' engagement.

We will also investigate relationships with the quality of teacher-student relationships. In line with SDT and past studies (Cheon et al., 2014; Pelletier, Séguin-Lévesque, & Legault, 2002; Van den Berghe et al., 2014), we postulate that autonomous motivation will positively relate to autonomy support, relatedness support and task climate support, and negatively to ego climate. As for controlled motivation, we hypothesize finding strong positive relationships with ego climate and we are open to finding possible negative relationships with autonomy-, relatedness- and task support. Regarding amotivation, we expect negative relationships with autonomy-, relatedness- and task support, as amotivated teachers will lack the energy to invest in the quality of the teacher-student relationship. With regard to relationships between teachers' amotivation and an ego-oriented climate, we expect to find null- or positive relationships, because we assume that the establishment of an ego climate constitutes the path of least effort.

Finally, we expect all three BPNs to be significantly positively related to teachers' autonomous motivation (Collie et al., 2016; Janke, Nitsche, & Dickhäuser, 2015; Van den Berghe et al., 2014). It is hypothesized that null or positive relationships between relatedness or competence satisfaction and controlled motivation will be found, while we expect negative or null relationships with autonomy satisfaction (Deci & Ryan, 2000; Haerens, Aelterman, Vansteenkiste, Soenens, & Van Petegem, 2015; Van den Berghe et al., 2014). We further expect that, in particular, autonomy and competence satisfaction will negatively relate to teachers' amotivation (Carson & Chase, 2009; Deci & Ryan, 2000).¹

Adopting a person-centered approach, the second purpose is to determine teachers' motivational profiles on the basis of their scores for autonomous motivation, controlled motivation and amotivation. Analogous to previous studies (Jansen in de Wal et al., 2014; Van den Berghe et al., 2013, 2014), we expect to find at least three profiles: a controlled motivation group, an autonomous-controlled group and an autonomous motivation group. Moreover, in line with studies that have included amotivation in other contexts (Haerens et al., 2010; Howard et al., 2016), we expect to find a fourth amotivation group. Because previous results are less clear-cut, we are open to the possibility of a fifth low autonomous-controlled motivation group being identified (Van den Berghe et al., 2013, 2014).

Finally, based on the tenets of SDT and past studies (Jansen in de Wal et al., 2014; Van den Berghe et al., 2013, 2014), we hypothesize that the group characterized by high levels of autonomous motivation and lower levels of controlled motivation or amotivation will display the most adaptive pattern of outcomes, particularly when compared to the group that is high on amotivation or controlled motivation, alone. While the latter group may still invest some energy in their job, and experience some competence or relatedness satisfaction, they are hypothesized to be higher on burnout, ego-climate support, and to be especially lower on autonomy satisfaction when compared to the purely autonomously motivated group. For this reason, it is also hypothesized that it would be better to display low levels of autonomous motivation and controlled motivation, as opposed to being predominantly controlled motivated. A final hypothesis is that the group characterized by high levels of autonomous motivation and lower levels of controlled

¹ While in our initial version of this manuscript we hypothesized to find negative relationships between need satisfaction, and both controlled motivation and amotivation. We have refined these hypotheses throughout the review process.

motivation, would display a more optimal profile when compared to a group that is high on both autonomous and controlled motivation.

2. Methods

2.1. Participants and procedures

Participants were 584 Spanish teachers from 106 secondary schools (81 government schools, 25 independent schools). Of the participants, 56% were female, 71% were employed in government schools and all of them taught at mixed schools. The teachers were, on average, 45.04 ($SD = 8.97$) years old, and had been working as teachers for an average of 17.55 ($SD = 10.26$) years. In terms of educational qualifications, 93% of the participants had teacher education university degree and/or other university degree, while the remaining 7% also had a Ph.D.

Approval for this study was obtained from the University's research ethics committee. Participants were recruited through e-mail and Web-based surveys. Specifically, an e-mail was sent to all 7418 secondary teachers from the Aragon region (Spain), who were employed during the 2014/2015 academic year. This e-mail included a brief explanation of the study purposes, a weblink providing access to the online questionnaire and the contact data of the main researcher. The response rate was 8%. Teachers had 30 days to submit the questionnaire. Participation was voluntary, and anonymity was guaranteed.

2.2. Measures

2.2.1. Basic psychological needs satisfaction

Needs satisfaction of teachers was measured using the Spanish version of the Basic Psychological Needs at Work Scale (BPNWS-Sp; Abós, Sevil, Julián, Martín-Albo, & García-González, 2017). This scale includes 12 items (four items per factor) and taps into autonomy satisfaction (e.g., "I can take on responsibilities at my job"), competence satisfaction (e.g., "I am able to solve problems at work"), and relatedness satisfaction (e.g., "When I'm with the people from my work environment, I feel I can trust them"). Responses were registered on a 6-point Likert scale ranging from 1 ("strongly disagree") to 6 ("strongly agree"). This scale has shown adequate reliability and validity in prior research (Boudrias et al., 2014). In the present study, the Cronbach alphas for autonomy, relatedness and competence satisfaction were 0.84, 0.84, and 0.90 respectively.

2.2.2. Teacher motivation

Teacher motivation was measured using the Motivation for Teaching Scale in Secondary Education (MTSSE; Abós, Sevil, Martín-Albo, Aibar, & García-González, 2018). This scale starts with the stem "I get involved in teaching because ..." followed by 19 items assessing teachers' intrinsic motivation (four items; e.g., "I am very interested in teaching") identified regulation (four items; e.g., "I think it is very valuable for me as a person"), introjected regulation (four items; e.g., "I want others to think I'm a good teacher"), external regulation (four items; e.g., "Others pressurize me to do this") and amotivation (three items; e.g., "I don't know, I feel like I'm wasting time when I teach"). Responses were provided on a 5-point Likert scale ranging from 1 ("strongly disagree") to 5 ("strongly agree"). In the current study, a confirmatory factor analysis (CFA) was performed showing adequate goodness-of-fit ($\chi^2/df = 5.48$, $p < .001$; RMSEA = 0.080; CFI = 0.960; TLI = 0.951). Similarly to previous studies with teachers (Van den Berghe et al., 2013, 2014),

analyses were performed on the basis of the composite scores for autonomous and controlled motivation rather than on the separate types of regulation for parsimony reasons. Based on the expected cross-validation index (ECVI), for which lower values indicate better fit, the three-factor model (ECVI = 1.329) displayed a better fit than the five-factor model (ECVI = 1.688). The Cronbach alphas for autonomous motivation, controlled motivation, and amotivation were 0.85, 0.77, and 0.88 in the current study, respectively.

2.2.3. Worn-out at work

Worn-out at work was measured using a subscale of the Spanish version of the Burnout Clinical Subtype Questionnaire (BCSQ-36; Montero-Marín & Garcia-Campayo, 2010). The scale consists of 12 items (four items per factor) assessing respondents' neglect (e.g., "I give up in response to difficulties in my work"), lack of acknowledgement (e.g., "I think my dedication to my work is not acknowledged") and lack of control (e.g., "I feel the results of my work are beyond my control"). The items were rated on a 7-point Likert scale, ranging from 1 ("totally disagree") to 7 ("totally agree"). The scale was found to be valid and reliable in prior research with university employees (Montero-Marín et al., 2012). In the current study, the internal consistencies, as indexed by Cronbach alphas, were 0.89, 0.84, and 0.82 for neglect, lack of acknowledgement, and lack of control, respectively.

2.2.4. Engagement at work

Engagement at work was measured using the Spanish version of the Utrecht Work Engagement Scale (UWES, Schaufeli, Martínez, Marques-Pinto, Salanova, & Bakker, 2002). This scale consists of 17 items assessing respondents' vigor (six items; e.g., "When I get up in the morning, I feel like going to work"), dedication (five items; e.g., "My job inspires me") and absorption (six items; e.g., "I feel happy when I am working intensely"). The items were rated on a 7-point Likert scale, ranging from 0 ("never") to 6 ("always"). This scale has shown adequate reliability and validity in prior research (Høigaard, Giske, & Sundsli, 2012; Klassen, Yerdelen, & Durksen, 2013). In the current study, the Cronbach alphas for vigor, dedication, and absorption were .89, .80, and 0.79 respectively.

2.2.5. Interpersonal style

Teachers' interpersonal style was measured with the Need-Supportive Teaching Style Scale (NSTSS; Abós, Sevil, Martín-Albo, Julián, & García-González, 2018). This scale consists of 15 items, preceded by the stem "In my classes ...". The questionnaire taps into autonomy support (four items; e.g., "I give students the opportunity to select activities according to their own interests"), relatedness support (three items; e.g., "I try to get my students to 'work together' as a team"), task climate support (5 items; e.g., "For me, it is important for students to try their best") and ego climate support (three items; e.g., "For me, it is important for students to show that they are better than others"). Teachers were asked to rate each item on a 5-point Likert scale ranging from 1 ("strongly disagree"), to 5 ("strongly agree"). In the present study, a CFA was performed showing adequate goodness-of-fit ($\chi^2/df = 2.67$, $p < .001$; RMSEA = 0.051; CFI = 0.941; TLI = 0.927), and the Cronbach alphas for autonomy support, relatedness support, task climate and ego climate support were .73, .74, 0.79 and 0.72 respectively.

2.3. Data analysis

2.3.1. Preliminary descriptive and measurement analyses

Firstly the descriptive statistics and latent correlation analyses

(via CFA) were computed. Analyses were performed using SPSS 20.0 and Mplus 7.3 software.

2.3.2. Variable-centered approach

The first purpose of the study was examined by means of SEM-analyses, investigating relationships between experienced need satisfaction, teachers' motivation, worn-out at work, engagement at work and interpersonal teaching style. To run SEM-analyses the weighted least squares mean and variance adjusted estimator (WLSMV) was chosen, because it is more suited for data with Likert scales taking into account non-normal data (Lei, 2009). The assessment of the models was based on the root mean square error of approximation (RMSEA) with values equal to or less than 0.08 considered acceptable, and the comparative fit index (CFI) and Tucker-Lewis index (TLI) with values greater than 0.90 considered acceptable (Marsh, Hau, & Wen, 2004). We controlled covariance between the independent variables. There were no problems with collinearity (see Appendix).

2.3.3. Person-centered approach

Teachers' motivational profiles were generated by adopting a combination of hierarchical and nonhierarchical clustering methods (Garson, 2014). In a first step, the standardized scores for the teachers' autonomous motivation, controlled motivation and amotivation were calculated. Then, univariate (i.e., values greater than three standard deviations above or below the mean) and multivariate (i.e., individuals with high Mahalanobis values) outliers were removed (Steinley & Brusco, 2011). Secondly, hierarchical cluster analyses based on square Euclidian distances and Ward's method were performed (Everitt, Landau, & Leese, 2001). The possibility of three-, four- and five-cluster solutions were considered based on previous studies with teachers (Jansen in de Wal et al., 2014; Van den Berghe et al., 2013, 2014). To identify the number of profiles, the increase in clustering variance in each of the possible groups was examined. The three-cluster solution was not retained because the explained variance for autonomous motivation was lower than 50% (Milligan & Cooper, 1985). A four-cluster solution explained 51%, 58% and 70% of the variance in autonomous motivation, controlled motivation and amotivation, respectively and five-cluster solution explained 51%, 62% and 74% respectively. The four-cluster solution was retained for two reasons. The four-cluster solution was theoretically more interpretable than the five-cluster solution. The low autonomous-controlled motivation group did not emerge in the four- or in the five-cluster solutions; instead, we retained a fifth cluster that was similar to the amotivation group. Second, the five-cluster solution explained the same variance in autonomous motivation as the four-cluster solution, and it did not explain a substantial additional variance (<5%) in controlled motivation and amotivation (Milligan & Cooper, 1985).

In a third step, the cluster centers obtained with Ward's hierarchical method were used as non-random starting points in an iterative, non-hierarchical k-means clustering procedure (Asendorpf, Borkenau, Ostendorf, & Van Aken, 2001). Further, the stability of cluster solutions was assessed by randomly splitting the sample into two and applying the full two-step procedure (i.e., Ward, k-means) in each half. The teachers in each half were assigned to new clusters based on their Euclidean distances to the cluster centers of the other half of the sample. Then, these new clusters were compared for agreement with the original cluster solution using Cohen's kappa (K) statistic. The two resulting kappas were averaged and an agreement of at least 0.60 was considered acceptable (Asendorpf, Borkenau, Ostendorf, & Aken, 2001). Finally,

Chi-square tests were computed across gender to explore the need to include it as a covariate in subsequent analyses.

2.3.4. Differences in teachers' motivation antecedents and outcomes

We used a multivariate analysis of variance (MANOVA) with the cluster solution as independent variable to investigate differences between clusters in worn-out, engagement, teaching style and BPN. If significant differences were found, post-hoc tests by means of Bonferroni method were inspected. Effect sizes were considered small, moderate or large, when partial eta squared values were above 0.01, 0.06 and 0.14, respectively (Cohen, 1988).

3. Results

3.1. Preliminary descriptive and correlational results

The descriptive statistics and latent correlations are reported in Table 1. Overall, latent correlations showed significant and strong relationships between most of the study variables.

3.2. Variable-centered approach

SEM revealed that the model showed an adequate fit with the data ($\chi^2 = 4785.771$, $p < .001$; $\chi^2/df = 2.326$; RMSEA = 0.048; 90% CI = 0.046–0.049; CFI = 0.942; TLI = 0.938). Regarding teacher outcomes (see Fig. 1), we found that autonomous motivation was significantly positively related to all three engagement factors and all positive dimensions of interpersonal teaching styles (i.e., autonomy support, relatedness support and task climate support), whereas it was negatively related to the three worn-out factors, and unrelated to ego climate support. Controlled motivation was unrelated to vigor and dedication (i.e., engagement factors), autonomy support, relatedness support and task climate support, while being positively, though weakly, associated with absorption. On the other hand, controlled motivation was significantly positively associated with the three worn-out factors and ego climate support. Finally, amotivation was significantly positively associated with all negative outcomes, while the opposite was true for the positive outcomes. Regarding antecedents, satisfaction of all BPNs was positively associated with autonomous motivation, whereas negative associations were found with amotivation. In addition, autonomy satisfaction was significantly negatively associated with controlled motivation, whereas competence satisfaction and relatedness satisfaction were unrelated.

3.3. Person-centered approach

Nine univariate outliers and 12 multivariate outliers were removed prior to conducting the cluster analysis (final sample = $n = 563$; 248 males). Fig. 2 represents the graphical results for the four-cluster solutions. The Y-axis represents the Z-scores for autonomous motivation, controlled motivation and amotivation. The four clusters were labelled as follows: (1) amotivation group characterized by very low autonomous motivation, medium-low controlled motivation and very high amotivation; (2) relatively controlled motivation group typified by low autonomous motivation, high controlled motivation and low amotivation; (3) combined autonomous-controlled motivation group characterized by relatively high levels of autonomous motivation, high to very high controlled motivation and low amotivation; and (4) relatively autonomous motivation group typified by high autonomous motivation, very low controlled motivation and low to very low

Table 1
Descriptive statistics and latent correlations for the study variables.

Study variables	M (SD)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. Autonomy satisfaction	4.77 (0.80)	—															
2. Relatedness satisfaction	4.60 (0.89)	.42**	—														
3. Competence satisfaction	5.02 (0.59)	.53**	.41**	—													
4. Autonomous motivation	4.26 (0.50)	.44**	.38**	.55**	—												
5. Controlled motivation	2.62 (0.66)	-.21**	-.19**	-.23**	-.07	—											
6. Amotivation	1.45 (0.53)	-.54**	-.37**	-.56**	-.66**	.48**	—										
7. Neglect	2.09 (0.97)	-.37**	-.31**	-.55**	-.59**	.32**	.81**	—									
8. Lack of acknowledgement	3.66 (0.93)	-.55**	-.42**	-.26**	-.38**	.18**	.51**	.49**	—								
9. Lack of control	3.74 (1.45)	-.52**	-.31**	-.37**	-.40**	.26**	.56**	.53**	.81**	—							
10. Vigor	3.97 (0.99)	.40**	.34**	.59**	.66**	-.17**	-.65**	-.67**	-.43**	-.43**	—						
11. Dedication	4.23 (1.05)	.46**	.41**	.66**	.76**	-.22**	-.73**	-.66**	-.45**	-.47**	.96**	—					
12. Absorption	3.86 (0.97)	.36**	.34**	.54**	.66**	-.08	-.59**	-.58**	-.32**	-.29**	.96**	.95**	—				
13. Autonomy support	3.21 (0.69)	.25**	.11*	.27**	.32**	-.07	-.22**	-.19**	-.18**	-.21**	.28**	.29**	.28**	—			
14. Relatedness support	3.50 (0.77)	.33**	.20**	.38**	.34**	-.15*	-.27**	-.30**	-.27**	-.33**	.32**	.32**	.30**	.61**	—		
15. Task climate support	4.57 (0.43)	.30**	.27**	.44**	.42**	-.07	-.42**	-.43**	-.16**	-.16**	.40**	.40**	.40**	.31**	.49**	—	
16. Ego climate support	2.03 (0.75)	-.12*	-.06	-.17**	-.16*	.35**	.34**	.29**	.11*	.12*	-.10*	-.10*	-.07	-.05	-.03	-.28**	—

Note: * = $p < .05$; ** = $p < .01$.

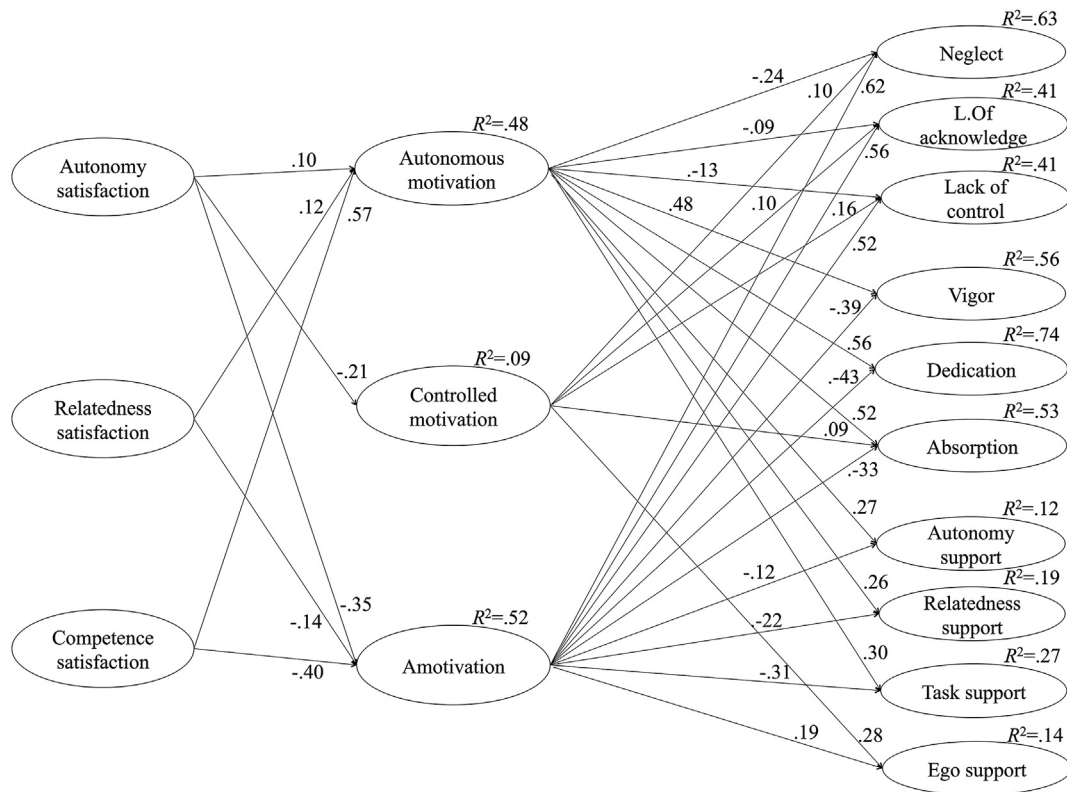


Fig. 1. Structural model of the teachers' motivation antecedents and outcomes from a variable-centered approach.
Note: $p < .05$ = values between 0.12 and -0.14 ; $p < .01$ = values greater than 0.12 and lower -0.14 ; R^2 on latent variable; For a more detailed view of the indicators loading and covariance see appendix; L. Of. acknowledge = Lack of acknowledgement.

amotivation. The double-split cross-validation method indicated an average kappa value, based on two random subsamples, of .77 (i.e., good agreement) for the four-cluster solution.

Next, the distribution across teacher gender in the four clusters was examined. Male and female teachers were almost equally distributed across the amotivation group (male = 86, 15%; female = 99, 17%), the relatively controlled motivation group (male = 60, 11%; female = 82, 15%), the controlled-autonomous group (male = 34, 6%; female = 47, 8%), and the relatively autonomous group (male = 65, 12%; female = 90, 16%). Chi-square testing revealed a non-significant cluster assignment by gender effect

($\chi^2[3, n=563] = 0.99, p > .05$). Based on these results, gender was not considered as a covariate in subsequent analyses.

3.4. Differences in teachers' psychological functioning, interpersonal style and need satisfaction according to cluster membership

The multivariate effect of cluster assignment was significant ($F(48, 1618.78) = 42.12, p < .001, \eta^2_p = .55$). As can see in Table 2, the relatively autonomous motivation group reported the most adaptive pattern of outcomes with significantly higher scores of vigor,

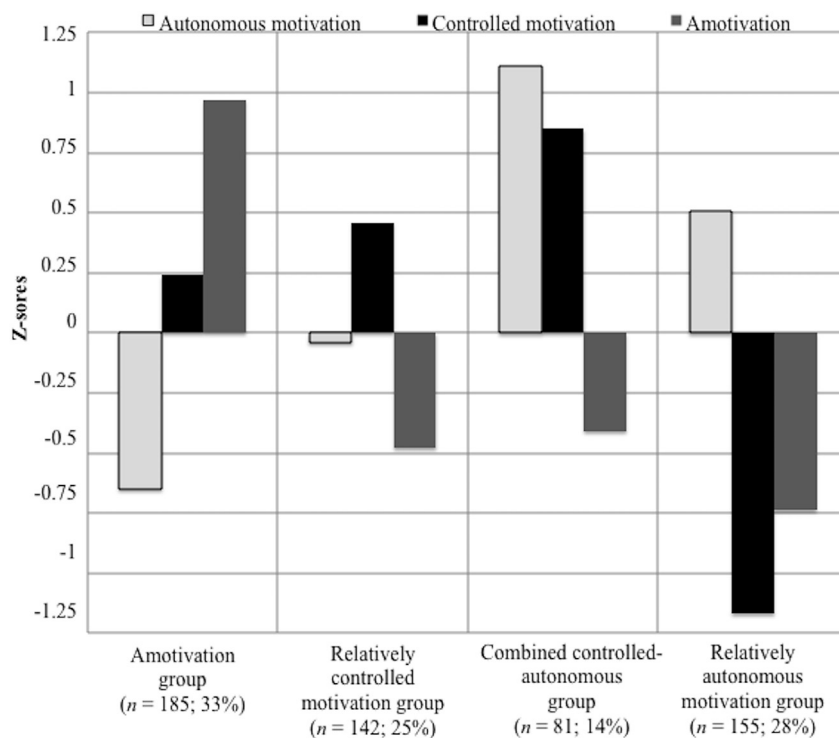


Fig. 2. Four-cluster solution based on Z-scores for autonomous motivation, controlled motivation and amotivation for secondary teachers.

dedication, and absorption, autonomy support, relatedness support, task-climate support, and need satisfaction and lower scores for ego-climate support when compared to the amotivation group that displayed a less optimal pattern of outcomes. Similar differences were found in favor of the relatively autonomous motivation group when this group was compared with the relatively controlled motivation group, yet not for all outcomes. Differences were significant for neglect and lack of control, vigor and dedication, autonomy support, ego climate support and autonomy and competence satisfaction. Next, only three significant differences were found between the relatively autonomous motivation group and the autonomous-controlled motivation group. While the former reported lower levels of lack of control and ego-climate support, the latter reported higher levels of absorption.

