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TESIS DOCTORAL

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DOCTORADO EN EDUCACIÓN

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Agradecimientos

Mi más sincero agradecimiento a todos aquellos que de forma directa, o indirecta, me han ayudado en laelaboración de la presente Tesis Doctoral

A mis directores de tesis, los Drs. Antonio Granero Gallegos y María Carrasco Poyatos, sin vosotros no hubiera iniciado este bonito camino en el que actualmente me encuentro.

A mis padres Ginés y Nicolasa por haberme apoyado, ayudado y haber creído en mí siempre, al igual que a mis hermanos María del Mar y José Matías, destacando este último por ser un referente personal y profesional.

A mi pareja, por transmitirme cada día la energía necesaria para afrontar este proceso con entusiasmo y devoción.

A cada una de las personas que me han animado y motivado a perseguir mis sueños con perseverancia,constancia y tranquilidad.

Y en especial a ti, Antonio, tu dedicación, entusiasmo y paciencia han conseguido que te conviertas en un verdadero referente para mí.

A todos,

muchas gracias.

UNIVERSIDAD DE ALMERIA

Dr. D. **Antonio Granero Gallegos** y Dra. Dª. **María Carrasco Poyatos** de la Universidad de Almería, directores de la Tesis Doctoral titulada: **Relación de variables contextuales y motivaciones con variables cognitivas en profesorado en formación ¿Existen diferencias entre los futuros docentes de Educación Física y otros ámbitos de conocimiento?** / Relationship of contextual variables and motivations with cognitive variables in pre-service teachers. Are there differences between future Physical Education teachers and other fields of knowledge?

Realizada por el doctorando Don **Ginés David López García**

INFORMAN que dicha Tesis reúne las condiciones de rigor científico, originalidad y elaboración suficientes para ser defendida ante el tribunal que se nombre a tal efecto.

Almería, 2023

Antonio Granero Gallegos María Carrasco Poyatos

Tesis Doctoral por compendio que incluye las siguientes publicaciones:

López-García, G. D., Carrasco-Poyatos, M., Burgueño, R., & Granero-Gallegos, A. (2022). Teaching Style and Academic Engagement in Pre-service Teachers during the COVID-19 Lockdown. Mediation of Motivational Climate. *Frontiers in Psychology, 13*, 992665. https://doi.org/10.3389/fpsyg.2022.992665. IF-JCR 2022: 3.8 (Q1).

López-García, G. D., Granero-Gallegos, A., Carrasco-Poyatos, M., & Burgueño, R. (2023). Detrimental effects of disempowering climates on teaching intention in (physical education) initial teacher education. *International Journal of Environmental Research and Public Health, 20*(1), 878. https://doi.org/10.3390/ijerph20010878. IF-SJR 2022: 0.828 (Q2).

López-García, G. D., Granero-Gallegos, A., Carrasco-Poyatos, M., & López-Osca, R. (2022). Efectos de interacción del sexo y tipo de estudios sobre la motivación y el compromiso académico en futuros docentes. En M. Bermúdez Vázquez, M. L. Vadillo Rodríguez, & E. Casares Landauro, *Humanismo poliédrico. Nuevas apuestas de estética, arte, género y ciencias sociales* (pp. 885-905). Dykinson. Editorial del primer cuartil (Q1) de Scholarly Publishers Indicators (SPI) 2022.

López-García, G.D., Carrasco-Poyatos, M., Burgueño, R., & Granero-Gallegos, A. (2023). Relationships between needs satisfaction and the quality of motivation with academic engagement in pre-service physical education teachers. *SAGE Open, 13*(3), 1-11. https://doi.org/10.1177/21582440231197507. IF-JCR 2022: 2.0 (Q2).

López-García, G. D., Granero-Gallegos, A., Carrasco-Poyatos, M., & Burgueño, R. (aceptado para publicación). Variables motivacionales y cognitivas en profesorado en formación inicial: diferencias entre Educación Física y ámbitos STEM, Social-lingüístico y Artístico. *Revista Interuniversitaria de Formación del Profesorado*. IF-

SJR 2022: 0.211 (Q2); segundo cuartil (C2) de la clasificación de revistas con sello de Calidad FECYT-2022.

Presentación

Antes de continuar con el desarrollo de la presente Tesis Doctoral me gustaría realizar una breve presentación sobre mí mismo y sobre mi formación investigadora.

Mi nombre es Ginés López y acabé el Grado de Ciencias de la Actividad Física y del Deporte en el año 2020. Ese año, como bien es sabido, estuvo marcado por una pandemia mundial derivada del conocido COVID-19. El siguiente curso me matriculé en el Doble Máster en Profesorado de Educación Secundaria (especialidad Educación Física) y Máster de Investigación e Innovación en Ciencias del Deporte. Durante el desarrollo de este curso académico el Dr. Antonio Granero, profesor de una de las asignaturas nos habló de un proyecto de investigación y solicitó abiertamente, y de manera voluntaria, colaboración a aquellos estudiantes que quisieran cooperar en una toma de datos del referido proyecto. Yo, de manera desinteresada, le manifesté mi interés con el único fin de aprender. Ese fue el inicio de la carrera investigadora que hoy día cierra una etapa con la presente Tesis Doctoral.

De esta manera, colaboré con el Dr. Antonio Granero en la citada toma de datos. Mi único objetivo, hasta el momento, era poder disponer de una pequeña base de datos en la que hubiera participado de primera mano para la redacción de mi Trabajo Fin de Máster del Master de Investigación e Innovación en Ciencias de la Actividad Física y del Deporte. Hasta ese momento, y desde el principio, mi vocación era y sigue siendo ser docente de Educación Física. No obstante, un nuevo mundo se abría ante mí, la posibilidad de poder continuar mi formación universitaria a través de un Doctorado.

Hasta este momento mi carrera investigadora ha experimentado una vida ajetreada. Desde el inicio, con la defensa de mi TFM (dirigido también por los dos directores de la tesis doctoral) tuve que tomar parte de lecciones de estadística. Estas fueron complementadas por la formación recibida por mis directores, así como, con diversos cursos de la Escuela Internacional de Doctorado de la Universidad de Almería (EIDUAL) sobre es-

tadística y sobre la publicación en revistas de alto impacto. Los borradores de los primeros manuscritos llevaban muchas versiones y muchas reuniones para que pudieran empezar a ver la luz y parecerse a un artículo de investigación. Agradezco desde aquí a mis directores, la paciencia por comprender que estaba en proceso de aprendizaje, la constancia por no darme por perdido y el entusiasmo por recorrer todo el proceso con una sonrisa.

Llegado a este punto es importante hacer un inciso que marcaría mi carrera investigadora, fui contratado durante más de un año en el proyecto de investigación I+D+i de la Junta de Andalucía: "¿Se relaciona el clima motivacional *empowering-disempowering* percibido por alumnado de Grado con la intención de ser docente? Un estudio longitudinal con profesorado en formación" (Ref. P20_00148), liderado por el Dr. Antonio Granero (esta Tesis Doctoral deriva íntegramente de este proyecto de investigación). Esto lo cambió todo. Desde ese momento en un tiempo muy limitado había que preparar el cuestionario, comprobar las variables, contactar con los responsables del Máster en Profesorado de Educación Secundaria en todas las universidades andaluzas, preparar el trabajo de campo y todo lo que un proyecto de carácter longitudinal conlleva. Esto supuso una gran cantidad de tareas, actividades y procedimientos que hoy, aunque haya pasado poco tiempo, recuerdo con admiración, entusiasmo y mucha nostalgia.

Mientras desarrollaba las actividades del proyecto fui realizando de manera conjunta las cinco publicaciones que hoy componen la presente Tesis Doctoral. De manera complementaria y vinculada con el desarrollo del proyecto he realizado diferentes actividades de investigación. Entre ellas, he asistido a varios internacionales (I Congreso Internacional de pensamiento, cultura y sociedad. Proyecto Logos; XVI Congreso Internacional de Educación E Innovación; III Congreso Internacional de Innovación Docente; VI Congreso Internacional de Intervención e Investigación en la Salud) con un total de ocho comunicaciones presentadas en ellos. De igual forma, aparte de los estudios que compo-

nen esta tesis doctoral he colaborado en la publicación de dos capítulos de libro y varios artículos vinculados al proyecto de investigación todos ellos indexados en JCR, y cuyas referencias pongo a continuación:

Granero-Gallegos, A., López-García, G. D., Baena-Extremera, A., & Baños, R. (2023). Relationship between Psychological Needs and Academic Self-Concept in Physical Education Pre-Service Teachers: A Mediation Analysis. *Sustainability*, *15*(5), 4052. https://doi.org/10.3390/su15054052

Rubio-Valdivia, J. M., Granero-Gallegos, A., & López-García, G. D. (2022). Efectos del estilo interpersonal docente sobre el compromiso académico en futuros docentes: el rol mediador de la confianza y el esfuerzo académico. *CADMO. Giornale Italiano di Pedagogia sperimentale*, 2022(2), 85-103. https://doi.org/10.3280/CAD2022-002006

Granero-Gallegos, A., Escaravajal, J. C., López-García, G. D., & Baños, R. (2022). Influence of Teaching Styles on the Learning Academic Confidence of Teachers in Training. *Journal of Intelligence*, *10*(3), 71. https://doi.org/10.3390/jintelligence10030071

Granero-Gallegos, A., López-García, G., & Burgueño, R. (en-prensa). Are educator-created (dis)empowering climates equally associated with motivational experiences in physical education pre-service teachers as in foreign language pre-service teachers? *Porta Linguarum*. https://doi.org/10.30827/portalin.viVII.29163

Además simultáneamente tuve la oportunidad de colaborar, de manera desinteresada, en el proyecto de investigación “Métodos de entrenamiento interválico aeróbico de alta intensidad para la rehabilitación cardiaca y funcional”, en este caso liderado por la

Dra. María Carrasco. En este proyecto participé principalmente en la toma de datos, ampliando mi formación como investigador con un estudio experimental, del cual derivó un artículo indexado en JCR.

Carrasco-Poyatos, M., Granero-Gallegos, A., López-García, G. D., & López-Osca, R. (2022). HRV-Guided Training for Elders after Stroke: A Protocol for a Cluster-Randomized Controlled Trial. *International Journal of Environmental Research and Public Health*, *19*(17), 10868. https://doi.org/10.3390/ijerph191710868

También, como parte de esta formación como investigador, he tenido la oportunidad de colaborar en otras publicaciones relacionadas con la Educación Física de secundaria, también publicadas en revistas de impacto:

Bracho-Amador, C. M., Granero-Gallegos, A., Baena-Extremera, A., & López-García, G. D. (2023). The Effect of the Motivational Climate on Satisfaction with Physical Education in Secondary School Education: Mediation of Teacher Strategies in Maintaining Discipline. *Behavioral Sciences*, *13*(2), 178. https://doi.org/10.3390/bs13020178

Torres-Gázquez, S., López-García, G. D., & Granero-Gallegos, A. (2023). Emotional intelligence and resilience in secondary school Physical Education students during the COVID-19 pandemic. *Espiral. Cuadernos del Profesorado*, *16*(32), 51-63. https://doi.org/10.25115/ecp.v16i32.9098

Asimismo, he de comentar que a la misma vez que he desarrollado mi carrera investigadora he estado preparando las oposiciones al cuerpo de docentes de secundaria

en la especialidad de Educación Física. Esta comenzó en septiembre de 2021, unos meses antes de mi primera matricula de Doctorado y ha acabado en junio de 2023, unos meses antes de depositar la presente Tesis Doctoral. Durante esta preparación acudí a dos de los congresos referenciados anteriormente y relacionados con la innovación educativa, presentando un total de cuatro ponencias como resultado de la inclusión de mis líneas de investigación en el nexo del nuevo currículo implementado por la Ley Orgánica para la Mejora de la Ley Orgánica de Educación (LOMLOE) (Ley Orgánica 3/2020).

Por último, en esta sencilla, pero emotiva presentación, me gustaría acabar concluyendo que he crecido tanto personal como profesionalmente, he disfrutado y aprovechado cada segundo de tiempo que le he dedicado y he sido consciente de lo único que limita nuestros objetivos somos nosotros mismos. TODOS y TODAS aquellas personas que habéis colaborado en que me convierta en mejor persona a través de este presente documento. GRACIAS.

ÍNDICE

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Glosario abreviaturas

AE: Compromiso Académico

AGT: Teoría de la Metas de Logro

ANOVA: Análisis de la Varianza

AS: Satisfacción de la Autonomía

AVE: Varianza Media extraída

BPN: Necesidades psicológicas básicas

CFA: Análisis factorial confirmatorio

CFI: Índice de ajuste comparativo

CI: Intervalo de confianza

CM: Motivación controlada

CR: Fiabilidad compuesta

CS: Satisfacción de la competencia

DT: Desviación típica

EF: Educación Física

EIDES: Estilo Interpersonal Docente en Educación Superior

ES: Tamaño del efecto

FBPN: Frustración de las Necesidades Psicológicas Básicas

INT: Intención de ser docente

NS: Satisfacción de la novedad

M: Media

MAES: Máster en Profesorado de Educación Secundaria Obligatoria y Bachillerato, Formación Profesional y Enseñanza de Idiomas

MANOVA: Análisis multivariante de la varianza

MC: Clima motivacional hacia la maestría

MI: Motivación intrínseca

MLR: Máxima verosimilitud robusta

n: muestra

PC: Clima motivacional hacia el rendimiento

PE: Educación Física

R^2: Varianza explicada

RMSEA: Error de Aproximación Cuadrático Medio

RS: Satisfacción de la relación con los demás

SD: Desviación standard

SDT: Teoría de la Autodeterminación

SEM: Análisis de Ecuaciones Estructurales

STEM: Ciencia, Tecnología, Ingeniería y Matemáticas

SRMR: Media Cuadrática del Error Tipificada

TLI: Índice de Tucker-Lewis

TPB: Teoría del Comportamiento Planificado

UWES-SS: Escala de Compromiso Laboral de Utrecht

ω: Omega de McDonald

χ^2: Chi-cuadrado

α: Alfa de Cronbach

β: beta

RESUMEN

Resumen

La formación docente es considerada como uno de los indicadores de calidad del sistema educativo. En el proceso de formación como docentes, el profesorado en formación desarrollará habilidades y actitudes cruciales para hacer frente a los obstáculos y desafíos que aparezcan, no sólo durante su programa de formación inicial, sino también a lo largo de su futura labor profesional en un centro educativo. Sin embargo, algunos docentes en formación pueden no poseer las habilidades requeridas para desarrollar su programa formativo con éxito. Así pues, la comprensión de la relación entre los factores contextuales y motivaciones con los cognitivos durante su proceso de formación como docentes podría proporcionar evidencia científica que mejorara la calidad de los programas de formación docente. Por tanto, el objetivo principal de esta tesis doctoral fue analizar la relación entre variables contextuales y motivacionales, junto con variables cognitivas, en profesorado en formación atendiendo a las diferencias entre la especialidad de Educación Física y el resto de las materias.

Con el objetivo de abordar el propósito principal de esta tesis doctoral, se plantearon diferentes estudios. En el primer estudio, se analizó el rol mediador del clima motivacional entre el estilo interpersonal docente y el compromiso académico en futuros docentes en un contexto resiliente. Participaron un total de 1410 estudiantes del Máster en Profesorado de Educación Secundaria Obligatoria y Bachillerato, Formación Profesional y Enseñanza de Idiomas (MAES) (59.6% mujeres, 40.3% hombres; 0.1% otro; M_{edad}=23.85; *DT*=5.13) de diferentes universidades andaluzas. Cada participante completó diferentes escalas que medían Estilo Interpersonal Docente en Educación Superior, Clima Motivacional en Educación

Superior, Cuestionario de Compromiso Académico y Resiliencia. Los resultados del modelo del análisis de mediación de ecuaciones estructurales ponen de manifiesto, por una parte, la importancia del estilo interpersonal docente de apoyo a la autonomía sobre el compromiso académico del profesorado en formación. Por el otro lado, el clima maestría actúa de mediador entre el apoyo a la autonomía y el compromiso académico. Además, el estilo controlador predice positivamente el compromiso académico.

En el segundo estudio se pretendió analizar la mediación del compromiso académico y las variables motivacionales del *lado negativo,* entre el clima motivacional *disempowering* y la intención de ser docente en profesorado en formación inicial. En este estudio la muestra es similar a la del primero, pero en este caso, cada participante completo las escalas de Compromiso Académico, Frustración de las Necesidades Psicológicas Básicas en Contexto Educativo, Intención de ser Docente, Clima Motivacional *Disempowering* y Motivación Académica. Se realizó un análisis descriptivo y de correlaciones entre las escalas utilizadas y se hipotetizó un modelo de ecuaciones estructurales con variables latentes. Los resultados derivados del modelo muestran la predicción del estilo motivacional *disempowering* sobre el lado negativo de la motivación y su influencia como promotores negativos de la intención de ser docente en profesorado en formación. No obstante, también se muestra la particularidad de la motivación controlada como agente de promoción del compromiso académico.

En el tercer estudio se comprobaron los efectos de interacción del sexo y el tipo de estudios cursados (grado/máster) sobre las formas motivacionales y el compromiso académico. Para tal finalidad, participaron 920 estudiantes universita-

rios del MAES y del Grado de Educación Primaria de la especialidad de Educación Física con edades entre 20 y 57 años (569 hombres and 351 mujeres*; M*$_{edad}$ =24.73; *DT*=5.34). Estos completaron un cuestionario formado por la Escala de Motivación Académica y Cuestionario de Compromiso Académico. Concretamente se calcularon los estadísticos descriptivos y se realizó un análisis multivariante de la varianza (MANOVA). Lo hallazgos, por un lado, muestran valores más altos de motivación intrínseca hacia el logro y compromiso académico en mujeres, mientras que, en hombres, los promedios más altos fueron de regulación externa y desmotivación. Por otro lado, según el tipo de estudios, los estudiantes de grado muestran más altos promedios en los factores de motivación intrínseca y en todas las formas de regulación menos autodeterminadas, excepto la regulación externa y la desmotivación.

En el cuarto estudio, se analizó el rol mediador de la motivación académica entre las necesidades psicológicas básicas y el compromiso académico en futuros docentes. La muestra utilizada para tal fin es la misma que en el estudio anterior, pero en este caso, cada participante completó las escalas de Satisfacción de Necesidades Psicológicas Básicas en Educación, Motivación Académica y Cuestionario de Compromiso Académico. Los hallazgos desprendidos del modelo de ecuaciones estructurales con variables latentes revelaron que la satisfacción de autonomía, competencia y novedad predicen positivamente la motivación autónoma y negativamente la desmotivación. Además, la motivación autónoma y la motivación controlada predicen positivamente el compromiso académico, mientras que la desmotivación se asocia negativamente con él.

En el quinto estudio se planteó como objetivo analizar la variables motivacionales y cognitivas de profesorado en formación de Educación Física, comparando los resultados con otros ámbitos de conocimiento al inicio del MAES. Participaron un total de 747 futuros docentes de educación secundaria (48.3% mujeres; 51.0% hombres; 0.7% otro; M_{age}=25.56, *DT*=4.92) de diferentes ámbitos de conocimiento (i.e., STEM, Artístico, Social-Lingüístico, Educación Física) y de diferentes universidades andaluzas. El cuestionario estaba formado por las escalas de Motivación Académica, Compromiso Académico, Resiliencia e Intención de Ser Docente y, para dar respuesta al objetivo, se realizó un análisis descriptivo y de correlación, así como un análisis de la varianza (ANOVA). Los hallazgos, por un lado, evidencian valores significativos más elevados de las conductas motivacionales menos autodeterminadas de los profesores en formación de Educación Física en comparación con el resto de las especialidades. Por otro lado, se demuestra que los docentes en formación de Educación Física son más resilientes que el resto de futuros profesores.

Como conclusiones del presente trabajo de tesis doctoral, por un lado, se proporcionan evidencias de que, en un contexto resiliente, para elevar el compromiso académico entre el profesorado en formación se recomienda a los docentes utilizar estilos centrados en la provisión de autonomía. Por otro lado, mediadores psicológicos o climas socio-contextuales que promuevan la motivación controlada en profesorado en formación estimularán el compromiso del alumnado. Además, en este trabajo de tesis también se concluye que los futuros maestros de primaria están intrínsicamente más motivados en sus estudios que los futuros docentes de secundaria. Por último, se desprende que entre los estudiantes de las

diferentes especialidades del MAES, los de Educación Física presentan conductas motivacionales menos autodeterminadas que el resto de las especialidades.

Palabras clave: teoría de la auto-determinación, motivación académica, Educación Física, compromiso académico, profesorado en formación, intención de ser docente.

ABSTRACT

Abstract

Teacher education is considered one of the quality indicators of the educational system. In the teacher education process, pre-service teachers develop crucial skills and attitudes to cope with the barriers and challenges encountered not only during their initial teacher education programme, but also in their future professional work in an education institution. However, some pre-service teachers may not have the skills required to develop their training programme successfully. Thus, understanding the relationship between contextual and motivational factors with cognitive variables during the teacher education process could provide scientific evidence to improve the quality of teacher education programmes. Therefore, the main objective of this doctoral thesis was to analyse the relationship between contextual and motivational variables, together with cognitive variables in pre-service teachers, focusing on the differences between PE and other fields of knoledge.

In order to approach the main purpose of this doctoral thesis, different studies were proposed. In the first study, the mediating role of motivational climate between interpersonal teaching style and academic engagement in pre-service teachers in a resilient context was analysed. A total of 1410 university students in initial teacher training participated (59.6% female, 40.3% male; 0.1% other; M_{age}=23.85; *SD*=5.13). Each participant completed different scales measuring Interpersonal Teaching Style in Higher Education, Motivational Climate in Higher Education, Academic Engagement Questionnaire and Resilience. The model results of the mediation analysis show, on the one hand, the importance of the autonomy-supportive interpersonal teaching style on the academic engagement of pre-

service teachers. On the other hand, mastery climate acted as a mediator between autonomy support and academic engagement. In addition, the controlling style positively predicted academic engagement.

The second study aimed to analyse the mediation of academic engagement and the dark side motivational variables between disempowering motivational climate and intention to become a teacher in pre-service. In this research the sample is the same as in the first study, but in this case, each participant completed the scales of Academic Engagement, Frustration of Basic Psychological Needs in Educational Context, Intention to be a Teacher, Disempowering Motivational Climate and Academic Motivation. A correlation and descriptive analysis of the scales was carried out and a latent variable structural equation model was hypothesised. The results derived from the structural equation model show the prediction of the disempowering motivational style on the negative side of motivation and its influence as a negative promoter of the intention to become a teacher in pre-service teachers. However, the particularity of controlled motivation as a promoter of academic engagement is also shown.

The third study tested the interaction effects of gender and type of studies (Degree/MAES) on motivational forms and academic engagement. For this purpose, 920 university students from the MAES and the Primary Education Degree in Physical Education between the ages 20 and 57 years (569 male; 351 female; M_{age}=24.73; *SD*=5.34). They completed a questionnaire consisting of the Academic Motivation Scale and the Academic Engagement Questionnaire. Specifically, descriptive statistics were calculated and a multivariate analysis of variance was carried out. The findings, on the one hand, show higher values for intrinsic motiva-

tion and academic engagement in females, while in males, the highest averages were for external regulation and amotivation. On the other hand, according to the type of studies, undergraduate students had high averages in intrinsic motivation factors and in all forms of less self-determined regulation, except external regulation and demotivation.

In the fourth study, the mediating role of academic motivation between basic psychological needs and academic engagement in pre-service teachers was analysed. The sample used for this purpose is the same as in the previous study, but in this case, each participant completed the scales of Satisfaction of Basic Psychological Needs in Education, Academic Motivation and Academic Engagement Questionnaire. Findings from structural equation modelling with latent variables revealed that autonomy, competence and novelty satisfaction positively predict autonomous motivation and negatively predict amotivation. Moreover, autonomous motivation and controlled motivation positively predict academic engagement, whereas demotivation is negatively associated with it.

The aim of the fifth study was to analyse the motivational and cognitive variables of Physical Education preservice teachers, comparing the results with other areas of knowledge at the beginning of the MAES. A total of 747 future secondary school teachers (48.3% female; 51.0% male; 0.7% other; M_{age}=25.56, SD=4.92) from different subject areas (i.e., STEM, Artistic, Social-Linguistic, Physical Education) and different Andalusian universities participated. The questionnaire consisted of the Academic Motivation, Academic Engagement, Resilience and Teaching Intention scales and, in order to answer this, a descriptive and correlation analysis was carried out, as well as an analysis of variance (ANOVA). The findings, on the

one hand, show significant higher values of less self-determined motivational behaviours of pre-service teachers of Physical Education compared to the rest of fields of knowledge. On the other hand, it is shown that Physical Education pre-service teachers are more resilient than other future teachers.

As conclusions of this doctoral thesis work, on the one hand, evidence is provided that, in a resilient context, to increase academic engagement among pre-service teachers, it is recommended that teachers use styles that focus on providing autonomy. On the other hand, psychological mediators or socio-contextual climates that promote controlled motivation in pre-service teachers will stimulate student engagement. Furthermore, this thesis shows as a conclusion that future primary school teachers are intrinsically more motivated in their studies than future secondary school teachers. Finally, it was found that among the MAES specialties, Physical Education had less self-determined motivational behaviours than the rest of field of knowledge.

Keywords: self-determination theory, academic motivation, physical education, academic engagement, pre-service teachers, intention to become a teacher.

INTRODUCCIÓN

Marco Teórico

El auge y progreso de una sociedad depende en gran medida del sistema educativo (López García & Durán Romero, 2021). En este sentido, autores como Muñiz-Rodríguez et al. (2016) enfatizan que una adecuada preparación e intervención profesional por parte de los docentes constituyen factores destacados para el buen funcionamiento del sistema educativo. Los programas de formación docente han constituido la piedra angular para mejorar las habilidades y destrezas de los futuros docentes con el objetivo de minimizar el impacto producido entre el proceso de formación y el desempeño de la profesión docente (Meeus et al., 2018; Muñiz-Rodríguez et al., 2021). Por ello, resulta interesante, en este ámbito, estudiar los factores predictores de resultados educativos, así como las formas motivacionales que afectan al profesorado en formación inicial durante su proceso formativo.