Next, also the combined autonomous-controlled group displayed a more adaptive pattern than the amotivation group with lower scores on all three indicators of worn-out, higher scores on engagement, autonomy-support, relatedness support and task-climate support and higher experienced need satisfaction. The combined group was only similar with the amotivation group with regard to ego-climate support. Yet, differences between the combined autonomous-controlled group and the controlled motivation group were less pronounced. The autonomous-controlled group put more energy in their job, provided more task-climate support and experienced greater competence satisfaction, yet for all other variables differences were insignificant. Finally, the relatively controlled group reported significantly higher scores of vigor, dedication and absorption, and lower levels of worn-out than the amotivation group. They also provided more task-climate support and experienced more need satisfaction.

4. Discussion

Most research so far has focused on organizational and interpersonal determinants of work-related engagement and burnout

among teachers (Roth, 2014). Relying on both a variable- and person-centered approach, the present study aimed to add to this existing literature by examining how teachers' quality of motivation (i.e., personal factor) can be related to antecedents and outcomes at workplace.

4.1. Examining teachers' motivation by means of a variable-centered approach

The first purpose of this study involved investigating the associations between teachers' motivation and their psychological functioning at work. Results revealed that teachers who report enjoying and valuing teaching more (i.e., autonomous motivation) are less likely to report symptoms of worn-out and are more likely to report higher engagement in their work. These findings confirm previous findings on associations between autonomous motivation, feelings of burnout (Eyal & Roth, 2011; Fernet et al., 2008; Roth et al., 2007; Van den Berghe et al., 2013, 2014) and teacher engagement (Cheon et al., 2014; Fernet et al., 2008).

In line with our hypotheses and previous research (Fernet et al., 2008), results further showed that teachers who feel more pressurized (i.e., controlled motivation) were more likely to report symptoms of worn-out, while not necessarily putting less energy into their jobs. Specifically, controlled motivation was unrelated to two of the subdimensions of engagement (i.e., vigor or dedication), while it was weakly positively associated with absorption. It seems that teachers who are high on controlled motivation are still putting some effort into their jobs, yet they pay an emotional price. The findings may explain why inconsistent relationships between controlled motivation and engagement have been reported previously (Fernet et al., 2008; Jansen in de Wal et al., 2014), and correspond to previous research that reveals that burnout and engagement can, to some degree, co-occur among teachers (Mäkikangas, Hyvönen, & Feldt, 2017). Finally, results showed that, in particular, teachers who are highly amotivated, and do not see

Table 2
Motivational clusters' mean scores, F-values and effect sizes for teachers' motivation, antecedents and outcomes.

Variables	Cluster 1: Amotivation group <i>n</i> = 185 (33%)	Cluster 2: Relatively controlled motivation group <i>n</i> = 142 (25%)	Cluster 3: Autonomous- controlled group <i>n</i> = 81 (14%)	Cluster 4: Relatively autonomous motivation group <i>n</i> = 155 (28%)	F-value ^(3, 559)	η^2_p
Autonomous motivation						
Z-scores	-.65 (.04) ^a	-.04 (.05) ^b	1.10 (.07) ^c	.51 (.05) ^d	188.35 ^{***}	.50
Raw scores (1–5)	3.84 (.03) ^a	4.19 (.03) ^b	4.85 (.04) ^c	4.51 (.03) ^d		
Controlled motivation						
Z-scores	.23 (.05) ^a	.45 (.05) ^b	.84 (.07) ^c	–1.16 (.05) ^d	252.28 ^{***}	.58
Raw scores (1–5)	2.78 (.03) ^a	2.92 (.03) ^b	3.19 (.04) ^c	1.83 (.03) ^d		
Amotivation						
Z-scores	.97 (.04) ^a	–.48 (.04) ^b	–.40 (.04) ^b	–.74 (.03) ^c	426.85 ^{***}	.70
Raw scores (1–5)	2.06 (.02) ^a	1.19 (.02) ^b	1.24 (.03) ^b	1.04 (.02) ^c		
Teacher psychological outcomes						
Neglect (1–7)	2.85 (.05) ^a	1.93 (.06) ^b	1.67 (.08) ^{bc}	1.53 (.08) ^c	103.46 ^{***}	.36
Lack of acknowledgement (1–7)	4.19 (.10) ^a	3.61 (.12) ^b	3.40 (.15) ^b	3.20 (.11) ^b	15.62 ^{***}	.08
Lack of control (1–7)	4.29 (.09) ^a	3.78 (.10) ^b	3.68 (.14) ^b	3.08 (.10) ^c	26.93 ^{***}	.13
Vigor (0–6)	3.33 (.08) ^a	3.96 (.06) ^b	4.58 (.09) ^c	4.43 (.06) ^c	63.77 ^{***}	.25
Dedication (0–6)	3.44 (.08) ^a	4.26 (.06) ^b	4.91 (.09) ^c	4.79 (.06) ^c	91.67 ^{***}	.33
Absorption (0–6)	3.33 (.09) ^a	3.87 (.06) ^b	4.52 (.09) ^c	4.12 (.07) ^b	42.43 ^{***}	.18
Teacher interpersonal style						
Autonomy support (1–5)	3.06 (.05) ^a	3.14 (.06) ^{ab}	3.32 (.07) ^{bc}	3.37 (.05) ^c	7.34 ^{***}	.04
Relatedness support (1–5)	3.27 (.06) ^a	3.47 (.06) ^{ab}	3.56 (.08) ^b	3.68 (.06) ^b	8.46 ^{***}	.04
Task climate support (1–5)	4.41 (.03) ^a	4.56 (.03) ^b	4.73 (.04) ^c	4.66 (.03) ^{bc}	15.94 ^{***}	.08
Ego climate support (1–5)	2.18 (.05) ^a	2.06 (.06) ^a	2.07 (.08) ^a	1.79 (.06) ^b	7.99 ^{***}	.04
Teacher antecedents						
Autonomy satisfaction (1–6)	4.45 (.06) ^a	4.75 (.06) ^b	4.94 (.08) ^{bc}	5.07 (.06) ^c	20.21 ^{***}	.10
Relatedness satisfaction (1–6)	4.32 (.06) ^a	4.59 (.07) ^b	4.80 (.09) ^b	4.84 (.07) ^b	12.00 ^{***}	.06
Competence satisfaction (1–6)	4.67 (.04) ^a	5.01 (.04) ^b	5.25 (.06) ^c	5.32 (.04) ^c	48.93 ^{***}	.21

Note: Standard errors are reported in parenthesis. A group mean is significantly different from another mean if they have different superscripts. Differences between the four groups were examined repeating the equations twice and modifying the reference category. So, coefficients for each group were extracted allowing pairwise comparisons. *** = $p < .001$.

why they should put effort into their teaching, display higher risks of developing worn-out and display lower engagement, which is in line with previous research (Fernet et al., 2008; Nie et al., 2015).

SDT suggests that teachers' motivation is not only relevant for their psychological functioning, but that is also relates to the quality of their interactions with their students (Deci & Ryan, 1985; Weinstein et al., 2010). As theoretically expected and consistent with past research (Cheon et al., 2014; Pelletier et al., 2002; Taylor et al., 2008; Van den Berghe et al., 2014), teachers who enjoy and value teaching more (i.e., autonomous motivation), are also more likely to explain the relevance of a task, to involve students in decision-making and to show interest in students' preferences (i.e., autonomy support), while investing more in a close relationship with their students (i.e., relatedness support), and more strongly emphasizing individual progress and effort (i.e., task climate support). In line with our hypotheses, we found that teachers, who are more controlled motivated, were more likely to create an ego-oriented learning climate. This is an interesting finding, as it suggests that teachers who feel pressurized to teach because they feel obliged to fulfill the expectations of others such as their principals (i.e., external regulation), or because they are higher on ego-involvement themselves (i.e., introjected regulation, deCharms, 1968; Ryan, 1982) and are thus more likely to evaluate themselves in comparison to other teachers (Butler, 2014), are also more likely to take a more pressurizing stance towards their students (Pelletier & Rocchi, 2015; Retelsdorf & Günther, 2011). Although we

expected controlled motivated teachers to also be less autonomy- or relatedness supportive, because they would have a less open view and less available energy, this was not the case. These results corroborate findings of previous research (Van den Berghe et al., 2014), and align with the fact that controlled motivated teachers still invest some energy into their jobs, yet this energy does not always seem to be optimally directed.

As for amotivation, we expected teachers to invest minimal energy in the quality of their relationships with their students resulting in lower autonomy-, relatedness, or task climate support. This hypothesis was confirmed. Moreover, more amotivated teachers were more likely to instill an ego climate by reinforcing and assessing one student's success in comparison with other students' success (Butler, 2014; Soini, Liukkonen, Watt, Yli-Piipari, & Jaakkola, 2014). These findings might suggest that more motivating strategies (i.e., autonomy support, task climate) require more preparation and "positive" energy from teachers, and those teachers who lack this energy refrain from adopting motivating strategies, but instead instil an ego-oriented climate. This is quite worrying, as we know from past studies that students are less optimally motivated when exposed to an ego climate (Fernández-Río, Méndez-Giménez, & Cecchini, 2014), and teachers who are high on amotivation could thus possibly be at risk of ending up in a negative vicious circle (Pelletier et al., 2002; Reeve, 2013). To illustrate, teachers who generate an ego climate may provoke negative outcomes in students (e.g., amotivation, boredom; Abós,

Sevil, Julián, Abarca-Sos, & García-González, 2017; Sevil, Abós, Aibar, Julián, & García-González, 2016), which, in turn, could trigger feelings of incompetence and further reinforce teachers' amotivation. In contrast, if teachers interact with their students in a more need-supportive way or manage to instill a more task-oriented climate, this not only benefits students' autonomous motivation and engagement (Cheon, Reeve, & Song, 2016; Leenknecht et al., 2017), but also positively affects teachers' own functioning as they will feel more competent and they will experience the value of their teaching more strongly (Butler, 2014; Cheon et al., 2014; Retelsdorf, Butler, Streblov, & Schiefele, 2010), further reinforcing their interpersonal teaching styles (Reeve, 2013).

Given that teachers' motivation is strongly related to their psychological and behavioral functioning, we have also examined their roots. According to SDT, for teachers to fully internalize their behaviors, it is important for all three needs, and particularly the need for autonomy, to be satisfied (Deci & Ryan, 2000). This assumption was confirmed in our findings, as all three needs were positively related to autonomous motivation. This indicates that satisfying the BPNs can supply the necessary fuel for teachers to identify the relevance of their work and experience the pleasure that teaching produces per se. However, whereas past studies pointed to autonomy (Van den Berghe et al., 2014) or relatedness (Taylor et al., 2008) as the most influential needs in terms of physical education teachers' autonomous motivation, this study found the strongest relationships with competence satisfaction. As for controlled motivation, we only found negative relationships with autonomy satisfaction. In line with theory (Deci & Ryan, 2000) and previous empirical work (Van den Berghe et al., 2014), it thus seems that, more specifically, teachers who fail to grasp the value of teaching, and who experience a lack of freedom or a lack of possibilities for initiative taking, are feeling pressurized to teach. These results suggest that autonomy satisfaction is not only a prerequisite for autonomous motivation, but it could also be a buffer against feelings of pressure. As for amotivation, negative relationships with all three needs were found, yet, in line with our hypotheses and past research (Carson & Chase, 2009), relationships were the strongest for autonomy and competence satisfaction.

4.2. Examining teachers' motivation by means a person-centered approach

While the previously discussed findings shed light on the relationships between different motivational regulations and teachers' psychological functioning, the quality of teacher-student interactions, and experienced need satisfaction, in reality most teachers can simultaneously have more than one motive for putting effort into their work (Van den Berghe et al., 2013, 2014). Therefore, it is interesting to identify which combinations of autonomous motivation, controlled motivation and amotivation in secondary teachers naturally co-occur, and how these differ in terms of outcomes and antecedents.

4.2.1. Clustering of teachers according to types of motivation

Relying on a person-centered approach, four groups of teachers could be identified. As expected, we found a relatively autonomous motivation group accounting for 28% of the sample. We also identified a combined autonomous-controlled group accounting for 14% of the sample. Interestingly, this group displayed the highest scores on both autonomous and controlled motivation, while displaying relatively low levels of amotivation (relative to the sample). A relatively controlled motivation group also emerged accounting for 25% of the sample. Finally, an amotivation group was

identified, comprising the largest group (33% of the sample). When presenting these four groups, we deliberately use the term "relatively". It is important to note that in an absolute sense, the teachers in all four groups reported very high levels of autonomous motivation ($M = 3.84-4.85/5$), low to medium levels of controlled motivation ($M = 1.83-3.19/5$) and low amotivation scores ($M = 1.04-2.06/5$). The labeling of the groups is thus a matter of gradation.

The first three profiles found in the current study, were also found in previous research with teachers (Jansen in de Wal et al., 2014; Van den Berghe et al., 2013, 2014), while the fourth amotivation profile is broadly aligned with previous research that included amotivation among a population of students (Haerens et al., 2010) and employees (Howard et al., 2016). Also note that in contrast to previous work (Van den Berghe et al., 2013, 2014) a low autonomous-controlled motivational group did not emerge. There is a possibility that the addition of amotivation explains why this profile did not emerge, as the presence of amotivation was combined with relatively low levels of both autonomous and controlled motivation. With regard to the representation of teachers in each of the clusters, the results differ from previous studies. While in the current study the amotivation group constituted the largest group, previous studies with teachers identified the relatively autonomous motivation group and the autonomous-controlled group as comprising the majority of the sample (Jansen in de Wal et al., 2014; Van den Berghe et al., 2013, 2014).

4.2.2. Differences in teachers' psychological functioning, interpersonal styles and need satisfaction according to cluster membership

Based on SDT, a first assumption was that teachers who display high levels of autonomous and relatively low levels of controlled motivation or amotivation would display the most optimal pattern of outcomes, particularly when compared to teachers high on amotivation, or on controlled motivation. This assumption was largely confirmed. The purely autonomously motivated group displayed less burnout, higher engagement, better quality teacher-student interactions and more need satisfaction when compared to the amotivation group that displayed the opposite pattern of results. Differences with the purely controlled group were along the same line but less pronounced and not for all outcomes. The relatively autonomously motivated group displayed less worn-out (i.e., lower levels of neglect and lack of control), higher engagement (i.e., higher levels of vigor and dedication), provided more autonomy and less ego climate support, and experienced more autonomy and competence satisfaction when compared with the controlled motivated group. Such findings align with previous studies (not including amotivation) indicating that the relatively controlled motivation group displayed more feelings of burnout (Van den Berghe et al., 2013), lower engagement (Jansen in de Wal et al., 2014), a less optimal teaching style and less need satisfaction (Van den Berghe et al., 2014).

A second assumption, according to SDT, is that the presence of controlled motivation in addition to autonomous motivation, is not beneficial, on the contrary. This premise can be studied by comparing the relatively autonomously motivated group with the combined autonomous-controlled motivated group. Both the predominantly autonomously motivated group and the combined autonomous-controlled group showed high levels of engagement and good teacher-student quality interactions, and high levels of need satisfaction, and thus both showed to be adaptive profiles. When comparing both groups, only three differences were found, with two of them being in favor of the purely autonomously

motivated group that displayed less lack of control and less ego-climate support, but also displayed lower levels of absorption. Although these findings seem to suggest that the combination of high levels of autonomous and controlled motivation with low levels of amotivation may, to some degree, be equally adaptive, it is important to note that, with respect to the sample, the combined group displayed the highest levels of autonomous motivation (4.85/5). Yet, despite their high levels of autonomous motivation, the presence of controlled motivation puts them at a greater risk of experiencing lack of control over their job demands, and of creating an ego climate. It would be interesting to investigate whether these teachers, despite being highly autonomously motivated and being very absorbed in their work, would be more sensitive to develop worn-out in the long run (Jansen in de Wal et al., 2014). Because they are highly engaged and rely more on ego-related strategies, they may be at a greater risk of ending up in this negative spiral where students' disengagement, as a result of being exposed to an ego climate (Fernández-Río et al., 2014), negatively affect their own motivation (Reeve, 2013). Yet, teachers' extremely high levels of autonomous motivation seemed to buffer this dynamic to some extent, as these teachers were also highly need-supportive and task-oriented. They just seem to do more of everything. In that respect, it is interesting to note that the predominantly controlled motivated group, which also displayed high scores in autonomous motivation in an absolute sense (4.19/5), already displayed a less adaptive pattern of outcomes.

Overall, it is clear from these comparisons that the presence of high levels of autonomous motivation, preferably in combination with low levels of amotivation and controlled motivation, energizes teachers towards their jobs and constitutes a protective factor against worn-out. With worn-out constituting a more severe subtype of burnout, which is related to many symptoms akin to those of depression (Farber, 2000), it is important to gain these insights, as prevention strategies might be aimed at identifying teachers with at-risk profiles. Moreover, because teachers with high levels of autonomous motivation interact in a more motivating way with their students, their students will more likely be engaged and satisfied (Cheon et al., 2016; Leenknecht et al., 2017; Roth, 2014), which will further boost teachers' own motivation and need satisfaction (Pelletier et al., 2002; Retelsdorf et al., 2010), and in turn reinforce their interpersonal teaching styles (Reeve, 2013).

4.3. Implications for practice

The present findings demonstrate that the quality of teachers' motivation not only affects their own well-being at work, but it also reflects how they interact with their students. Professional development programs may help to make teachers aware of these dynamics, and provide them with specific ideas on how to cope with the pressure they experience in their profession. Further, the results confirm the critical role of BPN satisfaction as the necessary fuel for adequate functioning at work (Klassen, Frenzel, & Perry, 2012; Roth, 2014). This has important implications not only for teachers themselves, but also for principals and the educational administration. Specifically, if the educational administration manages to develop a more open curriculum with teachers and provides higher quality resources in classrooms, teachers will more likely feel satisfied in their autonomy. Similarly, principals could be supportive of teachers' autonomy by, listening to teachers' concerns and being more flexible with regard to developing curricular activities based on common interests of both teachers and students. Moreover, by providing opportunities to attend conferences, offering courses to stimulate professional development, and by providing more positive feedback to teachers, principals could support teachers' competence. Finally, teachers' relatedness can be

nurtured by supporting involvement in interdisciplinary projects. If collaborations and relationships among teachers who belong to different areas and students from different courses are fostered, this will likely create a friendlier working environment in schools (Durksen, Klassen, & Daniels, 2017).

4.4. Limitations and future directions

A first limitation of the current study relates to its cross-sectional design, hampering drawing causal effect conclusions. Future studies, adopting a longitudinal or interventional design, are needed to further unravel the direction of the relationships studied. In addition, it is important to note that the response rate (i.e., 8%) was not very high, which could explain why our sample was highly autonomously motivated, overall. Future studies with a larger sample could contribute to verifying the evidence found in this study. Third, the present study focuses on teachers' motivation in general. However, teaching requires a wide range of tasks, such as class preparation, evaluating students, or administrative tasks (Fernet et al., 2008). Additional research about the extent to which the same motivational profiles would be retained with regard to specific teaching tasks could provide more detailed evidence on teaching motivation at work. Fourth, only worn-out and engagement have been measured as indicators of teachers' well-being. Future studies could go deeper into the differences between the retained groups with complementary indicators of teachers' well-being (e.g., job satisfaction or intention to quit the job). Finally, only need satisfaction was studied as an antecedent of teachers' motivation. In future studies, other antecedents such as experienced need frustration, could also be included (Haerens, Vansteenkiste, Aelterman, & Van den Bergh, 2016).

5. Conclusion

The results of the present study show that teachers who are more autonomously motivated, and thus value or enjoy teaching more, are better protected against the development of burnout, and are more engaged in their jobs, they teach in a more motivating way, while the opposite is true for teachers who are highly amotivated. Teachers who feel more pressurized are still absorbed in their work, yet they are more likely to develop worn-out, and to instill an ego-oriented learning climate. Finally, BPN satisfaction related positively and negatively to autonomous motivation and amotivation, respectively. Particularly, when teachers feel less satisfied in their need for autonomy, they are more likely to teach as a result of pressurized reasons. Therefore, with a view to preventing burnout, and to stimulate the motivation of teacher-student interactions, it seems important to search for ways to better support the BPN of teachers at work.

Conflicts of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Appendix

Standardized regression weights, standard errors, significant values and covariance between independent variables belonging to the model of Fig. 2.

			β	Standard error	p
Autonomy satisfaction	→	Autonomous motivation*	.10	.04	<.05
Autonomy satisfaction	→	Controlled motivation**	-.21	.05	<.01
Autonomy satisfaction	→	Amotivation**	-.35	.04	<.01
Relatedness satisfaction	→	Autonomous motivation**	.12	.05	<.01
Relatedness satisfaction	→	Controlled motivation	-.08	.05	>.05
Relatedness satisfaction	→	Amotivation**	-.14	.04	<.01
Competence satisfaction	→	Autonomous motivation**	.57	.04	<.01
Competence satisfaction	→	Controlled motivation	-.08	.05	>.05
Competence satisfaction	→	Amotivation**	-.40	.04	<.01
Autonomous motivation	→	Neglect**	-.24	.03	<.01
Autonomous motivation	→	Lack of acknowledgement*	-.09	.04	<.05
Autonomous motivation	→	Lack of control**	-.13	.04	<.01
Autonomous motivation	→	Vigor**	.48	.03	<.01
Autonomous motivation	→	Dedication**	.56	.03	<.01
Autonomous motivation	→	Absorption**	.52	.03	<.01
Autonomous motivation	→	Autonomy support**	.27	.05	<.01
Autonomous motivation	→	Relatedness support**	.26	.05	<.01
Autonomous motivation	→	Task support**	.30	.04	<.01
Autonomous motivation	→	Ego support	-.02	.05	>.05
Controlled motivation	→	Neglect*	.10	.04	<.05
Controlled motivation	→	Lack of acknowledgement*	.10	.03	<.05
Controlled motivation	→	Lack of control**	.16	.04	<.01
Controlled motivation	→	Vigor	.01	.03	>.05
Controlled motivation	→	Dedication	-.03	.03	>.05
Controlled motivation	→	Absorption*	.09	.04	<.05
Controlled motivation	→	Autonomy support	-.01	.05	>.05
Controlled motivation	→	Relatedness support	-.07	.05	>.05
Controlled motivation	→	Task support	-.04	.05	>.05
Controlled motivation	→	Ego support**	.28	.04	<.01
Amotivation	→	Neglect**	.62	.02	<.01
Amotivation	→	Lack of acknowledgement**	.56	.03	<.01
Amotivation	→	Lack of control**	.52	.04	<.01
Amotivation	→	Vigor**	-.39	.03	<.01
Amotivation	→	Dedication**	-.43	.03	<.01
Amotivation	→	Absorption**	-.33	.03	<.01
Amotivation	→	Autonomy support**	-.12	.05	<.01
Amotivation	→	Relatedness support**	-.22	.05	<.01
Amotivation	→	Task support**	-.31	.05	<.01
Amotivation	→	Ego support**	.19	.05	<.01
		Autonomy satisfaction			
		Relatedness satisfaction			
		Competence satisfaction			
Autonomy satisfaction	–		.34**		.37**
Relatedness satisfaction		–			.31**
Competence satisfaction					–

Note: β = standardized regression weights; * = $p < .05$; ** = $p < .01$.

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5.2.2. Estudio 6: Towards a more refined understanding of the interplay between burnout and engagement among secondary school teachers: A person centered perspective

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Towards a more refined understanding of the interplay between burnout and engagement among secondary school teachers: A person-centered perspective

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ABSTRACT

Recent research in different types of employees has suggested that burnout and engagement at work may occur to different degrees. However, little is known about the interplay between burnout and engagement among secondary school teachers. Using a person-centered approach, this study examined which configurations of the three Farber burnout subtypes (i.e., frenetic, underchallenged, and wornout), together with engagement at work, emerged among teachers, and which resulting profiles yielded the most adaptive pattern of teachers' psychological, physical, and work-related functioning. A sample of 584 secondary school teachers ($M = 45.04 \pm 8.97$) participated in this study. Five profiles were identified, showing a co-occurrence of frenetic burnout and engagement in three of those profiles. Further, experiencing moderate levels of engagement appeared to be more adaptive than experiencing high levels of engagement combined with moderate levels of frenetic burnout. These results support the coexistence of burnout and engagement, highlighting how different profiles can differently affect teachers' well-functioning at work.

1. Introduction

Over the last three decades, significant reforms and changes in the educational system of some European countries have provoked a higher risk of developing mental health problems within the teaching profession (Betoret, 2009; Skaalvik & Skaalvik, 2015). In fact, teachers have been found to experience more burnout than members of other social professions (Garrick et al., 2014; Innstrand, Langballe, Falkum, & Aasland, 2011), with prevalence rates of between 25% and 35% in European secondary school teachers (García-Carmona, Marín, & Aguayo, 2018; Quattrin et al., 2010; Rodríguez-Mantilla & Fernández-Díaz, 2011). Teacher burnout is typified as a negative work-related mental state that has a direct influence on their psychological health (e.g., anxiety; Gluschkoff et al., 2016) and quality of life (e.g., sleep problems; Moriana & Herruzo, 2006), even affecting their students' academic achievement (e.g., Klusmann, Richter, & Lüdtke, 2016). In contrast, teacher engagement is typified as a positive mental state, which not only may buffer their health problems (e.g., anxiety;

Simbula, Guglielmi, Schaufeli, & Depolo, 2013), but may also lead to good psychological functioning and work performance, as well as benefit students' motivation (Abós, Sevil, Martín-Albo, Julián, & García-González, 2018; Kangas, Siklander, Randolph, & Ruokamo, 2017).

Traditionally, most studies have suggested that burnout and engagement represent the opposite ends of a single continuum (e.g., Crawford, LePine, & Rich, 2010; González-Romá, Schaufeli, Bakker, & Lloret, 2006; Høigaard, Giske, & Sundsli, 2012). Conversely, a previous study on a sample of teachers suggested that some dimensions of burnout and engagement could be experienced simultaneously (i.e., distinct dimensions; Trépanier, Fernet, Austin, & Ménard, 2015). These aforementioned studies were conducted using a variable-centered approach (i.e., inter-individual), which does not permit analyzing the simultaneous co-occurrence of both constructs. In contrast, the use of a person-centered approach (i.e., intra-individual) not only provides an opportunity to shed light on the question of whether burnout and engagement represent distinct constructs or are opposites of a single continuum, but its use may also permit the identification of potential

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relative risk profiles based on the interconnectedness of both constructs (Morin, Morizot, Boudrias, & Madore, 2011). To illustrate, a recent person-centered study conducted among employees¹ (Moeller, Ivcevic, White, Menges, & Brackett, 2018) revealed that some individuals may experience burnout symptoms, while being simultaneously highly engaged. The current study adds to this emerging body of literature by investigating whether such combinations of burnout and engagement also occur among teachers, a topic that has not been explored to date. If so, from a preventive perspective, it becomes interesting to study which resulting profiles yield the most (mal)adaptive patterns in terms of teachers' psychological (i.e., anxiety, depression), physical (i.e., sleep quality), and work-related outcomes (i.e., intention to quit the job).

1.1. Teacher burnout

When studying burnout, most researchers have relied on the internationally accepted definition of burnout described by Maslach and Jackson (1986). According to this definition, burnout is determined by the three dimensions of emotional exhaustion (i.e., the feeling of not being able to offer any more of oneself), cynicism (i.e., a distant attitude towards work and colleagues), and inefficacy (i.e., the feeling of not conducting tasks adequately at work) (Maslach & Jackson, 1986; Maslach, Schaufeli, & Leiter, 2001). Despite being extensively used, Maslach's definition considers burnout as a single phenomenon with a similar pattern of symptoms in all individuals as a response to chronic stress at work (Montero-Marín, García-Campayo, Mera, & del Hoyo, 2009), which makes it difficult to design specific prevention strategies based on the characteristics and feelings experienced by each person (Montero-Marín & García-Campayo, 2010). To overcome this issue, from a more practical point of view and focusing on teaching job characteristics, Farber (1990, 2000) identified three different burnout subtypes in teachers based on different ways of responding to stress and frustration at work. From the highest to the lowest degree of energy, these burnout subtypes are frenetic, underchallenged, and wornout (Montero-Marín et al., 2009). Given the possibilities of Farber's definition to design and apply more specific interventions (Montero-Marín et al., 2009), the present study relies on the frenetic, underchallenged, and wornout burnout subtypes.

The frenetic subtype comprises teachers who invest an irrational and excessive amount of time and effort in their work, even risking their health and personal lives because they need to achieve great success at work and avoid failure (Farber, 2000; Montero-Marín et al., 2009). Previous studies have shown that frenetic burnout is positively related to Maslach's dimension of emotional exhaustion (Montero-Marín et al., 2012; Montero-Marín & García-Campayo, 2010), possibly owing to the excessive workload experienced by this highly devoted type of teacher. The underchallenged subtype involves teachers who experience non-stimulating work conditions that do not provide the necessary job satisfaction, and who consider their jobs to be monotonous and routine. They work superficially because their talents remain unacknowledged and they are characterized by feelings of indifference (Farber, 2000; Montero-Marín & García-Campayo, 2010). Underchallenged burnout is positively related to Maslach's dimension of cynicism (Montero-Marín et al., 2012; Montero-Marín & García-Campayo, 2010), which is comprehensible given the possible lack of enthusiasm of teachers, resulting from their own negative evaluation of their jobs. Finally, the wornout subtype comprises teachers who no longer care about their responsibilities. They do not feel professionally appreciated or recognized by the educational administration or principals, and feel that they have lost control over some results of their actions at school (e.g., students' misbehavior or insufficient involvement of parents) (Farber, 2000; Montero-Marín et al., 2009). Teachers' wornout burnout is positively

¹ Employees were recruited from all industrial sectors in the approximate proportion of each industry in the US workforce.

related to Maslach's dimension of inefficacy (Montero-Marín et al., 2012; Montero-Marín & García-Campayo, 2010), possibly due to apathy and increasing lack of interest in teaching, enhanced by their experiences of lack of acknowledgement and control.

Grounded in Maslach's definition, a wealth of studies has revealed that teacher burnout may lead to negative outcomes such as anxiety (Bianchi, Boffy, Hingray, Truchot, & Laurent, 2013; Moriana & Herruzo, 2006), depression symptoms (Moriana & Herruzo, 2006; Shin, Noh, Jang, Park, & Lee, 2013), sleep disorders (Bianchi et al., 2013; Gluschkoff et al., 2016), and intention to quit their jobs (Høigaard et al., 2012; Ryan et al., 2017; Skaalvik & Skaalvik, 2016, 2017). Yet, to the best of our knowledge, no previous study based on Farber's burnout proposal has addressed these associations in teachers.

1.2. Teacher engagement

In international literature, engagement is defined as a positive multi-dimensional mental state characterized by the dimensions of vigor, dedication, and absorption (Schaufeli, Salanova, González-Romá, & Bakker, 2002). Vigor refers to high levels of energy, willingness, and resilience. Dedication is expressed by a sense of significance, enthusiasm, pride, and inspiration about the profession. Finally, absorption refers to a pleasant state of high concentration, whereby time passes quickly while doing the job. A large body of research has shown that engagement is negatively related to a range of health problems and maladaptive outcomes in teachers such as anxiety and depression (Simbula et al., 2013), and intention to quit their jobs (Høigaard et al., 2012; Skaalvik & Skaalvik, 2016), while being positively related to indicators of psychological and physical health (e.g., sleep quality; Garrick et al., 2014).

1.3. Combinations of burnout and engagement among teachers

Because engagement and burnout are traditionally characterized as the central components of well-being at work (Schaufeli, Taris, & van Rhenen, 2008), researchers have increasingly devoted attention to the relationship between both constructs. In line with their opposite relationships with work-related outcomes, a vast body of empirical research - commonly conducted with Maslach's definition - has shown that there is a strong negative relationship between some dimensions of burnout and engagement (Crawford et al., 2010; González-Romá et al., 2006; Høigaard et al., 2012). Yet, other recent studies reported only moderate (i.e., $-0.43 < r < -0.17$) negative associations between different components of burnout and engagement, suggesting that feelings of burnout and engagement may coexist at the same time among teachers (Trépanier et al., 2015). However, according to Farber's burnout proposal, little is known about the interplay between burnout subtypes and engagement. According to Farber's proposal, teachers who experience frenetic feelings try to cope with stress by working harder (Montero-Marín et al., 2009). Particularly, the frenetic burnout subtype proposed by Farber could be positively related to engagement given that frenetic people are characterized by involvement in work and need for achievements. In a person-centered study, a possible "moderate to high engaged - moderate to high frenetic" group could emerge from this hypothetical relationship.

Yet, frenetic burnout teachers are also characterized by an inability to acknowledge failure, neglecting own needs, and irritability, which, contrary to engagement, are widely related to detrimental health outcomes (Montero-Marín et al., 2009). Therefore, although both constructs share some common similarities, they are conceptually distinct and need to be separated, from a functional point of view. Indeed, Farber (2000) suggests that frenetic subtype teachers, despite their high energy and dedication levels, are still at risk of suffering mental health problems (e.g., lower sleep quality, anxiety, or stress). Whereas the frenetic subtype is considered highly energetic, the underchallenged and wornout subtypes would display moderate to low levels of energy

at work, respectively, and burnout and engagement would thus be either unrelated or negatively related in these teachers (Montero-Marín et al., 2009). To date, we do not have much empirical data supporting these claims. However, the scarce research conducted with Farber's proposal has shown that not only experiencing feelings of frenetic burnout is risky, but also that the underchallenged and wornout burnout subtypes are especially related to a range of maladaptive outcomes (e.g., anger, irritability, anxiety; Aydemir & Icelli, 2013; Montero-Marín et al., 2009).

Furthermore, most studies to date have used inter-individual methods (e.g., correlations, regression, or ESEM; Morin et al., 2011) to establish relationships between burnout, engagement, and work-related outcomes, which allows for conclusions at group level (e.g., Trépanier et al., 2015), but does not permit identifying possible combinations of burnout and engagement. However, relying on intra-individual methods instead of variable-centered (i.e., inter-individual) analyses, three studies have found evidence for the co-occurrence of burnout and engagement in different types of employees (Mäkikangas et al., 2014; Mäkikangas, Feldt, Kinnunen, & Tolvanen, 2012; Moeller et al., 2018). Two studies with Finnish employees - one longitudinal with engineer managers (Mäkikangas et al., 2012), and one diary study with health and social care professionals (Mäkikangas et al., 2014) - showed that moderate to high feelings of burnout (as operationalized by Maslach's dimensions), and engagement at work may be experienced together. Unlike these two studies with Finnish employees, the present study based its methodological approach mainly on one research study on intra-individual profiles of burnout and engagement conducted recently by Moeller et al. (2018) in US employees. In particular, in this above-mentioned study, three profiles that combined burnout and engagement (as operationalized by global dimensions) emerged, which offered support to the coexistence of the two constructs at different levels (i.e., “lowly engaged –low burnout”, “moderately engaged –moderate burnout”, “highly engaged – high burnout”). Interestingly, the “highly engaged –high burnout” profile was more detrimental in terms of negative work-related outcomes than the “moderately engaged –moderate burnout” and the “lowly engaged –low burnout” profiles (Moeller et al., 2018). However, to the best of our knowledge, there are no person-centered studies to date that have examined whether a “highly-high”, “moderately-moderate”, or “lowly-low” engaged burnout profile also exists among teachers, hereby relying on the three Farber burnout subtypes instead of a global burnout dimension.

Identifying different burnout-engagement profiles among teachers is crucially important for the design and development of specific preventive recommendations that are optimally tailored to the way burnout and engagement are manifested among individual teachers (Montero-Marín & García-Campayo, 2010). Likewise, previous research in teachers has commonly been aimed at examining the roots of burnout and engagement (i.e., personal, interpersonal, organizational, etc.) instead of possible health and work-related outcomes (García-Carmona et al., 2018). Identifying profiles of teachers based on the interconnectedness of engagement and burnout may also be useful to the most (mal)adaptive patterns regarding teachers' psychological functioning, physical health, and work-related outcomes. This could shed more light to better understand how teachers may feel every day, based on their levels of burnout and engagement.

1.4. The present study

Considering the gaps that have been identified in literature, the current study aims at identifying different burnout-engagement profiles among teachers. Specifically, our first aim was to study, in a sample of secondary school teachers, how the three Farber burnout subtypes (i.e., frenetic, underchallenged, and wornout) and engagement could cluster together by adopting a person-centered perspective. Based on Farber's burnout subtypes (Farber, 2000; Montero-Marín et al., 2009) and past person-centered studies in employees (Mäkikangas et al., 2012, 2014;

Moeller et al., 2018), we expect (1) to find at least two groups of teachers that are highly engaged and low in all three burnout subtypes and vice versa (i.e., lowly engaged and high in all three burnout subtypes). Moreover, because the frenetic subtype is expected to display the highest level of energy, while the underchallenged and wornout subtypes are expected to display moderate and low levels, respectively (Montero-Marín et al., 2009), based on past studies with employees (Mäkikangas et al., 2012, 2014; Moeller et al., 2018), we also expect (2) to find a third group of teachers that is highly engaged and with highly frenetic burnout. In addition, analogous to previous studies (Moeller et al., 2018), (3) it might be possible to identify a fourth group that may combine low to moderate levels of frenetic burnout and low to moderate levels of engagement. However, based on Farber's burnout proposal (Montero-Marín et al., 2012), we can practically rule out the coexistence of underchallenged and wornout subtypes with engagement, at least, at moderate-high levels.

A second aim was to identify whether one burnout-engagement profile is more detrimental than another, by comparing each of the identified profiles in terms of a range of psychological (i.e., anxiety, depression), physical (i.e., sleep quality) and work-related outcomes (i.e., intention to quit the job). Based on Farber's burnout proposal (Farber, 2000; Montero-Marín et al., 2009), and previous studies (Mäkikangas et al., 2012, 2014; Moeller et al., 2018), we hypothesize (4) that the profiles characterized by a higher presence of engagement and a low presence of burnout subtypes would display the most adaptive pattern of outcomes, while the opposite would be true for profiles that involve low levels of engagement and high levels of burnout, in particular if the resulting profiles have high levels of underchallenged and wornout subtypes. In that respect, we also hypothesize (5) that the profiles characterized by a low presence of engagement and a high presence of frenetic burnout subtype, because of the higher presence of energy than in the underchallenged and wornout subtypes (see Montero-Marín et al., 2009), would yield a more (but not the most) adaptive pattern of outcomes, compared to the abovementioned profiles characterized by low levels of engagement and high levels of underchallenged and/or wornout burnout subtypes. According to Moeller et al. (2018) and past research, experiencing very high levels of frenetic burnout may be risky (Farber, 2000), thus, the last hypothesis (6) is that if two groups with different levels (i.e., moderate and high) of frenetic burnout and engagement were to emerge, the moderately frenetic-moderate engaged would display a more adaptive pattern of outcomes when compared to a possible group that is high on both frenetic burnout and engagement constructs.

2. Methods

2.1. Participants and procedure

Approval for this study was obtained from the University's research ethics committee. As our target population was in-service secondary school teachers, we contacted all the 6393 teachers who had worked during the 2014/2015 academic year in one Spanish region (Aragon). The response rate was 10%. A sample of 584 in-service teachers from 106 secondary schools participated in this study (81 state schools, 25 non-state schools). The sample of the present study included the same proportion of male (i.e., 43%) and female (i.e., 57%) teachers as the total population of secondary school teachers of Aragon. In addition, participants represented a wide variety of ages and teaching experience, ranging from 25 to 66 years old ($M_{age} = 45.04$, $SD = 8.97$) and from 1 to 45 years' experience ($M_{experience} = 17.55$, $SD = 10.26$). In terms of teaching areas, the proportion of participants who taught in each area was also balanced: 29% taught subjects in the Humanities area (e.g., foreign languages, Spanish language and literature, philosophy, and ethics, etc.), 19% taught subjects in the Social Sciences area (e.g., geography, history, economics, etc.), 26% taught subjects in the Scientific-Technical Sciences area (e.g., mathematics, biology, physics,

chemistry, etc.), 19% taught subjects in the Artistic-Corporal Sciences area (e.g., physical education, music, plastic arts, etc.), and 7% taught subjects in two or more different areas. Finally, despite most of the participants working in state schools (71%), secondary school teachers who worked in non-state schools (29%) were also represented in the present study. These sample proportions of the study were equal to the total population of secondary teachers of the region of Aragon. These data statistics were provided by the Spanish Ministry of Education, Culture, and Sport (MECD; for further information, see <http://www.mecd.gob.es>).

Teachers received an explanation of the study aims and a weblink to access the online questionnaire via e-mail during the last term of the academic year. The teachers' contact information (i.e., e-mail) was obtained through the Educational Administration of the region of Aragon. The online questionnaire was designed to avoid missing values, making it impossible to continue until all the answers had been completed. The deadline to complete and submit the questionnaire was 30 days. Given the potential importance of collecting the data in the same period of the academic year, reminders were not sent to those teachers who did not respond the first time. Participation was strictly voluntary and anonymous.

2.2. Measures

2.2.1. Burnout at work

Based on Farber's conceptualization, the three burnout subtypes were measured using the Spanish version of the Burnout Clinical Subtype Questionnaire (Montero-Marín & García-Campayo, 2010). This questionnaire consists of 36 items evenly distributed into three subscales with 12 items each: frenetic (e.g., "I need to achieve great success in my work", $\omega = 0.92$), underchallenged (e.g., "I feel helpless in many situations in my work", $\omega = 0.95$), and wornout (e.g., "I feel bored at work", $\omega = 0.94$). The items were rated on a 7-point Likert scale ranging from 1 ("totally disagree") to 7 ("totally agree"). This scale has shown adequate reliability and validity in prior research with university employees (Montero-Marín et al., 2012). In the present study, a confirmatory factor analysis (CFA) was performed showing adequate goodness-of-fit ($\chi^2/df = 3.36$, $p < .001$; RMSEA = 0.06; CFI = 0.90; TLI = 0.90).

2.2.2. Engagement at work

Teacher engagement was measured using the Spanish version of the Utrecht Work Engagement Scale (Schaufeli et al., 2002). This scale consists of 17 items and taps into vigor (six items; e.g., "At work, I feel strong and vigorous", $\omega = 0.88$), dedication (five items; e.g., "I feel happy when I am working intensely", $\omega = 0.92$), and absorption (six items; e.g., "I am immersed in my work", $\omega = 0.86$). The items were rated on a 7-point Likert scale ranging from 0 ("never") to 6 ("always"). In the present study, the relationships between each of the three engagement factors as well as the relationships between each one individually and the engagement composite score showed strongly significant and positive associations. More precisely, vigor was highly correlated with dedication ($r = 0.83$, $p < .001$) and absorption ($r = 0.80$, $p < .001$), as well as dedication with absorption ($r = 0.79$, $p < .001$). Furthermore, vigor ($r = 0.94$), dedication ($r = 0.93$), and absorption ($r = 0.91$) were also highly positively correlated with the engagement composite score at $p < .001$ level. In addition, a one-factor CFA was performed showing adequate goodness-of-fit ($\chi^2/df = 3.58$, $p < .001$; RMSEA = 0.066; CFI = 0.98; TLI = 0.97). Given that the inspection of engagement at work as a one-dimensional construct may be a more parsimonious and interpretable option in this study, and consistent with previous research (e.g., Shimazu et al., 2008) that found a proper fit for the one-dimensional representation of engagement at work, we used the mean composite score of all 17 items ($\omega = 0.91$) as a measure of work engagement.

2.2.3. Anxiety and depression

Anxiety and depression were measured using the Spanish version of the Hospital Anxiety and Depression Scale (Quintana et al., 2003). This scale consists of 14 items assessing respondents' anxiety (seven items; e.g., "I feel tense or 'wound up'", $\omega = 0.96$) and depression (seven items; e.g., "I have lost interest in my appearance", $\omega = 0.93$). Each item is rated on a 4-point scale from 0 to 3 (with 3 indicating maximum symptom severity). Each subscale has a summed score with a potential range from 0 to 21, with a higher score pointing to higher symptom severity. This scale has shown adequate reliability and validity in prior research with teachers (Bellgrath, Weigl, & Kudielka, 2008). In the current study, a CFA was conducted showing adequate goodness-of-fit ($\chi^2/df = 3.42$, $p < .001$; RMSEA = 0.064; CFI = 0.92; TLI = 0.90).

2.2.4. Sleep quality

Sleep quality was assessed using one single item (i.e., "During the past month, how would you rate your sleep quality overall?") from the Spanish version of the Pittsburgh Sleep Quality Index (Macias & Royuela, 1996). The item was rated on a 4-point Likert scale, ranging from 1 ("very bad") to 4 ("very good"). This question has widely been included to measure sleep quality in past research with employees (e.g., Kalmbach, Pillai, Cheng, Arnedt, & Drake, 2015; Pereira & Elfering, 2014).

2.2.5. Intention to quit the job

Intention to quit the job was measured by the dichotomous question "Have you ever thought about leaving your job as a teacher? (yes or no)". This question has been used previously in studies with teachers (e.g., Høigaard et al., 2012).

2.3. Data analysis

2.3.1. Preliminary descriptive, correlational, and reliability analyses

Prior to the main analyses, the descriptive statistics (M and SD), bivariate correlation analyses (Pearson's for continuous variables and Spearman's rho for intention to quit the job), and scales reliability (McDonald's omega) were computed using IBM SPSS Statistics 22.0 and Mplus 7.3. McDonald's omega (McDonald, 1999) was calculated because Cronbach's alpha may be biased by the number of items (Dunn, Baguley, & Brunnsden, 2014). Further, previous studies in social sciences have supported the use of this reliability parameter (e.g., León, Núñez, & Liew, 2015), showing evidence of better accuracy than Cronbach's alpha (Revelle & Zinbarg, 2009).

2.3.2. Person-centered approach

A two-step procedure, adopting a combination of hierarchical and non-hierarchical clustering methods (Garson, 2014), was conducted on the one dimension of engagement and the three burnout subtypes (i.e., frenetic, underchallenged, and wornout). First, the standardized scores (Z -scores) were calculated using the teachers' descriptive values (M , SD , Minimum and Maximum) for frenetic, underchallenged, and wornout burnout, as well as for engagement. Then, individuals with values of more than three standard deviations above or below the mean, or with high Mahalanobis values, were removed from the analyses to reduce the impact of univariate and multivariate outliers, respectively (Steinley & Brusco, 2011). Second, to identify initial cluster centers, Ward's method was used to guide hierarchical cluster analysis based on square Euclidian distances. Three to six possible cluster solutions were considered by inspecting the percentage of explained variance. The cluster solution with explained variance values of $< 50\%$ for each dimension was not retained for subsequent analyses. The increase in clustering variance in each of the possible groupings was examined to identify the final number of profiles (Aguinis, Gottfredson, & Joo, 2013). Third, the previously obtained cluster centers, using Ward's hierarchical method, were used as non-random initial cluster centers in an iterative, non-hierarchical k-means clustering procedure (Asendorpf,

Borkenau, Ostendorf, & Van Aken, 2001). Fourth, a double-split cross-validation method was used to examine the stability of the final cluster solution. The individuals were randomly split into two subsamples and the full two-step procedure (i.e., Ward, k-means) was then applied in each subsample. The teachers in each subsample were assigned to new clusters based on their Euclidean distances to the cluster centers of the other half of the sample. Then, these new cluster solutions were compared for agreement with the original cluster solution using Cohen's kappa (K) statistic. The two resulting kappas were averaged and an agreement of at least 0.60 was considered acceptable (Asendorpf et al., 2001). Finally, given that gender and teaching experience may influence teachers' psychological functioning (e.g., Antoniou, Ploumpi, & Ntalla, 2013; Betoret & Artiga, 2010), the cluster assignment in these two socio-demographic variables was examined via Chi-square test and multinomial regression, respectively. The results of this analysis told us if it was necessary to include them as covariates in the subsequent analyses.