La formación inicial docente tiene como uno de sus objetivos despertar en el futuro profesorado una motivación para la adquisición de nuevos procesos y aprendizajes que mejoren, en consecuencia, su desempeño laboral como docentes (Rosales, 2014). En este sentido, siguiendo a autores como Tang et al. (2020), cabe destacar que el alumnado que durante su proceso de formación docente incremente su interés profesional, dotado por un correcto desarrollo del proceso de formación, ayudará a su inserción en el mundo laboral. Por ello, resulta de interés para el ámbito de la formación docente entender cómo influyen los climas socio-contextuales generados por el formador de docentes sobre las variables motivacionales y cognitivas que afectan al futuro profesorado durante su proceso de formación inicial.

Variables Socio-Contextuales

Avances recientes en el ámbito educativo han tratado de examinar cómo repercuten los entornos socio-contextuales de aula en la formación inicial docente. Una de las teorías que puede dar explicación a estos avances es la Teoría de las Metas de Logro (AGT, por sus siglas en inglés; Ames, 1992). La AGT expone que, en una situación rela-

cionada con el logro, la motivación de una persona y los comportamientos asociados se ven influenciados según cómo se percibe el éxito y se evalúa la competencia. En este sentido, los climas motivacionales indican como influyen los diferentes factores de meta sobre el logro en el ámbito educativo (Alonso-Tapia et al., 2019). Según la AGT se pueden distinguir dos climas motivacionales: el clima motivacional hacia la maestría (i.e., centrado en la cooperación entre estudiantes, y el éxito se encuentra basado en el proceso de aprendizaje) y clima motivacional hacia el rendimiento (i.e., basa el éxito en criterios normativos e interpersonales, se ofrece una respuesta punitiva ante errores, existe rivalidad entre los estudiantes, y favorece el éxito basado en criterios normativos e interpersonales) (Ames, 1992; Walling & Duda, 2016).

Otra de las teorías con más respaldo en el campo educativo que estudia los ámbitos socio-contextuales en la formación docente es la Teoría de la Autodeterminación (SDT, por sus siglas en inglés; Ryan & Deci, 2017, 2020). La SDT considera, según la manera en la que el formador del profesorado interactúa, se comunica y se relaciona con el profesorado en formación inicial, distintos estilos interpersonales (Ryan & Deci, 2020; Ryan et al., 2021). De esta manera, se distingue, al menos, entre un estilo de apoyo a la autonomía (i.e., referido a aquellas estrategias docentes que proporcionan al estudiante oportunidades para elegir y tomar decisiones, explicaciones argumentadas de las tareas, reconoce las opiniones del alumnado e identifica sus intereses) y un estilo controlador (i.e., referido a aquellas estrategias docentes que presionan al alumnado para que piense, se comporte y sienta de la manera preestablecida por el docente) (Aelterman et al., 2019; Ryan & Deci, 2020; Ryan et al., 2021).

En esta línea, recientemente Duda y Appleton (2016) sugirieron una reconceptualización del clima motivacional integrando diferentes dimensiones del ambiente social de la AGT (Ames, 1992) y del estilo motivacional dentro de la SDT (Ryan & Deci, 2017). Concretamente, la nueva conceptualización planteada por Duda y Appleton (2016) es llevada a cabo en el mundo deportivo, y autores como Milton et al. (2018) y Mastagli et al.

(2021) lo llevan al ámbito de la Educación Física (EF), mientras que autores como Granero-Gallegos et al. (manuscrito en revisión) lo desarrollan en el campo de la formación inicial del profesorado. En este sentido, esta mencionada reconceptualización combina ambas teorías (i.e., AGT y SDT) en un clima multidimensional de mayor *empowering* o *disempowering*, capaz de influir en la forma de actuar, sentir y pensar de los alumnos (Duda & Appleton, 2016; Mastagli et al., 2021). Sin embargo, a pesar de que la conceptualización de estos dos climas se ha dado de manera conjunta (ver Duda & Appleton, 2016), el clima motivacional *disempowering* apenas ha recibido atención entre la literatura científica (Mastagli et al., 2021). La escasa literatura reciente (Milton et al., 2018; Solstad et al., 2020) se ha centrado en la evaluación de las propiedades psicométricas de la escala o, aunque hayan evaluado ambos climas (Granero-Gallegos et al., manuscrito en revisión; Guo et al., 2022), no han profundizado en el desarrollo de este clima socio-contextual sobre las consecuencias motivacionales y cognitivas de los estudiantes.

Variables Motivacionales

La SDT representa una estructura motivacional amplia a la hora de estudiar la influencia socio-contextual sobre la motivación y la conducta humana (Ryan & Deci, 2017). Un eje central de la SDT postula que las conductas motivacionales se encuentran apoyadas por la satisfacción o frustración de las necesidades psicológicas básicas (BPN, por sus siglas en inglés). Las BPN son entendidas como nutrientes esenciales y universales para el óptimo desarrollo del crecimiento y bienestar. Concretamente, la SDT postula la existencia de cuatro BPN: autonomía (i.e., experiencia de voluntad y capacidad de decisión que tiene el individuo sobre sus propias acciones), relación con los demás (i.e., sentimiento de ser aceptado y conectado con los demás), competencia (i.e., deseo de sentirse eficaz y capaz en las actividades que se realiza) y, por último, la novedad, recientemente aceptada como una necesidad psicológica básica más dentro de la SDT (i.e., necesidad de experimentar algo que no se ha experimentado con anterioridad o que difiere

de la rutina diaria) (González-Cutre et al., 2020; Ryan & Deci, 2020; Vansteenkiste et al., 2020).

La SDT postula que la satisfacción de las BPN energizará la motivación autónoma, así como las consecuencias afectivas, cognitivas y comportamentales de carácter adaptivas (Ryan & Deci, 2020). En este sentido, la motivación autónoma refleja la adopción de la conducta en base a experiencias guiadas por el disfrute y la búsqueda de nuevos horizontes, su alineamiento con los valores y metas personales, y por la identificación de sus beneficios. Por el contrario, la frustración de las BPN facilitará la motivación controlada y la desmotivación, así como los resultados afectivos, cognitivos y comportamentales de carácter desadaptativos (Ryan & Deci, 2020). Por ello, la motivación controlada es definida como la acción conductual emprendida por experiencias basadas tanto en presiones externas como en la ausencia de regulación hacia el comportamiento deseado, mientras que la desmotivación corresponde a la total ausencia de intencionalidad hacia la conducta deseada. En este sentido, resulta relevante estudiar los procesos motivacionales del profesorado en formación inicial.

Variables Cognitivas

La investigación en el contexto de la formación inicial docente ha señalado la importancia de conocer variables como la resiliencia (Mansfield & Beltman, 2019), la intención de ser docente (Burgueño et al., 2022), y el compromiso académico (Granero-Gallegos et al., 2022), entre el futuro profesorado.

Recientemente, se ha evidenciado la relevancia de investigar los niveles de resiliencia de futuros docentes (O'Brien et al., 2020). Sin embargo, el desarrollo de la pandemia provocada por la COVID-19 ha incrementado su relevancia en el ámbito de la formación inicial docente (e.g., Granero-Gallegos et al., 2023). La resiliencia se definide como la capacidad para recuperarse y mantener una conducta adaptativa después del abandono o la incapacidad al iniciarse un evento estresante (Notario-Pacheco et al., 2011). De esta manera, la resiliencia ha sido destacada como una estrategia para mejo-

rar el bienestar subjetivo en el ámbito de la formación docente (Mansfield & Beltman, 2019), por lo que futuros profesores podrán construir una alta identidad como docente (Krisdianata & Mbato, 2022).

Por otro lado, el compromiso ha sido otra de las variables posicionada como piedra angular en el proceso de la formación docente. Schaufeli et al. (2002) definen el compromiso académico como el estado mental positivo caracterizado por altos niveles de energía, entusiasmo e inmersión en acciones en las que el tiempo pasa desapercibido. La evidencia científica ha operativizado el compromiso académico a través de tres dimensiones: dedicación (i.e., percepción de una elevada implicación con los estudios), absorción (i.e., percepción de elevados niveles de inmersión en tareas académicas), y vigor (i.e., percepción de elevados niveles de energía durante la actividad educativa) (Schaufeli et al., 2006). Estudios previos han puesto de manifiesto la relación entre el compromiso académico y eficacia docente (Kim & Corcoran, 2018), intención de completar el proceso de formación (Rots et al., 2014), y persistencia durante el programa de formación docente (Fokkens-Bruinsma & Canrinus, 2015).

Además, la evidencia en el ámbito de la formación inicial del profesorado actual ha reflejado la importancia de examinar los niveles de intención de ser docente entre los futuros profesores (Burgueño et al., 2022; Fokkens-Bruinsma & Canrinus, 2015). La intención de ser docente es una variable creada a partir de la intención conductual, englobada dentro de la Teoría del Comportamiento Planificado (TPB, por sus siglas en inglés; Ajzen, 1991). Según esta teoría, la intención de comportamiento futuro es un antecedente del grado de implicación conductual de un estudiante para tener una conducta concreta. Así, las intenciones previas hacia el comportamiento docente se consideran consecuencias cognitivas relevantes para el futuro ejercicio profesional del profesorado en formación.

Hipótesis y Objetivos

Teniendo en cuenta lo expuesto anteriormente, resulta de interesante para el ámbito de la formación inicial del profesorado entender cómo se relacionan los climas socio-contextuales generados por el formador de docentes con las variables motivacionales y cognitivas que afectan al futuro profesorado durante su formación. De igual forma, hasta nuestro conocimiento, no se han realizado estudios que comparen los resultados de variables motivacionales y cognitivas entre diferentes ámbitos de conocimiento (i.e., EF, STEM, Artístico, Social-Lingüístico). Atendiendo a todo lo anterior, en esta tesis doctoral se plantean los siguientes objetivos e hipótesis:

- Estudio 1:
  - Objetivo:
    - Analizar la mediación del clima motivacional entre el estilo interpersonal docente y el compromiso académico en profesorado en formación en un contexto resiliente.
  - Hipótesis:
    - El estilo actitudinal de apoyo a la autonomía estará positivamente relacionado con el compromiso académico (H1).
    - El estilo actitudinal controlador estará negativamente relacionado con el compromiso académico (H2).
    - El clima motivacional hacia la tarea estará positivamente asociado con el compromiso académico (H3).
    - El clima motivacional orientado al ego estará negativamente asociado con el compromiso académico (H4).
    - El clima motivacional orientado a la tarea actúa de mediador positivo entre el estilo de apoyo a la autonomía y el compromiso académico (H5).
    - El clima motivacional orientado al ego actúa como mediador

negativo entre el estilo controlador y el compromiso académico (H6).

- Estudio 2:
  - Objetivo:
    - Analizar la mediación del compromiso académico y las variables motivacionales del "lado oscuro" (*dark side*) (i.e., motivación controlada, desmotivation, y frustración de las necesidades psicológicas básicas) entre el clima motivacional *disempowering* y la intención de ser docente en profesorado en formación inicial.
  - Hipótesis:
    - El clima *disempowering* predecirá negativamente la intención de ser docente (H1).
    - El "lado oscuro" de la motivación mediará negativamente la relación entre el clima *disempowering* y la intención de ser docente (H2).
    - El compromiso académico precedido por el "lado oscuro" de la motivación mediará la relación entre el clima *disempowering* y la intención de ser docente (H3).
- Estudio 3:
  - Objetivo:
    - Analizar los efectos de interacción del sexo y el tipo de estudios cursados sobre las formas motivacionales y el compromiso académico en futuros docentes de educación primaria y educación secundaria de EF.

- Estudio 4:
  - Objetivo:
    - Analizar las relaciones predictivas de la satisfacción de las necesidades psicológicas (i.e., autonomía, competencia, relación con los demás, novedad) básicas sobre el compromiso académico a través de las calidades motivacionales en futuros docentes de EF.
  - Hipótesis:
    - La autonomía se asociará positivamente con la motivación autónoma y negativamente con la motivación controlada y la desmotivación (H1).
    - La competencia se asociará positivamente con la motivación autónoma y negativamente con la motivación controlada y la desmotivación (H2).
    - La relación con los demás se asociará positivamente con la motivación autónoma y negativamente con la motivación controlada y la desmotivación (H3).
    - La novedad se asociará positivamente con la motivación autónoma y negativamente con la motivación controlada y la desmotivación (H4).
    - La motivación autónoma se relacionará positivamente con el compromiso académico (H5).
    - La motivación controlada se relacionará positivamente con el compromiso académico (H6).
    - La desmotivación se relacionará positivamente con el compromiso académico (H7).

- Estudio 5:
  - Objetivo:
    - Analizar las variables motivacionales (i.e., motivación académica) y cognitivas (i.e., resiliencia, compromiso académico e intención de ser docente) en profesorado en formación de EF, comparando los resultados con otros ámbitos de conocimiento (STEM, Social-Lingüístico, Artístico) al inicio del Máster en Profesorado de Educación Secundaria Obligatoria y Bachillerato, Formación Profesional y Enseñanza de Idiomas (MAES).

Diseño General de la Tesis

En esta tesis doctoral, en primer lugar, se plantea un análisis con el objetivo de estudiar el efecto del clima motivacional como mediación entre los estilos interpersonales docentes y el compromiso académico en estudiantes de MAES (futuros docentes). Además, esta investigación se lleva a un contexto resiliente, dado que los participantes provienen del confinamiento general de la población como consecuencia de la COVID-19. Participaron 1410 estudiantes en formación inicial a docentes de educación secundaria (M_{edad}=23.85, *DT*=5.13; 59.6% mujeres, 40.3% hombres, 0.1% otro) de diferentes universidades andaluzas. Los datos se recabaron al final del proceso formativo de los estudiantes. Los resultados sugieren que, en un contexto resiliente, caracterizado por la formación online, el estilo interpersonal de apoyo a la autonomía, mediado por el clima motivacional de aula hacia la tarea, incrementa el compromiso académico de los estudiantes. Por el contrario, en este estudio se evidencia que las variables socio-contextuales de carácter negativo (i.e., estilo controlador y clima orientado hacia el rendimiento) no incrementan el compromiso académico. Como parte de los resultados, se identificaron algunas incongruencias con los postulados de la SDT (i.e., el estilo interpersonal controlador predice positivamente el compromiso académico).

Al hilo de estos resultados del estudio 1, resulta de especial relevancia abordar de manera concreta el llamado “lado oscuro” (*dark side*) de la SDT. Para ello, con los mismos participantes del estudio 1, se propone un modelo de ecuaciones estructurales con el objetivo de analizar la mediación del compromiso académico y las variables motivacionales del lado negativo entre el clima motivacional *disempowering* y la intención de ser docente en profesorado en formación inicial (estudio 2). Los resultados ofrecen incoherencias con la literatura provocadas por la identificada relación positiva entre la motivación controlada y el compromiso académico. Por este motivo, se plantea la incógnita de si la duración del proceso de formación de los futuros docentes influye en la regulación positiva de conductas motivacionales externas que alumnado del MAES ha evidenciado. En

este sentido, se decide abordar el análisis de los tipos de motivación en función de los tipos de estudios (secundaria / primaria) a través de una nueva toma de datos que englobe alumnado de educación primaria de EF y futuros docentes del MAES de la especialidad de EF (estudio 3). Se concreta en EF por afinidad para las repercusiones prácticas de los principales investigadores.

De esta manera, se aborda el tercer estudio de la presente tesis con el objetivo de analizar los efectos de interacción del sexo y el tipo de estudios cursados sobre las formas motivacionales y el compromiso académico en futuros docentes de EF. Para ello, fueron recogidos los datos al final de la formación como futuros docentes de 920 estudiantes (61.8% varones; M_{edad}=24.73, *DT*=5.34; 60.8% de Grado en Educación Primaria, 39.2%, MAES) de diversas universidades andaluzas y se realizó un análisis multivariante de la varianza (MANOVA) teniendo en cuenta las variables sexo y tipo de estudios (primaria / MAES). Los principales hallazgos muestran la existencia de diferencias significativas según el sexo y tipo de estudios, tanto en la motivación como en el compromiso académico. Concretamente, los estudiantes del grado de primaria mostraron valores promedios más altos que el alumnado de máster en las conductas motivacionales externas (i.e., motivación intrínseca a la estimulación, motivación intrínseca al logro, motivación intrínseca al conocimiento), pero también en algunas externas (i.e., regulación integrada, regulación identificada, y regulación introyectada). Debido a la particularidad de los hallazgos obtenidos se cuestiona el grado de relación que existiría en la presente muestra siguiendo la secuencia lógica de la SDT (i.e., Factores sociales → Mediadores psicológicos → Motivación → Consecuencia) (estudio 4).

Al hilo de los resultados del estudio anterior, se plantea un modelo de mediación con ecuaciones estructurales controlado por sexo que incluye las variables motivacionales de la SDT en la muestra futuros docentes de primaria y de secundaria (estudio 4). Para ello, el objetivo fue analizar el rol mediador de la motivación académica entre las necesidades psicológicas básicas y el compromiso académico en futuros docentes. Los

principales resultados mostraron que las conductas motivacionales no siguieron los postulados de la SDT (i.e., las calidades motivacionales menos autodeterminadas deben de reducir las consecuencias). Por este motivo, dado que los dos últimos estudios se han focalizado en EF, se decide abordar el análisis de las variables motivacionales y cognitivas al inicio del proceso formativo como docentes y, por ello, se plantea entre estudiantes de máster, pero en este caso comparando los futuros docentes de EF con el resto de las especialidades (estudio 5).

Finalmente, el estudio 5 tiene como objetivo analizar las variables motivacionales y cognitivas (i.e., motivación académica, resiliencia, compromiso académico e intención docente) de profesorado en formación de Ef, comparando los resultados con otros ámbitos de conocimiento (i.e., STEM, Artístico, Social-Lingüístico) al inicio del MAES. Participaron un total de 747 futuros docentes de diferentes ámbitos de conocimiento (i.e., STEM, Artístico, Social-Lingüístico, EF) de diferentes universidades andaluzas. Los principales resultados mostraron diferencias significativas en las regulaciones positivas (motivación al logro) y las negativas (regulación integrada, regulación externa, amotivación) más altas en el profesorado en formación de EF. Al mismo tiempo, entre los ámbitos estudiados, el profesorado en formación de EF mostró una conducta más resiliente.

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PUBLICACIÓN 1

Teaching Style and Academic Engagement in Pre-service Teachers during the COVID-19 Lockdown. Mediation of Motivational Climate

Estudio 1

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Este artículo ha sido publicado:

López-García, G. D., Carrasco-Poyatos, M., Burgueño, R., & Granero-Gallegos, A. (2022). Teaching Style and Academic Engagement in Pre-service Teachers during the COVID-19 Lockdown. Mediation of Motivational Climate. *Frontiers in Psychology, 13,* 992665. https://doi.org/10.3389/fpsyg.2022.992665

Información factor de impacto (FI) Journal Citation Report (JCR):

- Revista situada en primer cuartil (Q1; 34/147), categoría Psychology, Multidisciplinary (Social Sciences Citation Index, SSCI). FI año 2022: 3.8

Teaching Style and Academic Engagement in Pre-service Teachers during the COVID-19 Lockdown. Mediation of Motivational Climate

Abstract

COVID-19 and the resulting confinement has had a great impact on the educational environment. Although research in initial teacher education has focused on studying the factors that lead to increased academic engagement, there is no evidence that examines the role of teacher interpersonal style and motivational classroom in a virtual learning context. The aim of this research was to analyse the mediating role of motivational climate between teacher interpersonal style (i.e., autonomy support and controlling style) and academic engagement climate in pre-service teachers in a resilient context. The research design was observational, descriptive, cross-sectional, and non-randomized. A total of 1410 university students (pre-service teachers) participated (M_{age}=23.85; *SD*=5.13) (59.6% female; 40.3% male; 0.1% other). The scales of interpersonal teaching style, classroom motivational climate, academic commitment, and resilience were used, and a structural equation analysis with latent variables was carried out controlling resilience and gender. The results of the structural equation model show the importance of student perception of teacher autonomy support on academic engagement of the pre-service teachers, as well as the mediation of the mastery climate between autonomy support and academic engagement. For this reason, in order to increase academic engagement in pre-service teachers, it is recommended the use of motivating styles and instructional strategies focused on supporting the decision-making process, initiative, and significant learning.

Keywords: autonomy support, controlling style, mastery motivational climate, performance motivational climate, resilience.

Introduction

The situation caused by the COVID-19 pandemic has meant a change of approach to the teaching-learning process at all educational levels, including in initial teacher training (Camargo et al., 2020). During the first phase of the pandemic, characterized by a period of confinement, initial teacher training programmes had to adapt quickly and abruptly to the new training reality, which meant moving from a face-to-face training model to a virtual one (Lorenzo-Lledó et al., 2021). For pre-service teachers, this new scenario meant facing both the inconveniences related to a virtual educational model (e.g., lack of digital competence, lack of technological resources, problems with the Wi-Fi connection, or lack of planning), and with their home conditions (e.g., sharing spaces with other family members, stress, or difficulties in concentrating), which led to them experiencing low engagement levels towards their initial training programme (Scull et al., 2020).

Academic engagement has been identified as the cornerstone of all educational outcomes as it is closely linked to the quality of the training process for every student, including pre-service teachers (OECD, 2014). Indeed, it is thought that academic engagement could be influenced to a greater extent by the role that the teacher trainer, as a teacher, might adopt within the classroom. According to the Achievement Goal Theory (AGT; Ames, 1992), the teacher's role is recognized as being amongst the environmental factors that can influence different variables at the academic level (e.g., academic engagement) and that the motivational climate generated in the classroom by the teacher is so important that some authors emphasize it may be responsible for the academic success or failure of students (Ntoumanis & Biddle, 1999). Previous studies (Mastagli et al., 2021; Milton et al., 2018) have shown the need to combine Self-Determination Theory (SDT; Ryan & Deci, 2017) with the AGT (Ames, 1992) when delving into the influence of the classroom social environment, for example, taking into account the interpersonal

teaching style. However, to date, no recorded studies have examined the effects of the classroom social environment generated by the teacher trainer on the academic engagement of pre-service teachers during confinement, a period characterized by a virtual training model and a resilient environment (i.e., one that favours both the capacity for recovery in the face of adversity and for adapting to changing demands; Tugade & Fredrickson, 2004). Therefore, this research aims to analyse the potential role that social and environmental factors in the classroom (i.e., interpersonal teaching style and motivational climate) might play in favouring academic engagement in future teachers within a resilient context, acquiring an important role in the context provoked by the COVID-19 pandemic.

Academic Engagement

Academic engagement has been conceptualized as the positive affective and mental state related to academic work, characterized by high levels of energy, enthusiasm, and immersion in activities in which time goes by unnoticed (Schaufeli et al., 2006). The previous research (Schaufeli et al., 2006) operationalized academic engagement through the dimensions of vigour (the perception of high energy levels during study), dedication (the perception of high involvement in studies) and absorption (the perception of high levels of immersion and concentration presented by any academic task). Previous studies have shown the positive relationship between academic engagement and a number of adaptive educational consequences, such as persistence during the teacher training programme (Fokkens-Bruinsma & Canrinus, 2015), teacher effectiveness (Kim & Corcoran, 2018) and the intention to complete the training programme (Rots et al., 2014), amongst teachers in initial training. Given the importance of academic engagement to the training process of the future, it is necessary to delve into those factors that might determine it in the context of initial teacher training. Specifically, previous research has shown that academic engagement could be greatly influenced by an environment characterized by resilience (Ojo et al., 2021; Wang et al., 2021; Zhang et al., 2021), as well as by prior motivational experiences (Howard et al., 2021). Accordingly, the possible role of the moti-

vational climate in the classroom is considered a proximal factor of teachers' academic engagement in initial training (OECD, 2014).

Motivational Climate

One of the theories that can explain the motivational aspects related to academic engagement is the AGT (Ames, 1992). AGT is a verified theory in the educational field. It states that, in an achievement-related situation, a person's motivation and associated behaviours are affected by how success is perceived, and how competence is evaluated. Motivational climates indicate how the different goal factors of the educational context influence achievement in the school environment (Alonso-Tapia et al., 2019). According to the AGT, there are two predominant motivational climates in social contexts of achievement situations: the mastery climate (MC) and the performance climate (PC) (Walling & Duda, 2016). The MC refers to that focused on cooperation between students, where each plays a role in the class and success is based both on the learning process and on intrapersonal criteria related to effort and personal improvement. The PC favours success based on normative and interpersonal criteria, where a punitive response to errors is found and where there is rivalry between students (Ames, 1992). According to the existing literature, the motivational climate in the classroom can affect the adaptive patterns of students (Madjar et al., 2019). Conversely, PC is negatively related to variables such as perceived competence (Granero-Gallegos et al., 2021) and academic performance (Gutiérrez & Tomás, 2018). Various studies have shown that a positive MC is associated with better cognitive and motivational outcomes, including academic engagement (Patrick et al., 2011; Reyes et al., 2012). Research has also suggested that the motivational climate in the classroom might be partly due to the type of teaching style used by the teacher trainer (Granero-Gallegos et al., 2021).

Interpersonal Teaching Style

SDT understands interpersonal style to be the way in which the teacher trainer interacts, communicates, and relates to teachers in initial training during the teacher-training

programme (Ryan & Deci, 2020; Ryan et al., 2021). SDT differentiates at least two types of interpersonal styles - a support for autonomy style, referring to those teaching strategies that provide the student with opportunities to choose and make decisions, giving reasoned explanations for tasks, recognizing the opinions of students and identifying their interests (Ryan & Deci, 2020; Ryan et al., 2021), and a controlling style, referring to those teaching strategies that pressure students into thinking, behaving and feeling in a way that is pre-established by the teacher, where the teacher imposes his/her own agenda and the requirements to be met by the student, regardless of the students' interests (Ryan & Deci, 2020; Ryan et al., 2021).