2.3.3. Differences in teachers' profiles and outcomes

A multivariate analysis of variance (MANOVA) with post-hoc tests using Bonferroni method was conducted to examine differences between the retained clusters regarding anxiety, depression, and sleep quality. Partial eta squared (η_p^2) effect sizes above 0.01 were considered small, above 0.06 moderate, and above 0.14 large (Cohen, 1988). Pearson's chi-square test and Cramer's V by mean crosstabs were performed to examine associations between cluster membership and intention to quit the job. Cramer's V values above 0.10 were considered small, above 0.30 medium, and above 0.50 large (Cohen, 1988). To analyze the adjusted residuals, a value greater than two (i.e., > 2) was taken to establish an excitatory relationship, and lower than minus two (i.e., < -2) to establish an inhibitory relationship. The statistical significance level considered was $p < .05$.

3. Results

3.1. Preliminary descriptive and correlational results

Means, standard deviations, and correlations among the study variables are reported in Table 1. We found that correlations between the three dimensions of burnout ranged from non-significant among the frenetic and underchallenged subtypes ($r = -0.02, p > .05$) or moderate among the frenetic and wornout subtypes ($r = 0.10, p < .05$) to slightly large among the underchallenged and wornout subtypes ($r = 0.66, p < .01$). Further, frenetic burnout showed a moderate positive relationship to engagement ($r = 0.35, p < .01$), whereas the underchallenged and wornout subtypes showed high ($r = -0.58, p < .01$) and moderate ($r = -0.48, p < .01$) negative relationships to engagement, respectively. Regarding study outcomes, the three burnout subtypes were positively related to anxiety, depression, and intention to

quit, and negatively related to sleep quality. On the contrary, engagement was negatively related to anxiety, depression, and intention to quit, and positively related to sleep quality.

3.2. Aim 1: simultaneous coexistence of Farber's burnout subtypes and engagement in the teaching profession

Prior to conducting the cluster analysis, twelve univariate outliers and four multivariate outliers were removed, resulting into a sample of 568 secondary teachers (247 males, 321 females) for the person-centered approach. Consistent with recent studies with employees (e.g., Moeller et al., 2018), three, four, five, and six-cluster solutions were considered and compared. The three and four-cluster solutions were not retained because the explained variance for frenetic burnout and underchallenged burnout was < 50% (Aguinis et al., 2013). A five-cluster solution explained 51%, 63%, 50%, and 60% of the variance in frenetic, underchallenged, wornout burnout subtypes, and engagement, respectively, and a six-cluster solution explained 51%, 64%, 50%, and 63%, respectively. In this sense, the five-cluster solution was retained because it was more interpretable than the six-cluster solution, and because, compared to the five-cluster solution, the variation explained in the three burnout subtypes, as well as in engagement in the six-cluster solution, scarcely increased (Aguinis et al., 2013). The double-split cross-validation method showed an average kappa value of 0.70 (good agreement) for the five-cluster solution.

Fig. 1 shows the graphical results for the five-cluster solution based on Z-scores (Y-axis) for the three burnout subtypes and engagement at work. Two groups scored either extremely low or low on engagement, and relatively high on the burnout subtypes of underchallenged and wornout. These groups were labelled as (1) the “disengaged-underchallenged/wornout” group ($n = 102, 18\%$), and (2) the “lowly engaged-underchallenged/wornout” group ($n = 144, 25\%$). Further, two groups were characterized by relatively high scores in engagement, and high or moderate scores in frenetic burnout, while the other two burnout subtypes (i.e., underchallenged and wornout) were relatively low. These groups were labelled as (3) the “highly engaged-high frenetic” group ($n = 54, 10\%$), and (4) the “highly engaged-moderate frenetic” group ($n = 52, 9\%$). Finally, there was a group that was moderately engaged ($n = 216, 38\%$) and had lower scores in the three burnout subtypes, which we labelled as (5) the “moderately engaged-low burnout” group.

The standardized and absolute scores for the five-cluster solution in each dimension are reported in Table 2. Most of the groups differed significantly from each other in terms of the three burnout subtypes and engagement at work. The only exceptions were the “highly engaged-high frenetic” group and the “moderately engaged-low burnout” group that were similar in terms of their lower values for underchallenged, and the “disengaged-underchallenged/wornout” group and the “highly engaged-high frenetic” group in terms of their average values of

Table 1
Possible range, means, standard deviation and intercorrelation among measured variables.

Study variables	Possible range	M (SD)	1	2	3	4	5	6	7	8
1. Frenetic burnout	1–7	4.22 (0.89)	–							
2. Underchallenged burnout	1–7	2.20 (1.11)	–0.02	–						
3. Wornout burnout	1–7	3.21 (1.04)	0.10*	0.66**	–					
4. Engagement	0–6	3.98 (0.96)	0.35**	–0.58**	–0.48**	–				
5. Anxiety	0–21	7.24 (3.63)	0.38**	0.21**	0.39**	–0.15**	–			
6. Depression	0–21	3.95 (3.25)	0.22**	0.44**	0.49**	–0.37**	0.62**	–		
7. Sleep quality	1–4	2.83 (0.75)	–0.13**	–0.12**	–0.20**	0.10**	–0.30**	–0.30**	–	
8. Intention to quit ^a	(yes/no)	29.80% ^b	0.09*	0.35**	0.41**	–0.23**	0.22**	0.27**	0.15**	–

* $p < .05$.

** $p < .001$.

^a Spearman's rho correlation.

^b Teachers who have ever considered leaving your job.

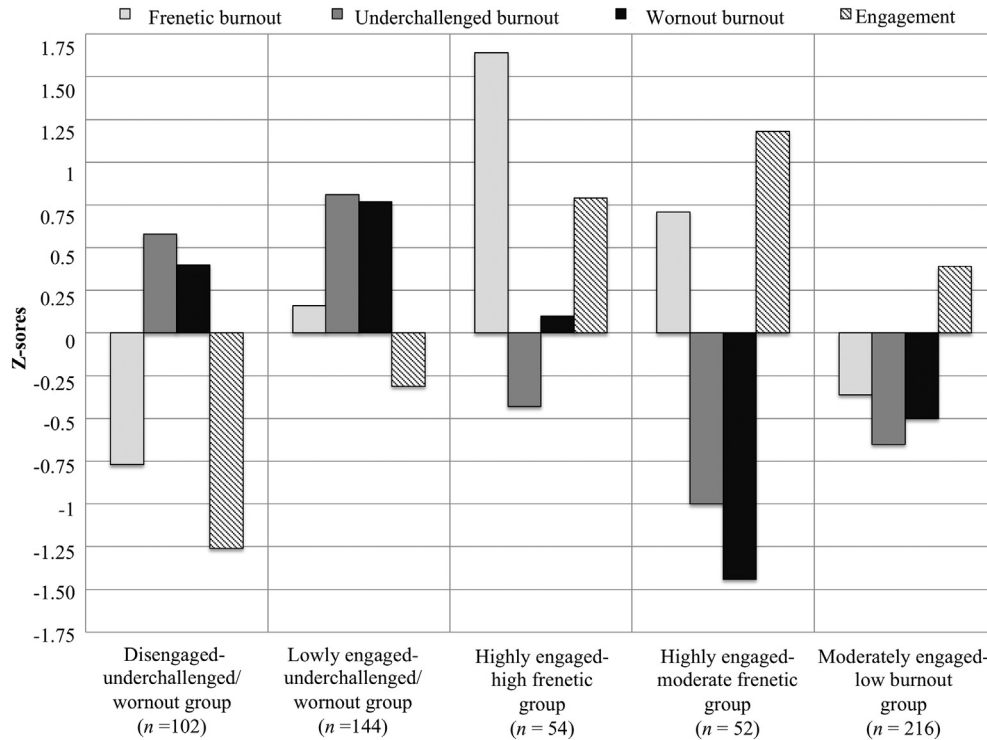


Fig. 1. Five-cluster solution based on Z-scores for Farber's burnout subtypes of frenetic, underchallenged, and wornout, as well as Z-scores for engagement among secondary school teachers. Above can be observed the colors with which each variable included in the cluster analysis is identified.

wornout. Prior to conducting a MANOVA, the cluster assignment by gender and teaching experience was examined. Chi-square testing revealed a non-significant cluster assignment by gender effect ($\chi^2 [4, n = 568] = 2.43, p > .05$). Male and female teachers were almost equally distributed across the “disengaged-underchallenged/wornout” group (male = 43, 8%; female = 59, 10%), the “lowly engaged-underchallenged/wornout” group (male = 65, 11%; female = 79, 14%),

the “highly engaged-high frenetic” group (male = 19, 4%; female = 35, 6%), the “highly engaged-moderate frenetic” group (male = 21, 4%; female = 31, 5%), and the “moderately engaged-low burnout” group (male = 99, 17%; female = 117, 20%). In addition, multinomial regression analysis showed no association between teaching experience and the retained five-cluster solution (Pseudo- R^2 Nagelkerke = 0.40, $p > .05$). Based on these results, gender and teaching experience were

Table 2

Resulting clusters' mean scores, F-values, and effect sizes for teachers' burnout, engagement and psychological and physical teacher outcomes at work.

	Cluster (1): disengaged- underchallenged/ wornout n = 102	Cluster (2): lowly engaged- underchallenged/ wornout n = 144	Cluster (3): highly engaged- high frenetic n = 54	Cluster (4): highly engaged- moderate frenetic n = 52	Cluster (5): moderately engaged-low burnout n = 216	F-value ^(4, 563)	η_p^2
Cluster dimensions							
Burnout frenetic							
Z-scores	-0.77 (0.06) ^{2,3,4,5}	0.16 (0.05) ^{1,3,4,5}	1.64 (0.09) ^{1,2,4,5}	0.71 (0.09) ^{1,2,3,5}	-0.36 (0.04) ^{1,2,3,4}	144.48*	0.51
Raw scores (1–7)	3.53 (0.06) ^{2,3,4,5}	4.36 (0.05) ^{1,3,4,5}	5.68 (0.08) ^{1,2,4,5}	4.85 (0.08) ^{1,2,3,5}	3.89 (0.04) ^{1,2,3,4}		
Burnout underchallenged							
Z-scores	0.58 (0.05) ^{2,3,4,5}	0.81 (0.04) ^{1,3,4,5}	-0.43 (0.07) ^{1,2,4}	-0.99 (0.07) ^{1,2,3,5}	-0.65 (0.03) ^{1,2,4}	235.29*	0.63
Raw scores (1–7)	2.84 (0.06) ^{2,3,4,5}	3.11 (0.05) ^{1,3,4,5}	1.71 (0.08) ^{1,2,4}	1.08 (0.08) ^{1,2,3,5}	1.47 (0.04) ^{1,2,4}		
Burnout worn-out							
Z-scores	0.40 (0.06) ^{2,4,5}	0.76 (0.05) ^{1,3,4,5}	0.09 (0.09) ^{2,4,5}	-1.44 (0.09) ^{1,3,4,5}	-0.49 (0.04) ^{1,3,4,5}	138.38*	0.50
Raw scores (1–7)	3.62 (0.07) ^{2,4,5}	4.01 (0.06) ^{1,3,4,5}	3.31 (0.09) ^{2,4,5}	1.70 (0.09) ^{1,3,4,5}	2.69 (0.05) ^{1,3,4,5}		
Engagement at work							
Z-scores	-1.26 (0.06) ^{2,3,4,5}	0.31 (0.05) ^{1,3,4,5}	0.78 (0.08) ^{1,2,4,5}	1.18 (0.08) ^{1,2,3,5}	0.39 (0.04) ^{1,2,3,4}	207.20*	0.60
Raw scores (0–6)	2.75 (0.06) ^{2,3,4,5}	3.68 (0.05) ^{1,3,4,5}	4.74 (0.08) ^{1,2,4,5}	5.12 (0.08) ^{1,2,3,5}	4.36 (0.04) ^{1,2,3,4}		
Psychological outcomes							
Anxiety (0–21)	6.96 (0.33) ³	8.08 (0.27) ^{4,5}	9.11 (0.45) ^{1,4,5}	5.90 (0.46) ^{2,3}	6.35 (0.22) ^{2,3}	12.34*	0.08
Depression (0–21)	4.62 (0.27) ^{4,5}	4.97 (0.23) ^{4,5}	4.50 (0.37) ^{4,5}	2.15 (0.38) ^{1,2,3}	2.78 (0.18) ^{1,2,3}	21.57*	0.13
Physical outcomes							
Sleep quality (1–4)	2.78 (0.07) ^{4,5}	2.71 (0.06) ^{4,5}	2.55 (0.09) ^{4,5}	3.15 (0.09) ^{1,2,3}	3.01 (0.04) ^{1,2,3}	7.51*	0.05

Note: Standard errors are reported in parenthesis. Numbers in superscript refers to groups significantly different. Differences between the five groups were examined repeating the equations twice and modifying the reference category. So, coefficients for each group were extracted allowing pairwise comparisons.

* $p < .001$.

not considered as covariates in subsequent analyses.

3.3. Aim 2: differences in psychological, physical, and work-related teacher outcomes according to cluster membership

The multivariate effect of cluster membership on anxiety, depression, and sleep quality was significant with a high effect size ($F(28, 2009.71) = 66.03; p < .001, \eta_p^2 = 0.44$). Pairwise comparisons between groups, univariate F-values, and effect sizes (η_p^2) based on the Bonferroni method are reported in Table 2. The “moderately engaged-low burnout” group and the “highly engaged-moderate frenetic” group reported significantly lower scores of anxiety and depression, and higher scores of sleep quality compared to the rest of the groups. There was only one exception with the “disengaged-underchallenged/wornout” group that did not significantly differ from these referred groups in terms of anxiety. There were no differences between the other three groups (i.e., cluster 1, 2, 3; see Table 2) in terms of depression and sleep quality. For anxiety, only one significant difference was found with the “disengaged-underchallenged/wornout” group reporting significantly lower scores than the “highly engaged-high frenetic” group.

The associations between intention to quit the job and cluster membership are reported in Table 3. Intention to quit the job showed a significant association with cluster membership with a medium effect size ($\chi^2(4) = 54.39; V = 0.31; p < .001$). Inspection of the adjusted residuals showed that the highest positive relationship with intention to quit the job was obtained for the “lowly engaged-underchallenged/wornout” group, whereas the “highly engaged-moderate frenetic” group and the “moderately engaged-low burnout” group obtained a negative association with intention to quit the job.

4. Discussion

Up until today, the issue of whether burnout subtypes and engagement are different concepts representing the opposite ends of the same continuum, or whether they may coexist still remains unanswered in the teaching domain. To fill this gap, the overall goal of the present study was to examine whether the three burnout subtypes (i.e., frenetic, underchallenged, and wornout), proposed by Farber (2000), cluster differently with engagement at work, and whether these different profiles vary in terms of teacher functioning.

4.1. Interconnectedness between the three Farber burnout subtypes and engagement: a person-centered perspective (Aim 1)

Because it was the first person-centered study that combined Farber's burnout subtypes with engagement at work, our hypotheses regarding the retained profiles were tentative. Results of the cluster analyses pointed towards the retention of five different groups. Similar to research conducted with employees (Mäkikangas et al., 2012, 2014; Moeller et al., 2018) and consistent with our hypothesis, a “moderately engaged-low burnout” group (i.e., moderate scores in engagement and

low scores in frenetic, underchallenged, and wornout burnout subtypes) and a “lowly engaged-underchallenged/wornout” group (i.e., low scores in engagement and medium to high scores in frenetic, underchallenged, and wornout burnout subtypes) emerged. In line with the idea that burnout and engagement represent two opposite poles (Crawford et al., 2010; González-Romá et al., 2006; Høigaard et al., 2012), these two groups seem to indicate that at least some teachers will barely experience burnout at work when they are engaged and vice versa.

However, these two groups only represent 56% of all the secondary school teachers in our study. As in previous research in employees (Moeller et al., 2018) and consistent with the hypotheses, we also found the co-occurrence of burnout and engagement in three of the five identified profiles, providing evidence that both dimensions may also be experienced by teachers at the same time. Specifically, two groups of teachers with moderate and high scores in the frenetic subtype, and relatively high levels of engagement, were found in both groups (i.e., “highly engaged-moderate frenetic” group and “highly engaged-high frenetic” group). Likewise, in line with a profile identified by Moeller et al. (2018) in employees, named “apathetic” - which showed mutually low scores in both burnout and engagement -, we also found a third group of teachers that combined very low levels of frenetic burnout and engagement, whereas they reported relatively high levels in both the wornout and underchallenged burnout subtypes (i.e., “disengaged-underchallenged/wornout” group). Together, these results confirm that high frenetic subtype levels can exist alongside relatively high levels of engagement at work and vice versa, suggesting that some teachers may experience engagement and frenetic burnout simultaneously, while teachers who experience high levels of underchallenged and wornout subtypes are hardly likely to experience engagement at the same time. In support of this agreement, the correlational results of the present study showed a moderate positive relationship between engagement and the frenetic burnout subtype, while the relationships between engagement with underchallenged and wornout burnout subtypes, respectively, were negative. These results, in line with studies in different types of employees (Mäkikangas et al., 2012, 2014; Moeller et al., 2018), reinforce the importance of evaluating not only different burnout subtypes, but also the levels of engagement at work.

4.2. Can highly engaged teachers still suffer psychologically when they combine high engagement with burnout? (Aim 2)

Having identified different combinations of Farber's burnout subtypes and engagement, the second aim of the present study was to examine which of the retained profiles is at a higher risk of maladaptive psychological, physical, and work-related functioning. To address this aim, teachers' levels of anxiety, depression, sleep quality, and intention to quit their jobs were compared across the retained profiles.

We found that two of the three groups, characterized by higher engagement levels (i.e., the “moderately engaged-low burnout” group and the “highly engaged-moderate frenetic” group), displayed the most

Table 3 Association between resulting clusters and intention to quit the job (n = 568).

	Cluster (1): disengaged-underchallenged/ wornout n = 102	Cluster (2): lowly engaged-underchallenged/wornout n = 144	Cluster (3): highly engaged-high frenetic n = 54	Cluster (4): highly engaged-moderate frenetic n = 52	Cluster (5): moderately engaged-low burnout n = 216	
Intention to quit the job*						
No	n (%)	69 (68%)	74 (51%)	41 (76%)	50 (96%)	174 (80%)
	ar	-1.0	-6.3	0.7	4.1	3.6
Yes	n (%)	33 (32%)	70 (49%)	13 (24%)	2 (4%)	42 (20%)
	ar	1.0	6.3	-0.7	-4.1	-3.6

Note: n = subject frequency; % = percentage; ar = adjusted residuals.

* p < .001.

adaptive pattern of outcomes as indexed by the lowest scores of anxiety and depression, the highest levels of sleep quality, and highest inhibitory relationships to the intention of the quit their jobs as teachers. Similar results were found by Moeller et al. (2018), who showed that a group of employees, characterized by the highest levels of engagement and low burnout, displayed the highest positive emotions and skill acquisition at work, as well as the lowest negative emotions. Likewise, these findings are also in line with past research among teachers that adopts a variable-centered approach, showing that engagement at work is negatively related to anxiety, depression, sleeplessness, and motivation to quit the job (Garrick et al., 2014; Simbula et al., 2013; Skaalvik & Skaalvik, 2016; Trépanier et al., 2015). Interestingly, although also scoring high on engagement, the “highly engaged-high frenetic” group displayed a less adaptive pattern of outcomes than the “moderately engaged-low burnout” group. On average, this group even displayed the highest levels of anxiety. It seems that this group, while probably being described as a well-functioning group of teachers by principals and colleagues, suffers psychologically (i.e., in terms of anxiety and depression) and physically (i.e., in terms of sleep quality), in a similar manner to teachers who are lowly engaged and high on the underchallenged and wornout subtypes (i.e., “disengaged-underchallenged/wornout” group and “lowly engaged-underchallenged/wornout” group). Indeed, our findings are congruent with the study of Moeller et al. (2018), which showed that employees who combined high scores of engagement with high scores of burnout, experienced negative emotions at work, similarly to those employees who combined low scores of engagement with high scores of burnout. Returning to the current study, this is an important finding, as this group of teachers at risk may remain undiscovered due to their high engagement levels. These teachers who put tremendous effort into their work, to the extent of neglecting their own personal needs to avoid failure (i.e., frenetic burnout) and starting to suffer lack of professional recognition (i.e., wornout burnout), are at a high risk of suffering health problems even though they are still highly engaged in their profession.

Together with the “highly engaged-high frenetic” group, we found that the groups characterized by higher burnout levels (i.e., the “disengaged-underchallenged/wornout” group and the “lowly engaged-underchallenged/wornout” group) displayed a less optimal pattern of outcomes. In these three groups, more depression and lower sleep quality were noticed. These results suggest that experiencing any burnout subtype, whether it is wornout, underchallenged, or frenetic, could elicit depressive tendencies and relatively poor sleep quality (see Macias & Royuela, 1996), even when some burnout subtypes coexist with high levels of engagement (i.e., in the case of the “highly engaged-high frenetic” group). However, it is important to note that all resulting groups reported depression values of normality (ranges from 1 to 7; see Quintana et al., 2003). Although the three burnout subtypes were positively related to depression, burnout is an exclusive work-related outcome, whereas the nature of depression is multifactorial in origin, which could explain these results (Bakker et al., 2000). Regarding anxiety, the “lowly engaged-underchallenged/wornout” group and the “highly engaged-high frenetic” group reported significantly more anxiety than the “disengaged-underchallenged/wornout” group. In addition, both groups reported anxiety scores of above seven, indicating that these teachers are more nervous, worried, and distressed in their daily lives (see Quintana et al., 2003).

Interestingly, our results also seem to point out that it is more adaptive to be moderately engaged at work and relatively less frenetic (i.e., the “moderately engaged-low burnout” group) than to be (too) highly engaged and frenetic (i.e., the “highly engaged-moderate frenetic” group). There seems to be a threshold above which the combination of high engagement with frenetic burnout becomes a risk in terms of experienced negative psychological (i.e., anxiety and depression) and physical outcomes (i.e., sleep quality). This threshold might similarly be identified in the study of Moeller et al. (2018), where highly engaged-exhausted employees experienced higher negative

emotions than the moderately engaged-exhausted employees, despite the latter group reporting lower levels of engagement. Therefore, according to our results and in support of this potential threshold, a high frenetic burnout can act as a trampoline for developing underchallenged and wornout symptoms, triggering a full-burnout syndrome in the long run (Farber, 2000; Montero-Marín et al., 2009). Indeed, while the “lowly engaged-underchallenged/wornout” group intended to quit the job, this was not yet the case for the “highly engaged-high frenetic” group. According to Ryan et al. (2017), these results suggest that fully burnt-out teachers, in addition to harming the teaching quality and generating higher administrative health costs, could also yield an additional economic cost to the educational system when the intention to quit the job ends up becoming a real fact. Therefore, the early detection of possible teachers at this hypothetical threshold level (i.e., highly engaged-high frenetic), could be essential, not only to prevent them from continuing to suffer physically and psychologically, but also to prevent cases of totally burnt-out teachers and, consequently, to avoid unnecessary costs to education and health administrations.

4.3. Practical implications

Based on the present findings, we suggest that a specific evaluation of the different burnout subtypes in combination with engagement could shed light on how to design effective preventive strategies for risk profiles among teachers. According to the treatment strategies for the different types of teacher burnout proposed by Farber (1998, 2000) and the definition of work engagement (Schaufeli et al., 2002), some practical implications for teachers, but also for principals and the educational administration are proposed.

Frenetic teachers (e.g., teachers belonging to the “lowly engaged-underchallenged/wornout” group, the “highly engaged-high frenetic” group, and the “highly engaged-moderate frenetic” group) find it difficult to switch off from their work and they do not contemplate failure in any way (Farber, 1991, 2000). Firstly, it is important to note that highly frenetic levels in teachers may be hidden from the eyes of the environment, especially because they coexist with high levels of dedication (Montero-Marín et al., 2009). Yet, as the results of the present study show, these teachers may suffer psychologically and physically as if they were completely burnt out. As such, it is crucial for principals to be able to differentiate between teachers who are engaged and teachers who are not only highly engaged but also highly frenetic. An engaged teacher is not anxious, has good sleep quality, does not neglect his/her personal appearance or does not let go of personal relationships, while a frenetic teacher shows an opposite pattern (Farber, 2000; Montero-Marín et al., 2009). By being vigilant for these signals, principals could detect the coexistence of engagement and frenetic burnout, and take steps to reduce frenetic burnout. To illustrate this, delegating roles to other workmates could be an effective strategy to reduce the workload these teachers may suffer from (Farber, 1998). In addition, participation in activities that involve cooperation with significant others (i.e., family members, friends), such as physical activity, sports, dancing or family hiking trips, could reduce their frenetic levels (Brajša-Žganec, Merkaš, & Šverko, 2011; Naczenski, de Vries, van Hooff, & Kompier, 2017). Likewise, these teachers usually find it difficult to relax so they may also benefit from common stress-reduction techniques (e.g., meditation; Farber, 1998; Heckenberg, Eddy, Kent, & Wright, 2018). Further, cognitive therapies to help teachers accept early failures that are inherent to their work could also be useful for frenetic teachers (Iancu, Rusu, Măroiu, Păcurar, & Maricuțoiu, 2018). The educational administration and policy-makers should not only encourage teachers to participate in these types of therapies or techniques, but also, and insofar as this is possible, help towards teacher participation through economic funding.

Underchallenged and wornout teachers (e.g., teachers belonging to the “disengaged-underchallenged/wornout” group and the “lowly

engaged-underchallenged/wornout” group) feel that, given the work they put in, they are getting insufficient challenges from teaching, which likely undermines their self-esteem (Farber, 1991, 2000). Further, those teachers feel that several situations are out of control and that nothing they do is acknowledged by principals or educational administration (Farber, 2000; Montero-Marín et al., 2009). Therefore, principals could provide new challenges at work and improve teachers' self-esteem by providing more academic freedom in teaching, listening to their problems, and supporting curricular and extracurricular activities that are more challenging for them (Farber, 1998). In addition, involving teachers in interdisciplinary projects with teachers of other subjects could provide new challenges to combat their work routine (Farber, 1998). Offering courses funded by the educational administration to improve professional development, and their perceived competence and self-efficacy, could also help teachers to better manage some situations at work (Rothmann & Fouché, 2018). These types of teachers tend to minimize successes and perceive the future even worse than the present. Keeping a diary of successes and pleasant work experiences (e.g., with colleagues, families or students) may be useful, to remind teachers of all positive activities of their work on a daily basis (Farber, 1998). Importantly, the burnout subtypes of underchallenged and wornout, which often coexist to the same extent, seem to show a stable opposing pattern regarding teacher engagement. Thus, strategies focused on improving engagement could also be effective for these referred profiles. To illustrate this, the educational administration could play an important role in providing higher quality resources in classrooms to stimulate and facilitate teaching tasks (Knight, Patterson, & Dawson, 2017). Further, reducing some non-teaching tasks - if it is possible - that are negatively related to engagement, such as the excessive demands of the educational administration in terms of filling in bureaucratic documents, could have a positive impact on teacher engagement (Rothmann & Fouché, 2018; Skaalvik & Skaalvik, 2018).

These are just some suggested strategies that could improve teachers' psychological outcomes. Most importantly, these strategies are not mutually exclusive, and depending on the diagnosed profile for each teacher, greater efforts may be put into one strategy or another.

4.4. Limitations and future directions

There are several limitations to the present study that demand further study. First, this study has been carried out using a burnout conceptualization that has been less explored to date, while most previous studies have relied on Maslach's definition. This must be considered when interpreting and generalizing the results of this study. In addition, the present study relied on the cluster analysis method, which has been considered appropriate for research with exploratory features (Eshghi, Haughton, Legrand, Skaletsky, & Woolford, 2011; Stanley, Kellermanns, & Zellweger, 2017). However, future person-centered research should refute current results using statistical methods capable of providing more robust evidence such as latent profile analysis. Second, this study was conducted on a sample of teachers, which limits the generalizability of the findings to other working populations. Future studies should examine if the three Farber burnout subtypes and engagement also coexist in other occupations. Third, results of the current study are based on cross-sectional data, precluding causal effect conclusions. Also, while we considered engagement and the three burnout subtypes (i.e., frenetic, underchallenged, and wornout) as predictors of teachers' psychological outcomes, some of the outcomes studied could also impact on the scores of these factors. Future longitudinal studies are needed to shed light on the direction of the relationships studied. Further, in a study adopting a longitudinal design we could study whether teachers shift from one group to another, before eventually dropping out from teaching. Fourth, the low response rate (i.e., 10%) can introduce bias, limiting the generalizability of the results. The moment when information was collected (i.e., the last term of the academic year), when teachers usually experience higher workload,

could lead to a sample composed of the most engaged and/or the least burnt-out, which may affect the variables assessed. Consequently, results should be interpreted with caution. To overcome these limitations, future research should take these factors into account and obtain a more representative sample that allows expanding and verifying these contributions. Fifth, sleep quality was measured with a single item that might be considered a bit too general. Therefore, in the present study the reliability of this single item could not be examined, so results have to be interpreted cautiously. Future studies could refine this measure including other indicators of sleep quality such as, for instance, sleep maintenance problems, sleep onset problems, and non-restorative sleep (e.g., Gluschkoff et al., 2016; Önder, Beşoluk, İskender, Masal, & Demirhan, 2014). This would also allow examining the reliability of the scale used. Similar guidelines should be considered to measure intention to quit the job. Future studies should not only measure this variable in a dichotomous way (i.e., yes or no) but also consider the intensity of this thought occurring (e.g., by using a Likert scale ranging from “never” to “I'm actively looking for a new job”; see Bothma & Roodt, 2013). Finally, in the current study most of the outcomes studied were theoretically negative (with the only exception of sleep quality). Further, all the outcomes studied were related to teacher functioning. Examining links between burnout-engagement profiles and other behavioral outcomes such as teachers' interpersonal styles (e.g., Abós et al., 2018) or students' achievement (e.g., Collie & Martin, 2017) could be a new and interesting avenue of research. Moreover, intervention programs aimed at applying specific preventive strategies regarding the different levels of burnout subtypes and engagement experienced by teachers are required.

5. Conclusion

Using a person-centered approach, this study provided new evidence and a more refined insight into the question of whether the three Farber burnout subtypes and engagement represent endpoints of the same continuum or co-exist in teachers, instead. First, five distinct profiles were identified, showing the co-occurrence of frenetic burnout and engagement in three of those profiles. These findings, therefore, suggest that burnout and work engagement do not represent two perfect ends of the same continuum. Second, the groups characterized by moderate to high engagement showed the most adaptive psychological functioning patterns, whereas the opposite was true for the groups characterized by high feelings of underchallenged and wornout burnout. Yet, there seems to be a risk threshold for teachers when feelings of engagement are overcome by feelings of frenetic burnout. So, in the long run, moderate levels of engagement could be more adaptive compared to high levels of engagement combined with moderate levels of frenetic burnout.

Conflict of interest

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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5.3. CAPÍTULO III: Diseño, desarrollo y evaluación de un programa de intervención de actividad física para mejorar el funcionamiento psicológico del profesorado

5.3.1. Estudio 7: Improving teachers' work-related outcomes through a group-based physical activity intervention during leisure-time

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Improving teachers' work-related outcomes through a group-based physical activity intervention during leisure-time

Abstract

Grounded in self-determination theory, this study examines the effects of a leisure-time physical activity (LTPA) intervention with work colleagues on work-related outcomes of relatedness satisfaction, engagement factors, satisfaction, and burnout subtypes. Fifty-seven teachers ($M_{age}=46.81\pm7.90$), from two secondary schools randomized as an experimental (n=22) or control (n=35) group, participated in the study. Thirty-two sessions based on playful, strength, aerobic, and back pain prevention activities were performed two days per week throughout one academic year. The experimental group teachers reported significant improvements in relatedness satisfaction, vigor, absorption, and satisfaction at work compared to the control group teachers and their own baseline scores. Results highlight that two weekly sessions of LTPA with work colleagues can lead to positive work-related outcomes among teachers.

Keywords: teachers, leisure-time physical activity, intervention, relatedness satisfaction, engagement, burnout.

Introduction

A high prevalence rate of burnout among secondary school teachers has been shown in a recent systematic-review (García-Carmona, Marín, & Aguayo, 2018). Teacher stress and burnout may have devastating outcomes on their health and quality of life (e.g., anxiety, depression, sleep problems; Skaalvik & Skaalvik, 2016; Yu, Wang, Zhai, Dai, & Yang, 2015), but they also have high organizational and interpersonal costs for schools and administrations (e.g., sickness absence, conflicts among colleagues; Rabasa, Figueiredo-Ferraz, Gil-Monte, & Llorca-Pellicer, 2016; Skaalvik & Skaalvik, 2016), as well as a negative impact on students' quality of education (e.g., low motivation and academic achievement; Klusmann, Richter, & Lüdtke, 2016). These stressful working conditions have also negatively affected teachers' satisfaction and engagement at work (Skaalvik & Skaalvik, 2015, 2016). Recent research shows that secondary school teachers' job satisfaction has plummeted since the beginning of the 21st century (Anaya & López, 2014). Due to the serious consequences and very high

costs (i.e., at individual, interpersonal and organizational levels) of work-related burnout, and the decreasing satisfaction and engagement in teachers, there is an urgent need for effective solutions.

Different types of burnout interventions (i.e., cognitive behavioral, mindfulness/meditation, professional development, psychoeducational, social support, and socio-emotional skills) have reported small, but statistically significant positive effects on reducing burnout among teachers (Iancu, Rusu, Măroiu, Păcurar, & Maricuțoiu, 2018). Likewise, various types of work-engagement interventions (i.e., personal/job resource building, leadership training, and health promotion) seem to show small, but significantly positive effects on increasing employees' engagement (Knight, Patterson, & Dawson, 2017). Alternatively, a body of research evidences that teachers' health- and work-related problems may be prevented through leisure activities (Brajša-Žganec, Merkaš, & Šverko, 2011), especially by participating in regular physical activity (PA) (Bogaert, De Martelaer, Deforche, Clarys, & Zinzen, 2014). Recent studies with employees have shown that both group-based PA (i.e., that takes place with other colleagues) and leisure-time PA (LTPA) (i.e., that takes place during non-working hours) may induce physical and psychological benefits (Andersen et al., 2015; White et al., 2017). The current study adds to this emerging body of literature by investigating the possible effects that a LTPA intervention with work colleagues may have on a set of teachers' work-related outcomes (i.e., relatedness satisfaction, engagement factors, job satisfaction, and burnout subtypes); a topic that no study has addressed in this field to date.

Physical activity and work-related outcomes

PA, which is defined as “any bodily movement produced by skeletal muscles that results in energy expenditure” (Caspersen, Powell, & Christenson, 1985, p. 126), may encompass physical exercise, sports, as well as physical activities as part of daily living (e.g., active commuting), including, therefore, both worksite PA (i.e., that takes place during people's working hours and inside the workplace) and LTPA (Powell, Paluch, & Blair, 2011). Although the overall benefits of regular PA on physical, social, and psychological health have been widely proven (e.g., Eime, Young, Harvey, Charity, & Payne, 2013), only a small percentage of teachers met moderate-to-vigorous PA recommendations (Nikolovski & Sarić-Tanasković, 2006; Webber et al., 2012). With

regard to work-related outcomes, over the last decades several mechanisms have been suggested to explain how regular PA participation affects employees' psychological functioning (Naczenski, de Vries, van Hooff, & Kompier, 2017). However, the underlying mechanisms of this association have not been fully elucidated yet (Ginoux, Isoard-gauthier, & Sarrazin, 2019). A combination of physical, social, and physiological mechanisms may offer preliminary support to understand this proposed association.

The physical health benefits of PA, such as a lower risk of metabolic syndrome, musculoskeletal complaints, diabetes mellitus, and different types of cancer, have been well-established (Moore et al., 2016; Pedersen & Saltin, 2015). It thus seems logical to assume that regular PA participation can also benefit work-related parameters in a roundabout way, via increasing employees' physical health (Sui, Smith, Fagan, Rollo, & Prapavessis, 2019). In support of this agreement, two recent studies have shown that installing bike desks in the office for a 5-month period positively influences employees' work engagement, attention, and motivation, by improving employees' physical health indicators (Torbeyns et al., 2016; Torbeyns, de Geus, Bailey, Decroix, & Meusen, 2017). In addition, literature reviews and longitudinal studies have found consistent associations between physical health, lower levels of work absenteeism (e.g., Darr & Johns, 2008), and burnout among employees (e.g., Kim, Ji, & Kao, 2011).

The social health benefits from PA such as the development of a social network and improved social skills is also well-documented. Regular PA may strengthen employees' relatedness and social support through various mechanisms. A wide variety of different types of PA and sports are often performed with others (White et al., 2017). According to the social interaction hypothesis, the social relationships and social support that emerge among those who take part in regular group-based PA activities may help to deal with physical and mental health problems (Ransford, 1982; Teychenne, Ball, & Salmon, 2008) by creating broader social networks, avoiding feelings of loneliness, as well as increasing personal resources such as self-esteem (Pels & Kleinert, 2016). Within the work-context, group-based PA participation with work colleagues can provide a large number of opportunities for social interactions (Bruton, Vurnakes, Martin, Perry, & Henderson, 2012). A sense of belonging and warm relationships with work colleagues in group-based PA sessions may, consequently, be effective in improving relatedness satisfaction among teachers at

work (Andersen et al., 2015; Arroggi, Schotte, Bogaerts, Boen, & Seghers, 2017). In parallel, a growing body of research based on the self-determination theory (SDT; Deci & Ryan, 1985; Ryan & Deci, 2017), has widely shown how these warm interpersonal relationships with work colleagues at work can facilitate positive work-related outcomes (i.e., engagement, job satisfaction) and even conceal burnout feelings (e.g., Abós, Haerens, Sevil, Aelterman, & García-González, 2018; Abós, Sevil, Julián, Martín-Albo, & García-González, 2018). To illustrate, a friendly working environment (i.e., by increasing teachers' interpersonal relationships) could improve confidence among teachers and facilitate collaboration among them (e.g., interdisciplinary projects).

As regards physiological mechanisms, empirical research has evidenced that psychological stress at work might be managed through regular PA (Klaperski, von Dawans, Heinrichs, & Fuchs, 2014). The cross-stressor adaptation hypothesis is one of the most accepted mechanisms to explain this association (see Sothman, 2006). According to this mechanism, regular PA leads to biological adaptations (e.g., influencing individual's sedation patterns, decreasing hormone production, and lowering blood pressure), which decrease physiological responses, not only to PA-related stressors but also to stressors in general, including job stressors (Klaperski, von Dawans, Heinrichs, & Fuchs, 2013; Sothman, 2006). Given that empirical research shows that fast recovery from stress prevents numerous health-related problems (Chrousos, 2009), a cross-stressor adaptation by participating in PA is considered a central health-protective mechanism. Interestingly, this buffering and correct adaptation to stress has been pivotal to prevent burnout experiences and intention to quit the job in teachers, as well as to benefit their engagement at work (Gluschkoff et al., 2016; Skaalvik & Skaalvik, 2016). Moreover, regular PA may induce changes in several neurotransmitters and neuromodulators such as noradrenaline, dopamine, and serotonin (5-HT), resulting in the reduction of burnout levels, better mood, and an increase of energy (Schuch et al., 2016). Similarly, a wide range of studies based on job-stress recovery processes (e.g., Feuerhahn, Sonnentag, & Woll, 2014; Sonnentag, Venz, & Casper, 2017) point to off-job PA as a key factor to inhibit work stress, replenish depleted resources, and optimize work engagement levels.

Group-based physical activity

Despite the aforementioned overall benefits of PA in work-related outcomes (e.g., Naczenski et al., 2017; Stults-Kolehmainen & Sinha, 2014), a recent body of research additionally suggests that regular PA participation with work colleagues may also be associated with additional social and psychological health benefits among employees (e.g., Jakobsen, Sundstrup, Brandt, & Andersen, 2017; White et al., 2017). Several group-based PA interventions at worksites have shown improvements, not only in PA levels but also in relatedness satisfaction in LTPA (Harden et al., 2015) and in their work (Andersen et al., 2015; Bruton et al., 2012). For example, in a group-based PA intervention at a worksite conducted by Podlog & Dionigi (2009), several employees manifested the friendship and camaraderie that they experienced with their work colleagues. Likewise, Andersen et al. (2015) and Bruton et al. (2012) reported the benefits of a group-based PA intervention at the workplace for enhancing worksite social capital, integration, and interpersonal interactions among employees. A possible mechanism could be explained by the social interaction hypothesis (Ransford, 1982; Teychenne et al., 2008; White et al., 2017), which suggests that participating in PA with other people may generate psychosocial benefits. To date, however, there are no studies in teachers that have assessed the impact of conducting a group-based PA intervention during LTPA with work colleagues.

Leisure-time physical activity among teachers

Systematic reviews and longitudinal studies have widely shown that employees may improve work-related outcomes, such as reducing burnout or increasing work engagement by taking part in any form of PA interventions, both at the worksite (Abdin, Welch, Byron-daniel, & Meyrick, 2018; Naczenski et al., 2017) and in their leisure-time (Abu-Omar & Rütten, 2008; Bernaards et al., 2006; White et al., 2017).

Within the teaching field, recent research has suggested that PA interventions during working hours are not feasible for most secondary school teachers (Bogaert, De Martelaer, Deforche, Clarys, & Zinzen, 2015). A mixed-method study among secondary school teachers, conducted by Boagert et al. (2015), concluded that individual job-related responsibilities (e.g., teaching, preparing lessons, meetings with parents), organizational barriers (e.g., few free hours and different teaching schedules among teachers), as well as a lack of resources and sports facilities (e.g., sharing sport facilities

with Physical Education teachers or other schools), make it difficult to implement PA interventions during school hours. Given that both worksite PA interventions and LTPA interventions have proven to be effective to improve work-related outcomes (e.g., Abdin et al., 2018; Benaards et al., 2006; White et al., 2017), and taking into account teachers' working conditions, particularly in Spanish schools¹, promoting LTPA interventions seems to be the most feasible choice (Bogaert et al., 2014, 2015). For example, Bogaert et al. (2014) found that participating in LTPA was significantly and positively related to perceived physical and mental health, job satisfaction, and negatively related to stress and absenteeism in secondary school teachers. Likewise, a significantly negative relationship between LTPA and burnout in childcare teachers was found in another study (Carson, Baumgartner, Matthews, & Tsouloupas, 2010). Yet, it seems important to note that despite these preliminary and correlational findings among teachers, to the best of our knowledge, there are no studies that have examined the effectiveness of LTPA interventions with work colleagues on teachers' work-related outcomes. Hence, designing, developing, and assessing LTPA interventions among teachers seems necessary.

Theory-driven physical activity interventions

According to the most recent Special Eurobarometer (2018), one of the main perceived barriers to PA in adults is lack of motivation. To overcome barriers to PA, it therefore seems justified to design theory-driven interventions to engage teachers and maintain the beneficial effects of PA over time (Prestwich et al., 2014). One of the most widely-used theoretical frameworks to explain human behavior is SDT, which offers individuals support for them to develop more autonomous and internalized forms of motivation (Deci & Ryan, 1985; Ryan & Deci, 2017). SDT has been used to guide interventions in many and varied contexts, including PA settings (Fortier, Duda, Guerin, & Teixeira, 2012). These SDT-based interventions facilitate and maintain PA behavior change by satisfying the three basic psychological needs (i.e., autonomy, competence, and relatedness) through the creation of a need-supportive environment (e.g., Kwasnicka, Dombrowski, White, & Sniehotta, 2016; Rodrigues et al., 2018).

¹ In Spain, secondary school teachers have to work at school for at least 25 hours per week (i.e., 5 to 6 hours per day, with a short break of 25 to 30 minutes). Of those 25 hours, they are teaching for approximately 20 hours. The rest of the hours are spent carrying out other school tasks, such as department meetings, teacher/tutor meetings, commissions, interviews with parents, library services, among others. In addition, during these hours, teachers have to prepare their lessons, evaluate exams and student work, as well as prepare and adapt materials for their students, among other tasks.

Autonomy refers to individuals' needs to feel volitional in self-regulated decisions (Ryan & Deci, 2017). To illustrate this, autonomy support for PA may be provided to teachers by encouraging them to participate in LTPA, listening and attending to their interests and preferences, or providing them with health literacy information related to PA benefits. Competence refers to individuals' needs to feel effective and capable of achieving desired outcomes (Ryan & Deci, 2017). For instance, teachers may receive competence support for PA by providing positive and constructive feedback after, during and before the activity sessions, providing achievable goals and progressive challenges with increasing difficulty. Lastly, relatedness refers to individuals' needs to feel mutually connected to significant others and experience warm interpersonal relationships (Sparks, Lonsdale, Dimmock, & Jackson, 2017). To illustrate this, teachers may receive relatedness support for PA by establishing a respectful and comfortable environment, offering multiple opportunities to improve their interpersonal relationships, participating in PA in different groups and with different work colleagues, or performing activities or tasks with a one-point solution (e.g., cooperative games). Importantly, recent empirical evidence in the PA domain has shown an association between a relatedness-supportive environment and relatedness need satisfaction (Sparks et al., 2017). Grounded in SDT, therefore, improvements in the need for relatedness at work in teachers could also trigger benefits in terms of work-related outcomes (e.g., Abós, Sevil, Julián, et al., 2018). Based on the abovementioned advantages of LTPA participation among teachers, motivational theories such as SDT seem essential to guide LTPA interventions and facilitate long-term maintenance of PA.

Study aim and hypothesis

Although previous cross-sectional studies have suggested the benefits of PA participation with work colleagues (Jakobsen et al., 2017; White et al., 2017), and during leisure-time with teachers (Bogaert et al., 2014, 2015), to date, no intervention studies have examined its effects on work-related outcomes in one of the most stressful social professions, such as teaching (García-Carmona et al., 2018). To fill this gap, the present study aims to assess the effectiveness of a LTPA intervention with work colleagues on teachers' work-related outcomes. It was hypothesized that, compared to the control group and baseline values, the intervention group would show improvements in relatedness satisfaction at work, work engagement factors, job satisfaction, and burnout subtypes at work.

Methods

Design, participants, and procedure

A quasi-experimental design was carried out on a convenience sample of teachers from two public secondary schools in Huesca (Aragon, Spain). Both schools were similar in terms of school community size, class sample size, school schedules, and facilities. As observed in Figure 1, all secondary school teachers ($n=226$) from the two schools were invited to voluntarily participate in the study. One school was randomly assigned to the experimental condition. Initially, a sample of 106 secondary school teachers (58 from the experimental group and 48 from the control group) decided to participate in the study. After applying the inclusion criteria (i.e., attending more than one session in the experimental group and completing all the questionnaires in the pre-test and post-test measurements in both groups), a final sample of 57 secondary school teachers ($M_{age}=46.81\pm 7.90$) participated in this study: the experimental group comprised 22 ($M_{age}=47.73\pm 7.98$; 100% females), while the control group comprised 35 ($M_{age}=45.89\pm 7.82$; 43% females). Further information on the sociodemographic characteristics and differences between the experimental and the control groups is provided in Table 1.