SDT-based research has shown that the autonomy support style and the controlling style are two independents, yet related, variables (Opdenakker, 2021; Reeve et al., 2014; Ryan & Deci, 2017). This implies that both interpersonal styles can coexist in the same context and contribute in a differentiated way to the prediction of specific consequences. Specifically, it is argued that the autonomy support style would not only favour positive consequences but would also dampen negative experiences. Conversely, it is believed that the controlling style would facilitate maladaptive consequences and, at the same time, undermine positive experiences (Opdenakker, 2021). Previous studies with university students have observed that the autonomy support style was positively related to both MC (Granero-Gallegos et al., 2021) and to academic engagement (Jiang & Zhang, 2021; Ma, 2021). In contrast, the controlling style was positively associated with maladaptive consequences, such as PC (Moreno-Murcia et al., 2018), while it was negatively related to adaptive consequences (Moreno-Murcia et al., 2018).

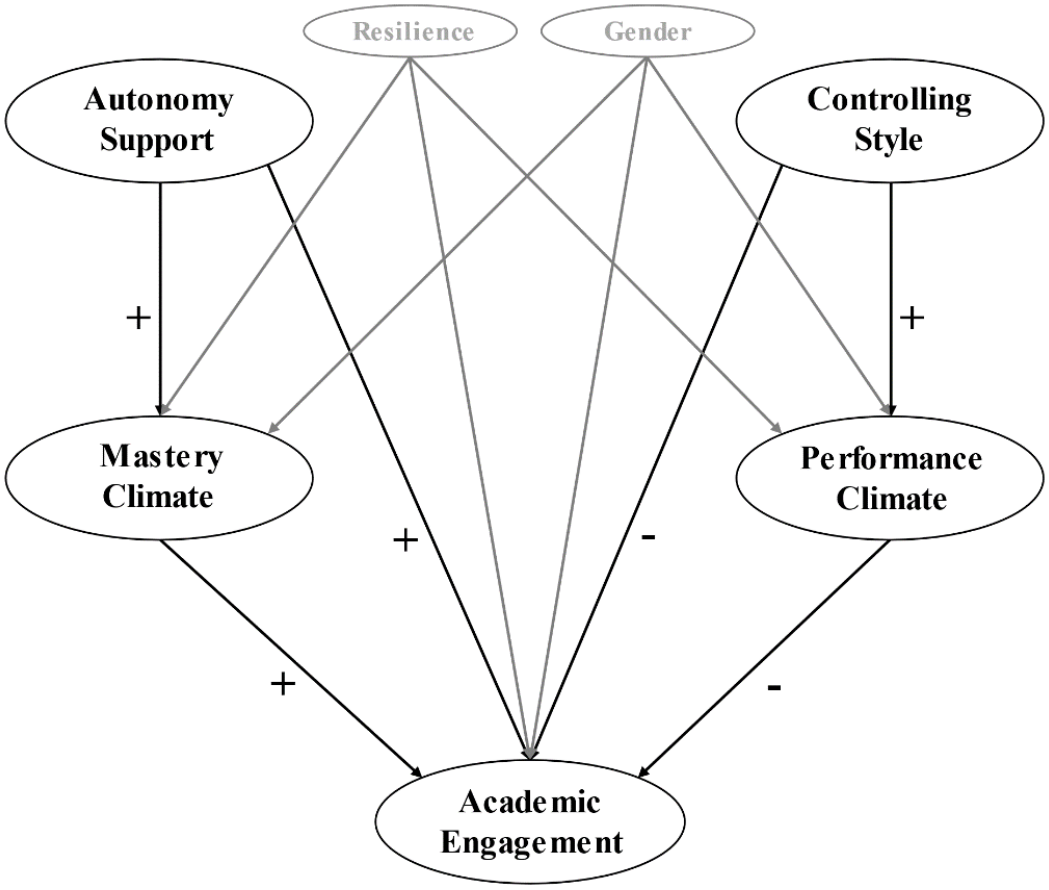
The Present Study

Despite the importance attributed to academic engagement as a cornerstone of the pre-service teacher training process, little is known about the role that interpersonal style and the motivational climate generated by the teacher trainer might play in the academic engagement of pre-service teachers. To date, no scientific evidence has been

found that studies this relationship while also considering the resilience of pre-service teachers in terms of the motivational and cognitive abilities provoked by the pandemic environment caused by COVID-19. This aspect is also significant, and an important contribution to the scientific literature given the scarcity of studies looking at the influence of interpersonal teaching styles on motivational and cognitive variables affecting pre-service teachers in the pandemic period. Therefore, the objective of this study is to analyse the mediating role of the motivational climate between the interpersonal teaching style and academic engagement in trainee teachers in a resilient context. The following hypotheses were established: First, that the perception of autonomy support will be positively related to academic engagement (H1); second, that the controlling style will be negatively related to academic engagement (H2); third, that the MC will be positively associated with academic engagement (H3): fourth, that the PC will be negatively associated with academic engagement (H4); fifth, that the MC acts as a positive mediator between autonomy support and academic engagement (H5); and sixth, that the PC acts as a negative mediator between the controlling style and academic engagement (H6); (Figure 1). The *Strengthening the Reporting of Observational Studies in Epidemiology* (STROBE) *Initiative* (Von Elm et al., 2007) was used for the study description.

Figure 1

Predictive relationships of the interpersonal teaching style on academic engagement through the mediating role of the motivational climate, controlling the gender and resilience variables



Note: ***p*<.001; R^2=explained variance; CI=confidence interval. The dashed lines represent non-significant relationships.

Method

Design

The research design was observational, descriptive, cross-sectional, and non-randomized. The sample was made up of university students from several Andalusian universities. The data were collected at the end of the 2020/2021 academic year. The following inclusion criteria were established: (i) to be a student of the Master's Degree in Secondary and Upper-Secondary Education Teaching, Vocational Training and Language Teaching or a student of a University Degree (face-to-face study) dedicated to the initial

training of teachers. The exclusion criteria were: (i) not consenting to the use of data in the study; (ii) not completely filling in the data collection form.

Instruments

Interpersonal Teaching Style in Higher Education (EIDES). The Spanish version by Granero-Gallegos et al. (2021) was used, comprising 11 items that measure the students' perception of the teacher's controlling style (6 items) (e.g., "My teacher has paid less attention to students he/she disliked") and support for teacher autonomy (5 items) (e.g., "My teacher has offered different opportunities and options during the class"). The responses were collected on a Likert scale ranging from 1 (*completely disagree*) to 5 (*completely agree*).

Motivational Climate in Higher Education (MCES). The Spanish version by Granero-Gallegos and Carrasco-Poyatos (2020) was used. The instrument comprises a total of seven items that make up two factors measuring the motivational climate of the classroom: the mastery climate (4 items) and the performance climate (3 items). The responses were collected on a Likert scale ranging from 1 (*completely disagree*) to 5 (*completely agree*).

Academic Engagement. The Spanish version of the *Utrecht Work Engagement Student Scale* (UWES-SS) (Schaufeli et al., 2002) was used. The instrument consists of 17 items that make up three factors: vigour (6 items) (e.g., "In my studies I feel full of energy"), dedication (5 items) (e.g., "My studies are stimulating and inspiring") and absorption (6 items) (e.g., "I am immersed and focused on my studies"). The responses were collected on a Likert scale ranging from 1 (*completely disagree*) to 5 (*completely agree*). Academic engagement was calculated as the average value of the scores for each of the factors that comprise it.

Resilience. The reduced version by Notario-Pacheco et al. (2011), adapted to the Spanish university context, was used. This instrument comprises 10 items (e.g., I can adapt to changes) that are organized in a dimension that measures resilience in young

adults. The responses were collected on a Likert scale ranging from 0 (*never*) to 4 (*always*). High scores on the scale indicate a high level of resilience.

Procedure

Firstly, the heads and teachers of the Faculties of Education Sciences and the Master's Degree in Secondary and Upper-Secondary Education Teaching, Vocational Training and Language Teaching were contacted to request permission and to ask for their collaboration in the research. The researchers then contacted the students by email. The data were collected using an online form throughout May 2021. The form briefly explained the importance of the research, the anonymity of the responses, the way to complete the scale, that the responses given would not affect any qualification in any way, and that the participants could stop participating in the study at any time. All participants gave their consent to be included in the study prior to participating. The research was conducted in accordance with the Declaration of Helsinki and the protocol was approved by the Bioethics Committee of the University of Almería (Ref: UALBIO2021/009).

Risk of Bias

Regarding the risk of bias, it should be noted that there was no sample randomization since convenience sampling was employed. However, there was blinding between the participants and the researchers in charge of data treatment and analysis. With respect to selection bias, participation was voluntary and communication with participants was conducted by email.

Sample size

An a priori analysis was carried out on the statistical power of the adequate sample size for meeting the study objective. Using the *Free Statistics Calculator* v.4.0 software (Soper, 2022), it was estimated that a minimum of 1401 participants were needed for f^2=.15 effect sizes with a statistical power of .99 and a significance level of α=.05 in a structural equation model with six latent variables and 32 observables variables. In the actual study, 1410 university students took part.

Data Analysis

The descriptive statistics of each factor were calculated as well as the asymmetry, kurtosis, Cronbach's alpha (α), and the correlation between dimensions, using SPSS v.27 software. The hypothesized predictive relationships of the interpersonal teaching style on academic engagement, mediated by the motivational climate, were verified with a structural equations model (SEM) of the latent variables using AMOS v.25. Following the proposal of Wang et al. (2017), model analysis was performed using the two-step method. In the first step, the saturated model was examined by relating all the dimensions to each other. In the second step, the predictive relationships of the hypothesized model were evaluated. The evaluation of the models was performed taking into account the following goodness-of-fit indices: the values of the χ^2/df ratio, CFI (*Comparative Fit Index*), TLI (*Tucker–Lewis Index*), RMSEA (*Root Mean Square Error of Approximation*) with its 90% confidence interval (CI), and SRMR (*Standardized Root Mean Square Residual*). For the χ^2/df ratio, values <5.0 are considered acceptable (Hu & Bentler, 1999); CFI and TLI values between .90 and .95, and RMSEA and SRMR values <.08, are considered to have acceptable goodness-of-fit indices (Hooper et al., 2008; Marsh et al., 2004). In addition, RMSEA values <.06 and SRMR values <.05 are considered to have excellent model goodness-of-fit indices (Hooper et al., 2008; Hu & Bentler, 1999). The internal consistency of each scale was evaluated with different parameters: α, composite reliability (CR), H coefficient, and AVE (*Average Variance Extracted*) to measure convergent validity. Reliability values ≥.70 and AVE values >.50 are considered acceptable (Dominguez-Lara, 2017; Hair et al., 2018).

In the hypothesized model, the following direct relationships were established: between the dimensions of the interpersonal teaching style and the two dimensions of motivational climate and academic engagement; and between MC, PC and academic engagement. Indirect relationships were established between autonomy support, controlling style and academic engagement through the MC and PC. As the Mardia coefficient values

were high (>123.67; p<.001), the analyses were performed using the maximum likelihood estimation method and the 5000-iteration *bootstrapping* procedure (Kline, 2016). In addition, R^2 was used for the effect sizes (ES) in order to improve the results interpretation, since it estimates the degree of influence by quantifying the variance percentage of the dependent variable explained by the predictors (Domínguez-Lara, 2017). The cut-off points were: 02, .13, and .26, for small, medium, and large effect sizes, respectively (Cohen, 1992). Furthermore, the confidence intervals (CI95%) were calculated to ensure that no R^2 value was <.02, as this is the minimum required for the interpretation.

Results

Participants

A total of 1410 university students participated (841 women, 568 men, 1 other) from the Master's Degree in Secondary and Upper-Secondary Education Teaching, Vocational Training and Language Teaching from eight Andalusian public universities (Spain). The age of the participants was between 21 and 60 years (*M*=23.85; *SD*=5.13). There were no missing values in the included sample data.

Preliminary Analyses

The descriptive statistics and the correlations between the study's latent variables are presented in Table 1.

Table 1

Descriptive statistics and correlation between variables

Variable	*M*	*SD*	Q1	Q2	*α*	CR	AVE	H	2	3	4	5	6
1.Autonomy Support	3.65	0.83	-0.38	-.25	.85	.82	.53	.83	-.36**	.38**	.79**	-.17	.56**
2.Controlling Style	2.30	0.95	0.44	-.51	.88	.88	.54	.88		-.15**	-.31**	.71**	-.07
3.Resilience	4.09	0.68	-0.40	-.62	.09	.89	.52	.90			.32**	-.04	.37**
4.Mastery Climate	3.88	0.76	-0.51	-.01	.78	.79	.51	.82				-.17	.59**
5.Performance Climate	2.47	0.97	0.45	-.29	.72	.74	.51	.84					-.02
6.Academic Engagement	3.51	0.82	-0.31	-.07	.90	.89	.54	.91					

Note. **The correlation is significant at the .01 level; *M*=mean; *SD*=standard deviation; Q1= skewness; Q2=Kurtosis; α=Cronbach's alpha; CR=composite reliability; AVE=average mean extracted; *H*=H coefficient.

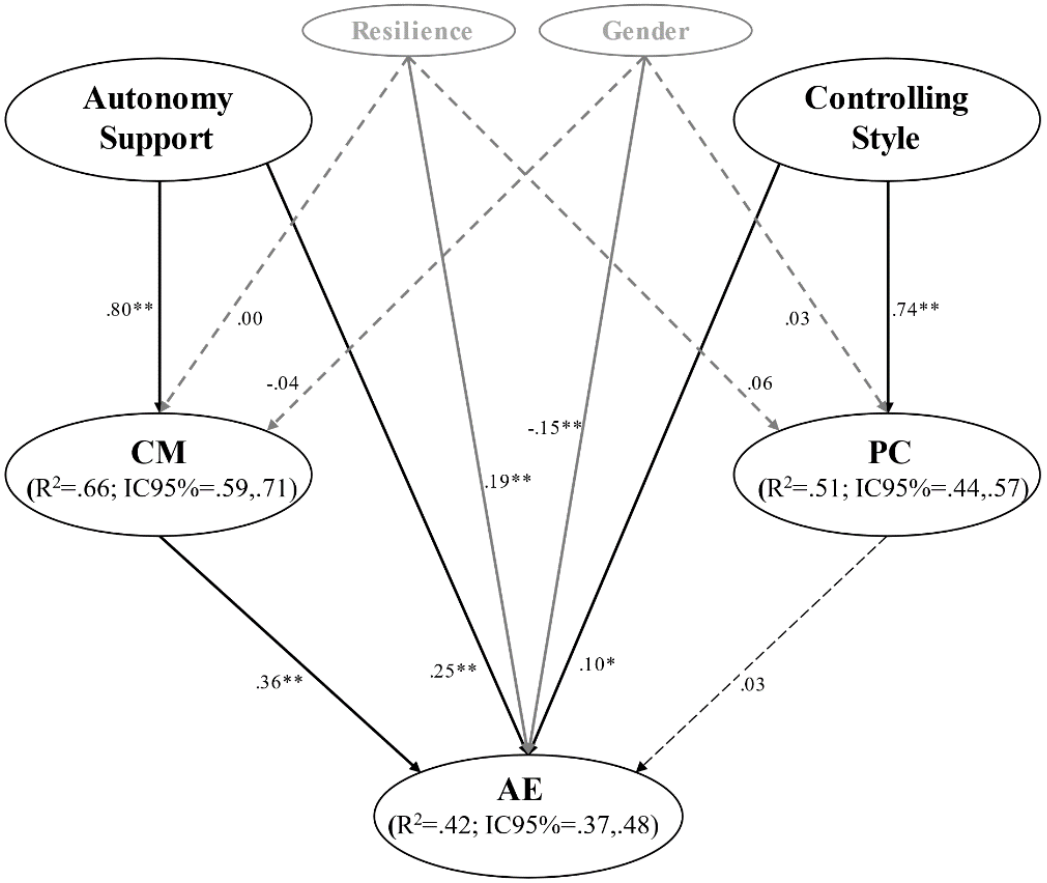
Main Analyses

In Step 1, the model presented acceptable goodness-of-fit indices: χ^2/df=2.662, p<.001; CFI=.944; TLI=.937; RMSEA=.043 (90%CI=.040; .045; p_{close}=1,000), SRMR=.049. In Step 2, the predictive SEM model showed the following acceptable goodness-of-fit index: χ^2/df=3.470, p<.001; CFI=.945; TLI=.938; RMSEA=.042 (90%CI=.040; .044; p_{close}=1,000), SRMR=.047. The explained variance was 63% for the MC, 51% for the PC, and 44% for academic engagement. In the SEM model, after controlling for gender and resilience, the direct relationships between the perception of a controlling style by the teacher and the MC, as well as the direct relationship between the PC and academic engagement, were not significant; nor were the direct effects of resilience on the two dimensions of motivational climate and PC on academic engagement. In contrast, the direct relationships between the perception of autonomy support and MC, and between PC and academic engagement, were statistically significant, as were the direct effects of the controlling style, the PC and academic engagement. Finally, the direct relationship between resilience and academic engagement was also statistically significant, as was the gender variable, which showed that, among women, the relationship between the prediction and academic engagement was higher.

Regarding the effects of mediation, the MC was a mediator between the teacher autonomy support style and academic engagement (β=.29; p<.001). However, the PC did not act as a mediator between any of the interpersonal teaching style factors and academic engagement. With regard to the total effects, it is noteworthy that the prediction of the perception of autonomy support on academic engagement, mediated by the MC, supposes an increase in the predictive relationship (β=.54; p<.001) between the above two variables. Figure 2 shows the CI(95%) of R^2, which can be considered as ES measures (Dominguez-Lara, 2017) and, in all cases, this is large.

Figure 2

Predictive relationships of the interpersonal teaching style on academic engagement through the mediating role of the motivational climate, controlling the gender and resilience variables



Note: ***p*<.001. AE=Academic engagement; MC=Motivational climate; PC=Performance climate; R^2=Explained variance; CI=Confidence interval. The dashed lines represent non-significant relationships.

Discussion

The objective of this research was to analyse the relationships of both the interpersonal teaching style of autonomy support and the controlling style on academic engagement in a sample of teachers in initial training, examining the mediating role of the motivational climate in the resilient context caused by the pandemic. The main results highlight the importance of the mediation of MC between the autonomy support style and academic engagement.

In accordance with the posited hypotheses, the results reveal that, during the training process, the autonomy support style had a positive direct effect on the academic en-

gagement of future teachers (H1) as well as a positive indirect effect mediated by the MC (H5). Although both relationships were statistically significant, it should be noted that the magnitude of the effect size was greater in the relationship between autonomy support and academic engagement mediated by the MC. These results corroborate previous studies that showed the importance of motivational climate mediation on mastery between the teaching styles and the cognitive (Jiang & Zhang, 2021) and behavioural (Granero-Gallegos et al., 2021) consequences in the university environment. In this way, teacher trainers who support student autonomy will generate a motivational climate oriented towards a process that will develop greater learning engagement from teachers in initial training. This might be because MC is a positive predictor of more self-determined motivational styles, regulating the students' behaviour to incorporate learning-directed skills (Hodge & Gucciardi, 2015; Kipp & Amorose, 2008; Standage et al., 2003). In fact, using autonomy-supporting teaching styles tends to motivate students towards the self-realization of their goals and making it more likely that they develop higher levels of interest (Ryan & Aikenhead, 1992); that is to say, support for student autonomy has an effect on intrinsic motivation, resulting in students being more interested in the task they are performing (Reeve, 2009). Therefore, establishing motivational climates that foster interpersonal relationships in the classroom leads to students adopting a self-regulated approach to the work they are undertaking and results in increased academic engagement (Carmichael et al., 2017).

In addition to examining the indirect relationship of autonomy support to academic engagement, the present research also showed the positive direct relationship of MC on academic engagement (H3). These results are in line with previous studies, such as those by Gutiérrez and Tomás (2018) and Sevil Serrano et al. (2016), underlining the importance of generating a process-focused socio-contextual climate, which can contribute to improving learning outcomes in initial teacher training. This may be due to the importance of the educational context in shaping the students' academic engagement (Wang & Eccles,

2013). Specifically, the MC regulates the behaviour patterns of students to incorporate skills directed towards the learning process (Hodge & Gucciardi, 2015). Therefore, the future teachers will perceive a social environment in the classroom particularized by participation, effort, cooperation, and improvement when undertaking learning tasks and thus they will feel academically involved in the training process.

The findings reveal that when a controlling style is perceived, it has a direct positive effect on the academic engagement of future teachers, thus falsifying H2. The present research also showed the absence of a relationship between the PC and academic commitment, discounting H4 and H6. Although the PC does not act as a mediator between the controlling teaching style and academic engagement (H6), the direct relationship between the controlling style and the PC is statistically significant and positive, thus meeting H7. However, perceiving a controlling style on the part of the teacher can generate a positive predictive relationship to academic engagement, although less than the predictive relationship of perceiving an autonomy support style. These results do not support the findings of previous research, such as those of De Meyer et al. (2014) and Soenens et al. (2012), in showing a negative relationship between the controlling teaching style and student engagement. This contradictory result could be due to the traditional use in classrooms of a controlling teaching style by teachers in the academic field, as expressed by authors such as Assor et al. (2002), which may mean that some students are used to being directed and need to feel controlled during the learning process in order to advance.

Following the hypothesized model, the findings of the present research contribute to the scientific evidence on the relationship between resilience and academic engagement. Previous studies, such as Koob et al. (2021) or Medina et al. (2020) corroborate the significant and positive relationship between resilience and academic engagement in a virtual training context caused by the COVID-19 pandemic. These results may be due to the protective role that resilience plays on the uncertainty factors caused by COVID-19 in students (Gundogan, 2021; Herbers et al., 2021). Thus, trainee teachers who have a

greater capacity to overcome adverse situations will experience greater study engagement. In addition, the results of the present study demonstrate a greater predictive relationship to academic engagement among girls than among boys. This result corroborates the findings of several previous works in this field (Driessen & van Langen, 2013; Kim & Corcoran, 2017). Studies such as those of Kessels et al. (2014) and Tison et al. (2011) demonstrate higher average values of academic engagement in women than in men. One possible explanation may be due to the important role of gender identity, socially created for teaching careers (Kessels et al., 2014). As a result, female teachers in training will be more academically engaged in their studies.

Finally, the educational relevance of the MC should be highlighted. This is generated through the interpersonal teaching style of autonomy support in a context of resilience, resulting in greater academic engagement in teachers undergoing training.

Limitations and Future Prospects

Despite the above findings, the present research also has certain limitations. First, the convenience sampling method used means the results obtained should be interpreted with caution. Second, no experimental intervention was established with different teaching styles to allow us to verify their effects on the students' perceptions. As future lines of research, it would be important to establish intervention protocols that measure the effect of different teaching styles on the academic engagement of trainee teachers by creating both motivational classroom climates. Finally, the measurement of teaching intervention styles and motivational classroom climates was only carried out via questionnaires. Therefore, it is recommended that future lines of research use complementary observational instruments to triangulate the data obtained.

Practical Implications for Initial Teacher Training

The results of this study suggest the need to use motivating styles characterized by autonomy support, and to generate mastery climates that foster academic engagement in future teachers. In this regard, teacher trainers need to use instructional strategies fo-

cused on providing meaningful choice, initiative, and justification: a) providing coherent explanations on course objectives, content, homework, and other learning tasks. b) using cooperative learning strategies based on group training in which students can work cooperatively by discussing ideas, providing feedback, and sharing the necessary resources with the rest of their classmates. (c) establishing opportunities of choice to learn and develop knowledge and to perform learning tasks around their preferences and interests. d) establishing assessment processes that promote student feedback in the teaching process.

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PUBLICACIÓN 2

Detrimental effects of disempowering climates on teaching intention in (physical education) initial teacher education

Estudio 2

Detrimental effects of disempowering climates on teaching intention in (physical education) initial teacher education

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Este artículo ha sido publicado:

López-García, G. D., Granero-Gallegos, A., Carrasco-Poyatos, M., & Burgueño, R. (2022). Detrimental effects of disempowering climates on teaching intention in (physical education) initial teacher education. *International Journal of Environmental Research and Public Health, 20*(1), 878. https://doi.org/10.3390/ijerph20010878

Información factor de impacto (FI) en SCOPUS:

- Revista situada en segundo cuartil (Q2), categoría Public Health, Environmental and Occupational Health de SJR año 2022: 0.828; primer cuartil (Q1) de CiteScore (Scopus) año 2022: 5.4.

Detrimental effects of disempowering climates on teaching intention in (physical education) initial teacher education

Abstract

Previous research has looked at the positive consequences generated by teacher-generated climates on the motivational experiences of pre-service teachers. However, there is scarce research focusing on the adverse motivational consequences that affect the perceptions of future teachers during the training process. The objective of this study was to explore the dark side of Duda's multidimensional conceptualization, its influence on academic engagement, and the intention of pre-service teachers to be educators. A total of 1,410 university students in initial teacher training (including physical education pre-service teachers, etc.) (59.6% women; 40.3% men; 0.1% other; M_{age}=23.85; *SD*=5.13) participated. The following scales were used: disempowering motivational climate, frustration of basic psychological needs, academic motivation, academic engagement, and the intention to choose teaching. The results of the structural equation model with latent variables show the positive prediction of the disempowering climate on the dark side and its negative influence on the intention to be a teacher. Controlled motivation preceded by academic engagement significantly mediate the relationship between a disempowering climate and the intention to be a teacher, increasing the total effects on the latter variable. Therefore, this research highlights for both teachers and researchers the impact of a disempowering motivational style, as well as its influence on the dark side as a negative promoter in trainee teachers regarding their intention to be teachers.

***Keywords*:** teacher education; choose teaching as a profession; basic psychological needs; controlled forms of motivation; dark side; Self-determination theory.

Introduction

The high rate of teacher dropout during the first years of professional work has heightened the level of concern within the initial teacher training programs (Hong et al., 2018); these are undertaken at a complicated and sensitive time and have a significant impact on the development of future teachers (Ávila-Toscano et al., 2022; OECD, 2018; Sanchez-Cabrero & Pericacho-Gómez, 2021). Among the reasons for the problems that arise are the abandonment of the profession during the first few years (Pineda-Herrero et al., 2016), and the decision to opt for other careers with better job opportunities (Gratacós & López-Jurado, 2016). Given this growing concern, authors such as Hong et al. (2018) have identified the main causes of teaching abandonment, one of which is a lack of initial motivation to pursue the profession (Rots et al., 2007). Accordingly, the prior intention towards teaching behavior (i.e., the intention to choose teaching) has been considered in recent literature (Burgueño et al., 2022) as one of the relevant cognitive consequences for completing the teacher training program, as well as being necessary for practicing the profession in the future. Understanding the influential factors involved in choosing teaching as a professional career is necessary to improve the quality of teaching (Fray & Gore, 2018). In this regard, authors such as Fokkens-Bruinsma and Canrinus (2015) mainly highlight motivation and the social-psychological environment (i.e., the educational environment) as the key outcomes influencing the choice of teaching as a career.