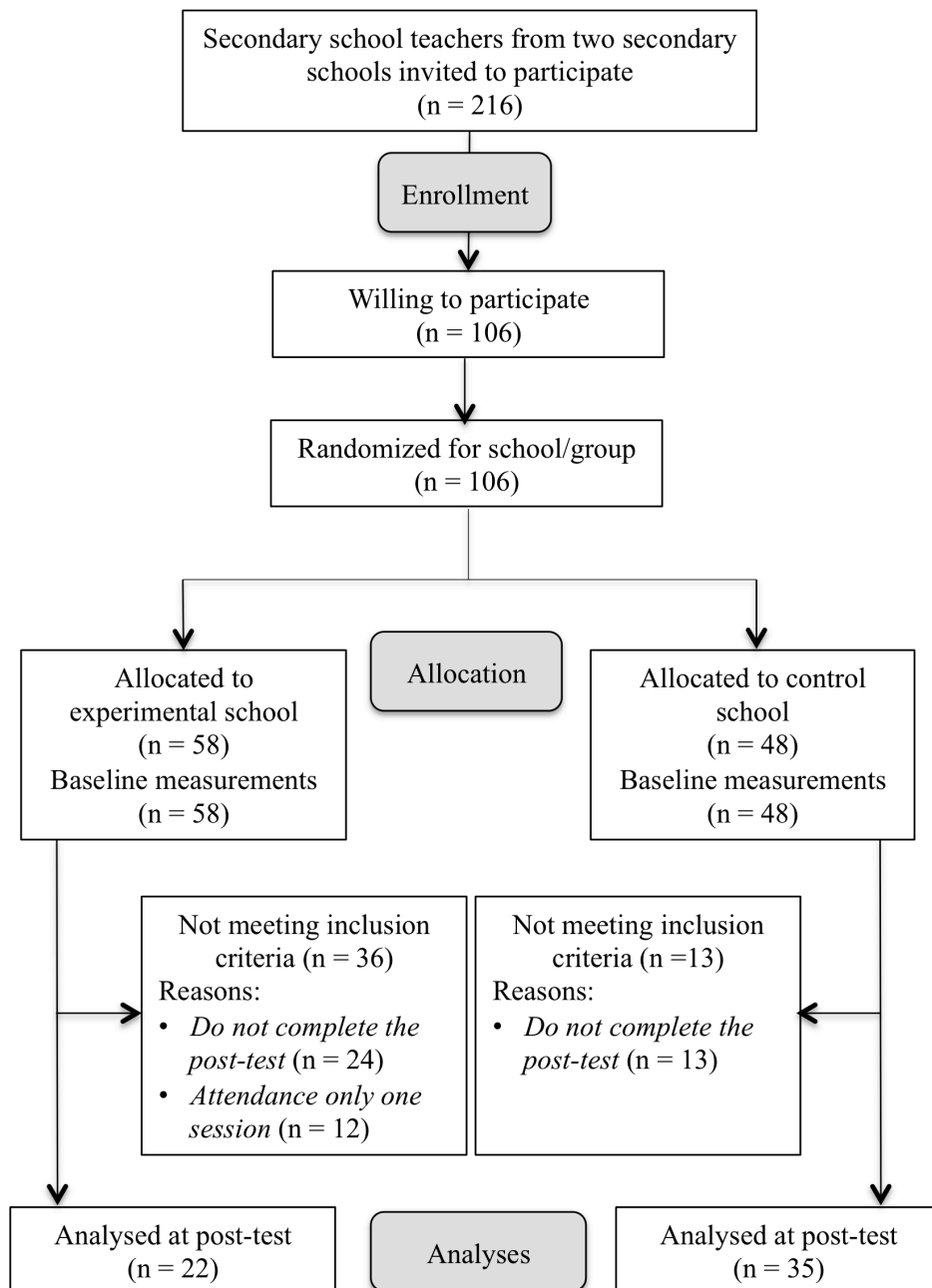
Table 1. Differences in baseline sociodemographic characteristics between teachers in the experimental group and teachers in the control group.

	Experimental group ($n=22$)	Control group ($n=35$)	t or χ^2 value
Age, mean (SD)	47.73 (7.98)	45.89 (7.82)	0.85
Gender, % female	100%	43%	19.36*
Living situation, % living with a partner	77%	77%	0.00
Number of children, mean (SD)	1.36 (1.21)	1.06 (1.05)	1.00
Teaching experience, years (SD)	19.73 (10.01)	18.54 (9.71)	0.43
Current school, years (SD)	5.50 (6.96)	6.51 (8.43)	0.47
Type of contract, % permanent	77%	80%	0.13
Working day, % full-time work	95%	86%	1.36

Note: SD = standard deviation; * $p < .001$.

The intervention lasted from November to June (eight months). Prior to the research, all teachers were informed about the nature of the study, requirements, and benefits of participating. Further, before starting the group-based PA intervention, participants were informed that their anonymity would be preserved in the data collection process and in the future scientific dissemination of the study. During the week prior to the start of the intervention (i.e., November), a pre-test assessment was

conducted for all teachers. The post-intervention testing was carried out one week after the intervention program ended (i.e., June). Data collection took place at each school (i.e., experimental and control groups) and questionnaires were administered in paper-and-pencil format. Teachers had five weekdays to complete the questionnaire and deposit it in a mailbox located in the staffroom of each school. The study protocol was approved by the Ethics Committee for Clinical Research of Aragon (CEICA) and the Educational Services of the Government of Aragon.



Measures

Sociodemographic characteristics. Teachers' sociodemographic details in terms of age, gender, living situation, number of children, type of contract, full- or part-time work, years of teaching experience, and years at current school, were measured.

Relatedness satisfaction at work. Teachers' relatedness satisfaction at work was measured using the four items corresponding to the relatedness satisfaction factor (e.g., “When I am with the people from my work environment, I feel understood”) from the Spanish version of the Basic Psychological Needs at Work Scale (BPNWS-Sp; Abós, Sevil, Julián, et al., 2018). Teachers' responses were registered on a 6-point Likert scale ranging from 1 (“strongly disagree”) to 6 (“strongly agree”). In the present study, the Cronbach alphas, both in the pre- and post-test for relatedness satisfaction, were .88 and .93, respectively.

Work engagement. Teachers' work engagement was measured using the Spanish version of the Utrecht Work Engagement Scale (UWES; Schaufeli, Martinez, Marques-Pinto, Salanova, & Bakker, 2002). This scale includes 17 items that evaluate vigor (six items; e.g., “At my work, I feel bursting with energy”), dedication (five items; e.g., “I find the work that I do is full of meaning and purpose”), and absorption (six items; e.g., “I am immersed in my work”). The items were registered on a 7-point Likert scale ranging from 0 (“never”) to 6 (“always”). This questionnaire has shown adequate psychometric properties in previous research with teachers (e.g., Høigaard, Giske, & Sundsli, 2012). In the present study, the Cronbach alphas both in the pre- and post-test, for vigor, dedication, and absorption, were .86/.92, .89/.91, and .73/.86, respectively.

Job satisfaction. Teachers' job satisfaction was measured using a Spanish translation of the Teacher Job Satisfaction Scale (TJSS; Skaalvik & Skaalvik, 2011). This four-item scale includes one single factor (e.g., “I look forward to going to school every day”). This scale was translated from English to Spanish following the guidelines of the International Test Commission (Muñiz, Elosua, & Hambleton, 2013). Teachers' responses were registered on a 6-point Likert scale from 1 (“strongly disagree”) to 6 (“strongly agree”). This scale has shown adequate psychometric properties in past research with teachers (e.g., Skaalvik & Skaalvik, 2014). In the current study, the

Cronbach alphas, both in the pre- and post-test for job satisfaction, were .88 and .86, respectively.

Burnout at work subtypes. Teacher burnout subtypes were measured using the Spanish short-version of the Burnout Clinical Subtype Questionnaire (BCSQ-12; Montero-Marín, Skapinakis, Araya, Gili, & García-Campayo, 2011). This scale consists of 12 items (four items per factor) assessing respondents' overload (e.g., “I overlook my own needs to fulfil work demands”), lack of development (e.g., “My work doesn't offer me opportunities to develop my abilities”), and neglect (e.g., “I give up in response to difficulties in my work”). Teachers' responses were provided on a 7-point Likert scale ranging from 1 (“strongly disagree”) to 7 (“strongly agree”). This scale has shown adequate psychometric properties in previous research with teachers (e.g., Abós, Sevil, Martín-Albo, Julián, & García-González, 2018). In the current study, the Cronbach alphas, both in the pre- and post-test for overload, lack of development, and neglect were .89/.91, .84/.86, and .86/.95, respectively.

Intervention program

The present group-based intervention with work colleagues comprised 32 sessions of LTPA consisting of a combination of 10 cooperative and playful sessions (31%), 11 strength sessions (34%), seven aerobic sessions (22%), and four back pain prevention sessions (13%), held from November to June. This intervention was exclusively offered to the teachers from the experimental group; the control group did not receive any PA intervention. Prior to the start of the intervention, experimental group teachers were informed at a meeting about the benefits and risks of inactivity with the aim of encouraging teachers to participate in the PA program. Given the efficacy demonstrated by playful, strength, and aerobic activities in previous PA interventions among employees (e.g., Bruton et al., 2012; Gerber et al., 2013), the initial design of this LTPA intervention aimed to develop these three types of sessions. However, other aspects such as total number of sessions, weekly frequency of sessions, or the schedule of the sessions were not decided before the program began. With the intention of providing autonomy, the aim was for teachers to gradually decide about these nuances based on their interests, preferences, and availability. Likewise, the possibility of adding new PA content was progressively offered. To illustrate, as a consequence of back pain experienced at work by some teachers, four back pain prevention sessions were also held at the end of the intervention. In short, after a first

welcome session, the early sessions were generally based on cooperative and playful games with the aim of creating a friendly and trusting environment among participants. Then, during the winter months (i.e., December to February), these cooperative and playful sessions were combined with strength sessions because both were carried out indoors. Next, strength sessions, held outdoors, during the spring months (i.e., March to May), began to be combined with aerobic sessions. Finally, four back pain prevention sessions were performed during the last two months of the intervention (i.e., May and June). At the end of each session, benefits of different types of PA were usually discussed with the aim of encouraging and empowering teachers to keep up PA on a regular basis and to achieve a more active lifestyle. All sessions were conducted under the supervision of a PA and Sport Sciences graduate and were commonly held twice per week for one hour (on Tuesday and Thursday) during teachers' leisure-time (5 PM to 6 PM). Both the days and the session schedules were decided and agreed by the majority of the participants during the first session. Importantly, the intervention program was interrupted during Christmas and Easter vacation. Further details on the description of the activities of each type of session, timing, place, and main aim are reported in Table 2.

Given that SDT has widely demonstrated that a need-supportive environment may have the potential to initiate and maintain PA behavior (Kwasnicka et al., 2016; Rodrigues et al., 2018), the intervention was also designed to provide the experimental group teachers with autonomy, competence, and relatedness support for PA. The aim of developing this need-supportive environment was to satisfy BPNs (i.e., autonomy, competence, and relatedness) in order to improve teachers' rate of adherence to PA intervention. These need-supportive strategies were designed and implemented by the PA and Sport Sciences graduate with the supervision of a research team. Although this person was also an expert in the SDT framework and had previously carried out different SDT-based PA interventions, the need-supportive strategies were co-developed and co-supervised by the research team during each PA session in order to ensure their implementation. The main strategies used to create a need-supportive environment through the 32 PA sessions are reported in Table 3.

Table 2. Timing, aims, description, places, and additional details about the four different types of PA sessions performed in the intervention.

Type and timing	Main aim(s)	Structure and description	Other details	Place(s)
Cooperative and playful sessions (1, 2, 3, 4, 5, 6, 9, 11, 13, and 17)	To create a friendly environment by using cooperative games.	The structure of the cooperative and playful sessions was as follows: warm-up, main part, and cool-down. Before starting each session, the objectives and tasks established were briefly explained. The warm-up always consisted of joint mobility exercises that were carried out individually or in pairs. The main part consisted of cooperative games or tasks with all teachers having to reach a common goal through shared decisions and collaboration. For example, among all the teachers, they tried to keep a ball in the air for as long as possible without dropping it, by hitting the ball with any part of the body. The cooperative and playful sessions ended with the teachers carrying out static and dynamic stretching exercises, and a brief summary, pooling their thoughts, discussing contents and defining the activities and goals of the following sessions.	Material, groupings, and tasks varied in each session. Each session had at least two different cooperative games. All sessions were accompanied with music.	Indoor: school sports facilities.
Strength sessions (7, 8, 10, 12, 14, 15*, 16, 20, 22, 24*, and 30)	To increase the teachers' muscle tone through circuit strength training.	The structure of the strength sessions was as follows: warm-up, main part, and cool-down. Before starting each session, the goals and exercises to be carried out were briefly explained. Exercises, series, and repetitions were explained using a chalkboard. The warm-up usually consisted of joint mobility exercises that were performed individually or in pairs. The main part of the session was characterized by circuit strength training consisting of at least 10 tasks that combined core stability, and lower and upper limb strength exercises. Further, low-intensity jogging and running exercises were included among the strength exercises. All the exercises were usually carried out in pairs or in small groups (i.e., three or four teachers), but never alone. Finally, teachers did static and dynamic stretching exercises, and then pooled their thoughts, discussing contents and characteristics for the following sessions.	Strength exercises and materials were varied in each session. All sessions were accompanied with music.	Indoor: school and university (fitness room*) sports facilities.
Aerobic sessions (18, 19, 21, 23, 26*, 27*, and 32)	To improve the teachers' aerobic endurance through trekking and indoor cycling sessions.	The aerobic sessions consisted of trekking in the area around Huesca. The walking intensity was low to moderate, meaning that participants could talk while walking. The distance and intensity increased slightly with each session. Further, two indoor-cycling sessions were conducted with the same intensity as the trekking sessions. At the end of the	Trekking activities were carried out along different routes. The indoor-cycling sessions were accompanied with music.	Outdoor-Indoor: City of Huesca surroundings and university facilities.

<p>Back pain prevention sessions (25^{**}, 28^{**}, 29^{**}, and 31^{***})</p>	<p>To prevent teachers' injuries and backaches.</p>	<p>sessions, teachers did static and dynamic stretching exercises in groups, and discussed the exercises and goals for the following sessions.</p> <p>The healthy back sessions were structured as follows. Before starting, the aims and exercises to be carried out were briefly explained. The first three sessions were conducted in a tatami room and consisted of exercises without material and/or with simple materials (e.g., balloons, fitball, bosu-ball, etc.). The fourth session was carry out in an indoor heated swimming pool and consisted of aquatic exercises aimed at preventing back pain using swimming materials (e.g., pull buoy, kickboard, pool noodles, etc.). Basic swimming skills were needed to participate in this session. At the end of each session the contents of the following sessions were discussed together.</p>	<p>(fitness room[*]) sports facilities.</p>
		<p>Sessions held in the tatami room were accompanied by relaxing music.</p>	<p>Indoor: university (tatami room^{**}) sports facilities and heated swimming pool^{***}.</p>
		<p>The entrance ticket to the indoor heated swimming pool was paid voluntarily by the participants.</p>	

Table 3. Mapping of BPN support-based strategies for PA applied to the experimental group teachers.

Autonomy-supportive strategies for PA

- Teachers were informed about the session goals and activities.
- Teachers were involved in the choice of activities and type of sessions (e.g., back pain prevention sessions), type of music during the PA sessions (e.g., relaxation), and when (i.e., day and schedule) and where (e.g., teachers decided which routes they took for the trekking exercise) to participate in PA sessions, based on their interests and motivations.
- Teachers were encouraged and empowered to do autonomous PA, based on information about PA-friendly environments of the city of Huesca and surroundings (e.g., cycling and trekking routes, city parks), materials and resources (e.g., back pain prevention exercises, a list of swimming pool exercises), as well as awareness of types and intensities of PA (light, moderate, and vigorous) and its benefits.
- Teachers were encouraged to participate in exercise events (e.g., trekking, amateur running, cycling routes) carried out in the city of Huesca (Spain) throughout the PA intervention.

Competence-supportive strategies for PA

- Teachers tried out a wide variety of new activities and materials.
- At least two different exercises were carried out in each session (with the only exception of the trekking and indoor cycling sessions), and multiple opportunities were offered to achieve success.
- Teachers received positive and constructive feedback before, during, and after PA sessions.
- The aims of the PA exercises were both individual or group (i.e., offering challenges).
- The goals and exercises throughout the PA intervention went progressively from simple to more complex.
- Individual challenges were designed to participate in exercise events held in Huesca and surroundings (e.g., participating and finishing an amateur race)

Relatedness-supportive strategies for PA

- The focus was on establishing a respectful and comfortable environment where teachers could improve their integration, collaboration, and interpersonal relationships.
- Teachers interacted in different types of grouping (i.e., individual, small groups, and large groups) and with work colleagues from the same school during the PA intervention program.
- Decisions about the intervention program, for example, schedules, types of sessions or different places to participate in PA were discussed in groups.
- Some intervention sessions were focused on cooperative games and teamwork activities with a one-point solution for all teachers.
- The PA professional was empathetic, friendly, a good listener, patient, good humored, and trustworthy during the PA sessions.

Data analysis

Levene and Shapiro-Wilk tests were performed to confirm the assumptions of homogeneity of variances and normality of distribution, respectively ($p > .050$). Descriptive statistics (i.e., mean and standard deviation) were calculated for all study variables, and Cronbach's alpha coefficient was conducted to assess the scale reliability. Further, baseline differences in sociodemographic characteristics between the experimental group and the control group were assessed by conducting chi-square tests (for categorical variables) and independent samples t-tests (for continuous variables). Likewise, baseline differences in dependent variables between genders were assessed by conducting two multivariate analyses of variance (MANOVA). The first one was performed with the final study sample (i.e., $n=57$; 22 from the experimental group and 35 [15 females] from the control group), whereas the second one was conducted using

only the sample of experimental school teachers at baseline (i.e., 58; 42 females and 16 males). In addition, a third MANOVA was carried out to analyze possible differences in dependent variables between teachers participating in the intervention (i.e., n=22) and those who were subsequently excluded from the intervention group (i.e., n=36). A partial correlation analysis was conducted to examine the relationship between the teachers' participation rates and post-test dependent variables, controlling the dependent variable levels at baseline. To examine the effect of the intervention program, a 2 x 2 (time x group) MANOVA with repeated measures over time (pre- and post-test) was independently conducted on each dependent variable of the study (i.e., relatedness satisfaction at work, vigor, dedication, and absorption, job satisfaction, overload, lack of development, and neglect). Between- and within-group comparisons using Bonferroni correction were examined. Partial eta squared (η_p^2) effect sizes above .01 were considered small, above .06 moderate, and above .14 large (Cohen, 1988). All analyses were performed using IBM SPSS v.20.0.

Results

Preliminary analysis

Table 1 shows baseline sociodemographic characteristics of the participating teachers. There were no significant differences in age, living situation, number of children, teaching experience, years at current school, type of contract (i.e., permanent or temporary), and type of working day (i.e., full-time or part-time) between the experimental group and the control group ($p > .050$). Because the experimental group was composed exclusively of female teachers, significant differences ($p < .001$) in gender distribution were found between the experimental group and the control group. Consequently, using the final study sample (i.e., n=57; 22 from the experimental group and 35 [15 females] from the control group), possible differences in terms of gender in the dependent variables of the study at baseline were examined by means of MANOVA, resulting in a non-significant gender effect (Wilks' Lambda=.858; $F(8,48)=0.992$; $p=.455$; $\eta_p^2=.142$). Likewise, using only the initial sample of experimental school teachers (n=58), gender differences between the 42 female and the 16 male teachers were also examined in the dependent variables at baseline values. Results of this MANOVA did not show a significant gender difference, either (Wilks' Lambda=.937;

$F(5.52) = 0.703$; $p = .623$; $\eta_p^2 = .063$). Therefore, gender was not included as a covariate in further statistical analyses.

On the other hand, differences between teacher-participants (i.e., $n = 22$) and teacher non-participants (i.e., teachers from the experimental school who were subsequently excluded; $n = 36$) from the experimental group were also investigated at baseline. MANOVA showed a non-significant main interaction effect (Wilks' Lambda = .922; $F(5.52) = 0.882$; $p = .500$; $\eta_p^2 = .078$). More accurately, between-group univariate contrasts showed no significant effects between these two referred groups in any dependent variable of the study, resulting in p -values ranging from .121 (absorption) to .766 (relatedness satisfaction).

Intervention fidelity and program attendance

Of the 34 teachers who filled out the pre- and post-test, 12 were excluded from the study because they only attended the first meeting session, resulting in an experimental group of 22 teachers. Overall, and similar to previous studies (J. R. Hunter, Gordon, Bird, & Benson, 2018), the main reason that was given to not continue participating in the LTPA intervention was incompatibility of personal schedules, and other family and work responsibilities. Average attendance to the PA sessions was 11.25 ± 3.40 . The most normal attendance (i.e., mode) was 12 teachers per session, which occurred six times (i.e., 19% of the PA sessions). The least attended PA session comprised four teachers, while the session with the highest teacher participation comprised 18. Both occurred once. Attendance remained stable throughout the PA intervention, although the first and last sessions were the most frequented. The teacher who attended fewer PA sessions did so five times (16%), while the teacher who participated more times did so in 27 of 32 sessions (84%). Finally, partial correlations showed that teacher participation rates in the intervention group were significantly and positively related to relatedness satisfaction ($r = .56$, $p = .003$), vigor ($r = .44$, $p = .017$), absorption ($r = .65$, $p < .001$), and job satisfaction ($r = .43$, $p = .028$) at post-test, controlling the dependent variable levels at baseline. Yet, teacher participation rates were not significantly related to dedication or burnout at work in the intervention group.

Table 4. Descriptive statistics of relatedness satisfaction, engagement, satisfaction and burnout at work in the experimental and control schools. Between- and within-group effects.