Recent advances in the educational field have tried to examine how socio-contextual classroom environments (i.e., the social-psychological environment) affect motivational processes, as well as the role the teacher trainer might adopt in the initial teacher training context (Castellanos Vega et al., 2022; Escriva-Boulley et al., 2021; Granero-Gallegos et al., 2022; López-García et al., 2022). In this sense, following Self-Determination Theory (SDT; Ryan & Deci, 2017), various interpersonal teaching styles are recognised (e.g., autonomy support and controlling style) in the teaching intervention. Likewise, Achievement Goal Theory (AGT; Ames, 1992) recognizes the role of the teach-

er as among those environmental or climate factors that can influence different variables at the academic level (e.g., task-involving and ego-involving climates). In this regard, Duda and Appleton (2016) suggested a conceptualization of the motivational climate integrating the dimensions of the classroom social environment of the AGT (Ames, 1992) and the motivational style of the SDT (Ryan & Deci, 2017). This new conceptualization combines AGT and SDT in a multidimensional motivational climate of greater empowering or disempowering created by the teacher, which can influence the way students think, feel and act (Duda & Appleton, 2016; Milton et al., 2018). Although the existence of both climates has been taken together since their conceptualization (see Duda & Appleton, 2016), the Disempowering motivational climate has hardly received any attention in the scientific literature (Mastagli et al., 2021). The few studies that do exist (Milton et al., 2018; Solstad et al., 2020) have focused on evaluating the psychometric properties of the scale, or they have not looked in detail at the development and discussion of the motivational aspects present in a disempowering motivational climate, even though they evaluated both climates (Granero-Gallegos et al., under review). To date, there is no record of studies focused on the effects of a disempowering motivational climate in terms of its maladaptive and cognitive motivational consequences for students. Therefore, the present research aims to analyse the potential role that social and environmental classroom factors (i.e., a disempowering climate) might play on the intention to be a teacher, examining the possible mediating role of maladaptive motivational (i.e., the dark side of motivation) and cognitive (i.e., academic engagement) processes in the context of initial teacher training.

Disempowering Motivational Climate

A disempowering climate is characterized as having a greater ego-involving and controlling style (see Duda & Appleton, 2016). The controlling style (Ryan & deci 2017) establishes ways of thinking, acting and behaving that are imposed by the teacher, independent of the students' interests, while the ego-involving climate (Ames, 1992) focuses on criticising students' mistakes and rewarding the most competent. On the one hand,

Duda's disempowering climate framework has been negatively related to cognitive variables (e.g., academic engagement or the intention to teach). Specifically, authors such as Guo et al. (2022) have only examined the relationship between an empowering climate and academic engagement, leaving aside the possible maladaptive influence of a disempowering climate. The possible negative influence of a disempowering climate on the intention of future behaviours (i.e., the intention to choose teaching as a career) has not yet been examined, despite its influence on the teacher training context. On the other hand, a disempowering climate has been positively related to the maladaptive motivational outcomes encompassed within the SDT (Duda & Appleton, 2016). For example, in a study on teachers in initial training, a disempowering climate positively predicted basic psychological needs frustration (Granero-Gallegos et al., under review). This relationship between maladaptive social environments created by the teacher (i.e., perceived controlled behaviours) and negative self-determined motivation variables (e.g., basic psychological needs frustration) has been conceptualized in previous works as the dark side of motivational processes (Haerens et al., 2016). However, despite its importance in the educational field, recent studies based on the dark side (Trigueros et al., 2019; Viksi & Tilga, 2022) have not taken into account the possible role of the ego-involving climate, as conceptualized by Duda and Appleton (2016) with regard to educational and motivational outcomes.

Dark Motivational Pathway

SDT (Ryan & Deci, 2020; Ryan et al., 2021) suggests that the socio-contextual environment influences the motivational behaviours of individuals, including in the educational setting. Specifically, the perception of external pressures and the use of ego-centred coercive means by the teacher will lead to the frustration of the students' basic psychological needs (FBPN), understood as the so-called dark side. Basic psychological needs (BPN) are viewed as the essential and universal nutrients for optimal development, growth and well-being (Ryan & Deci, 2017; Vansteenkiste et al., 2020). In this sense, FBPN is explained as: the frustration of autonomy (i.e., the degree of pressure and internal feeling

carried out by an individual), the frustration of competence (i.e., the degree of inferiority or failure to execute a task at a certain level), the frustration of relatedness (i.e., the degree of perceived loneliness and alienation) and the frustration of novelty (i.e., the degree of perceived monotony and invariability) (González-Cutre et al., 2016; Vansteenkiste et al., 2020). Likewise, authors such as Viksi and Tilga (2022) have evaluated the dark side via the Trans-Contextual Model of Motivation, comprising the least self-determined types of motivation: controlled motivation (CM) and amotivation (Ryan & Deci, 2020). CM is conceived as both introjected and external regulation, while amotivation is understood as the absence of self-determination and regulation towards the desired behaviour. In this regard, SDT postulates that the dark side of motivation (i.e., FBPN, CM, and amotivation) will reduce the affective, cognitive and behavioural consequences in an adaptive way within the teacher training context. In the educational context, several authors have noted the negative relationship between the dark side and cognitive outcomes such as academic engagement or the intention to teach. Specifically, academic engagement has been negatively related to the dark side: CM (Datu et al., 2018), amotivation (Ghannad et al., 2017) and FBPN (Buzzai et al., 2021). In addition, authors such as Burgueño et al. (2022) have negatively linked FPBN to the intention to teach in pre-service teachers. Although recent research has analysed the dark side in an educational context (Trigueros et al., 2019; Viksi & Tilga, 2022), to date, no analysis has taken into account the less self-determined end of the Trans-Contextual Model of Motivation together with FPBN in trainee teachers.

Academic Engagement

Academic engagement has been conceptualized as the positive affective and mental state related to academic work, involving the intention, interest and effort invested by students in the learning process (Schaufeli et al., 2006). Previous research (Schaufeli et al., 2006) has operationalized academic engagement across different dimensions: vigour, dedication, and absorption. Specifically, research in the teacher training context has

shown the importance of academic engagement both as a consequence of socio-contextual classroom environments (López-García et al., 2022) and as a mediator between educational outcomes (Granero-Gallegos et al., 2022). Although the use of academic engagement as an antecedent of future behaviours has been evidenced (Truta et al., 2018), few studies have evaluated its possible positive influence on behavioural intention (i.e., the intention to be a teacher) (Hsieh, 2022) despite its relevance in the teacher training context (Burgueño et al., 2022; Fokkens-Bruinsma & Canrinus, 2015; Rots et al., 2014).

Theory of Planned Behavior

The intention to be a teacher is a construct created from the behavioural intention encompassed in the Theory of Planned Behavior (Ajzen, 1991). Behavioural intent (i.e., the intention to choose teaching as a career) represents an immediate antecedent of a person's degree of effort to act. Specifically, in the context of initial training, the intention to be a teacher reflects the degree of planning and effort that pre-service teachers employ in working as teachers. Likewise, according to Ajzen (1991, 2002), the intention to choose teaching as a career is influenced by: i) the attitude towards the behaviour, that is, a positive or negative behavioural assessment of teaching; (ii) the subjective norm, i.e. the individual's beliefs, which indicates whether there is social pressure to engage in certain behaviours; (iii) the perceived behavioural control, i.e. the degree of perceived ease or complexity associated with performing the future behaviour. Thus, previous intentions towards teaching behaviour are considered relevant cognitive consequences for the future professional practice of trainee teachers.

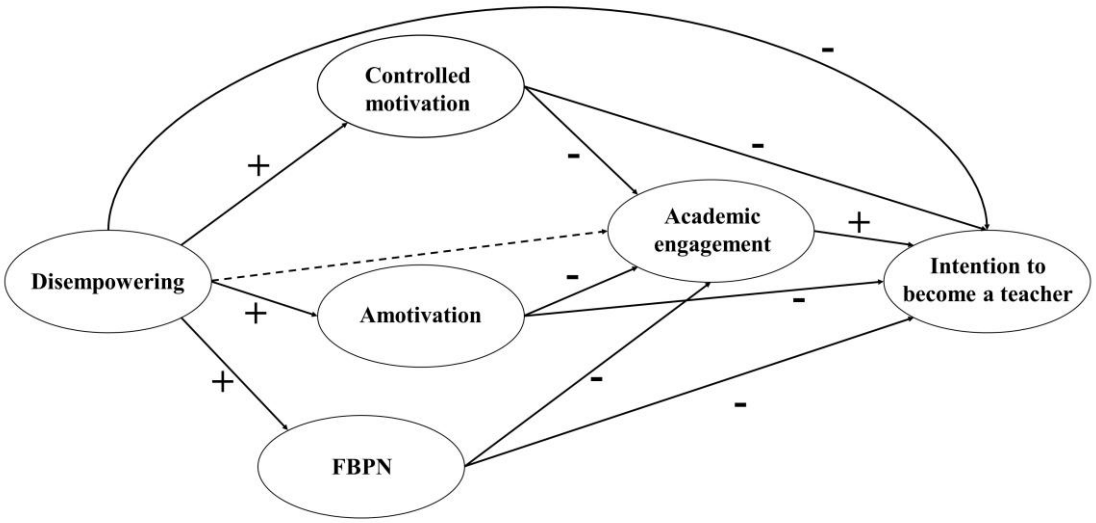
The Present Study

Given the importance of the intention to teach in pre-service teachers, both during their training and while practising professionally as teachers, a predictive analysis is required of the motivational and engagement variables affecting the intention to teach. Furthermore, to the best of our knowledge, no analysis of the mediating role played by the

dark side of motivation between a disempowering motivating climate and the intention to teach in pre-service teachers has been addressed in the scientific literature. Taking into account the postulates of the SDT and AGT, as well as a review of previous studies, a hypothesized model (see Figure 1) was created to examine the above-mentioned relationships. Therefore, the objective of this study was to analyse the mediation of academic engagement and the dark side motivational variables between a disempowering climate and the intention to choose teaching as a career in pre-service teachers. The following hypotheses were established: i) a disempowering climate negatively predicts the intention to become a teacher (H1); ii) the dark side of motivation (i.e., CM, amotivation, and FBPN) negatively mediates the relationship between a disempowering climate and the intention to become a teacher (H2); iii) academic engagement negatively preceded by the dark side of motivation (i.e., CM, amotivation, and FBPN) mediates the relationship between a disempowering climate and the intention to become a teacher (H3). The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Initiative (Von Elm et al., 2008) was used for the study description.

Figure 1

Hypnotized model



Note: the dashed lines represent non-significant relationships; FBPN = frustration of basic psychological needs.

Materials and Methods

Design

The study design was observational, descriptive, cross-sectional and non-randomized. The sample was made up of students from eight Andalusian universities and the data were collected in May 2021. Inclusion criterion: (i) to be a student of the Master's Degree in Secondary and Upper-secondary Education Teaching, Vocational Training and Language Teaching (presential modality) from one of the Andalusian public universities. Exclusion criteria: (i) not consenting to the use of the study data; (ii) not completely filling in the data collection form.

Instruments

Disempowering Climate. Based on the theoretical assumptions of the SDT and AGT, and previous works (Mastagli et al., 2020), including research on Spanish university students (Granero-Gallegos et al., under review), the ego-involving climate subscales from the Motivational Climate in Education Scale (Granero-Gallegos & Carrasco-Poyatos, 2020), and the controlling style from the Interpersonal Teaching Style in Higher Education Scale (Granero-Gallegos et al., 2021) were used to measure the different dimensions. The perceived disempowering climate measure included the following two subscales: the ego-involving climate (three items, e.g., “The teacher gives most attention to the successful students”) and the controlling style (six items, e.g., “My teacher threatened to punish students to keep them in line during class”). Responses to each item were scored on a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The disempowering climate was calculated as the mean value of the average scores of the two factors comprising it. In the present study, the hierarchical two-factor CFA (H-CFA) model of the scale presented the following goodness-of-fit indices: $\chi^2/df=3.59$, $p<.0001$; CFI=.98; TLI=.98; RMSEA=.053 (90%CI=.042,.065), SRMR=.024. The reliability obtained was McDonald's Omega (ω)=.88.

BPN Frustration in Education. The Spanish version by Cuevas et al. (2015) of the Psychological Need Thwarting Scale was used. In addition, the novelty frustration measure by González-Cutre et al. (2020) was included. This instrument is composed of 17 items that measure autonomy (4 items, e.g., “I feel pushed to behave in certain ways”), competence (four items, e.g., “Situations occur in which I am made to feel incapable”), relatedness (four items, e.g., “I feel I am rejected by those around me”), and novelty (five items, e.g., “I feel monotony”) need frustration. Responses to each item are scored on a Likert scale from 1 (strongly disagree) to 7 (strongly agree). The FBPN was calculated as the mean value of the average scores for each of the factors comprising it. In the present study, the H-CFA model of the scale presented the following goodness-of-fit indices: χ^2/df=4.52, p<.0001; CFI=.95; TLI=.95; RMSEA=.062 (90%CI=.057,.119), SRMR=.044. The reliability obtained was: ω=.94.

Controlled Motivation and Amotivation. The introjected regulation, external regulation, and amotivation subscales from the Spanish version (Burgueño et al., 2017) of the Academic Motivation Scale (Vallerand et al., 1989) were used. The scale is grouped into four items per dimension to measure introjected regulation (e.g., "Because passing at university makes me feel important"), external regulation (e.g., "Because I want to have a good life in the future") and amotivation (e.g., “I honestly don't know; truthfully, I feel like I'm wasting my time in the master's/ undergraduate degree.”). A Likert scale ranging from 1 (*Does not correspond at all*) to 5 (*Corresponds exactly*) was used for the responses. In accordance with the SDT (Ryan & Deci, 2020), the CM was calculated as the mean value of the average scores for external regulation and introjected regulation. In the present study, the H-CFA model of the scale presented the following goodness-of-fit indices: χ^2/df=4.51, p<.0001; CFI=.97; TLI=.96; RMSEA=.062 (90%CI=.048,.076), SRMR=.032. The reliability obtained was: ω=.75.

Academic Engagement. The Spanish version for students of the *Utrecht Work Engagement Student Scale* (UWES-SS) was used (Schaufeli et al., 2002). The scale is

composed of 17 items that form three dimensions: vigour (6 items; e.g., "I feel strong and vigorous when I am studying or going to classes"), dedication (5 items; e.g., "I am proud to follow this career"), absorption (6 items; e.g., "I am immersed in my studies"). Responses to each item are scored on a Likert scale from 1 (strongly disagree) to 5 (strongly agree). Academic engagement was calculated as the mean value of the average scores for each of the factors comprising it. In the present study, the H-CFA model of the scale presented the following goodness-of-fit indices: χ^2/df=4.97, *p*<.0001; CFI=.96; TLI=.94; RMSEA=.071 (90%CI=.056,.092), SRMR=.052. The reliability obtained was: ω=.93.

Intention to Choose Teaching as a Career. The Spanish version (Burgueño et al., 2022) of The Future Teaching Intention Scale (FTIS), based on Fishbein and Ajzen (2011), was used. This unidimensional instrument assesses the pre-service teachers' future intention to work as teachers and is composed of three items: "I intend to work as a teacher in the next 3 years", "I will try to work as a teacher in the next 3 years", and "I am determined to work as a teacher in the next 3 years". Responses to each item are scored on a Likert scale from 1 (totally improbable) to 7 (extremely probable). In the present study, the CFA model presented the following goodness-of-fit indices: χ^2/df=1.69, *p*<.0001; CFI=.97; TLI=.96; RMSEA=.035 (90%CI=.023,.054), SRMR=.023. The reliability obtained was: ω=.93.

Procedure

First, the heads of the Faculty of Education Sciences and the Master's Degree in Secondary and Upper-secondary Education, Vocational Training and Language Teaching were contacted to request permission and to ask for their collaboration in the research. Once permission was granted, the researchers contacted the students by email. The data were collected in May 2021 using an online form. The form briefly explained the importance of the research, the anonymity of the responses, the way to complete the scale, that the responses given would not affect any qualification in any way, and that the participants could stop participating in the study at any time. All the participants gave their con-

sent to be included in the study prior to participating. The research was conducted in accordance with the Declaration of Helsinki and the protocol was approved by the Bioethics Committee of the University of Almería (Ref: UALBIO2021/009).

Risk of Bias

There was no sample randomization since the sampling was for convenience; however, there was blinding between the participants and the researchers in charge of the data treatment and analysis. With respect to selection bias, participation was voluntary and communication with the participants was conducted by email.

Sample size

The a priori analysis of the statistical power of the adequate sample size for meeting the study objective was carried out using *Free Statistics Calculator* v.4.0 software (Soper, 2022). It was estimated that a minimum of 1,401 students were necessary for effect sizes of f^2=0.152 with a statistical power of .99, and significance level of α=.05 in a structural equation model with six latent variables and 18 observable variables. In total, 1,410 pre-service teachers took part in the study.

Data analysis

Both the descriptive statistics and the correlations between the analysed variables were estimated with the SPSS program (v.28). In addition, the McDonald's omega coefficient was calculated for each of the variables, indicating that values above .70 would be indicative of good reliability (Viladrich et al., 2017)]. The SEM was controlled for sex and a two-step structural equation model was performed (Kline, 2016) with AMOS (v.26) software to analyse the predictive relationships between a disempowering climate and teaching intention through need frustration, CM, amotivation, and academic engagement. In the first step (the measurement model), the robustness of the bidirectional relationships between the variables that make up the model were analysed. In the second step, the predictive effects between the variables were examined. In the event that the multivariate normality assumption might be violated (Mardia's coefficient=55.65; p<.001), the analysis

was performed using the maximum likelihood method and the 5000-iteration *bootstrapping* procedure (Kline, 2016). The goodness of fit was evaluated with <5.0 for the chi-square coefficient and degrees of freedom (χ^2/df), values >.90 for the CFI (*Comparative Fit Index*) and TLI (*Tucker–Lewis Index*), together with values as high as .80 for the SRMR (*Standardized Root Mean Square Residual*) and RMSEA (*Root Mean Square Error of Approximation*) (Marsh et al., 2004). To better interpret the results, the total explained variance (R^2) was considered as a measure of the effect size (Dominguez-Lara, 2017). Small, medium, and large effect sizes were considered to have values less than 0.02, close to 0.13, and greater than 0.26, respectively (Cohen, 1992).

Results

Participants

A total of 1,410 pre-service teachers participated (59.6% women; 40.3% men; 0.1% other), all of whom were enrolled in the Master's Degree in Secondary and Upper-secondary Education Teaching, Vocational Training and Language Teaching of various Andalusian public universities (Spain) (University of Almeria, 13.5%; University of Cádiz, 3.6% University of Cordoba, 7.6%; University of Huelva, 3.4%; University Jaen, 11.4%; University of Granada, 27.2%; University of Malaga, 27.6%; University of Sevilla, 5.8%), in various specialties (Physical Education, etc.). There were 26 pre-service teachers who decided not to take part in this research. The age of the participants ranged from 21 to 60 years (*M*=23.85; *SD*=5.13). The representative sample of pre-service teachers was 38.60% of the total population under study in accordance with official data from the eight Andalusian public universities (*N*=3,653) with a confidence interval of 95% and a 2.1% error rate. There were no missing values in the included sample data.

Preliminary Results

The descriptive statistics and the correlations between the latent study variables are presented in Table 1.

Table 1

Descriptive statistics and correlation between variables

Variable	*M*	*SD*	Q1	Q2	ω	2	3	4	5	6
1.Disempowering	2.34	0.87	0.51	-0.18	.88	.31**	.45**	.43**	-.05	-.07*
2.Controlled motivation	3.22	0.77	0.02	-0.22	.75		.22**	.17**	.24**	.09**
3.FBPN	2.41	0.85	0.33	-0.37	.94			.47**	-.23**	-.21**
4.Amotivation	2.07	0.92	0.74	-0.02	.73				-.30**	-.24**
5.Academic engagement	3.47	0.82	-0.27	-0.09	.93					.26**
6. Intention to choose teaching	5.99	1.38	-1.41	1.52	.93					

Note. **The correlation is significant at the .01 level; *The correlation is significant at the .05 level. *M*=mean; *SD*=standard deviation; Q1=skewness; Q2=Kurtosis; ω=McDonald's omega; FBPN=Frustration of the Basic Psychological Needs.

Main Results

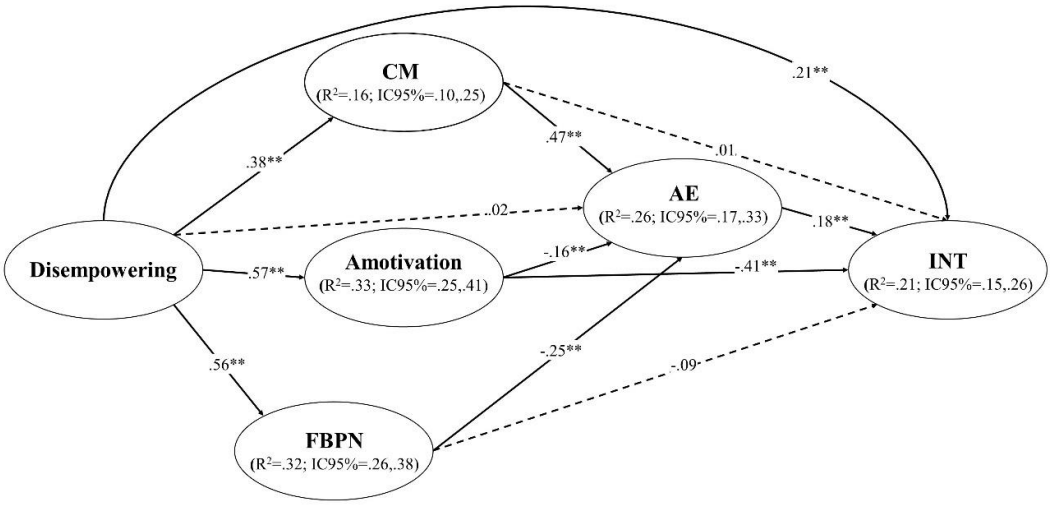
In step 1, the model presented acceptable goodness-of-fit indices: χ^2/df=5.193, *p*<.001; CFI=.94; TLI=.93; RMSEA=.068 (90%CI=.063; .073), SRMR=.062. In step 2, the predictive SEM model showed similar goodness-of-fit indices: χ^2/df=5.193, *p*<.001; CFI=.94; TLI=.93; RMSEA=.068 (90%CI=.063; .073), SRMR=.062. Although the χ^2/df ratio is greater than 5.0, we must consider that the chi-square test of exact fit often rejects the null hypothesis, especially in large samples, even when the postulated model is only trivially false [54]. The explained variance achieved was 33% for amotivation, 32% for FBPN, 16% for CM, 26% for academic engagement, and 21% for intention to choose teaching. After controlling for sex, in the SEM, the direct relationships between a disempowering climate and the three dark-side variables were positive and significant (strong with amotivation and FBPN; moderate with CM). Likewise, although the direct relationship between a disempowering climate and engagement was not significant, the relationship between a disempowering climate and the intention to choose teaching was significant and positive (low effect). In contrast, the other three dark-side variables showed significant direct effects on engagement: CM had a moderate positive effect, while FBPN and amotivation had negative effects. Of these three variables (i.e., CM, FBPN, and amotivation), only amotivation was significantly and negatively related (a moderate effect) to the intention to

choose teaching. Finally, the direct effect of engagement on the intention to choose teaching was significant and positive, although low.

Regarding indirect effects, only amotivation mediated between a disempowering climate and the intention to choose teaching, although with a significant negative relationship (-.23). The overall indirect effects between a disempowering climate and engagement via the dark-side variables were not statistically significant (*p*=.424). The total effects of a disempowering climate on the intention to choose teaching were only increased through CM and academic engagement (.24), whereas they decreased through FBPN and engagement (.18), and amotivation and engagement (.19), and were even negative when only considering the effect of amotivation (-.02). Lastly, there was a statistically significant overall indirect effect between a disempowering climate and the intention to choose teaching (β=-.29; CI95%=-.22; -.36; *p*=0.12).

Figure 2

Predictive relationships between a disempowering motivational climate and the intention to choose teaching through the mediating role of controlled motivation, frustration of basic psychological needs, amotivation, and academic engagement



Note: ***p*<.001. CM=Controlled motivation; FBPN=Frustration of Basic Psychological Needs; AE=Academic engagement; INT=intention to choose teaching; R^2=Explained variance; CI=Confidence interval. The dashed lines represent non-significant relationships.

Discussion

The objective of this research was to analyse the mediating role played by academic engagement and the dark-side motivational variables between a disempowering motivational climate and the intention to choose teaching as a career in the context of initial teacher training. The main results highlight the importance of the mediation from the dark side of motivation, through academic engagement, between a disempowering motivational climate and the intention to choose teaching as a career.

In accordance with the hypothesized model, the results reveal that a disempowering motivational climate used by teacher trainers had a direct positive effect on the teaching intention of pre-service teachers (rejecting H1). These findings are not in line with the postulates of the Theory of Planned Behavior (Ajzen, 1991); that is to say, following its theoretical foundation, a disempowering climate would influence the perceived behavioural control of pre-service teachers, triggering a decrease in the antecedent of future behaviour (i.e., the intention to teach). However, the present findings depart from this theoretical foundation. In other words, pre-service teachers who perceive that their educators create a disempowering motivational climate will not have their intention to choose teaching as a career diminished, but quite the opposite. This contradictory result might be due to the effect that this multidimensional conceptualization has (Duda & Appleton, 2016) on the motivational variables. Following the fundamentals of SDT (Social factors → Psychological Mediators → Motivation → Consequence; see Ryan & Deci, 2017), socio-psychological factors do not present a direct relationship on educational outcomes, if not, they are influenced by the motivational consequences that the social factors generate.

Continuing with the hypothesized model, the results reveal that the perception of a disempowering motivational climate has a direct positive effect on the dark side of motivation and, through amotivation, has a negative effect on the intention to teach (H2). In addition, only amotivation (from among the dark-side motivational outcomes used) was related to the intention to choose teaching as a career in pre-service teachers. These results con-

trast with other studies, such as those by Trigueros et al. (2019) and Viksi and Tilga (2022), and underline that neither CM nor FBPN predict the behavioural intention of students without the mediation of cognitive elements (e.g., academic engagement). A disempowering context in which students feel that their BPNs are frustrated, or feel controlled by external pressures, will not diminish their intention to choose teaching as a career. In contrast, a disempowering socio-contextual climate that promotes a lack of motivation will reduce the intention of pre-service teachers to become teachers. This might be because a lack of motivation, regardless of its causes (e.g., believing one has poor ability or poor effort, insufficient academic values, or unattractive schoolwork characteristics; see Green-Demers et al. 2008), has an influence on later teaching behaviours (Haerens et al., 2016). Specifically, amotivation is related to the lowest level of self-determination and represents a total absence of will with respect to antecedent behaviour (i.e., the intention to teach) (Shen et al., 2010); that is to say, when pre-service teachers perceive a motivational classroom climate characterized by high degrees of disempowerment, their intention to become teachers will decrease.

Finally, the SEM showed that academic engagement preceded by the dark side of motivation acted as a mediator between a disempowering motivational climate and the intention to choose teaching as a career (H3). Although all three relationships were statistically significant, it is worth noting the negative and significant effect of amotivation and FPBN on academic engagement and the intention to teach. These results are consistent with the studies by Trigueros et al. (2019) that examined the dark side through cognitive elements on educational outcomes and, in turn, with the results of Viksi and Tilga (2022), which stated that the dark side influences future intention behaviours. Pre-service teachers who perceive a disempowering climate, capable of frustrating their BPNs or reducing their self-determined motivation, reduce their academic engagement and, consequently, their intention to choose teaching as a career. This can be explained by the influence of cognitive variables, such as academic engagement, on motivational processes and future

intention behaviours (Appleton et al., 2008). Furthermore, in the SEM, a positive and significant predictive relationship of CM was found on academic engagement and the intention to teach based on a disempowering climate - if the disempowering climate generated by the teacher produces a behaviour based on external contingencies (i.e., CM), the pre-service teacher will increase their academic engagement and, as a consequence, increase their intention to choose teaching as a career. These results are far from the SDT (Ryan & Deci, 2017) and other previous studies (Haerens et al., 2016). However, as Howard et al. (2021) pointed out in a recent meta-analysis, a possible explanation for the above observation may be the influence of introjected regulation within the motivational processes of self-determination in the educational context. Likewise, introjection represents a partial internalization of self-determined values and, as such, can drive behaviours through ego-involvement and the use of internalized pressures (Ryan & Deci, 2017), in such a way that, in the pre-service teachers, the internalization of controlled forms of motivation induced by a disempowering motivational climate would provoke a regulation of behaviours alien to the student, capable of favouring the development of adaptive cognitive processes. Although authors such as Howard et al. (2021) have evidenced the double role (adaptive and maladaptive) of the influences of external motivations, far from the postulates of the SDT, there is no specific scientific evidence in the educational field that provides a specific explanation for this incongruity. Therefore, future studies should aim to establish a relationship between the dark side of motivation and a multidimensional perspective of academic motivation (Vallerand, 2000).

Limitations and Future Perspectives

Based on the results presented, this research clearly contributes to developing Duda and Appleton's (2016) conceptualization of the dark motivational pathway, introducing academic engagement and demonstrating its influence on the intention to choose teaching as a career. The model helps to understand how characteristic elements of a disempowering climate might influence FBPN to the extent that aspects of a need-

thwarting environment could be considered. Another strength of this study is that direct and mediated relationships are established that deepen and expand our knowledge regarding maladaptive behaviours on the dark side of motivation. Despite the above findings, the present research also has certain limitations. First, the convenience sampling method used means the results obtained should be interpreted with caution. Second, the cross-sectional design of the research only represents a particular view in time, neglecting the possibility that causal relationships might be established between a disempowering motivational climate and the motivational outcomes. Therefore, longitudinal research is needed to examine the fluctuations that the social-psychological environment and the dark side of motivation have on the cognitive consequences of students throughout the teacher training process. Third, the research based its main conclusions on self-reported questionnaires completed by the pre-service teachers. Future research should examine the disempowering motivational climate using different instruments and taking into account the teachers' perceptions so as to triangulate the data. Lastly, although the present research focused on examining the consequences of a disempowering climate and the dark side of motivation, it only evaluated positive educational consequences (i.e., the intention to become a teacher and academic engagement). Therefore, future research should evaluate the influence of the dark side of motivation over a broader spectrum of maladaptive consequences (e.g., disengagement and burn out) (Rojas-Solís et al.,2021). In this way, the consequences of the dark side of motivation on educational outcomes, and their role in the educational field, could be understood in more detail and depth.

Practical Implications for Initial Teacher Training

From the results of the present research, certain educational implications of interest can be established, especially for teacher educators trying to encourage their students to participate in learning (Sánchez-Martín et al., 2022). While previous research has shown the importance of generating an empowering motivational climate (Mastagli et al., 2021), the present results demonstrate the effects of a disempowering motivational cli-

mate on educational outcomes. Therefore, teacher educators should avoid strategies that create a disempowering climate (Duda & Appleton, 2016; Haerens et al., 2016), such as:

- Establishing threats regarding deadlines or strict rules (e.g., "Those not attending 85% of the subject will not be eligible for evaluation").
- Using normative behaviours in the classroom (e.g., "You cannot leave the classroom until the explanation has been given").
- Employing destructive criticism (i.e., "You have to know the characteristics of your students if you want to teach correctly in future").
- Denying the students' pedagogical contributions (e.g., "No, the report should be this length and have these characteristics").
- Using explicitly controlling language, such as "you must" or "you have to" (e.g., "You have to submit both tasks in order to take the exam").

In addition, a series of considerations are proposed to help teacher educators avoid generating a disempowering climate (Ames, 1992; Duda & Appleton, 2016; Haerens et al., 2016): i) The generation of a disempowering climate does not mean that teacher educators should refrain from structuring the learning process. They can start by establishing expectations or providing a scaffold while supervising the learning process of preservice teachers (Hernández-Andreo et al., Gómez-López, 2021; Moreno-Murcia & Corbí, 2021); that is, establishing the use of norms through understanding (i.e., why is a standard introduced?) and establishment (i.e., participating in the standard-setting process with the students); (ii) The perceptions of the teacher educators regarding the classroom climate differ from those of the students (Ames, 1992; Mosston & Ashworth, 2002) - teacher educators may have an erroneous perception of the classroom climate they are trying to avoid, which conflicts with the students' perception (Montoya et al., 2021). For this, various tools such as class video recording or student self-reports (Pascual-Arias et al., 2022) can be used to obtain an overview of the socio-environmental climates generated; iii) As

has been shown, some strategies for controlling the pre-service teachers' motivation can produce behavioural benefits, such as developing academic engagement and the intention to become a teacher. These outcomes are the result of specific motivational experiences caused by disempowering climates. In fact, the associated behavioural consequences of a dominating climate can exact an emotional cost, reducing psychological well-being over the long term (Haerens et al., 2016).

Conclusions

The findings from the present study reveal the association between a disempowering motivational style and its influence on the dark side of motivation, which act as negative promoters on the intention of pre-service teachers to pursue a teaching career. In addition, the results reveal the negative mediating influence that academic engagement has as a consequence of the dark side of motivation on the intention to be a teacher. Finally, the study findings highlight the importance of CM on the academic engagement of trainee teachers as a positive mediator between a disempowering motivational climate and the intention to become a teacher. In this regard, teacher educators should avoid a disempowering motivational climate given its negative consequences on academic engagement through the dark side of motivation, except when students perceive external demands during the teacher training process.

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PUBLICACIÓN 3

Efectos de interacción del sexo y tipo de estudios sobre la motivación y el compromiso académico en futuros docentes

Estudio 3

Efectos de interacción del sexo y tipo de estudios sobre la motivación y el compromiso académico en futuros docentes

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Este artículo ha sido publicado:

López-García, G. D., Granero-Gallegos, A., Carrasco-Poyatos, M., & López-Osca, R. (2022). Efectos de interacción del sexo y tipo de estudios sobre la motivación y el compromiso académico en futuros docentes. En M. Bermúdez Vázquez, M. L. Vadillo Rodríguez, & E. Casares Landauro, *Humanismo poliédrico. Nuevas apuestas de estética, arte, género y ciencias sociales* (pp. 885-905). Dykinson.

Información del impacto de la editorial, Scholarly Publishers Indicators (SPI):

- La editorial Dykinson está situada en el primer cuartil (Q1) de la clasificación de editoriales españolas del SPI (2022).

Efectos de interacción del sexo y tipo de estudios sobre la motivación y el compromiso académico en futuros docentes

Abstract

Motivation has been positioned as a key element in educational process. Scientific literature, also reflects the importance of developing high levels of academic engagement. In spite of the relevance of studying motivation and academic engagement in preservice teachers, there is no evidence that examines the rol of the different forms of motivation and academic engagement. Therefore, this study analysed the interaction effects of type of studies and gender on motivational forms and academic engagement in future teachers. The design was observational, descriptive, cross-sectional and non-randomized. Data were collected from 920 students (61.8% male; Mage=24.73; SD=5.34). A multivariate analysis of the variance of the sex and type of studies variables was performed with the SPSS v.29 software. The main findings show higher values of intrinsic motivation towards achievement and academic engagement in women, while in men, the highest averages were found for external regulation and amotivation. In addition, according to the type of studies, undergraduate students had high averages in intrinsic motivation factors and in all less self-determined forms of regulation, except external regulation and amotivation, which were the ones in which the master's students had high values. This study is highly relevant for teachers and researchers, by analysing the factors of motivation and academic engagement of pre-service teachers.

***Keywords*:** self-determination theory, pre-service teachers, student motivation, learning engagement

Introducción

El Sistema Educativo es uno de los principales factores del desarrollo y progreso de una Sociedad. Por ello, los dirigentes políticos gastan un gran porcentaje del presupuesto en la mejora del Sistema de Enseñanza (Rogero-García & Andrés-Candelas, 2014). Con el objetivo de analizar, mejorar y dirigir los procesos de cambio del sistema educativo, han surgido diversos informes e investigaciones de carácter nacional (García, 2020; Tiana-Ferrer, 2018) e internacional (Comisión Europea/EACE/Eurydice, 2015; ENQA, 2015; UNESCO, 2015). Ante los resultados de los informes y para responder los nuevos retos y cambios de la sociedad del conocimiento los sistemas educativos se encuentran en un proceso de constante transformación (Esteve, 2006; Gomendio, 2021). Por ello, existe en la literatura el debate sobre el papel que suscita el profesorado dentro del contexto educativo (Muñoz-Fernández et al., 2018). Entre los aspectos que definen el rol del profesorado, la formación constituye una gran incidencia en el posterior desarrollo de su labor docente, que junto con su experiencia forman un importante indicador de calidad educativa de un país (Coelho et al., 2011).

A pesar del objetivo de homogeneización e internacionalización a nivel europeo, actualmente existen diferencias entre los distintos sistemas de formación de profesorado (Rebolledo-Gámez, 2015). Por ello, es importante destacar la importancia de la formación inicial en promover y despertar en el profesorado en formación, una fuerte motivación para la adquisición de nuevos aprendizajes para mejorar su desempeño laboral como docentes (Rosales, 2013) Según García (2011) y Tang et al. (2020), cabe resaltar, que el alumnado que durante su formación inicial en la universidad desarrolle un mayor interés profesional, conseguirá con mayor rapidez y efectividad su inserción en el mundo laboral, por el contrario, aquellos que no lo consigan serán más susceptibles al abandono de su profesión en los primeros años. Por ello, resulta de gran interés para el ámbito educativo analizar los factores predictores de resultados educativos positivos y las formas

motivacionales que afectan al profesorado en formación inicial, durante su proceso formativo

Compromiso Académico

Entre las diferentes variables responsables de resultados educativos positivos que forman parte del proceso de formación, destaca el compromiso académico, debido a su instauración entre la literatura científica como un indicador de calidad educativa en la educación universitaria (Vilà et al., 2019). El compromiso académico, también llamado compromiso del estudiante, es un concepto complejo y pluridimensional que cambia de un marco a otro de aprendizaje (Appleton et al., 2008; Kahu, 2013; Martin et al., 2015). Schaufeli et al., (2006) definen el compromiso como un estado afectivo y mental positivo caracterizado por altos niveles de energía, entusiasmo e inmersión de actividades en las que el tiempo pasa desapercibido. Concretamente en el ámbito educativo, el compromiso académico alude al proceso psicológico que involucra el interés, la atención y el esfuerzo que el alumnado invierte en su proceso de enseñanza (Marks, 2000). Por lo tanto, el compromiso académico hace referencia al grado en que el alumnado está motivado para aprender y progresar en el centro escolar (Libbey, 2004). Debido a su carácter multidimensional el compromiso académico está constituido por tres factores: vigor, absorción y dedicación (Schaufeli et al., 2002). El vigor se caracteriza por altos niveles de energía y resiliencia mental durante el estudio; la dedicación, por una alta implicación de los estudiantes hacia sus tareas académicas, y la absorción se relaciona con los altos niveles de concentración que presenta una tarea. Estos factores, como manifiestan Schaufeli et al. (2002), determinan el nivel de compromiso académico de los estudiantes.

Estudiar el grado de compromiso académico de los estudiantes ha sido uno de los objetivos de muchos docentes e investigadores (Loera et al., 2013; Ross et al., 2008). La evidencia científica en el área, ha estudiado el nivel de compromiso académico en los diferentes ámbitos educativos (i.e., primaria, secundaria y universidad)(Friedman et al., 1988; Perkmann et al., 2021; Zhao et al., 2021), acentuando la importancia que este

constructo tiene en el ámbito escolar. El alumnado con altos niveles de compromiso académico tendrá un mejor desempeño educativo (Oriol et al., 2016), invertirá tiempo y energía en su proceso de aprendizaje (Martin & Dowson, 2009) y tendrá una mejor adaptación a sus estudios(Merino-Tejedor et al., 2018). Por consiguiente, el alumnado comprometido académicamente con sus estudios desarrollará habilidades y destrezas para afrontar las tareas y desafíos que aparezcan durante su proceso de formación. Por el contrario, el alumnado con bajo compromiso académico tendrá altos niveles de agotamiento y altos síntomas depresivos (Upadyaya & Salmela-Aro, 2013). Es decir, los estudiantes con menor compromiso académico gozarán de menor oportunidad para adquirir un aprendizaje de calidad. Congruentemente, estudiar los componentes del compromiso es un progreso hacia el aumento de la calidad de la educación en el profesorado en formación, dado que se incrementaría el conocimiento y habilidades de los estudiantes (Zhao et al., 2020). En consecuencia, mejorar de la calidad de la enseñanza del profesorado en formación resultaría de gran interés para su estudio.

Motivación Académica

La motivación ha sido considerada como uno de los factores clave necesarios para el correcto desarrollo del profesorado en formación (Urkidi-Elorrieta et al., 2020). Diversas teorías han explicado la motivación desde diferentes perspectivas. Sin embargo, la macroteoría con respaldo empírico que explica el funcionamiento de la motivación humana es la Teoría de la Autodeterminación (TAD; Deci & Ryan, 1985). La TAD ha sido aplicada con éxito en ámbitos como el laboral (Coxen et al., 2021) o el educativo (Howard et al., 2021). Concretamente, dentro del ámbito educativo ha sido estudiado en las diferentes etapas educativas (i.e., educación primaria, educación secundaria y universidad) (Kriegbaum et al., 2018; Urdan & Bruchmann, 2018), observando el amplio respaldo científico que esta tiene en este ámbito. Siguiendo los postulados de la TAD la motivación humana no debe ser tratada como un concepto unitario, sino como un concepto multidimensional (Ryan & Deci, 2000). Ryan y Deci, (2000) desarrollaron un modelo de motiva-

ción académica que se comprende en un continuo con seis estilos diferenciados (i.e., motivación intrínseca, regulación integrada, regulación identificada, regulación introyectada, regulación externa y amotivación), asociando un comportamiento concreto para cada forma determinada de motivación.

La motivación intrínseca se define como un deseo psicológico de representar comportamientos por el placer, la satisfacción o la emoción asociados con la representación del comportamiento en sí (Ryan & Deci, 2019). Dentro del continuo que forma el modelo compuesto por Vallerand (2000) la motivación intrínseca forma parte de un constructo global compuesto por: motivación intrínseca hacia la estimulación (el comportamiento es adoptado en función a la generación de estímulos en el trascurso de la actividad), motivación intrínseca hacia el logro (el comportamiento se adquiere en base al placer de conseguir un nuevo logro) y motivación intrínseca hacia el conocimiento (el comportamiento se interioriza en relación al disfrute que se experimenta durante el proceso formativo). Contrariamente, la motivación extrínseca hace referencia al proceso psicológico vivido por los individuos impulsados a lograr los resultados y metas diferenciados de las satisfacción de su comportamiento propio (Ryan & Connell, 1989). La motivación extrínseca, está formada por cuatro formas de regulación organizadas en función del grado de interiorización alcanzado (Ryan & Deci, 2000). Siguiendo a Ryan y Deci (2000) encontramos regulación integrada (la conducta se adhiere coherentemente a la propia identidad y sistema de valores personales), regulación identificada (la conducta se lleva a cabo debido a la conducta del valor personal percibido sean o no comportamientos inherentemente agradables), regulación introyectada (la conducta se desarrolla como resultado de la elusión de la sensación culpa) y la regulación externa (la conducta es adoptada para evadir castigos o conseguir gratificaciones). Además, dentro del continuo de motivación se encuentra la ausencia o falta de motivación, denominada desmotivación (Vallerand, 2000). Congruentemente, Vallerand (2000) identifica al entorno como un aspecto clave en la determinación de la motivación una persona. Así, la motivación académica ha sido

asociada como predictora del rendimiento académico (Kusurkar et al., 2013; Wu et al., 2020), relacionada con un aprendizaje más profundo (Levesque et al., 2004), con un mayor bienestar psicológico (Amholt et al., 2020; Vansteenkiste et al., 2005), y con altos niveles de compromiso académico (Ahn et al., 2021; Datu et al., 2018; Karimi & Sotoodeh, 2020). Como se desprende de la literatura científica previa, la motivación académica de los estudiantes relacionada con el compromiso académico (Howard et al., 2021). Por ello, y dejando clara la importancia que tiene la motivación sobre los procesos de aprendizaje, creemos que es importante analizar las formas motivacionales que actúan en el proceso de aprendizaje del profesorado en formación inicial. Sin embargo, hasta la fecha no existe evidencia científica en el ámbito que compare diferentes formas motivacionales entre el alumnado de grado y el alumnado de máster de secundaria dentro del proceso de formación docente.

El Presente Estudio

Según lo expuesto anteriormente, estudiar las formas motivacionales y el compromiso académico en profesorado en formación, resulta de interés en el ámbito educativo de la formación superior. Es conveniente destacar la escasez de estudios que han estudiado estas relaciones en el contexto educativo universitario y, además, ninguna investigación hasta nuestro conocimiento se ha centrado en analizar los posibles efectos del tipo de estudios (i.e., estudios de grado y estudios de máster) y sexo sobre las dimensiones de la motivación académica y el compromiso académico de profesorado en formación inicial. Teniendo en cuenta lo expuesto anteriormente, el objetivo del presente estudio es analizar los efectos de interacción del sexo y el tipo de estudios cursados sobre las formas motivacionales y el compromiso académico en futuros docentes.

Metodología

Diseño y Participantes

El diseño del estudio fue observacional, descriptivo, transversal y no aleatorizado. La selección de la muestra fue de tipo no probabilístico y por conveniencia. Participaron

920 estudiantes en formación inicial (569 mujeres; 351 hombres) (M_{edad} = 24.73; DT = 5.34) de diversas universidades andaluzas (60.8%, Grado; 39.2%, Máster en Profesorado de Educación Secundaria).

Instrumentos

Motivación Académica. Se usó la adaptación al contexto universitario español (Burgueño et al., 2017) de la *Academic Motivation Scale* (Vallerand et al., 1989). El instrumento consta de 32 ítems agrupados en cuatro reactivos por dimensión para medir los distintos tipos de motivación académica del alumnado en formación inicial: motivación intrínseca (MI) a la estimulación de experiencias, MI al logro, MI al conocimiento, regulación integrada, regulación identificada, regulación introyectada, regulación externa y desmotivación. Las respuestas son recogidas en una escala Likert entre 1 (totalmente en desacuerdo) y 5 (totalmente de acuerdo).

Compromiso Académico. Se usó la adaptación española para estudiantes de la Utrecht Work Engagement Student Scale (UWES-SS) (Schaufeli et al., 2002). El instrumento está compuesto por 17 ítems que se distribuyen en tres factores: vigor (6 ítems), dedicación (5 ítems), y absorción (6 ítems). Las respuestas son recogidas en una escala Likert entre 1 (completamente desacuerdo) y 5 (completamente de acuerdo). El compromiso académico se ha calculado como el promedio de los valores de los tres factores citados.

Procedimiento

Primero, se obtuvo el pertinente permiso de los responsables académicos del Máster en Profesorado de Educación Secundaria, Bachillerato, Formación Profesional y Enseñanzas de Idiomas, y de las facultades de Ciencias de la Educación. La solicitud de colaboración fue acompañada de una descripción y de los objetivos de la investigación. Se contactó con el alumnado a través de correo electrónico. Los datos se recogieron mediante un formulario on-line en el que se explicaba la importancia de la investigación, el anonimato de las respuestas, la forma de cumplimentar las escalas, que no afectarían en

ningún modo a ninguna calificación, y que podía abandonar su participación en el estudio en cualquier momento. Todos los sujetos dieron su consentimiento para participar. La investigación se llevó a cabo siguiendo los postulados de la Declaración de Helsinki. Asimismo, el protocolo de la investigación contó con la aprobación del Comité de Bioética de la Universidad de Almería (Ref: UALBIO2020/029).

Análisis Estadístico

El análisis de los diferentes ítems, homogeneidad, fiabilidad de cada factor (alfa de Cronbach), correlaciones y análisis multivariante de la varianza (MANOVA) 2 (sexo) x 2 (tipo de estudios) se efectuaron con SPSS v.29. También fueron calculados los estadísticos descriptivos, así como los valores de asimetría y curtosis de cada dimensión.

Resultados

Análisis Descriptivo y de Correlación

En la Tabla 1 se pueden comprobar los descriptivos de cada dimensión. Respecto a los valores promedio, en los factores de la motivación académica se hallaron medidas moderadas, correspondiendo las más altas a la regulación identificada y la MI al conocimiento. Mientras que la más baja correspondió a la desmotivación. El compromiso académico también mostró valores moderados. Finalmente, se pueden resaltar las altas, positivas y significativas correlaciones entre las dimensiones de la motivación intrínseca, así como la regulación integrada y la regulación identificada entre sí y con los factores de la motivación intrínseca. Las correlaciones estadísticamente significativas y más altas del compromiso académico fueron con la MI a la estimulación, MI al logro, MI al conocimiento y regulación integrada.

Respecto a la consistencia interna, aunque dos dimensiones mostraron valores de fiabilidad (alfa de Cronbach) <.70 (i.e., .69; *regulación identificada* y *regu-*

lación externa), se pueden considerar marginalmente aceptables (Taylor et al., 2008) dado el pequeño número de ítems de cada factor.

Tabla 1

Estadísticos descriptivos, fiabilidad y correlaciones entre las diferentes subescalas

Subesclas	M	DT	Q1	Q2	α	2	3	4	5	6	7	8	9
1 MI a la estimulación	*3.17*	*1.02*	*-.17*	*-.57*	*.85*	*.75***	*.67***	*.67***	*.41***	*.60***	*-.02*	*-.12***	*.54***
2 MI al logro	*3.47*	*1.03*	*-.50*	*-.34*	*.85*		*.71***	*.73***	*.53***	*.69***	*.08**	*-.21***	*.58***
3 MI al conocimiento	*3.85*	*.82*	*-.42*	*-.40*	*.85*			*.71***	*.72***	*.39***	*.05*	*-.40***	*.58***
4 Regulación integrada	*3.58*	*1.04*	*-.54*	*-.35*	*.87*				*.58***	*.53***	*.06*	*-.30***	*.53***
5 Regulación identificada	*3.96*	*.79*	*-.54*	*-.40*	*.69*					*.34***	*.28***	*-.41***	*.41***
6 Regulación introyectada	*2.79*	*1.11*	*.03*	*-.93*	*.83*						*.21***	*.11***	*.33***
7 Regulación externa	*3.64*	*.85*	*-.30*	*-.39*	*.69*							*.17***	*.00*
8 Desmotivación	*2.07*	*.92*	*.74*	*-.02*	*.73*								*.30***
9 Compromiso académico	*3.47*	*.82*	*-.28*	*-.09*	*.90*								

Nota: * $p < .05$; ** $p < .01$; *M* = Media; *DT* = Desviación típica; Q1 = Asimetría; Q2 = Curtosis.

Análisis Multivariante

Con objeto de comprobar los efectos de interacción del sexo y el tipo de estudios sobre las variables estudiadas, se llevó a cabo un análisis multivariante [MANOVA 2 x 2 (sexo x tipo de estudios)] en el que el sexo y el tipo de estudios (i.e., grado, máster) actuaron como variables independientes, y como variables dependientes los factores de la motivación académica y el compromiso académico. Se examinó la homogeneidad de la covarianza con el test M de Box; fue rechazada la hipótesis nula de ajuste de los datos (M de Box=351.74, F=2.56, p<.001). Por ello, se atendieron las sugerencias de Tabachnick y Fidell, (2019) de usar la Pillai's Trace en lugar de la Lamba de Wilks para evaluar la significación multivariada de efectos principales y de las interacciones. El contraste multivariado no mostró diferencias significativas y efectos de interacción entre las dos variables independientes (i.e., sexo x tipo de estudios) (Pillai's Trace=0.01, $F_{(9, 908)}$=0.96, p=.471). Sí se hallaron diferencias significativas según la variable sexo (Pillai's Trace=0.43; $F_{(9, 908)}$ =4.58; p<.001; d=0.424; potencia observada=.999) y tipo de estudios (Pillai's Trace=0.30; $F_{(9, 908)}$ =43.17; p<.001; d=1.309; potencia observada=1.00). Los tamaños del efecto -*effect size*- (*d*) y la *potencia observada* muestran diferencias altas, sobre todo en la variable tipo de estudios.