Test time		Pre-test (I)	Post-test (J)	Within-group contrast							
Study variables	Group	<i>M</i> (SD)	<i>M</i> (SD)	Mean Diff. (J-I)	Standard error	<i>F</i> (1,55)	<i>p</i>	η_p^2	95% CID		
									LL	UL	
Teachers' need for relatedness at work											
Relatedness satisfaction	Exp	4.70 (0.53) ^a	5.23 (0.45) ^a	.53	.15	12.07	.001	.180	-0.82	-	
	Cont	4.40 (0.88) ^a	4.50 (1.11) ^c	.10	.11	0.70	.405	.013	-0.33	0.13	
Teachers' work engagement											
Vigor	Exp	4.14 (1.08) ^a	4.67 (0.92) ^a	.53	.17	8.79	.004	.141	-0.88	-	
	Cont	3.69 (0.88) ^a	3.68 (0.89) ^d	-.01	.14	0.01	.920	.000	-0.27	0.29	
Dedication	Exp	4.43 (1.08) ^a	4.49 (1.00) ^a	.06	.18	0.16	.689	.003	-0.38	0.25	
	Cont	3.99 (0.96) ^a	3.94 (1.08) ^a	-.05	.12	0.16	.683	.003	-0.20	0.30	
Absorption	Exp	4.11 (1.02) ^a	4.67 (0.85) ^a	.56	.18	8.78	.004	.140	-0.92	-	
	Cont	3.72 (0.76) ^a	3.62 (0.97) ^d	-.10	.14	0.41	.522	.007	-0.20	0.39	
Teachers' job satisfaction											
Job satisfaction	Exp	4.20 (1.07) ^a	4.77 (0.79) ^a	.57	.18	9.46	.003	.116	-0.93	-	
	Cont	3.90 (0.89) ^a	3.97 (1.01) ^c	.07	.14	0.34	.561	.006	-0.38	0.21	
Teachers' burnout subtypes at work											
Overload	Exp	3.31 (1.32) ^a	3.46 (1.31) ^a	.15	.35	0.17	.679	.003	-0.85	0.56	
	Cont	3.54 (1.37) ^a	4.09 (1.50) ^a	.55	.28	3.92	.053	.067	-1.12	0.06	
Lack of development	Exp	2.56 (1.26) ^a	2.72 (1.15) ^a	.16	.26	0.11	.526	.002	-0.44	0.62	
	Cont	2.47 (0.76) ^a	2.85 (1.27) ^a	.38	.33	0.15	.061	.003	-0.79	0.54	
Neglect	Exp	2.08 (0.85) ^a	2.08 (0.98) ^a	.00	.18	0.00	1.000	.000	-0.37	0.37	
	Cont	2.09 (0.89) ^a	1.92 (0.96) ^a	-.17	.15	1.32	.254	.024	-0.12	0.47	

Note: Exp = Experimental group; Cont = Control group; Diff. = Difference; CID = Confidence interval differences; LL = Lower limit; UL = Upper limit. Between-group differences are reported with superscripts (a, a = $p > .05$; a, b = $p < .05$; a, c = $p < .01$; a, d = $p < .001$)

Intervention effects

Results indicated a significant main interaction effect (group x time) of the LTPA intervention with a medium effect size on relatedness at work (Wilks' Lambda=.919; $F(1,55)= 4.848$; $p=.032$; $\eta_p^2=.081$), vigor (Wilks' Lambda=.906; $F(1,55)=5.697$; $p=.020$; $\eta_p^2=.094$) and absorption at work (Wilks' Lambda=.881; $F(1,55)=7.412$; $p=.009$; $\eta_p^2=.119$), as well as job satisfaction (Wilks' Lambda=.929;

$F(1,55)=4.191$; $p=.045$; $\eta_p^2=.071$). Yet, no significant main interaction effect (group x time) of the LTPA intervention was found in dedication (Wilks' Lambda=.994; $F(1,55)=0.326$; $p=.571$; $\eta_p^2=.006$) and burnout subtypes of overload (Wilks' Lambda=.985; $F(1,55)=0.818$; $p=.370$; $\eta_p^2=.015$), lack of development (Wilks' Lambda=.991; $F(1,55)=0.476$; $p=.493$; $\eta_p^2=.009$), or neglect (Wilks' Lambda=.991; $F(1,55)=0.513$; $p=.477$; $\eta_p^2=.009$).

Between-group effects. As observed in Table 4, no significant differences were found between the experimental group and the control group at baseline values in any dependent variable of the study. Yet, after the intervention program (i.e., at post-test) the experimental group reported significantly higher values in relatedness satisfaction at work ($F(1,55)=8.211$; $p=.006$; $\eta_p^2=.130$), vigor ($F(1,55)=14.413$; $p<.001$; $\eta_p^2=.208$) and absorption at work ($F(1,55)=16.829$; $p<.001$; $\eta_p^2=.234$), as well as in job satisfaction ($F(1,55)=9.921$; $p=.003$; $\eta_p^2=.153$) than the control group.

Within-group effects. The experimental group showed a significant increase in relatedness satisfaction at work, vigor, and absorption at work, as well as job satisfaction compared to their baseline values. Moderate-to-large effect sizes were found in these work-related outcomes (for further details, see Table 4). No significant differences in any of the study variables were shown in the control group.

Discussion

Despite the large number of interventions that focus on improving outcomes such as engagement or burnout among teachers (e.g., Iancu et al., 2017; Knight et al., 2017), no study has yet investigated the effectiveness of a group-based leisure-time PA intervention on teachers' work-related outcomes. The main findings of this study highlight that two sessions of LTPA per week, during practically one academic year, with work colleagues from the same school, improve relatedness satisfaction, vigor and absorption at work, as well as job satisfaction, but not dedication and burnout, among a sample of Spanish secondary school teachers. Understanding the contributions of a LTPA intervention with work colleagues could provide valuable information to develop theory-driven PA interventions focused on increasing psychological functioning among teachers.

Consistent with our hypothesis, a medium effect size was found in teachers' relatedness satisfaction at work after the intervention program. Results of this study are in line with a few previous interventions in other professions that have suggested the effectiveness of group-based PA with work colleagues in order to improve their integration and interpersonal relationships (Andersen et al., 2015; Bruton et al., 2012; Podlog & Dionigi, 2009). All these results are congruent with the social interaction hypothesis (Ransford, 1982; Teychenne et al., 2008; White et al., 2017) which suggests that participating in PA with other people may generate psychosocial benefits. For example, in a group-based worksite PA intervention among office employees, participants explained that it was enjoyable to participate in PA with work colleagues and talk about things in a non-work setting (Andersen et al., 2011). Such programs could be very interesting because Skaalvik and Skaalvik (2015) reported that the teaching profession does not offer enough time to share experiences and develop social links among teachers. One potential explanation for the improvements in relatedness satisfaction at work in the present study is that the LTPA intervention was developed with teachers from the same school. These results reinforce the importance of developing LTPA interventions with work colleagues from the same school to establish warm interpersonal relationships at work. In addition, the type of PA sessions (e.g., cooperative and playful sessions) and the strategies providing support to teachers' relatedness satisfaction in LTPA (see Table 3) could explain the improvements in interpersonal relationships in LTPA, and, consequently at work.

The development of the LTPA intervention with work colleagues was also effective in increasing teachers' work engagement and job satisfaction by reporting large and moderate interaction effect sizes, respectively. Our results showed larger effect sizes than previous interventions based on personal/job resource building, leadership training, and health promotion, which reported small, but positive and significant effects on increasing employees' engagement (Knight et al., 2017). The larger effect sizes found in this LTPA intervention show promising results in terms of improving employees' engagement. These results are in line with other worksite PA interventions that have been effective in increasing well-being and satisfaction at work among different types of employees, including the university teaching staff (Abdin et al., 2018). Yet, to our knowledge, this is the first study that analyzes the effects of a LTPA intervention with work colleagues on teachers' work engagement and job

satisfaction. Despite the scarcity of PA intervention studies on teachers, our results are in line with previous cross-sectional studies on teachers that have suggested that LTPA may be beneficial for teachers' positive work-related outcomes (e.g., Bogaert et al., 2014). Research on recovery processes has demonstrated that off-job PA may have a particularly high potential to recover from job stress, and increase well-being and engagement at work (Sonnetag et al., 2017), which could explain the results found. Likewise, PA could also moderate stress levels (i.e., the cross-stressor adaptation hypothesis; see Sothman, 2006), resulting in a state of satisfaction that could be transferred to the work context owing to physiological mechanisms (i.e., influencing sedation patterns, decreasing hormone production, and lowering blood pressure) (Stults-Kolehmainen & Sinha, 2014).

According to SDT, another theoretical explanation of our results could be that improving relatedness satisfaction at work could also contribute to teachers' good psychological functioning at work (Ryan & Deci, 2017). Previous studies on teachers have shown associations between relatedness satisfaction at work and a wide range of work-related outcomes (e.g., work engagement; Abós, Haerens, et al., 2018; Abós, Sevil, Julián, et al., 2018). Yet, the present intervention has shown significant improvements in two factors of work engagement, such as vigor (i.e., high energy levels and resilience at work) and absorption (i.e., experience flow and full concentration while working), as well as in job satisfaction among the experimental group teachers, but not in dedication (i.e., experience enthusiasm, inspiration and sense of significance at work). It seems that the LTPA intervention with work colleagues could help towards teaching in a more energetic (i.e., vigor) and fully concentrated (i.e., absorption) way, but not in a more enthusiastic way (i.e., with more dedication). This could be explained because teacher dedication could be strongly related to teacher vocation, and, therefore, it is not easy to change intrinsic reasons, regardless of the type of intervention carried out (Fray & Gore, 2018). However, more research on the effects of LTPA with work colleagues in terms of dedication seems to be needed in order to refute this argument.

With regard to the effects of LTPA interventions with work colleagues on burnout subtypes, results reported a non-significant effect of the interaction of group and time. Our results are not aligned with past research where employees commonly showed improvements in stress and burnout after taking part in worksite group-based PA interventions (Conn, Hafdahl, Cooper, Brown, & Lusk, 2009; Naczenski et al.,

2017). Given that teachers' burnout tends to increase over the academic year (Llorens-Gumbau & Salanova-Soria, 2014), when job demands become greater (Chang, 2009), these results are not as negative as might have been expected. In the teaching profession, this critical moment coincides with the end of the academic year, when teachers have to evaluate exams and student work, attend teacher and parent meetings, among other manifold teaching tasks. This could limit the positive effects of the LTPA intervention on teachers' burnout. Nevertheless, it is also noteworthy that very low values in teachers' burnout were found at baseline values (see Table 4), which may explain non-significant differences in the experimental group. These results suggest that a LTPA intervention with work colleagues may not be enough to decrease teachers' burnout in one of the most stressful professions (García-Carmona et al., 2018). Further qualitative studies may be useful to understand the lack of significant changes in decreasing teacher burnout.

Implications and recommendations for practice

Although results are considered promising and may encourage the educational administration and school policy-makers to implement LTPA interventions with work colleagues, it is important to take some implications and recommendations for practice into account for future research. One of the most important parts of any intervention is program attendance. In fact, the present study showed a significant and positive relationship between the teachers' participation rates in PA sessions and mostly work-related outcomes (i.e., relatedness, vigor, absorption, and job satisfaction). Yet, our participation rates were lower than other worksite PA interventions conducted with employees (Abdin et al., 2018) or teachers (Aghdam, Sahranavard, Jahangiry, Jafarabadi, & Koushaa, 2016). Despite the development of a need-supportive environment, average attendance to the PA sessions was low. The incompatibility of personal schedules, and other family and work responsibilities could, therefore, explain the low PA attendance. In line with the explanation provided by Bogaert et al. (2015), it has to be noted that developing a PA program during teachers' leisure-time has many strengths, but it can also have additional barriers. In this sense, future studies could design PA programs with different schedules or days in order to reach most of the teachers (R. F. Hunter et al., 2018). As a peculiarity of our PA intervention, it should also be noted that all final participants were female. During the first meeting session, most of the participating teachers were female. One possible reason is that most of the

teachers in the experimental school were females (72%). Another possible reason is that, at this first meeting, females expressed their desire to do cooperative and playful sessions. That is why, perhaps, male teachers were not motivated, and decided not to take part. Future PA interventions should include alternative activities in their initial design that could attract both genders, such as kin-ball or korfbal among others.

Study limitations and directions for future research

Caution is warranted when interpreting the study results for the following reasons. Firstly, one of the main limitations of the present study was the lack of male teachers in the LTPA intervention, making it difficult to generalize the findings. Likewise, another important limitation that must be recognized was the self-selection of only two secondary schools to conduct the PA intervention, which resulted in a small convenience sample of teacher participants. Using a probabilistic random sample of school teachers from different secondary schools could avoid possible sample-related biases, as well as lead to a better understanding of the effects of LTPA interventions on work-related outcomes. Further, assessing variables such as students' socio-economic status (SES), school and class size, or parental involvement could contribute to more accurately determining the similarity between experimental and control groups in future PA intervention studies with teachers. Secondly, the lack of a follow-up assessment makes it impossible to examine the maintenance of the intervention in terms of study outcomes. Nevertheless, the LTPA intervention was guided by one of the theoretical frameworks that has proven to be most efficient in improving the long-term effects of PA (Kwasnicka et al., 2016; Rodrigues et al., 2018). Consequently, work-related benefits could also be maintained over time. Thirdly, the quasi-experimental design of the study may also limit its generalizability. Consequently, to interpret these results, the limitations of quasi-experimental intervention studies should always be taken into account (see, Campbell & Stanley, 1963). Consistent with limitations observed in multicomponent PA interventions (Prochaska & Prochaska, 2011), it was not possible to determine either the condition of the LTPA intervention (i.e., leisure-time socializing vs. leisure-time socializing in the LTPA intervention) or the type of sessions (i.e., cooperative-playful, strength, aerobic, or back pain prevention) that had more or less effect on the study outcomes. Likewise, given that the control group did not receive any PA intervention, and there was only one experimental group, results may be attributable to the Hawthorne effect (i.e., the tendency of participants to work hard and to perform

better simply because of the increased attention paid to them by an experimenter). Future studies should –as far as possible- conduct experimental designs in order to provide more insights into that question, comparing the effectiveness of having different experimental groups and PA sessions. Fourthly, although the use of need-supportive strategies was revised by the research team in each PA session, there was no systematic observation of teaching behaviors. The observational methodology opens up a complementary avenue to assess not only the frequency and intensity of need-supportive and need-thwarting strategies of exercise instructors, but also to assess their correct implementation. Fifthly, PA levels were not measured in our study. This fact did not allow us to examine the extent to which teachers' PA levels may also be related to the work-related outcomes. Future PA interventions should use accelerometers to measure PA levels before, during, and after the intervention. Finally, the present study only focuses on the effectiveness of a LTPA intervention with work colleagues on some work-related outcomes. Although we do not consider this to be a study limitation, expanding knowledge of the effects of a LTPA intervention on other work-related outcomes (e.g., workaholic, flow, absenteeism), and other health-related behaviors (e.g., diet, alcohol and tobacco consumption), could be a new avenue of research.

Conclusion

This study has shown that two sessions of LTPA per week, during one academic year with work colleagues from the same school, improve not only relatedness satisfaction at work but also positive work-related outcomes such as engagement and satisfaction at work among a sample of Spanish secondary school teachers. However, this intervention did not report improvements in dedication and burnout at work. This study does not just provide a promising, feasible, and healthy program to create a warm interpersonal relationship among teachers, but also a way to tackle the growing problem of low teacher engagement and satisfaction at work.

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LIMITACIONES Y PROSPECTIVAS

6. Limitaciones y prospectivas

A pesar de que cada uno de los siete estudios introducidos en el epígrafe anterior tiene detalladas sus pertinentes limitaciones y prospectivas, a continuación se describen unas limitaciones transversales y de carácter más general que han afectado al global de la tesis doctoral. Del mismo modo, parece oportuno reflexionar acerca de las prospectivas que habría que tener en cuenta en futuros diseños de investigación para superar las mencionadas limitaciones.

En primer lugar, tanto en los cuatro estudios de validación, como en los dos siguientes que analizan los procesos motivacionales y el funcionamiento psicológico del profesorado se ha utilizado un diseño transversal, lo que no permite inferir la causalidad de las relaciones estudiadas y limita la generalización de los resultados encontrados. Aunque hay que ser conscientes de los grandes esfuerzos que supone realizar distintas tomas de datos en una muestra compuesta por docentes de Educación Secundaria, futuros estudios de investigación deberían implementar diseños longitudinales para proporcionar una evidencia más sólida.

En segundo lugar, es preciso reconocer que el muestreo utilizado en todos los estudios ha sido no probabilístico. A pesar de que el tamaño de la muestra es suficiente para abordar los objetivos propuestos y no cuestiona los resultados encontrados, si que es cierto que afecta a la generalización de los mismos. Igualmente, la participación fue voluntaria, lo que podría haber provocado que los sujetos con mayores niveles de desmotivación o burnout hubiesen rehusado de participar en el estudio. Para superar esta limitación, futuros estudios deberían utilizar muestreos probabilísticos teniendo en cuenta variables sociodemográficas influyentes en el funcionamiento psicológico del profesorado con el objetivo de asegurar una muestra representativa y una mayor generalizabilidad de los resultados.

En tercer lugar, se ha utilizado una misma base de datos para abordar diferentes estudios de la tesis doctoral. A pesar de que se ha controlado el riesgo de error como consecuencia de estudios parciales utilizando diferentes variables, análisis y enfoques en cada uno de los estudios, futuros diseños de investigación deberían hacer el esfuerzo de recoger distintas bases de datos para abordar los diferentes objetivos.

En cuarto lugar, es preciso mencionar que todas las variables de la tesis doctoral –excepto las sociodemográficas– se han evaluado utilizando cuestionarios auto-

reportados. Este hecho puede conducir a un sesgo de deseabilidad social, así como a una posible infra- o sobre-estimación en las respuestas. Futuros estudios podrían valorar la inclusión de metodología observacional y/o cualitativa para conocer en mayor detalle los procesos motivacionales y el funcionamiento psicológico del profesorado, así como para justificar mejor algunos de los resultados hallados en la presente tesis doctoral.

En quinto lugar, el cuestionario utilizado para evaluar la satisfacción por el trabajo no está validado al español (i.e., TJSS; Skaalvik y Skaalvik, 2011b). En futuras investigaciones se debería abordar la validación de esta escala para obtener resultados más fiables. Igualmente los constructos de calidad del sueño e intención de dejar el trabajo fueron evaluados utilizando cuestionarios de un solo ítem. En consecuencia, la fiabilidad de estas variables no puede ser calculada y los resultados deben interpretarse con precaución. Futuros estudios deberían refinar estas medidas incluyendo otros indicadores tanto de calidad del sueño (e.g., problemas de mantener el sueño, problemas de conciliar el sueño al inicio, etc.; Gluschkoff et al., 2016; Önder, Beşoluk, İskender, Masal y Demirhan, 2014), como de la intención de abandono (e.g., intensidad y frecuencia con la que se da ese pensamiento; Bothma y Roodt, 2013).

Finalmente, aunque estas últimas limitaciones están más detalladas en el estudio 7, parece oportuno comentar en este apartado algunas de las más importantes dado que afectan al diseño general de la tesis doctoral (i.e., objetivo general 3). La muestra para desarrollar dicho estudio fue intencional y en el caso del grupo experimental, únicamente estuvo compuesto por mujeres, lo que limita la generalizabilidad de los resultados. Futuras investigaciones deberían utilizar muestreos probabilísticos. Igualmente, el diseño de la intervención únicamente contempló un grupo experimental. Esto hecho no permite identificar que factores (e.g., actividad física en grupo, actividad física en el tiempo libre, etc.) o que actividades (i.e., lúdicas-cooperativas, fitness, aeróbicas o espalda sana) provocaron los efectos en los participantes. Futuros estudios deberían incluir grupos con distintas características experimentales para poder identificar con rigurosidad la naturaleza de los efectos. Asimismo, a pesar de que se confió en un diseño longitudinal, únicamente se realizaron dos mediciones (i.e., pre-test y post-test). Futuras investigaciones deberían añadir al menos una tercera medición de seguimiento (i.e. *follow-up*) para poder observar si los efectos provocados por la intervención se mantienen a lo largo del tiempo.

CONCLUSIONES / CONCLUSIONS

7. Conclusiones / Conclusions

Teniendo en consideración los tres objetivos generales planteados en la presente tesis doctoral, los resultados hallados y las limitaciones descritas, a continuación se presentan las conclusiones obtenidas en cada uno de los siete estudios que la componen:

Objetivo general 1: Validar y adaptar al español y al contexto del profesorado de Educación Secundaria cuatro escalas relacionadas con el funcionamiento psicológico docente destinadas a la medición de los constructos de motivación por la enseñanza, satisfacción de las NPB, estilo interpersonal docente y burnout.

- **Estudio 1:** La Escala de Motivación por la Enseñanza en Educación Secundaria (EME-ES) es un instrumento con adecuadas propiedades psicométricas, fiable e invariante (parcial) respecto al género y al tipo de centro para evaluar la motivación por la enseñanza (intrínseca, identificada, introyectada, externa y desmotivación) del profesorado de Educación Secundaria. Asimismo, el desarrollo de la motivación intrínseca es determinante para una adecuada dedicación laboral, mientras que la prevención de la desmotivación contribuye a evitar sentimientos de aburrimiento en el trabajo.
- **Estudio 2:** La versión española de la Escala de Necesidades Psicológicas Básicas en el Trabajo (BPNWS-Sp) es un instrumento válido, fiable e invariante respecto al género y al tipo de centro para evaluar la satisfacción de la autonomía, la competencia y las relaciones sociales del profesorado de Educación Secundaria. Asimismo, la BPNWS-Sp es instrumento que permite predecir rigurosamente el funcionamiento psicológico del profesorado. Igualmente, aunque las tres NPB son importantes para el funcionamiento psicológico del profesorado, la satisfacción de competencia se postula como la necesidad más relevante para incentivar el compromiso laboral y prevenir el burnout.
- **Estudio 3:** La *Need-Supportive Teaching Style Scale* (NSTSS) es un cuestionario válido, fiable e invariante respecto al género y al tipo de centro para evaluar la percepción del profesorado de Educación Secundaria de su estilo interpersonal de enseñanza. Además, se demuestra que un marco teórico integrado por la TAD y la teoría de las metas de logro puede ser útil para recoger tanto estilos docentes

adaptativos (i.e., apoyo a la autonomía, apoyo a la relación social y apoyo al clima tarea), como no adaptativos (i.e., apoyo al clima ego).

- **Estudio 4:** La versión breve del *Burnout Clinical Subtype Questionnaire* (BCSQ-12) es válida y fiable para evaluar los subtipos de burnout de sobrecarga, falta de desarrollo y abandono en el profesorado de Educación Secundaria. Los resultados de su estructura factorial señalan que dichos subtipos, en línea con la teoría, deben medirse y analizarse por separado y no como un único factor. Además, este estudio demuestra que la satisfacción de las tres NPB se relaciona negativamente con alguno de los subtipos de burnout, con especial importancia de la satisfacción de autonomía. Finalmente, las profesoras muestran más riesgo de sufrir sobrecarga, los docentes de centros públicos de experimentar los tres subtipos de burnout y los más experimentados (i.e., > 16 años de experiencia) muestran un mayor riesgo de verse afectados por los subtipos de falta de desarrollo y abandono.

Objetivo general 2: Analizar los procesos motivacionales y el funcionamiento psicológico del profesorado de Educación Secundaria mediante un doble enfoque centrado en la variable y centrado en la persona.

- **Estudio 5:** El profesorado de Educación Secundaria motivado autónomamente tiene menos riesgo de sufrir el subtipo de burnout desgastado (i.e., wornout), está más comprometido con sus tareas y aplica estilos de enseñanza más adaptativos, mientras que lo contrario es cierto para el profesorado altamente desmotivado. El profesorado que trabaja motivado por razones controladas, aunque muestra rasgos de compromiso (i.e., absorción), tiene más posibilidades de sufrir el burnout desgastado (i.e., wornout) y de aplicar estilos de enseñanza orientados hacia el ego. Finalmente, la satisfacción de las tres NPB se configura como un aspecto fundamental para alcanzar la motivación autónoma del profesorado de Educación Secundaria y evitar la desmotivación.
- **Estudio 6:** Este estudio demuestra la coexistencia del burnout frenético y compromiso por el trabajo en el profesorado de Educación Secundaria. Los perfiles de docentes caracterizados por un compromiso moderado-alto muestran patrones más adaptativos (i.e., menos ansiedad y depresión, mejor calidad del sueño y menos intención de dejar el trabajo), mientras que los perfiles

caracterizados por un elevado burnout sin desafíos y desgastado muestran los patrones más perjudiciales (i.e., mayor ansiedad y depresión, peor calidad del sueño y más intención de dejar el trabajo). Además, parece existir un umbral de riesgo para experimentar alta ansiedad, depresión y una peor calidad del sueño cuando los niveles de burnout frenético superan a los niveles de compromiso del profesorado, aunque estos últimos sigan siendo altos. Por lo tanto, resulta más adaptativo experimentar niveles moderados de compromiso que niveles altos, si estos van a ir acompañados de niveles de burnout frenético.

Objetivo general 3: Diseñar, implementar y evaluar los efectos de un programa de intervención basado en la práctica de actividad física en el tiempo libre y con compañeros de trabajo para la mejora del funcionamiento psicológico del profesorado de Educación Secundaria.