Según la variable sexo, las pruebas de los efectos intersujetos mostraron diferencias significativas en la *MI al logro*, *desmotivación* y *compromiso académico* (Tabla 2); las mujeres mostraron promedios más altos en la *MI al logro* y en el *compromiso académico*. En el caso de la *desmotivación*, los varones presentaron valores medios superiores.

Tabla 2

Análisis multivariante (efectos intersujetos según sexo y tipo de estudios)

	Sexo							**Tipo de estudios**						
	Hombre		**Mujer**					**Grado**		**Máster**				
Subescalas	*M*	*DT*	*M*	*DT*	*F*	*p*	*d*	*M*	*DT*	*M*	*DT*	*F*	*p*	*d*
1 MI estimulación	3.10	0.99	3.22	1.05	0.11	.744	0.00	3.45	.89	2.75	1.08	104.07	.000	0.67
2 MI logro	3.25	1.06	3.61	0.99	11.21	.001	0.22	3.75	.90	3.04	1.08	94.45	.000	0.64
3 MI al conocimiento	3.76	0.79	3.91	0.84	2.30	.130	0.11	3.99	.77	3.63	.85	34.56	.000	0.39
4 Regulación integrada	3.46	1.02	3.65	1.05	0.39	.533	0.00	3.89	.84	3.11	1.14	126.92	.000	0.75
5 Regulación identificada	3.90	0.78	4.00	0.80	1.86	.174	0.09	4.01	.78	3.89	.81	4.40	.036	0.14
6 Regulación introyectada	2.61	1.12	2.89	1.09	3.05	.081	0.11	3.12	1.00	2.26	1.08	134.44	.000	0.77
7 Regulación externa	3.69	0.84	3.61	0.85	0.05	.832	0.00	3.48	.80	3.89	.86	48.80	.000	0.46
8 Desmotivación	2.19	0.96	2.00	0.89	5.32	.021	0.16	2.00	.90	2.18	.95	4.62	.032	0.14
9 Compromiso académico	3.34	0.83	3.56	0.80	11.29	.001	0.22	3.52	.78	3.40	.88	2.07	.150	0.09

Nota: *M* = Media; *DT* = Desviación típica; *d* = d de Cohen.

Teniendo en cuenta el tipo de estudios (Tabla 2), los efectos intersujetos mostraron diferencias estadísticamente significativas en todas las dimensiones de la motivación académica, pero no en el caso del compromiso académico. Se pueden resaltar, asimismo, los altos valores de tamaño del efecto. Los estudiantes de grado mostraron valores promedios significativamente más altos que el alumnado de máster en MI a la estimulación, MI al logro, MI al conocimiento, regulación integrada, regulación identificada y regulación introyectada. Por otro lado, los estudiantes de máster presentaron valores significativamente más altos de *regulación externa* y de *desmotivación*.

Discusión

El objetivo presente estudio fue analizar los efectos de interacción del sexo y el tipo de estudios cursados sobre la motivación y el compromiso académico en una muestra de profesorado en formación inicial. Los principales resultados de este estudio muestran como existen diferencias entre la variable sexo en su relación con los diferentes tipos de motivación y el compromiso académico. Además de existir diferencias significativas, con

altos valores de tamaño del efecto, entre los estudiantes del grado y los estudiantes del máster de profesorado.

Los resultados han mostrado diferencias significativas en algunas formas de motivación y el compromiso académico entre diferentes sexos. En primer lugar, las mujeres obtuvieron altos valores de motivación intrínseca hacia el logro, mientras que los hombres obtuvieron valores más altos de desmotivación. Estos hallazgos se encuentran en consonancia con los estudios de Naz et al. (2020) al encontrar más conductas motivadas intrínsecamente en las mujeres que en los hombres. Esto puede deberse a la vinculación que tiene el género como categoría social y cultural, en el mundo educativo (Beg et al., 2021). Por ello, debido a la trascripción social de la mujer en la escuela, tendría explicación la mayor presencia de la mujer en comparación con la de los hombres en el ámbito de la docencia (Azman, 2013). Es decir, el papel de la mujer estaría tradicionalmente reconocido en el ámbito educativo y podría desarrollar un estado de pertenencia con el futuro trabajo, incrementando así los valores de compromiso y motivación intrínseca hacia el logro. Además, en el presente estudio también se han encontrado valores promedios más altos de compromiso académico en mujeres. Este resultado se corrobora los descubrimientos de una gran cantidad de trabajos previos en este campo (Driessen & van Langen, 2013; Kim & Corcoran, 2017; Lane et al., 2012). Así, estudios como los de Kessels et al. (2014) y Tison et al. (2011) demuestran valores promedio más altos de compromiso académico en hombres que en mujeres. Esto puede deberse al importante rol de la identidad de género, creada socialmente para las carreras de docencia (Kessels et al., 2014). Como consecuencia, el profesorado en formación femenino estará más comprometido académicamente con sus estudios.

Los hallazgos de la presente investigación también reflejan diferencias significativas en las magnitudes de la motivación entre alumnado de grado y alumnado de máster. Concretamente en los estudiantes de grado, fueron más altos los promedios en los factores motivacionales de carácter intrínseco (MI hacia la estimulación, MI hacia el logro y MI

hacia el conocimiento) y en todas las formas de regulación menos autodeterminadas (regulación integrada, regulación identificada y regulación introyectada), excepto la regulación externa. Por otro lado, el alumnado proveniente del máster de secundaria tiene valores promedios más altos en desmotivación y regulación externa. Estos hallazgos están en consonancia con los de Burgueno et al. (2018) al presentar altos valores de regulación externa y desmotivación. Sin embargo, contrariamente a descubrimientos anteriores (Burgueno et al., 2018), los valores de motivación más intrínsecos e incluso los valores de las regulaciones externas son bajos, siendo más altos los del alumnado de grado. Una posible explicación puede deberse a la relación significativa entre la edad y el grado motivacional que desarrolle, siendo el alumnado más joven en los que se encuentra valores más altos de motivación intrínseca (Muñoz-Fernández et al., 2018). Otra posible explicación para ello, puede deberse al aumento de la carga lectiva en sus carreras educativas al tener que cursar un año de máster (Rebolledo Gámez, 2015), lo que explicaría esta diferencia motivacional. Este proceso de alargamiento de la vida estudiantil al tener que cursar 5 años en vez de 4, podría reflejar valores más altos de regulación externa y desmotivación al captar este proceso como un mero trámite. Así, este distanciamiento existente entre la formación teórica ofrecida por este programa de formación y la auténtica realidad educativa de los centros españoles de educación secundaria podría explicar los valores de insatisfacción (Muñiz-Rodríguez et al., 2016).

Este trabajo es el primero en estudiar la interacción de los factores motivacionales y el compromiso académico según el sexo y tipo de estudios relacionados en una muestra de profesorado en formación inicial. Además, aporta conocimiento sobre qué dimensiones de la motivación académica influyen en estudiantes procedentes del grado (Educación Primaria, Educación Infantil y EF) y procedentes del máster de profesorado en Educación Secundaria. Por otro lado, este estudio también presenta importantes limitaciones, como por ejemplo el difícil acceso a la muestra, la menor participación de varones en relación con mujeres y el uso exclusivo de escalas para la medición de las variables.

Otro factor limitante, se debe al diseño trasversal de la investigación, no permitiendo asociaciones de carácter causal entre las variables. Por ello, futuros estudios deberían investigar con carácter longitudinal las relaciones aquí tratadas para poder comprender como fluctúan estas mismas variables durante el desarrollo del proceso de formación.

Conclusiones

Por último, como resultado del análisis estadístico previo se desprenden las diversas conclusiones del presente estudio. Uno de los hallazgos más destacables hace referencia a los valores medios más altos de motivación intrínseca hacia el logro y el compromiso académico en mujeres. Además, se observa las diferencias significativas mostradas entre profesado de formación de grado y máster. Destaca en los estudiantes de grado, los altos promedios en los factores de motivación intrínseca y en todas las formas de regulación menos autodeterminadas, excepto la regulación externa. Por último, se desprende los altos valores medios de regulación externa y desmotivación que tiene el profesorado en formación inicial procedente del máster de profesorado en educación secundaria.

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PUBLICACIÓN 4

Relationships between needs satisfaction and the quality of motivation with academic engagement in pre-service physical education teachers

Estudio 4

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Este artículo ha sido publicado:

López-García, G.D., Carrasco-Poyatos, M., Burgueño, R., & Granero-Gallegos, A. (2023). Relationships between needs satisfaction and the quality of motivation with academic engagement in pre-service physical education teachers. *SAGE Open, 13*(3). https://doi.org/10.1177/21582440231197507

Información factor de impacto (FI) Journal Citation Report (JCR):

- Revista situada en segundo cuartil (Q2; 50/110), categoría Social Sciences, Interdisciplinary (Social Sciences Citation Index, SSCI); FI año 2022: 2.0

Relationships between needs satisfaction and the quality of motivation with academic engagement in pre-service physical education teachers

Abstract

Building upon self-determination theory, the objective of this research was to examine the predictive associations of pre-service physical education (PE) teachers' basic psychological need satisfaction (i.e., autonomy, competence, relatedness, and novelty) with their academic engagement via the quality of their motivation. A purposive sample of 920 pre-service PE teachers (569 men and 351 women; M_{age}=24.73; *SD*=5.34) participated in this cross-sectional research. The results from structural equation modelling revealed that autonomy, competence, and novelty satisfaction positively predicted autonomous motivation, and negatively predicted amotivation. While competence satisfaction positively predicted controlled motivation, novelty satisfaction did it negatively. Autonomous motivation and controlled motivation positively predicted academic engagement, while amotivation was negatively associated with it. This research underscores the importance of considering pre-service PE teachers' autonomy, competence, and, specially, novelty satisfaction in promoting their autonomous motivation and academic engagement in initial teacher education programme.

Keywords: Need-based experiences; behavioural regulation; self-determined motivation, student teacher, teacher training.

Introduction

Teacher shortage, and more particularly the physical education (PE) one, represents one of the main concerns for any Western country, including Spain (Organisation for Economic Co-operation and Development, OECD, 2018). To optimise the PE teacher students recruitment and selection process, the different public administrations have particularly turned their eyes towards the PE teachers' engagement with teaching to be built throughout their initial PE teacher education not only for successfully completing the programme in question, but also for coping with the obstacles and challenges that arise throughout their future professional career in the school PE (OECD, 2017). Thus, the study of the potential antecedents of pre-service PE teachers' academic engagement has taken on particular interest for teacher educators and initial teacher education policy makers. Motivational experiences have been described as key precursors to academic engagement (e.g., Fokkens-Bruinsma & Canrinus, 2014; Jungert et al., 2014) and its examination could help to gain a better insight into academic engagement in initial PE teacher education.

Self-determination theory (SDT; Ryan & Deci, 2017) is a broad theoretical model for the study of motivation, which is receiving a growing attention to explain the influence of motivational experiences in initial PE teacher education (Zhang, 2021). This notwithstanding, no previous studies to date were found to analyse the distinctive roles that pre-service PE teachers' basic psychological need satisfaction and motivation may perform in their academic engagement. Furthermore, there was no evidence for novelty satisfaction as the fourth basic psychological need within the SDT framework in the specific context of initial PE teacher education. Therefore, the present research sought to examine the relationships between basic psychological need satisfaction, novelty satisfaction and the quality of motivation with academic engagement in a sample of pre-service PE teachers.

Academic Engagement in Initial PE Teacher Education

Academic engagement is typically outlined as a state of mind that expresses a personal commitment to education – in our case, to initial PE teacher education – including the time and efforts pre-service PE teachers spend in learning activities both inside and outside the classroom (Appleton et al., 2008). In accordance with Schaufeli, Martínez, et al. (2002), academic engagement consists of, at least, the elements of vigour (i.e., high energy levels and mental resilience during study), dedication (i.e., high pre-service teachers' involvement towards their academic tasks) and absorption (i.e., to high concentration and connection levels towards the presented task).

In the general context of initial teacher education, a small basis of evidence has suggested that the pre-service teachers' academic engagement is largely influenced by their motivational experiences (Fokkens-Bruinsma & Canrinus, 2014; Jungert et al., 2014). To date, only two SDT-based studies with pre-service teachers were found indicating a positive relationship between autonomous motivation and academic engagement (Kaplan & Madjar, 2017), and a negative association of amotivation with academic engagement (López-García et al., 2023). Nonetheless, there was an unclear relationship between controlled motivation and academic motivation, such that López-García et al. (2023) reported a positive association among both variables, and Kaplan and Madjar (2017), instead, revealed a non-significant relationship between them. Although these studies conducted with pre-service teachers made a valuable contribution by shedding some light on the relationship between motivation and academic engagement, it is important to underscore that the interplay between the three qualities of motivation and academic engagement remains still to be explored in the specific context of initial PE teacher education.

Motivational Processes in Initial PE Teacher Education

Unlike the classical motivational theories that operationalise motivation in exclusively quantitative terms, SDT (Ryan & Deci, 2017) conceptualises motivation from a quantitative and qualitive perspective. This distinctiveness suggests that a great quantity

of motivation does not ensure the adoption of the desired behaviour, if the quality of that motivation is low (Ryan & Deci, 2017). SDT makes a clear distinction between three qualities (or types) of motivation along a self-determination *continuum* in accordance with the relative autonomy (or willingness) level present in each of them (Ryan et al., 2021; Ryan & Deci, 2020).

At one end of the self-determination *continuum* lies autonomous motivation, which represents the prototype of human motivation (Ryan et al., 2021). It refers to undertaking the target behaviour guided by the inherent interest, enjoyment, curiosity and seeking new horizons (i.e., intrinsic motivation), congruence with the person's core values and goals (i.e., integrated regulation), as well as by conscious identification of the benefits that the behaviour itself brings (i.e., identified regulation). At the centre of this *continuum* lies controlled motivation, which refers to undertaking the behaviour driven by self-imposed pressures based on internal rewards of self-esteem for success and avoidance of anxiety, shame of guilt for failure (i.e., introjected regulation), as well as by externally imposed pressures relied on social rewards and/or punishments (i.e., external regulation). At the opposite end of the self-determination *continuum* and contrasted with autonomous and controlled motivation stands amotivation, which expresses the full absence of willingness and regulation towards the desired behaviour.

Central to SDT is the assumption that the quality of motivation would depend on the satisfaction of three essential and universal psychological nutrients, broadly known as basic psychological needs. The first of them is autonomy, which concerns a sense of choice and ownership in one's actions. When people (i.e., pre-service PE teachers) perceive their need for autonomy as satisfied, they feel volition, freedom, and initiative in their behaviour. Competence, second basic psychological need, refers to a sense that one can succeed and grow. When people perceive their need for competence as satisfied, they feel able to achieve their expected goals, as well as to experience mastery, efficacy, and accomplishment in their activities. The third basic psychological need is relatedness,

which concerns a sense of mutual care, belonging and connection. When people perceive their need for relatedness as satisfied, they feel valued and accepted by their significant others. SDT holds the premise that need satisfaction not only would directly energise autonomous motivation (i.e., bright motivational path), but also it would buffer against experiences of controlled motivation and amotivation (i.e., cross-path) (Ryan & Deci, 2020; Vansteenkiste et al., 2020).

In addition to these three basic psychological needs, a growing body of SDT-based research has postulated the need for novelty as the fourth basic psychological need (see González-Cutre et al., 2016, 2020, 2023; González-Cutre & Sicilia, 2019). Novelty refers to a sense of experiencing something that has not been experienced previously or that differs from the daily routine (González-Cutre et al., 2016). When people perceive their need for novelty as satisfied, they feel the tendency to look for and get involved in new activities, as well as to experience new sensations and situations (González-Cutre et al., 2020). Previous SDT-grounded research conducted with secondary students in PE has gathered evidence in support of the bright motivational path for novelty satisfaction inasmuch as positive and consistent relationships were found between novelty satisfaction and higher-quality motivation (i.e., autonomous motivation) (González-Cutre et al., 2016, 2020; González-Cutre & Sicilia, 2019). However, cross-paths from novelty satisfaction to lower-quality motivation did not empirically supported to date given that nonsignificant associations were found between novelty satisfaction and controlled motivation and amotivation (González-Cutre et al., 2020).

In the general context of initial teacher education, very little attention has been paid to the relationship between pre-service teachers' need satisfaction and the quality of their motivation. In particular, Burgueño et al.'s (2022) study showed that pre-service teachers' need satisfaction was positively associated with autonomous, relative to controlled, motivation. Furthermore, Kaplan and Madjar's (2017) research revealed, in spite of not considering autonomy satisfaction, that competence and relatedness satisfaction were positi-

vely related to autonomous motivation, while being unrelated to controlled motivation. Albeit both studies on initial teacher education meaningfully contributed to providing some clues on the role that pre-service teachers' need satisfaction played in the quality of their motivation, they failed both to consider the satisfaction of all needs separately and operationalise motivation through its three qualities following the SDT's tenets (Ryan et al., 2021). To the best of our knowledge, no studies were found to analyse the separate role that the satisfaction of each need may play in developing both the three qualities of motivation and academic motivation in the specific context of initial PE teacher education. In addition to shedding light on how the three qualities of motivation would differentially contribute to academic engagement, it is important to expand evidence for novelty satisfaction as the fourth basic psychological need in the specific context of initial PE teacher education by examining the associations with the motivational quality and academic engagement amongst pre-service PE teachers. This will allow us to meet a basis of evidence that helps teacher educators implement more effective need-supporting and motivating strategies in developing the pre-service PE teachers' academic engagement throughout their initial PE teacher education programme.

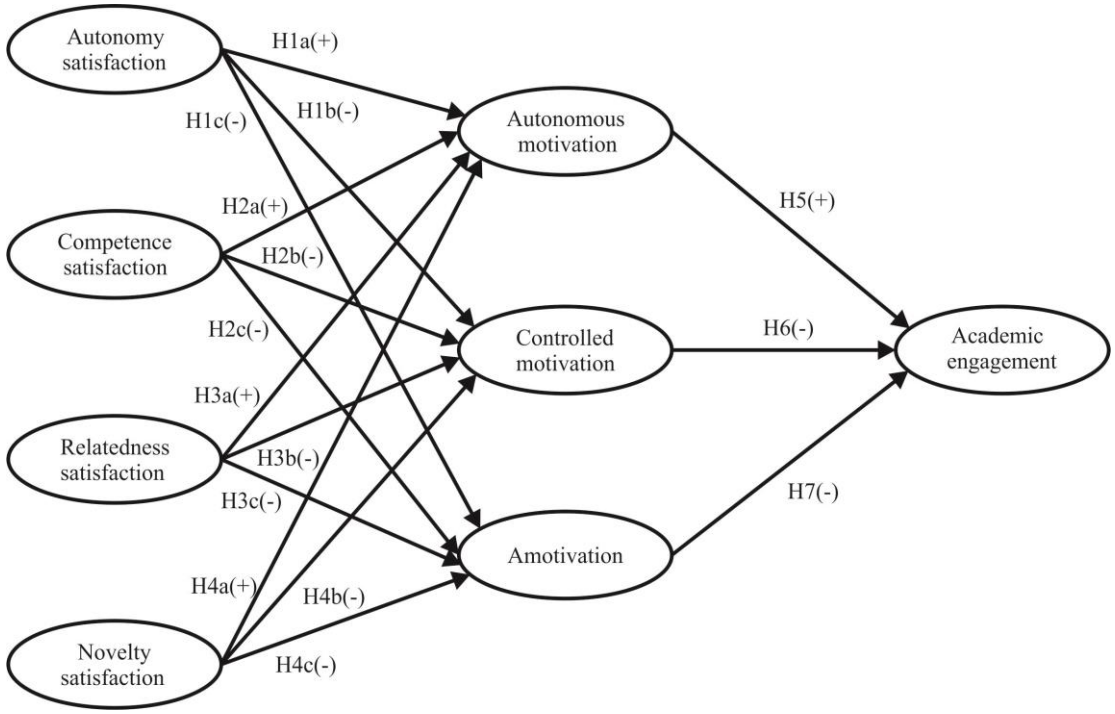
The Present Study

Therefore, the objective of the current SDT-based research was to analyse the relationships between the satisfaction of each of the four needs and the quality of motivation with academic engagement in pre-service PE teachers. Building upon SDT (Ryan & Deci, 2017) and following previous research in the general context of initial teacher education (e.g., Burgueño et al., 2022; Kaplan & Madjar, 2017; López-García et al., 2023), we hypothesised that autonomy, competence, relatedness would be positively associated with autonomous motivation, while each would be negatively related to controlled motivation and amotivation. We also hypothesised that autonomous motivation would be positively related to academic engagement, while controlled motivation and amotivation would do it in a negative way. Guided by the previous research with secondary PE students

(González-Cutre et al., 2016, 2020; González-Cutre & Sicilia, 2019), we further hypothesised that novelty satisfaction would positively associated with autonomous motivation and negatively related to controlled motivation and amotivation (see Figure 1).

Figure 1

Theoretically hypothesised model with the expected direct paths.



Method

Participants and Setting

Previous to study, a minimum of 876 participants for the trustworthiness of the study's results under conditions of a statistical power level of .95 and a significance level of α = .05 was estimated using *Free Statistics Calculator* v.4.0 software (Soper, 2022). Thus, a purposive and non-randomized sample of 920 pre-service PE teachers (569 men and 351 women) aged between from 20 to 57 years (M_{age} = 24.73; *SD* = 5.34) from eight Spanish public universities participated in this cross-sectional research. Regarding initial teacher education programme, 557 (60.54%) participants were pre-service primary PE teachers who were enrolled in fourth academic course of the BSc. in Primary Teacher Education (i.e., a four-year full-time programme in which pedagogical education and sub-

ject-related education take place simultaneously), while 363 (39.46%) participants were pre-service secondary PE teachers who were enrolled in a professional master's programme in education (i.e., one-year full-time professional course in education after having completed a four-year full-time BSc. in Sport and Exercise Sciences).

Instruments

Pre-service PE teachers were asked to rate their agreement with the items on a 5-point Liker-type scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

Need satisfaction in initial teacher education. To assess the pre-service PE teachers' perception of autonomy, competence and relatedness satisfaction, the Spanish educational version (León et al., 2011) of the *Échelle de Satisfacción des Besoins Psychologiques* (Gillet et al., 2008) was used. The instrument is headed by the stem: "In my classes…" and followed by15 items distributed over three 5-item dimensions each: autonomy satisfaction (e.g., "I feel a sense of choice and freedom in the things I undertake"), competence satisfaction (e.g., "I feel confident that I can do things well"), and relatedness satisfaction (e.g., I feel that the people I care about also care about me"). In the present research, the three-factor correlated model obtained a good fit to the observed data: $\chi^2(df=87)=174.401$, $p<.001$, $\chi^2/df=2.004$; CFI=.974; TLI=.967; SRMR=.038; RMSEA=.049(90%CI=.040–.058).

*Novelty satisfaction in initial teacher education***.** To assess the pre-service PE teachers' perception of novelty satisfaction, the novelty satisfaction subscale developed by González-Cutre et al. (2020) was used. The unidimensional measure of novelty satisfaction is headed by the stem "In my classes..." and includes 5 items (e.g., "I frequently feel there are novelties for me"). In the present research, the primary-order one-factor model obtained a good fit to the observed data: $\chi^2(df=5)=7.100$, $p=.137$, $\chi^2/df=1.420$; CFI=.998; TLI=.994; SRMR=.009; RMSEA=.034(90%CI=.001–.070).

*Motivation for initial teacher education***.** To assess the pre-service PE teachers' perception of autonomous motivation, controlled motivation and amotivation, the Spanish

version (Burgueño et al., 2017) of the Academic Motivation Scale (Vallerand et al., 1992). The scale is headed by the stem “I am carrying out this initial teacher education programme…”. It consists of 32 items and is grouped into four items per dimension to measure intrinsic motivation to experience motivation (e.g., “For the pleasure of reading interesting topics”), intrinsic motivation toward accomplishment (e.g., “For the satisfaction I feel in overcoming each of my personal goals”), intrinsic motivation toward knowledge (e.g., "For the pleasure of knowing more about the issues that attract me"), integrated regulation (e.g., "Because I consider it agrees with my values"), identified regulation (e.g., "Because it will possibly allow me to enter the labour market within the field that I like"), introjected regulation (e.g., "Because passing at university makes me feel important"), external regulation (e.g., "Because I want to have a good life in the future") and amotivation (e.g., “I honestly don't know; truthfully, I feel like I'm wasting my time in the master's/ undergraduate degree”). In accordance with Howard et al. (2017), a composite score for intrinsic motivation was computed by averaging values of the three subtypes of intrinsic motivation. Guided by SDT (Ryan et al., 2021) and following previous research (Burgueño et al., 2020), a hierarchical factor for autonomous motivation was specified by intrinsic motivation, integrated regulation and identified regulation, in the same way as a hierarchical factor for controlled motivation was specified by introjected and external regulation. In the current research, the second-order three-factor model had an acceptable fit to the data: $\chi^2(df=454)=1477$, $p<.001$, $\chi^2/df=3.254$; CFI=.949; TLI=.944; SRMR=.075; RMSEA=.055(90%CI=.051–.058).

*Academic Engagement***.** To assess the pre-service PE teachers’ perception of academic engagement, the Spanish student version (Benevides-Pereira et al., 2009) of the Utrecht Work Engagement Student Scale (Schaufeli, Salanova, et al., 2002) was used. The instrument includes 9 items, that grouped into three items per dimension, measure vigour (e.g., "When I get up in the morning, I feel like going to class"), dedication (e.g., "I am enthusiastic about my studies"), and absorption (e.g., "It is difficult to detach myself

from my studies"). In this study, the second-order one-factor model obtained a suitable fit to the data: $\chi^2(df=24)=97.223$, $p<.001$, $\chi^2/df=4.051$; CFI=.960; TLI=.931; SRMR=.038; RMSEA=.069(90%CI=.056–.083).

Procedure

The research team contacted academic managers of the BSc. in Primary Teacher Education (i.e., PE) and of the Professional Master's programme in Education (i.e., PE), as well as those responsible for the Schools of Education, and their teaching staff, to request their collaboration and inform them of the object of the research. The data were collected at the end of the second semester of the 2020/2021 academic year. The administration of the questionnaire took place in quiet classroom environment using an online survey in which we explained the importance of the investigation, the anonymity in answers, the way to complete the online questionnaire, that participation in the study would not affect any qualification in any way, and that it could be abandoned at any time. All participants had to meet the following inclusion criteria: a) being a student of a BSc. in Primary Teacher Education (i.e., PE) and/or a student of a professional master's programme in education (PE); b) presential initial education programme; c) having content to use data in the research. Indeed, every participant gave their informed consent for inclusion before they participated in the study. The research was carried out in accordance with the Declaration of Helsinki and the protocol was approved by the Bioethics Committee of the University of Almería (Ref: UALBIO2021/009).

Risk of Bias

At this point, it should be noted that there was no randomization of the sample, since convenience sampling was followed. There was blinding between the participants and the researchers in charge of the data treatment and analysis. Regarding selection bias, participation in the study was voluntary and communication with students was carried out by email.

Statistical Analysis

Descriptive statistics and McDonalds omega coefficient were, respectively, calculated using the *Statistical Package for the Social Sciences* v.28 (IBM, Chicago, IL, USA), whereas a two-step structural equation model (SEM) approach was run with *Mplus* v. 8.4 (Muthén & Muthén, 1998-2017). McDonalds omega shows a good level of reliability with values greater than .70 (Viladrich et al., 2017). Correlations among latent variables were values up to .85 in correlations are representative of the absence of multicollinearity among variables (Kline, 2016).

For the analysis of direct and indirect paths from need satisfaction to academic engagement via motivational quality, a two-step SEM approach was run (Kline, 2016). In the first step, the robustness of a model in which all target variables are freely correlated was tested (i.e., measurement model). In the second step, a structural model consisting of examining the predictive relationships among variables was tested. The model was controlled for gender and type of initial teacher education. The two-step SEM approach was run using the Robust Maximin Likelihood (MLR) estimator given that it provides fit and standard error rates that are robust to non-normality and Likert scales consisting of five or more response options (Muthén & Muthén, 1998-2017). The model's fit was evaluated by the coefficient between chi-squared and degrees of freedom (χ^2/df), comparative fit index (CFI), Tucker–Lewis index (TLI), standardised root mean square residual (SRMR), and root mean square error of approximation (RMSEA) paired with its confidence interval at 90% (90%CI). A good fit was achieved by scores as high as 5 for the χ^2/df coefficient, over .95 for CFI and TLI, and below .060 for SRMR and RMSEA, while values up to 3 in the χ^2/df coefficient, greater than .90 in CFI and TLI, and lower than .080 in SRMR and RMSEA are indicative of an acceptable fit (Kline, 2016). Indirect effects were also examined by the Hayes' (2017) methodological proposal, according to which an indirect (i.e., mediated) effect is statistically significant when its 95%CI does not include the zero value.

Results

Descriptive Statistics, Reliability, and Correlations Among Variables

Table 1 reports that, except for amotivation, the remaining variables under study scored higher than the mid-point of their respective measurement scale. McDonald's omega values were between .79 and .95. Moreover, correlation scores ranged from -.44 to .75. Correlation analysis further revealed that the satisfaction of each need was positively correlated with autonomous motivation and academic engagement, while being negatively related to amotivation. Autonomy, relatedness, and novelty satisfaction were negatively correlated with controlled motivation, whereas competence satisfaction did it positively.

Table 1

Descriptive statistics, reliability coefficients, and latent correlations between variables

	Range	*M*(*SD*)	γ_1	γ_2	ω	2	3	4	5	6	7	8
1. AS	1-5	3.32(0.90)	0.12	-0.62	.79	.42***	.32***	.53***	.41***	-.37***	-.06	.33***
2. CS	1-5	4.16(0.74)	-0.73	-0.47	.80	-	.66***	.62***	.31***	.28***	-.17**	.45***
3. RS	1-5	4.16(0.74)	-0.73	0.08	.83		-	.37***	.18***	-.15***	-.12*	.28***
4. NS	1-5	3.40(0.95)	-0.09	-0.30	.92			-	.44***	-.44***	-.11*	.54***
5. AM	1-5	3.61(0.80)	-0.31	-0.31	.95				-	.29***	-.24***	.75***
6. CM	1-5	3.21(0.76)	0.02	-0.22	.89					-	.28***	.69***
7. A	1-5	1.65(0.91)	1.59	1.03	.85						-	-.37***
8. AE	1-5	3.47(0.82)	-0.28	-0.09	.90							-

Note: AS=Autonomy Satisfaction; CS=Competence Satisfaction; RS=Relatedness Satisfaction; NS=Novelty Satisfaction; AM=Autonomous Satisfaction; CM=Controlled Motivation; A=Amotivation; AE=Academic Engagement; γ_1 = Skewness; γ_1 = Kurtosis; ***p<.001, **p<.01, *p<.05

Structural Equation Modelling

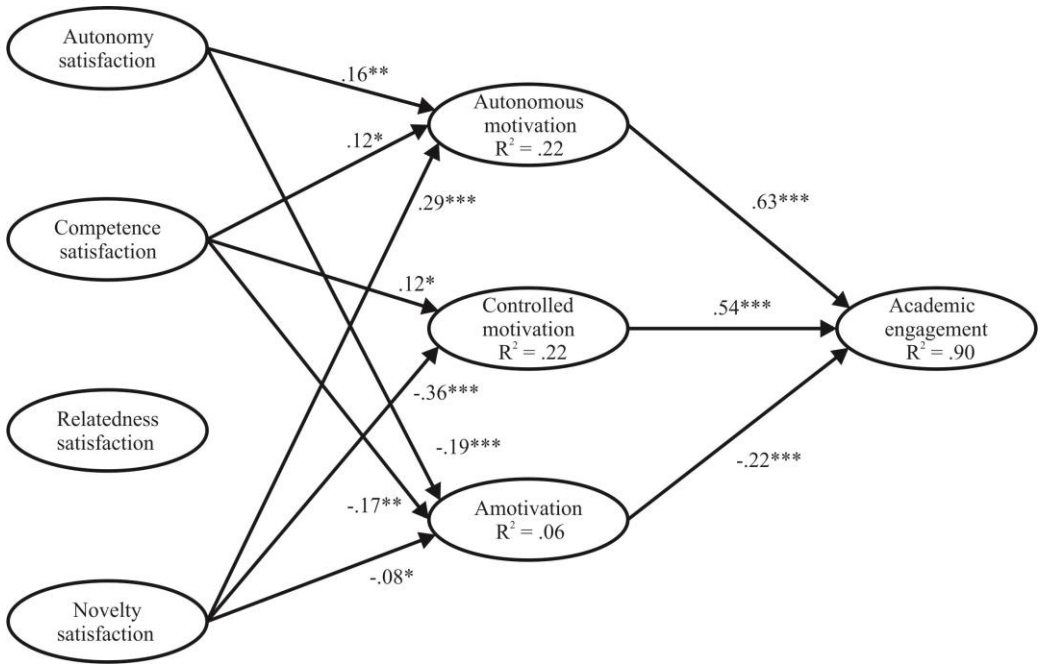
In the first step, the robustness of the measurement model was verified (χ^2[df=377]= 1070.214, p<.001, χ^2/df=2.838; CFI=.939; TLI=.926; SRMR=.053; RMSEA=.055[90%CI =.052–.058]). In the second step, the tested structural model had an

appropriate fit to the observed data: $\chi^2(df=378)=1076.558$, $p<.001$, $\chi^2/df=2.848$; CFI=.935; TLI=.925; SRMR=.063; RMSEA=.049(90%CI=.046–.053). The total explained variance was 22% for autonomous and controlled motivation, 5% for amotivation, and 90% for academic engagement.

Figure 2 shows that, after controlling for gender and initial teacher education programme, autonomy, competence, and novelty satisfaction positively predicted autonomous motivation (*β*=.16, *p*=.009; *β*=.12, *p*=.015; *β*=.29, *p*<.001), while negatively predicting amotivation (*β*=-.19, *p*=.001; *β*=-.17, *p*=.013; *β*=-.29, *p*=.029). Further, competence satisfaction positively predicted controlled motivation (β=.12, *p*=.022), whereas novelty satisfaction (*β*=-.36, *p*<.001) predicted it negatively. In addition, autonomous, and controlled motivation positively predicted academic engagement (*β*=.63, *p*<.001; *β*=.54, *p*<.001), while amotivation did it negatively (*β*=-.22, *p*<.001).

Figure 2

Direct paths from need satisfaction to academic engagement via the quality of motivation in pre-service PE teachers



Note: Significant direct paths are only depicted. ***p<.001; **p<.01, *p<.05.

Table 2 reports indirect effects from need satisfaction to academic engagement via motivational quality. In detail, autonomous motivation significantly mediated the relationship between autonomy, competence and novelty satisfaction and academic engagement. Controlled motivation negatively and significantly mediated the relationship between novelty satisfaction and academic engagement. Amotivation negatively mediated the relationship between autonomy and competence satisfaction with academic engagement.

Table 2

Indirect paths of pre-service PE teachers' need satisfaction on their academic engagement via quality of motivation.

	β(*SE*)	95%CI	*p*-value
Indirect paths from autonomy satisfaction to academic engagement			
Specific indirect via autonomous motivation	.09(.02)	.05 – .13	<.001
Specific indirect via controlled motivation	.03(.03)	-.02 – .08	.294
Specific indirect via amotivation	.04(.01)	.02 – .06	.003
Indirect paths from competence satisfaction to academic engagement			
Specific indirect via autonomous motivation	.07(.03)	.02 – .11	.017
Specific indirect via controlled motivation	.08(.04)	.01 – .15	.064
Specific indirect via amotivation	.04(.01)	.01 – .06	.010
Indirect paths from relatedness satisfaction to academic engagement			
Specific indirect via autonomous motivation	-.01(.02)	-.05 – .02	.488
Specific indirect via controlled motivation	-.02(.03)	-.06 – .02	.489
Specific indirect via amotivation	.01(.01)	-.01 – .02	.435
Indirect paths from novelty satisfaction to academic engagement			
Specific indirect via autonomous motivation	.16(.02)	.12 – .19	<.001
Specific indirect via controlled motivation	-.23(.06)	-.33 – -.12	<.001
Specific indirect via amotivation	.02(.01)	-.01 – .03	.070

Discussion

The objective of this SDT-based research was to analyse the associations of pre-service PE teachers' autonomy, competence, relatedness, and novelty satisfaction with their academic engagement via the quality of their motivation. The main results show that autonomy, competence, and novelty satisfaction were positively associated with autono-

mous motivation and academic engagement and negatively related to amotivation. In addition, competence satisfaction was positively related to controlled motivation, while novelty satisfaction did it negatively.

Consistent with our hypotheses and in line with previous research (Burgueño et al., 2022; Kaplan & Madjar, 2017), our results showed direct paths from autonomy, competence and novelty satisfaction to autonomous motivation. Except for relatedness satisfaction, the satisfaction of the remaining three needs adopted an energising role in developing higher-quality of motivation, which aligned with the SDT's assumptions (Ryan et al., 2021). A plausible argumentation would rest on the fact that when pre-service PE teachers perceive different choices to complete the target activity, efficacy in completing it and experiences that the task is different from usual, they will are prone to participate in the instructional practice guided by experiences both of enjoyment and because they truly want to take part into it by identifying its relevance to become a PE teacher. It is also important to stress that, in contrast to González-Cutre et al.'s (2020) research conducted with secondary PE students, novelty satisfaction was the strongest predictor of autonomous motivation in pre-service PE teachers. While González-Cutre et al.'s (2020) research revealed that secondary PE students' competence satisfaction more strongly predicted their autonomous motivation; our findings suggest that pre-service PE teachers need to have the sensation of experiencing tasks, instructional strategies and assessment formats differing from typical rather than feeling autonomous and competent in developing autonomous reasons that lead them to complete their initial teacher education programme and, in consequence, to become in-service teachers.

Contrasted with our hypotheses, pre-service PE teachers' competence satisfaction positively predicted their controlled motivation. This result differed from Kaplan and Madjar's (2017) study that revealed that both variables were unrelated in pre-service generalist teachers, while it was partially aligned with the López-García et al.'s (2023) research, given that a positive association was found from pre-service generalist teachers'

need satisfaction to their controlled motivation. This finding makes us suggest that when pre-service PE teachers feel their competence as satisfied, they could also have controlled reasons toward their initial teacher education programme. This would be due to when they feel able and efficient during the target activity completion, the activity in question could also be interpreted either as an obligation imposed by their teacher educator to pass a specific subject, or as a personal duty to become a good PE teacher student throughout their initial teacher education programme. However, it should also be underlined that the positive path from competence satisfaction to controlled motivation might also be caused by a time characteristic of our cross-sectional research. Thus, there is a need for future longitudinal studies to explore if the positive relationship between competence satisfaction and controlled motivation would be consistently maintained over initial PE teacher education programme.

In line with our hypotheses, our results showed a negative and significant path from novelty satisfaction to controlled motivation. Although this result differed from the one reported by González-Cutre et al. (2020), it was congruent with the SDT framework (Ryan et al., 2021) given that novelty satisfaction took a buffering role against controlled motivation in the specific context of initial PE teacher education. It could, likely, be explained by the fact that when pre-service PE teachers develop new activities and are trained by pedagogical models and teaching styles different than usual, they will tend to perceive less pressures in its external and self-imposed nature in completing their initial PE teacher programme. On the other hand, and unlike both our expectations and the SDT's tenets (Ryan et al., 2021), our results displayed that autonomy and relatedness satisfaction failed to buffer against controlled motivation. This would be indicative that for pre-service PE teachers to have a less relevant role than theorised to reduce controlled motivation by being more important for them to feel their need for novelty as fully satisfied in their initial PE teacher education programme.

In accordance with our hypotheses and following the SDT's assumptions (Ryan et al., 2021), the results from our research indicated that, except for relatedness satisfaction, negative associations were obtained from autonomy, competence and novelty satisfaction to amotivation among pre-service PE teachers. To the best of our knowledge, this is the first research exploring the potential role of the satisfaction of each need on amotivation in initial (PE) teacher education, reporting pre-service PE teachers' need satisfaction performed a buffering role against their amotivation. Thus, it should be argued that when pre-service PE teachers feel that they have as many choices as desired for the on-going task completion, feel capable to success in its development together with the activity in question differs from the classroom routine, they will be prone to experience less futility and disinterest in their initial PE teacher education.

Partially consistent with the hypotheses of this study and following the SDT framework (Ryan et al., 2021), our results reported autonomous both autonomous and controlled motivation positively predicted academic engagement, with autonomous motivation having a higher prediction. These findings shed some light on the relationships between autonomous and controlled motivation with academic engagement in pre-service PE teachers given that Kaplan and Madjar (2017) only found a positive association of autonomous motivation on academic engagement, while López-García et al. (2023) revealed a positive relationship between controlled motivation and academic engagement. These results further suggest that a large quantity of the two higher qualities of motivation would be enough to keep the pre-service PE teachers' academic engagement with their initial PE teacher education programme. However, it is important to emphasise that when pre-service PE teachers are autonomously motivated, they get more engaged than when they are guided by controlled reasons. Indeed, it is thought that controlled motivation might be an effective way to foster short-term academic engagement among pre-service PE teachers; however, there is a need for longitudinal studies to analyse if the effects of controlled motivation on academic engagement would be maintained throughout initial PE

teacher education. Moreover, and following López-García et al.'s (2023) research, our results also displayed a negative association of amotivation on academic engagement. This could be explained in that when pre-service PE teachers with levels of futility, inefficacy, undervaluation, and disinterest in their initial teacher education programme, they will be prone to have a lower academic engagement with their teaching career.

Partially delineated with previous research (Karimi & Sotoodeh, 2020), our results additionally showed that pre-service PE teachers' autonomous motivation positively mediated the relationships between their autonomy, competence, and relatedness satisfaction with their academic engagement. A plausible rationale would rely on that when pre-service PE teachers feel their needs for autonomy, competence, and relatedness as satisfied, they, in turn, participated in their instructional practice guided mainly by autonomous reasons and, in consequence, they will develop a higher academic engagement during their initial PE teacher programme. Moreover, the findings from this research also revealed that controlled motivation negatively mediated the relationship between novelty satisfaction and academic engagement. This would imply that when pre-service PE teachers combine experiences of new content and activity outside their classroom routine, but in conjunction with external and self-imposed pressures to participate in the lesson, they would tend to have a lower academic engagement. Lastly, amotivation positively mediated the relationships between autonomy and competence satisfaction with academic engagement. This would entail that when pre-service PE teachers feel their need for autonomy and competence as satisfied in their lessons, but accompanied by experiences of futility and disinterest, they will be prone to have less academic engagement with their initial PE teacher education and, consequently, with their future teaching profession.

Limitations and Future Research Directions

As with any scientific work, this research has several limitations. The first of them is the adoption of a convenience and non-randomised sampling method in recruiting and selecting the participating pre-service PE teachers. This type of sampling technique made

it hard to generalise our results to the whole population, so that they should be interpreted with caution. Therefore, future studies should analyse in depth the studied relationships in pre-service teacher samples with more heterogenous characteristics regarding initial teacher education to discuss or verify the results obtained. The second limitation is the use of a cross-section design, although building upon the SDT framework, makes is impossible to establish causal relationships between the variables under study. Hence, further research is needed to implement longitudinal or experimental designs to determine the causality of the variables considered in this study. The third limitation is the exclusive administration of self-reported measures of need satisfaction, motivation, and academic engagement to collect our data. Thus, additional studies are needed to combine the use of self-reports with other instruments (e.g., interviews) for the purpose of optimally triangulating data. This will allow us to a deeper insight into the role that need satisfaction and the quality of motivation play in academic engagement among pre-service PE teachers throughout their initial teacher education programme.

Conclusions

The main results from the present research show a direct path from the pre-service PE teachers' perception of autonomy, competence, and novelty satisfaction to autonomous motivation, as well as an indirect path from the satisfaction of these three needs to academic engagement via autonomous motivation. In addition, there is a direct and positive relationship between competence satisfaction and controlled motivation, while novelty satisfaction did it negatively. Further, pre-service PE teachers' autonomy, competence, and novelty satisfaction negatively predicted amotivation. Lastly, autonomous and controlled motivation positively predicted academic engagement, amotivation did it negatively. This is the first research conducted in the specific context of initial PE teacher education that adds evidence to consider the need for novelty as the fourth basic psychological need within the SDT framework. Indeed, novelty satisfaction was the highest prediction of autonomous motivation in pre-service PE teachers. Our results recommend that PE teacher

educators use need-supporting and motivating teaching strategies in optimally developing pre-service PE teachers' academic engagement through the promotion of autonomy, competence and novelty satisfaction and autonomous motivation.

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PUBLICACIÓN 5

Motivational and cognitive variables in pre-service teachers: differences between Physical Education and STEM, Social-Linguistic and Artistic areas

Estudio 5

Motivational and cognitive variables in pre-service teachers: differences between Physical Education and STEM, Social-Linguistic and Artistic areas

Este artículo ha sido publicado:

López-García, G. D., Granero-Gallegos, A., Carrasco-Poyatos, M., & Burgueño, R. (aceptado para publicación). Variables motivacionales y cognitivas en profesorado en formación inicial: diferencias entre Educación Física y ámbitos STEM, Social-lingüístico y Artístico. *Revista Interuniversitaria de Formación del Profesorado*.

Información factor de impacto (FI):

- Revista situada en segundo cuartil (C2) de la clasificación de revistas con sello de Calidad FECYT del año 2022, categoría Educación.
- Revista situada en segundo cuartil (Q2) de SJR de Scopus, categoría Cultural Studies; FI-SJR año 2022: 0.211; CiteScore de Scopus 2022: 0.8 (Q2).
- IF-JCR (Journal Citation Reports) 2022: 0.5, categoría Education & Educational Research - ESCI

Motivational and cognitive variables in pre-service teachers: differences between Physical Education and STEM, Social-Linguistic and Artistic areas

Abstract

Previous research has focused on the motivational and cognitive resources with which pre-service teachers during their initial teacher education programme. However, little research has focused on the motivational and cognitive resources with which pre-service teachers start their initial training process, taking into account the subject area they come from. The design of this research was descriptive and transversal, and the aim of the present study was to compare the motivational and cognitive values (i.e., academic motivation, resilience, academic engagement, and teaching intention) of Physical Education preservice teachers with the rest of subject areas (STEM, Social-Linguistic and Arts) at the beginning of the teacher education programme. A total of 757 university students in initial teacher education (48.3% female; 51.0% male; 0.7% other) (24.8% Physical Education; 30.5% Social-Linguistic; 23.2% STEM; 21.4% Artistic) participated (M_{age}=25.56, *SD*=4.92). Academic motivation, academic engagement, resilience, and intention to choose teaching scales were used. The results of the ANOVA test with multiple comparison contrasts show significant differences between Physical Education and STEM pre-service teachers in intrinsic motivation to accomplish, integrated regulation, external regulation and amotivation. Significant differences were also found in resilience for Physical Education between Social-Linguistic and Arts pre-service teachers. Therefore, this research highlights the interest in teachers and researchers in the analysis of motivational and cognitive processes at the beginning of the educational process, as well as its usefulness in the identification of the pedagogical measures needed to face the formative period successfully.

***Keywords*:** academic engagement; teaching as a profession; physical education; motivation; resilience.

Introducción

La escasez de docentes (Van den Borre et al., 2021) supone que el profesorado tenga que estar altamente motivado y comprometido con la docencia y, a su vez, resiliente para abordar los actuales desafíos de la profesión. Por ello, los programas de formación inicial del profesorado adquieren una especial relevancia a la hora de fomentar los procesos motivacionales y cognitivos que hagan que el profesorado en formación inicial desee acceder y permanecer en el sistema educativo como docente (OECD, 2018). El estudio de estas variables al inicio del proceso de formación adquiere especial interés y complejidad, sobre todo cuando se afronta teniendo en cuenta los diferentes ámbitos de conocimiento del profesorado dentro del proceso de formación docente (Glutsch & König, 2019).

En España, la formación inicial del profesorado de educación secundaria sigue un modelo consecutivo. Es decir, los aspirantes a docentes de secundaria en primer lugar deben cursar estudios de grado de una determinada disciplina académica (e.g., Matemáticas, Biología, Filosofía, EF) y, a continuación, cursar una formación pedagógica específica en el Máster en Profesorado de Educación Secundaria (MAES) (Muñiz-Rodríguez et al., 2021; Sánchez-Cabrero & Pericacho-Gómez, 2021). Como consecuencia de este modelo consecutivo, el futuro profesorado inicia el MAES procedente de diferentes ámbitos de conocimiento, por lo que las motivaciones y recursos cognitivos para ser docentes difiere según el ámbito de estudio del que proceden (Glutsch & König, 2019). Durante los últimos años, la literatura científica reciente ha estudiado los ambientes motivacionales y los procesos cognitivos de los futuros docentes durante su proceso de formación sin tener en cuenta el ámbito de conocimiento del que proceden (Burgueño et al., 2022; López-García et al., 2022, 2023) y, además, la investigación se ha centrado en el análisis al final

de este proceso formativo específico (i.e., MAES). Por lo tanto, es necesaria más investigación para examinar estos procesos motivacionales y cognitivos teniendo en cuenta el ámbito de conocimiento de procedencia al inicio del MAES.

Motivación Académica

A diferencia de las clásicas teorías que conciben la motivación exclusivamente en términos cuantitativos, la Teoría de la Auto-determinación (TAD; Ryan & Deci, 2020) conceptualiza la motivación desde una perspectiva tanto cuantitativa como cualitativa. Es decir, una gran cantidad de motivación no garantizaría realizar la conducta deseada, si la motivación implicada fuera de baja calidad. Este carácter distintivo ha convertido a la TAD en una de las teorías contemporáneas más importantes a la hora de estudiar la motivación en el contexto educativo, incluyendo la formación inicial del profesorado (Guay, 2022). La TAD operacionaliza la motivación a largo de un continuum de autodeterminación diferenciando tres calidades de motivación dependiendo del nivel relativo de autonomía presente en cada una de ellas. En un extremo del continuum de autodeterminación se encontraría la motivación intrínseca, la cual refleja que la conducta se adoptaría por placer, la satisfacción y curiosidad, así como por la búsqueda de nuevos horizontes. En el extremo opuesto del continuum se encontraría la desmotivación, que expresaría la total ausencia de intencionalidad respecto a la conducta deseada. En la parte central de este continuum se encontraría la motivación extrínseca, que indica que la conducta se realizaría como un medio para conseguir un fin. Dado el carácter instrumental que define a la motivación extrínseca, se requiere de un proceso de internalización (i.e., proceso por el cual las normas y las creencias sociales son progresivamente asimiladas como parte del yo) para realizar la conducta. Dependiendo del grado de internalización conductual, se han distinguido cuatro tipos de regulación para la motivación extrínseca: a) la regulación externa refleja una ausencia de internalización en la medida que la conducta se realizaría para cumplir con las demandas externas, tales como conseguir premios o evitar castigos; b) la regulación introyectada implica un grado parcial de internalización, donde la conduc-

ta se realizaría para satisfacer contingencias autoimpuestas con la finalidad de evitar sentimientos de culpabilidad y vergüenza o de mejorar el autoestima; c) la regulación identificada expresa un grado casi completo de internalización, donde la conducta se realizaría al reconocer los beneficios derivados de su adoptación y, d) la regulación integrada representa un grado completo de internalización, donde la conducta se realiza porque se alinea de forma armoniosa con los valores y necesidades de la persona (Howard et al., 2017).