- **Estudio 7:** Realizar dos sesiones por semana de una hora de actividad física en el tiempo libre con compañeros de trabajo del mismo centro educativo durante un curso académico mejora la satisfacción de relación social, la satisfacción laboral y los factores de compromiso de vigor y absorción en profesores de Educación Secundaria. Sin embargo, este tipo de actividad no tiene efectos de mejora sobre los subtipos de burnout de Farber (i.e., sobrecarga, falta de desarrollo, abandono) ni sobre la dedicación.

7. Conclusions

Taking into account the three general aims of this doctoral thesis, the results found, and the limitations described, the conclusions obtained in each of the seven studies are the following:

General aim 1: To validate and adapt four scales related to the psychological functioning of teachers, to Spanish and to the context of secondary school teachers, with the aim of measuring the constructs of motivation for teaching, BPN satisfaction, interpersonal teaching style, and burnout.

- **Study 1:** The Motivation for Teaching Scale in Secondary Education (EME-ES) is a reliable and (partially) invariant instrument regarding gender and type of school, with adequate psychometric properties, to assess the motivation for teaching (intrinsic, identified, introjected, external, and amotivation) of secondary school teachers. Likewise, the development of intrinsic motivation is determinant for adequate work dedication, while the prevention of amotivation helps to avoid feelings of boredom at work.
- **Study 2:** The Spanish version of the Basic Psychological Needs at Work Scale (BPNWS-Sp) is a valid, reliable, and invariant instrument regarding gender and type of school to assess the satisfaction of autonomy, competence, and relatedness of secondary school teachers. Likewise, the BPNWS-Sp is an instrument that allows to rigorously predict teachers' psychological functioning. Further, although the three BPNs are important for teachers' psychological functioning, satisfaction of competence is postulated as the most relevant need to foster work engagement and prevent burnout.
- **Study 3:** The Need-Supportive Teaching Style Scale (NSTSS) is a valid, reliable and invariant questionnaire regarding gender and type of school to assess the perception of interpersonal teaching styles of secondary school teachers. In addition, this study demonstrates that a theoretical framework integrated by the SDT and the achievement goal theory can be useful to compile both adaptive teaching styles (i.e., autonomy support, relatedness support, and task climate support), and non-adaptive (i.e., ego climate support).

- **Study 4:** The short version of the Burnout Clinical Subtype Questionnaire (BCSQ-12) is valid and reliable to assess the burnout subtypes of overload, lack of development and neglect in secondary school teachers. The results of its factorial structure indicate that these subtypes, according to the theory, must be measured and analyzed separately and not as a single factor. In addition, this study shows that the satisfaction of the three BPNs is negatively related to some of the burnout subtypes, especially, the satisfaction of autonomy. Finally, female teachers show a higher risk of overload, state school teachers show a higher risk of experiencing the three burnout subtypes, and the most experienced teachers (i.e., > 16 years' experience) show a higher risk of suffering lack of development and neglect.

General aim 2: To analyze motivational processes and the psychological functioning of secondary school teachers through a double variable- and person-centered approach

- **Study 5:** Secondary school teachers with autonomous motivation have a lower risk of suffering the wornout burnout subtype, they are more engaged in their tasks, and implement more adaptive teaching styles, whereas the opposite is true for highly amotivated teachers. Teachers with controlled motivation, although they show feelings of engagement (i.e., absorption), are also more likely to suffer burnout (i.e., wornout) and to apply ego climate-based teaching styles. Finally, the satisfaction of the three BPNs is fundamental to achieve autonomous motivation and to avoid amotivation of secondary school teachers.
- **Study 6:** This study demonstrates the coexistence of frenetic burnout and work engagement in secondary school teachers. Teachers' profiles characterized by moderate-high engagement show more adaptive patterns (i.e., less anxiety and depression, better sleep quality, and less intention to quit the job), while profiles characterized by high underchallenged burnout and worn-out burnout show the most detrimental patterns (i.e., higher anxiety and depression, worse sleep quality, and more intention to quit the job). In addition, there seems to be a risk threshold for experiencing high anxiety, depression, and poor sleep quality when levels of frenetic burnout surpass the levels of engagement of teachers, although engagement still remains high. Therefore, it is more adaptive to experience

moderate levels of engagement than high levels, if these levels of engagement are going to be accompanied by levels of frenetic burnout.

General aim 3: To design, implement, and assess the effects of a leisure-time physical activity intervention program with work colleagues with focus on improving the psychological functioning of secondary school teachers.

- **Study 7:** Carrying out two one-hour leisure-time physical activity sessions per week with work colleagues from the same school throughout one academic year improves relatedness satisfaction, job satisfaction and engagement factors of vigor and absorption in secondary school teachers. However, this type of activity does not have an improvement effect on Farber's burnout subtypes (i.e., overload, lack of development, neglect) or on dedication.

APORTACIONES PRINCIPALES

8. Aportaciones principales

En el presente apartado se exponen las principales contribuciones teóricas y prácticas que la presente tesis doctoral aporta tanto al campo de la investigación en educación, como para la mejora de los procesos motivacionales y el funcionamiento psicológico del profesorado de Educación Secundaria.

En primer lugar, esta tesis doctoral aporta como contribución teórica la validación en español de cuatro escalas válidas y fiables para evaluar la motivación por la enseñanza, la satisfacción de las NPB, el estilo interpersonal docente y el burnout del profesorado de Educación Secundaria (i.e., estudios 1, 2, 3 y 4). En la práctica, dichas escalas pueden resultar útiles tanto para los investigadores que deseen continuar investigado sobre estos constructos con muestras hispano-hablantes, como para aquellos que tengan interés (e.g., equipos directivos, administración educativa) en evaluar los procesos motivacionales y el funcionamiento psicológico del profesorado. Del mismo modo, permiten llevar a cabo una evaluación diagnóstica rigurosa sobre la cual diseñar y aplicar estrategias de intervención destinadas a optimizar el funcionamiento psicológico de este colectivo.

En segundo lugar, de los estudios 2, 4 y 5, se extrae como contribución teórica la importancia de la satisfacción de las tres NPB, y en especial de la autonomía y la competencia, para alcanzar en el profesorado de Educación Secundaria las formas de motivación más autodeterminadas así como un funcionamiento psicológico adaptativo. En la práctica, como se expone en los apartados de implicaciones prácticas de los tres estudios, resulta necesario que la administración educativa y los equipos directivos de los centros de enseñanza diseñen y apliquen estrategias basadas en el apoyo a las tres NPB del profesorado.

En tercer lugar, de la presente tesis doctoral y en particular del estudio 4, se deriva un importante aplicación práctica relacionada con las variables sociodemográficas que pueden afectar al funcionamiento psicológico del profesorado. Dicho estudio esboza la necesidad de prestar más atención a las profesoras, a los docentes de centros públicos y a los más experimentados, dado que estos tres colectivos son aquellos que tienen más riesgo de experimentar algún subtipo de burnout. Por lo tanto, los programas de intervención destinados a la prevención y reducción del burnout deberían hacer hincapié en estos colectivos para conseguir mayores efectos. Por otra

parte, estos resultados también suponen una contribución teórica importante al campo del estudio de burnout docente, dado que hasta la fecha, únicamente un estudio había analizado el efecto del género y la experiencia en trabajadores de universidad sobre los subtipos de burnout de Farber.

En cuarto lugar, en el estudio 1 y especialmente en el 5, se extrae como contribución teórica la importancia de la motivación autónoma del profesorado no solo para un adecuado funcionamiento psicológico, sino también para aplicar estilos de enseñanza más adaptativos. Además, es el primer estudio en docentes que analiza junto a la motivación autónoma y controlada, los efectos de la desmotivación con un enfoque centrado en la persona (i.e., cuatro perfiles motivacionales), demostrando las numerosas consecuencias psicológicas y comportamentales que tiene en el profesorado de Educación Secundaria. Igualmente, estos estudios muestran los efectos mixtos de la motivación controlada, la cual puede conducir hacia consecuencias positivas (e.g., compromiso), aunque también hacia consecuencias negativas (e.g., burnout, estilo de enseñanza orientado al ego). En la práctica, consecuentemente, habrá que diseñar y aplicar estrategias para mejorar la motivación autodeterminada (e.g., apoyo a las NPB). Igualmente, es necesario advertir a la administración educativa y a los equipos directivos acerca los riesgos que las presiones externas pueden tener sobre la motivación del profesorado (i.e., controlada, desmotivada), y por lo tanto sobre su funcionamiento psicológico, su estilo de enseñanza y la calidad educativa en su conjunto.

En quinto lugar, esta tesis doctoral, y en particular el estudio 6, es la primera investigación en demostrar que el subtipo frenético de burnout coexiste con el compromiso del profesorado, y por lo tanto, contribuye a ampliar las evidencias teóricas previas que sugieren que ambos constructos no representan dos extremos perfectos del mismo continuo. Igualmente, demuestra los beneficios o riesgos psicológicos y físicos de estar comprometido o quemado respectivamente, por lo que alienta a la administración educativa y a los equipos directivos a aplicar estrategias que optimicen los procesos motivacionales (i.e., apoyo a las NPB). Asimismo, se recomienda a los equipos directivos y al mismo profesorado que este vigilante con los posibles casos de un exceso de compromiso. Este constructo, tiene rasgos en común con el burnout frenético, de modo que si ambos son altos, las consecuencias para la salud del

profesorado son muy negativas (i.e. ansiedad, depresión y baja calidad del sueño), a pesar de experimentar altos niveles de compromiso.

Finalmente, esta tesis doctoral muestra el diseño de un programa de intervención basado en 32 sesiones de actividad física con compañeros del mismo centro y en el tiempo libre (i.e., estudio 7), lo cual permite su replicación por cualquier persona interesada. Además analiza los efectos de dicho programa, demostrando que la actividad física puede ser una herramienta útil para mejorar las relaciones sociales del profesorado, su satisfacción laboral y algunos rasgos del compromiso. En este sentido, parece que estos hallazgos deberían ser tenidos en cuenta por los creadores de políticas educativas y sanitarias, dado que además de mejorar la salud física, social y psicológica del profesorado, este programa de actividad física permite mejorar su funcionamiento psicológico y por lo tanto, la calidad educativa y de enseñanza. La administración educativa y los centros educativos deberían asumir responsabilidades, promocionar y dinamizar estos programas de actividad física, los cuales deben estar adaptados al contexto de cada centro de enseñanza y a las necesidades individuales del profesorado.

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9. Referencias bibliográficas

***Nota:** las referencias bibliográficas que se listan a continuación son aquellas utilizadas para el desarrollo de todos los apartados de la tesis doctoral, a excepción del apartado de resultados y discusión, en el cual se han integrado los siete estudios científicos. Las referencias utilizadas en cada estudio se encuentran ubicadas al final de cada artículo.

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APÉNDICE

Apéndice

Características bibliométricas de las publicaciones

Tabla 1. Características de las revistas donde se han publicado o han sido sometidos los artículos de la tesis doctoral.

	Revista	Factor de impacto ^{b,c}	Área(s), cuartil y posición
I	<i>The Spanish Journal of Psychology</i>	0.629	SSCI: Psychology, Multidisciplinary, Q4 (110/135)
II	<i>International Journal for Educational and Vocational Guidance</i>	1.306	SSCI: Education & Educational Research, Q3 (128/239) SSCI: Psychology, Applied, Q3 (55/82)
III	<i>Contemporary Educational Psychology</i>	3.356	SSCI: Psychology, Educational, Q1 (7/59)
IV ^a	<i>Current Psychology</i>	1.280	SSCI: Psychology, Multidisciplinary, Q3 (70/135)
V	<i>Teaching and Teacher Education</i>	2.473	SSCI: Education & Educational Research, Q1 (31/239)
VI	<i>Learning and Individual Differences</i>	1.420	SSCI: Psychology, Educational, Q3 (31/59)
VII ^a	<i>The Journal of Experimental Education</i>	1.867	SSCI: Education & Educational Research, Q2 (65/239) SSCI: Psychology, Educational, Q2 (19/59)

Notas:

a = Artículo sometido a fecha de depósito de la tesis doctoral.

b = Factor de impacto en *ISI Web of Knowledge – Journal Citation Reports*.

c = El factor de impacto de los siete artículos y la posición corresponde al año 2017, por lo que se considera provisional en todos ellos.

Contribución del doctorando en las publicaciones

- 1) **Abós, Á.**, Sevil, J., Martín-Albo, J., Aibar, A., y García-González, L. (2018). Validation evidence of the Motivation for Teaching Scale in Secondary Education. *The Spanish Journal of Psychology*, 21, e9. <http://doi.org/10.1017/sjp.2018.11>.

El doctorando participó activamente en la toma de datos, elaboró y revisó la base de datos. Además, realizó los análisis en colaboración con el Dr. Martín-Albo y el Dr. Aibar. Finalmente, como autor principal del estudio, redactó el artículo y realizó labores de revisión hasta su publicación final.

- 2) **Abós, Á.**, Sevil, J., Julián, J. A., Martín-Albo, J., y García-González, L. (2018). Spanish validation of the Basic Psychological Needs at Work Scale: A measure to predict teachers' well-being in the workplace. *International Journal for Educational and Vocational Guidance*, 18(2), 127–148. <http://doi.org/10.1007/s10775-017-9351-4>.

El doctorando participó activamente en la toma de datos, elaboró y revisó la base de datos. Además, como primer autor y responsable del estudio, realizó los análisis y redactó la primera versión artículo. Posteriormente, junto al resto de coautores, realizó labores de revisión pertinentes hasta su publicación.

- 3) **Abós, Á.**, Sevil, J., Martín-Albo, J., Julián, J. A., y García-González, L. (2018). An integrative framework to validate the Need-Supportive Teaching Style Scale (NSTSS) in secondary teachers through exploratory structural equation modeling. *Contemporary Educational Psychology*, 52, 48–60. <http://doi.org/10.1016/j.cedpsych.2018.01.001>.

El doctorando participó activamente en la toma de datos, elaboró y revisó la base de datos. Además, como primer autor y responsable del manuscrito, realizó los análisis estadísticos y redactó la primera versión del artículo. Por último, junto con el Dr. Javier Sevil, realizó labores de revisión hasta su publicación.

- 4) **Abós, Á.**, Sevil-Serrano, J., Montero-Marín, J., Julián-Clemente, J. A., y García-González, L. Examining the psychometric properties of the Burnout Clinical Subtype Questionnaire (BCSQ-12) in secondary school teachers. *Current Psychology*. Submitted.

El doctorando participó activamente en la toma de datos, elaboró y revisó la base de datos. Además, como primer autor y responsable del manuscrito, realizó los análisis de datos y redactó la primera versión del mismo. Finalmente, junto al resto de coautores, y en especial, junto al Dr. Luis García-González, realizó tareas de revisión.

- 5) **Abós, Á.**, Haerens, L., Sevil, J., Aelterman, N., y García-González, L. (2018). Teachers' motivation in relation to their psychological functioning and interpersonal style: a variable- and person-centered approach. *Teaching and Teacher Education*, 74, 21–34. <http://doi.org/10.1016/j.tate.2018.04.010>.

El doctorando participó activamente en la toma de datos, elaboró y revisó la base de datos. Además, como primer autor del manuscrito, realizó los análisis y redactó la primera versión artículo. Posteriormente, junto al resto de coautores, y en especial, junto a la Dra. Leen Haerens, realizó labores de revisión hasta su publicación definitiva.

- 6) **Abós, Á.**, Sevil-Serrano, J., Haerens, L., Aelterman, N., y García-González, L. (2019). Towards a more refined understanding of the interplay between burnout and engagement among secondary school teachers: A person-centered perspective. *Learning and Individual Differences*, 72, 69–79. <http://doi.org/10.1016/J.LINDIF.2019.04.008>.

El doctorando participó activamente en la toma de datos, pasando cuestionarios, creando y revisando la base de datos. Además, como primer autor y responsable del manuscrito, realizó los análisis y redactó la primera versión artículo. Posteriormente, junto al resto de coautores, realizó labores de revisión hasta su publicación.

- 7) **Abós, Á.**, Sevil-Serrano, J., Julián, J. A., Generelo, E., y García-González, L. Improving teachers' work-related outcomes through a group-based physical activity intervention during leisure-time. *The Journal of Experimental Education*. Submitted.

El doctorando llevo a cabo las dos tomas de datos (pre-test y post-test). Posteriormente, elaboró y revisó las dos bases de datos. Además, con la colaboración de el Dr. José Antonio Julián y el Dr. Eduardo Generelo, diseño el programa de intervención. Seguidamente, el doctorando fue el encargado de llevar a cabo la intervención, la cual fue supervisada por el Dr. Javier Sevil y el Dr. Luis García-González. Asimismo, como primer autor y responsable del estudio, realizó los análisis estadísticos y redactó el artículo. Finalmente, junto al resto de coautores, realizó tareas de revisión.

ANEXOS

Anexos

Anexo I – Financiación del proyecto

MINISTERIO DE
ECONOMÍA
Y COMPETITIVIDAD

SECRETARÍA DE ESTADO DE INVESTIGACIÓN,
DESARROLLO E INNOVACIÓN
SECRETARÍA GENERAL DE CIENCIA, TECNOLOGÍA
E INNOVACIÓN
DIRECCIÓN GENERAL DE INVESTIGACIÓN
CIENTÍFICA Y TÉCNICA
SUBDIRECCIÓN GENERAL DE PROYECTOS
DE INVESTIGACIÓN

**COMUNICACIÓN SOBRE LA PROPUESTA DE RESOLUCIÓN PROVISIONAL Y TRÁMITE DE
AUDIENCIA DE LA CONVOCATORIA 2013, MODALIDAD 1: PROYECTOS DE I+D+I, DEL PROGRAMA
ESTATAL DE INVESTIGACIÓN, DESARROLLO E INNOVACIÓN ORIENTADA A LOS RETOS DE LA
SOCIEDAD**

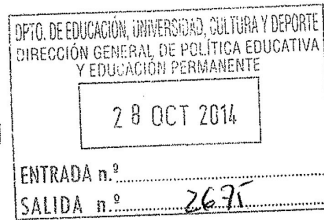
Referencia: EDU2013-42048-R
Investigador principal 1: JOSE ANTONIO JULIAN CLEMENTE
Entidad solicitante: UNIVERSIDAD DE ZARAGOZA
Centro: FAC. CIENCIAS HUMANAS Y DE LA EDUCACION
Título: PROMOCION DE LA SALUD Y EL BIENESTAR DEL ALUMNADO Y PROFESORADO DE ESO A TRAVES
DEL PROGRAMA INTEGRAL DE INTERVENCION "SIGUE LA HUELLA".
Duración en años: 2

De acuerdo con lo dispuesto en la Orden ECC/1780/2013 de 30 de septiembre (BOE de 2 de octubre), por la que se aprueban las bases reguladoras para la concesión de ayudas públicas del Programa Estatal de Investigación, Desarrollo e Innovación Orientada a los Retos de la Sociedad, en el marco del Plan Estatal de Investigación Científica y Técnica y de Innovación 2013-2016, y en la Resolución de 5 de noviembre de 2013 (BOE de 6 de noviembre), de la Secretaría de Estado de Investigación, Desarrollo e Innovación, por la que se aprueba la convocatoria para el año 2013 del procedimiento de concesión de ayudas correspondientes al Programa Estatal de Investigación, Desarrollo e Innovación Orientada a los Retos de la Sociedad, en el marco del Plan Estatal de Investigación Científica y Técnica y de Innovación 2013-2016, a la vista del informe elevado por la Comisión de Evaluación, esta Subdirección General de Proyectos de Investigación, como órgano instructor de la convocatoria, ha dictado la correspondiente **PROPUESTA DE RESOLUCIÓN PROVISIONAL**, que se ha publicado en la sede electrónica de la Secretaría de Estado de Investigación, Desarrollo e Innovación, (<https://sede.micinn.gob.es>), según lo dispuesto en el punto 3 del artículo 10 de la resolución de convocatoria, junto con los correspondientes anexos de solicitudes estimadas y desestimadas para financiación.

La propuesta a su solicitud de ayuda para el proyecto de investigación de referencia **EDU2013-42048-R**, que ha recibido la calificación **B**, se establece en siguientes términos:

Propuesta de financiación (costes directos, en euros)	CONCEDIDO 21.000
Propuesta de inclusión del proyecto en la correspondiente convocatoria de contratos predoctorales para la formación de doctores: NO	N.º de contratos (en caso afirmativo) 0

Anexo II – Visto bueno del Gobierno de Aragón



Zaragoza, 24 de octubre de 2014

Don José Antonio Julián Clemente, como miembro del Grupo de Investigación Consolidado EFYPAF nos informó del proyecto I+D+I que lleva por título "Promoción de la salud y el bienestar del alumnado y profesorado de ESO a través del programa integral de intervención "Sigue la huella" (Código: EDU2013-42048-R).

La finalidad del proyecto es la de diseñar, aplicar y evaluar la eficacia de un programa de intervención dirigido a promocionar la salud y el bienestar del alumnado y del profesorado, aumentando los niveles de actividad física y reduciendo los de estrés respectivamente.

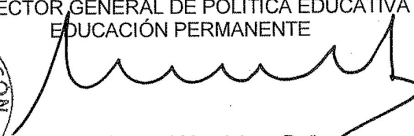
El proyecto tiene tres fases a lo largo de dos cursos académicos. La primera se centra en un estudio exploratorio en la población de docentes de Educación Secundaria de Aragón sobre los factores que influyen en el bienestar docente. Para poder cuantificar y realizar su trabajo requerirán de información que directamente no puede ser proporcionada desde la Dirección General de Política Educativa y Educación Permanente.

La literatura científica más reciente aboga por abordar la promoción de la salud y el bienestar a partir de modelos socio-ecológicos desarrollados desde los centros escolares. El proyecto se enmarca dentro del reto "Salud, cambio demográfico y bienestar" del Programa Estatal de I+D+I orientado a los retos de la sociedad.


El interés de la temática y el respaldo recibido por el Ministerio de Economía y Competitividad nos permite apoyar el proyecto, del cual iremos recibiendo información periódica a lo largo del proceso y la presentación de resultados del mismo.

Reciba un cordial saludo,

EL DIRECTOR GENERAL DE POLÍTICA EDUCATIVA Y EDUCACIÓN PERMANENTE



Fdo.: Manuel Magdaleno Peña



Anexo III – Comité de ética
**Informe Dictamen Favorable
Proyecto Investigación Biomédica**

C.P. - C.I. PI15/0283

25 de noviembre de 2015

Dña. María González Hinos, Secretaria del CEIC Aragón (CEICA)

CERTIFICA

1º. Que el CEIC Aragón (CEICA) en su reunión del día 25/11/2015, Acta Nº 19/2015 ha evaluado la propuesta del investigador referida al estudio:

Título: Promoción de la salud y el bienestar del alumnado y profesorado de ESO a través del programa integral de intervención "Sigue la Huella".

Investigador Principal: José Antonio Julián Clemente. Universidad de Zaragoza

Versión protocolo: noviembre/2015

2º. Considera que

- El proyecto se plantea siguiendo los requisitos de la Ley 14/2007, de 3 de julio, de Investigación Biomédica y su realización es pertinente.
- Se cumplen los requisitos necesarios de idoneidad del protocolo en relación con los objetivos del estudio y están justificados los riesgos y molestias previsibles para el sujeto.
- Es adecuado el tratamiento de los datos.
- El alcance de las compensaciones económicas previstas no interfiere con el respeto a los postulados éticos.
- La capacidad de los Investigadores y los medios disponibles son apropiados para llevar a cabo el estudio.

3º. Por lo que este CEIC emite **DICTAMEN FAVORABLE a la realización del proyecto.**

Lo que firmo en Zaragoza, a 25 de noviembre de 2015



★ María González Hinos
Secretaria del CEIC Aragón (CEICA)