La literatura ha mostrado que los procesos motivacionales al inicio del programa de formación inicial del profesorado se asocian con consecuencias adaptativas a su finalización, tales como la autoeficacia docente y la intención docente (e.g., Burgueño et al., 2022).

Variables Cognitivas: Compromiso Académico, Resiliencia, Intención de Ser Docente

La investigación en el contexto de la formación inicial docente ha señalado la importancia de conocer los niveles de resiliencia (Mansfield & Beltman, 2019), de intención de ser docente (Burgueño et al., 2022), y de compromiso académico (López-García et al., 2022) entre el futuro profesorado.

El compromiso académico es definido como el estado mental positivo caracterizado por altos niveles de energía, entusiasmo e inmersión en acciones en las que el tiempo pasa desapercibido (Schaufeli et al., 2002). Según la literatura previa, la implicación académica (i.e., compromiso académico) del alumnado durante su proceso de formación docente conlleva una adaptación positiva sobre sus resultados académicos (Kahu, 2013). Así, los estudiantes con altos niveles de compromiso tendrán: un mejor desempeño educativo (Oriol et al., 2016), mayor persistencia incluso durante el programa de formación docente (Kim & Corcoran, 2018), y una mejor adaptación a sus estudios (Merino-Tejedor et al., 2018). Por el contrario, los estudiantes con bajo compromiso académico manifestarán síntomas depresivos y altos niveles de agotamiento (Upadyaya & Salmela-Aro, 2013).

Por ello, el análisis de variables como la resiliencia de los estudiantes al inicio del MAES puede ayudar a realizar propuestas prácticas para su desarrollo, no solo durante los estudios de máster, sino también durante los estudios previos de grado, sobre todo porque los futuros docentes, como se ha resaltado, comienzan la formación inicial docente provenientes de diversidad de grados o ámbitos de conocimiento. Todo ello puede ayudar al desarrollo de fortalezas psicológicas durante su proceso formativo (Merhi et al., 2018; Rojas-Solís et al., 2021).

Si ya de por sí, la actual concepción de la formación universitaria ha evidenciado la importancia de estudiar los niveles de resiliencia de los futuros docentes durante su proceso de formación (Mansfield & Beltman, 2019; O'Brien et al., 2020), actualmente, el desarrollo de la pandemia de COVID-19 ha acentuado la relevancia de medir la resiliencia en el alumnado universitario en general (Killgore et al., 2020), así como, especialmente en los futuros docentes (Granero-Gallegos et al., 2023; López-García et al., 2022). La resiliencia es definida como la capacidad para recuperarse y mantener una conducta adaptativa después del abandono o la incapacidad al iniciarse un evento estresante (Garmezy, 1991) y se ha destacado en la literatura como una de las mejores estrategias para mejorar el bienestar subjetivo en la educación universitaria (Neufeld et al., 2020), así como en el ámbito de la formación docente (Mansfield & Beltman, 2019). En este sentido, los futuros profesores con altos niveles de resiliencia contribuyen a construir una alta identidad como docente (Krisdianata & Mbato, 2022), una mayor confianza académica (Granero-Gallegos et al., 2023), así como al mantenimiento de altos valores de motivación durante el proceso de formación docente (Kim & Kim, 2021). Por el contrario, los futuros docentes con bajos niveles de resiliencia se relacionan con altos niveles de estrés durante el proceso de formación docente (Diasti, 2021). Por lo tanto, consideramos relevante estudiar los niveles de resiliencia de los aspirantes a profesores al inicio del MAES.

Además, la evidencia en el ámbito de la formación docente actual ha reflejado la importancia de examinar los niveles de intención docente entre los futuros profesores

(Burgueño et al., 2022; López-García et al., 2023). La intención de ser docente se encuentra englobada dentro de la Teoría de la Conducta Planeada (TCP; Fishbein & Ajzen, 2011). Según esta teoría, la intención de comportamiento futuro es un antecedente del grado de implicación conductual de un individuo para tener una conducta concreta. En este sentido, la evidencia científica en el ámbito de la formación docente ha examinado la intención docente de los futuros profesores exclusivamente al final del proceso de formación (Burgueño et al., 2022; Holt, 2019; López-García et al., 2023). Sin embargo, hasta nuestro conocimiento, no existen estudios que hayan examinado la intención de ser docentes al inicio del MAES, existiendo una limitación en la literatura científica, lo que representa una relevante contribución de presente investigación.

Características de la Educación Física y Ámbitos de Conocimiento

Los programas de formación inicial docente se encuentran divididos en ámbitos de conocimiento con características específicas de desarrollo y aprendizaje (Decreto 327/2010; Jareño et al., 2021). En este sentido, destacan i) ámbito Social-Lingüístico (e.g., Lengua Extranjera, Lengua y Literatura, etc.) ii) ámbito STEM (e.g., Matemáticas, Tecnología y Procesos Industriales, Física, etc.) iii) ámbito Artístico (e.g., Dibujo, Imagen y Ares Plásticas, Música, etc.); iv) ámbito de la EF. En relación con este último, es necesario resaltar que la EF destaca como una asignatura singular y diferente al resto de especialidades, pues se basa en la educación a través del movimiento (i.e., es una materia que desarrolla actividad física a través de conocimientos, habilidades, y hábitos motores que contribuyan a crear una actitud positiva hacia el ejercicio físico, salud y estilo de vida (Morgan & Hansen, 2008; UNESCO, 2015). Además, en relación con los estudios de grado en EF, hay que tener en cuenta aspectos como los siguientes y que diferencian a estos estudiantes del resto de ámbitos: (i) carácter fundamentalmente práctico de los contenidos y realizados fuera del aula tradicional (actividad física y deportiva) y en el que la superación y competición (contra otros y contra sí mismo) está presente en las clases; (ii) en España, muchas de las clases se desarrollan a la intemperie y bajo variadas condicio-

nes atmosféricas y meteorológicas; (iii) se realizan numerosas prácticas en el entorno natural (montaña, nieve, playa, etc.) en las que el alumnado debe colaborar entre sí y superarse a sí mismo. De esta manera, debido a la peculiaridad que muestran los estudiantes del ámbito de la EF, resulta interesante comparar sus niveles motivacionales y cognitivos con el resto de los ámbitos.

No obstante, la mayoría de los estudios que han analizado variables motivacionales y/o cognitivas en el ámbito de la formación del profesorado lo han hecho sin tener en cuenta el ámbito de conocimiento de los futuros docentes (e.g., Burgueño et al., 2022; López-García et al., 2022, 2023). Se puede concretar más indicando que: i) Respecto a la motivación, se han desarrollado investigaciones en diferentes ámbitos por separado, como STEM (Kim et al., 2015), Artístico (Taskesen, 2019), EF (Calderón et al. 2020), y Social-Lingüístico (Lestari & Arfiandhani, 2019); al respecto, cabe señalar que solo el trabajo Calderón et al. (2020) centra el análisis al inicio del MAES; ii) en relación con el compromiso, se pueden encontrar estudios en el ámbito STEM (Djam'an et al., 2022), Social-Lingüístico (Murtiningsih & Rahmawati, 2018) y EF (Peralta et al., 2016); hasta nuestro conocimiento, ningún estudio se ha focalizado en el ámbito Artístico; iii) en el análisis de la resiliencia tan solo se ha encontrado el estudio de Tülüce (2018) en Social-Lingüística y el de O'Brien et al. (2020) en EF; en relación con esta variable no encontramos ninguna investigación en el ámbito STEM y en el Artístico; iv) en la intención docente, se encuentran investigaciones en el ámbito STEM (Holt, 2019), Social-Lingüístico (Asriani et al., 2022), y EF (Spittle & Spittle, 2014); tampoco en este caso hemos encontrado ningún estudio en el ámbito Artístico. Conviene resaltar que las investigaciones existentes se han focalizado en un ámbito de estudio, pero, hasta donde nosotros conocemos, ningún estudio ha establecido comparaciones comparación entre diversos ámbitos de conocimiento.

El Presente Estudio

Hasta donde sabemos, escasos estudios han abordado la pregunta de cómo influyen los procesos cognitivo-motivacionales de los futuros docentes al inicio del MAES.

Además, como se ha puesto de manifiesto en el párrafo anterior, hasta la fecha solo se han realizado investigaciones focalizadas en un único ámbito de conocimiento y, mucho menos, se han realizado investigaciones que analicen estas variables y comparen los resultados entre futuro profesorado de distintos ámbitos de conocimiento. Además, el presente estudio también es el primero en abordar algunas variables desde el ámbito Artístico (i.e., resiliencia, compromiso académico, intención docente) y desde el ámbito STEM (i.e., resiliencia). Por tanto, esta investigación basada en el análisis de variables cognitivas y motivacionales de futuros docentes al inicio del proceso formativo específico (i.e., MAES) supone una relevante contribución a la literatura científica debido a la posibilidad de orientar este proceso formativo según el ámbito de conocimiento. Por todo ello, y dadas las citadas peculiares características del ámbito de EF, el objetivo del presente estudio es analizar la variables motivacionales y cognitivas (i.e., motivación académica, resiliencia, compromiso académico e intención docente) de profesorado en formación de EF, comparando los resultados con otros ámbitos de conocimiento (i.e., STEM, Artístico, Social-Lingüísitico) al inicio del MAES. Para la descripción del estudio se utiliza The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) initiative (Von Elm et al., 2008).

Método

Diseño y Muestra

El diseño de investigación descriptivo y transversal y participó profesorado en formación ocho universidades públicas andaluzas. Se establecieron los siguientes criterios de inclusión: i) estar matriculado en el MAES en alguna universidad pública andaluza durante el curso 2021/2022; ii) asistir con regularidad a las clases de forma presencial; iii) entregar el consentimiento informado para tomar parte en la investigación.

Se llevó a cabo un análisis a priori del tamaño muestral con G*Power v.3.1 para responder al objetivo de investigación y se calculó un mínimo de 748 participantes para detectar tamaños del efecto f^2=.152 en un análisis de varianza con cuatro grupos, con

una potencia estadística de .95, un nivel de significancia de α=.05. Un total de 757 estudiantes del MAES participaron in este estudio. En función de la población total (*N*=3653, según datos oficiales del portal de trasparencia de cada universidad andaluza), la muestra es representativa con un nivel de confianza del 99% y un margen de error muestral del 4.2%. La participación según género está equilibrada (48.3% mujeres; 51.0% hombres; 0.7% otro), y la edad comprendida entre 21 y 55 años (M_{edad}=25.56, *DT*=4.92). Los participantes pertenecían a las siguientes universidades públicas andaluzas: Universidad de Almería (15.1%), Universidad de Cádiz (8.2%), Universidad de Córdoba (5.3%), Universidad de Granada (35.4%), Universidad de Huelva (3.3%), Universidad de Jaén (11.8%), Universidad de Málaga (13.5%), Universidad de Sevilla 7.5%). Además, el 24.8% era profesorado en formación inicial de EF (24.8%), 30.5% del ámbito Social-Lingüístico (e.g., Lengua Extranjera, Lengua y Literatura), 23.2% del ámbito STEM (e.g., Matemáticas, Química), y el 21.4% del ámbito Artístico (e.g., Dibujo, Imagen y Artes Plásticas, Música).

Procedimiento

Se obtuvo autorización de ocho universidades andaluzas tras contactar con los responsables académicos del MAES e informar de los objetivos del estudio. El cuestionario se administró mediante formulario on-line durante el mes de noviembre de 2021. En el formulario se explicaba la relevancia del estudio, anonimato de las respuestas, cómo rellenar las diferentes escalas, y que podía abandonar su participación en la investigación en cualquier momento. Todos los participantes en la investigación dieron su consentimiento previo para que sus respuestas fueran incluidas. La investigación se realizó de acuerdo con la Declaración de Helsinki y el protocolo fue aprobado por el Comité de Bioética de la Universidad de Almería (Ref: UALBIO2021/009).

Instrumentos

Motivación Académica. Se utilizó la versión de Burgueño et al. (2017) adaptada al contexto universitario español de la *Academic Motivation Scale* (Vallerand et al., 1989). Esta escala está compuesta por 32 ítems agrupados en ocho dimensiones, con cuatro

ítems por dimensión, para medir los diferentes tipos de motivación académica del profesorado en formación inicial: motivación intrínseca (MI) a la estimulación (e.g, “Por el placer de leer temas interesantes“), MI al logro (e.g, “Por la satisfacción que siento al superar cada uno de mis objetivos personales“), MI al conocimiento (e.g, “Por el placer de descubrir cosas nuevas desconocidas para mí“), regulación integrada (e.g, “Porque está de acuerdo con mi forma de vida“), regulación identificada (e.g, “Porque posiblemente me permitirá entrar en el mercado laboral dentro del campo que a mí me guste“), regulación introyectada (e.g, “Por el placer de saber más sobre las cuestiones que me atraen“), regulación externa (e.g, “Para conseguir en el futuro un trabajo de más prestigio y mejor pagado“), y amotivation (e.g, “No lo sé, no consigo comprender qué hago matriculado en este Máster“). Las respuestas son recogidas en una escala Likert entre 1 (totalmente en desacuerdo) y 5 (totalmente de acuerdo). La estructura factorial de la escala se evaluó mediante CFA (Confirmatory Factor Analysis) que mostró unos adecuados ajustes: χ^2/gl=4.76, *p*<.0001; CFI=.91; TLI=.90; RMSEA=.071 [90%IC=.067;.074]; SRMR=.065. Los valores de fiabilidad (Omega de McDonald, ω) de cada dimensión fueron aceptables: MI a la estimulación, ω=.78; MI al logro, ω=.86; MI al conocimiento, ω=.88; regulación integrada, ω=.88; regulación identificada, ω=.74; regulación introyectada, ω=.84; regulación externa, ω=.80; amotivation, ω=.85.

Compromiso Académico. Se utilizó una versión corta para estudiantes de Serrano et al. (2019) de la *Utrecht Work Engagement Student Scale* (UWES-SS) diseñada por Schaufeli et al. (2002). Esta versión se compone de nueve ítems que se agrupan en una dimensión que mide el compromiso de los estudiantes con sus estudios: (e.g., “Estoy entusiasmado con mis estudios”). Para las respuestas se ha utilizado una escala tipo Likert desde 1 (completamente desacuerdo) a 5 (completamente de acuerdo). En el presente estudio el CFA del modelo presentó los siguientes ajustes: χ^2/gl=1.69, *p*<.0001; CFI=.96; TLI=.93; RMSEA=.055 (90%IC=.035,.072), SRMR=.044. La fiabilidad obtenida fue: ω=.88.

Resiliencia. Se empleó la versión reducida adaptada al contexto universitario español por Notario-Pacheco et al. (2011). Esta escala está compuesta por 10 ítems (e.g., No me desanimo fácilmente con el fracaso") que se organizan en una dimensión que mide la resiliencia en jóvenes adultos. Se utilizó una escala Likert entre 1 (nunca) y 5 (siempre) para la recogida de las respuestas. Puntuaciones elevadas indican un alto nivel de resiliencia. En el presente estudio el CFA del modelo presentó los siguientes ajustes: χ^2/gl=3.84, *p*<.0001; CFI=.97; TLI=.95; RMSEA=.061 (90%IC=.050,.063), SRMR=.033. La fiabilidad obtenida fue: ω=.86.

Intention to Choose Teaching as a Career. Se usó la versión de Burgueño et al. (2022) de *The Future Teaching Intention Scale* (FTIS) de Fishbein y Ajzen (2011). Esta escala mide la intención de los futuros profesores de trabajar como docentes y está compuesta por tres ítems agrupados en una dimensión (e.g., "Tengo la intención de trabajar como profesor/a en los próximos 3 años". Se utilizó una escala Likert entre 1 (nunca) y 5 (siempre) para la recogida de las respuestas 1 (totalmente improbable) y 7 (totalmente probable). En el presente estudio el CFA del modelo presentó los siguientes ajustes: χ^2/gl=1.97, *p*<.0001; CFI=.98; TLI=.96; RMSEA=.038 (90%IC=.025,.053), SRMR=.024. La fiabilidad obtenida fue: ω=.93.

Análisis Estadístico

De forma preliminar se evaluó la estructura factorial de cada instrumento con CFA, realizado con AMOS v.29, y se calcularon los estadísticos descriptivos, así como los análisis de consistencia interna y los índices de asimetría y curtosis de cada una de las variables con SPSS v.29. Seguidamente, para estudiar las diferencias entre los futuros docentes de EF y el resto de las especialidades, se agruparon en tres ámbitos de conocimiento (STEM, Social-Lingüístico, Artístico), teniendo en cuenta lo especificado en el artículo 84 del Decreto 327/2010. Para el cálculo de las diferencias según ámbitos de conocimiento se realizó la prueba ANOVA con contrastes de comparaciones múltiples a posteriori (*post-hoc*) aplicando la corrección de Bonferroni para determinar entre qué grupos

existían diferencias. En las pruebas estadísticas se han tenido en cuenta las pruebas de normalidad y homogeneidad de la varianza. Estos cálculos se realizaron con SPSS v.29. Para la evaluación de los AFC de cada escala se han tenido en cuenta diferentes índices de bondad de ajuste: cociente chi cuadrado y grados de libertad (χ^2/gl), CFI (*Comparative Fit Index*), TLI (*Tucker–Lewis Index*), RMSEA (*Root Mean Squared Error of Approximation*), con su intervalo de confianza del 90%(IC), y SRMR (*Standardised Root Mean Squared Residual*). En la ratio χ^2/gl, valores <5.0, CFI y TLI >.90, y RMSEA y SRMR <.08, son valores aceptables (Hu & Bentler, 1997; Mars et al., 2004); asímismo, CFI y TLI >.95, RMSEA and SRMR <.06, indican ajuste excelente del modelo (Jöreskog & Sörbom, 2001). La fiabilidad de cada escala fue evaluada mediante Omega de McDonald (ω). Valores de fiabilidad >.70 se consideran aceptables. Además, se ha tenido en cuenta el tamaño del efecto para cuantificar el tamaño de las diferencias (Cohen, 1992).

Resultados

Resultados Preliminares

Los estadísticos descriptivos y las correlaciones entre las variables del estudio se presentan en la Tabla 1.

Tabla 1

Estadísticos descriptivos y correlaciones entre variables

Variable	1	2	3	4	5	6	7	8	9	10	11
1. MI experiencia		.77**	.76**	.69**	.44**	.73**	.10**	-.12**	.53**	.27**	.22**
2. MI logro			.77**	.76**	.61**	.94**	.07*	-.29**	.62**	.32**	.27**
3. MI conocimiento				.71**	.52**	.73**	.22**	-.13**	.53**	.28**	.23**
4. Regulación integrada					.65**	.67**	.12**	-.29**	.55**	.30**	.36**
5. Regulación identificada						.52**	.28**	-.36**	.46**	.23**	.36**
6. Regulación introyectada							.10**	-.21**	.53**	.30**	.22**
7. Regulación externa								.08*	-.03	-.01	.19**
8. Amotivation									-.34**	-.13**	-.29**
9. Compromiso académico										.38**	.25**
10. Resiliencia											.17**
11. Intención de ser docente											
Rango	1-5	1-5	1-5	1-5	1-5	1-5	1-5	1-5	1-5	1-5	1-7
Media	3.07	3.24	3.65	3.50	4.08	3.71	3.75	1.65	3.80	3.99	6.09

Desviación estándar	0.95	1.02	1.00	1.05	.81	1.06	1.01	0.91	0.76	0.65	1.79
Asimetría	-0.05	-0.25	-0.62	-0.36	-0.99	-0.68	-0.73	1.59	-.59	-0.57	-1.02
Curtosis	-0.47	-0.62	-0.21	-0.58	0.88	-0.09	-0.08	1.62	0.09	-0.03	1.66

Nota. **La correlación es significativa en el nivel .01; *La correlación es significativa en el nivel .05.

Resultados Principales: Diferencias entre Educación Física y Áreas Competenciales

Con objeto de comprobar las diferencias entre PE y los otros tres ámbitos (i.e., Artístico, Social-Lingüístico, STEM) al inicio del MAES en las diferentes dimensiones estudiadas se realizó un ANOVA. Como se muestra en la Tabla 2, se hallaron diferencias estadísticamente significativas en todas las variables analizadas estudiadas excepto en la regulación identificada y la intención docente. Además, se ha de indicar que los tañamos del efecto hallados son bajos, excepto en la regulación externa que es moderado. Para analizar entre qué grupos (i.e., EF vs Artístico, EF vs Social-Lingüístico, EF vs STEM) se establecen las diferencias estadísticamente significativas, se realizó una prueba de comparaciones múltiples a posteriori (*post-hoc*) aplicando la corrección de Bonferroni.

Tabla 2

Análisis de la varianza de un factor (ANOVA), diferencias según áreas competenciales

	EF (1) (*n*=188)	**Art (2) (*n*=162)**	**S-L (3) (*n*=231)**	**STEM (4) (*n*=176)**			
	***M*(*DT*)**	***M*(*DT*)**	***M*(*DT*)**	***M*(*DT*)**	**$F_{(gl1,gl2)}$**	***p***	***d***
MI experiencia	3.04(0.85)	3.19(1.03)[4]	3.19(0.92)[4]	2.83(0.92)[2,3]	$5.92_{(3,408.82)^+}$	<.001	0.31
MI logro	3.33(0.94)[4]	3.27(1.01)[4]	3.40(1.05)[4]	2.90(1.03)[2,3]	$9.07_{(3,753)}$	<.001	0.38
MI conocimiento	3.65(0.87)	3.74(0.99)[4]	3.77(1.02)[4]	3.40(1.05)[2,3]	$4.72_{(3,405.24)^+}$	.003	0.29
Regulación integrada	3.59(0.89)[4]	3.43(1.10)	3.65(1.06)[4]	3.26(1.08)1[1,3]	$5.37_{(3,403.27)^+}$	.001	0.30
Regulación identificada	4.09(0.72)	4.06(0.82)	4.16(0.82)	3.99(0.87)	$1.92_{(3,753)}$	.124	0.18
Regulación introyectada	3.68(0.94)	3.85(1.05)[4]	3.81(1.08)[4]	3.47(1.14)[2,3]	$4.60_{(3,753)}$	.003	0.27
Regulación externa	3.85(0.96)[4]	3.90(0.95)[4]	3.93(0.98)[4]	3.28(1.02) [1,2,3]	$18.24_{(3,753)}$	<.001	0.54
Amotivation	1.73(0.90)[4]	1.75(0.96)[4]	1.66(1.00)	1.45(.71) [1,2]	$5.37_{(3,407.41)^+}$	.001	0.38
Compromiso académico	3.66(0.70)	3.86(0.75)	3.86(0.82)	3.82(0.84)	$2.75_{(3,753)}$	.042	0.00
Resiliencia	4.17(0.56)[2,3]	3.89(0.64)	3.90(0.69)	4.02(0.67)	$9.18_{(3,\ 406.52)^+}$	<.001	0.36
Intención de ser docente	6.07(1.40)	6.08(1.32)	6.19(1.37)	6.00(1.49)	$1.24_{(3,753)}$	.593	0.11

Nota. Los números en superíndice informan los grupos entre los que son estadísticamente diferentes; 1 = profesora en formación de EF; 2 = profesorado en formación del ámbito Artístico; 3 = profesorado en formación del ámbito Social-Lingüístico; 4 = profesorado en formación del ámbito STEM; + = Welch; *M* = media; *DT* = desviación típica; *n* = muestra; gl = grados de Libertad; *d* = d de Cohen; EF = Educación Física; STEM = Ámbito Científico-Técnico; S-L = ámbito Social-Lingüístico; Art = ámbito Artístico.

Esta prueba arrojó diferencias estadísticamente significativas en MI al logro, regulación integrada, regulación externa, amotivation, compromiso académico, y resiliencia. En estas cuatro dimensiones de la motivación académica, las diferencias se producen entre el futuro profesorado de EF y el de STEM, presentando los de EF los promedios significativamente más altos en estas cuatro dimensiones motivacionales: MI al logro (p<.001), regulación integrada (p=.014), regulación externa (p<.001), y amotivation (p=.020). En el compromiso académico, la prueba *post-hoc* no mostró diferencias significativas entre ninguno de los grupos, mientras que, en la resiliencia, el profesorado en formación de EF presentó puntuaciones medias significativamente más altas que los del ámbito Artístico (p<.001) y Social-Lingüístico (p<.001).

Discusión

El objetivo de la presente investigación fue comparar los valores motivacionales y cognitivos (i.e., motivación académica, resiliencia, compromiso académico, e intención de ser docente) del profesorado en formación de EF con el resto de ámbitos de conocimiento al inicio del MAES. Los principales resultados destacan que se hallaron diferencias significativas entre los futuros profesores de EF y los de STEM en los procesos motivacionales (i.e., motivación intrínseca al logro, regulación integrada, regulación externa y amotivation) y en la resiliencia con los futuros docentes del ámbito Artístico y Social-Lingüístico.

Diferencias Motivacionales

Los resultados mostraron diferencias en los valores de motivación entre los futuros docentes de EF y los de STEM. Respecto a las motivaciones intrínsecas solo se encontraron valores motivacionales más altos en el profesorado en formación de EF en la MI al logro. Estos hallazgos se encuentran en consonancia con los estudios de Calderón et al. (2020) y de Spittle et al. (2009), que subrayan los altos valores de motivación intrínseca en los futuros docentes de EF. En este sentido, los valores más elevados de MI al logro en el profesorado en formación de EF que en los de STEM, puede ser debido a las

particularidades metodológicas y estratégicas que la EF muestra (Abós et al., 2021), suponiendo un reto que los futuros docentes de EF deben de abordar. Por ello, la consecución de estos retos durante sus estudios hace que el alumnado de EF desarrolle una alta regulación de la conducta interna (Ryan & Deci, 2020).

Por otro lado, el profesorado en formación de EF mostró promedios más altos de regulación integrada, regulación externa, y amotivación en comparación con los de STEM. Aunque son escasos los estudios en la literatura, estos resultados se encuentran en consonancia con estudios previos en el ámbito de la formación docente (Ekinci, 2020). La diferencia entre los valores motivacionales de los estudiantes de EF puede ser debida a la peculiaridad de las actividades durante su formación inicial de grado, la dependencia de conductas controladoras durante las clases y a la particularidad del proceso formativo inicial de estos futuros profesores de EF (López-García et al., 2023), mientras que los futuros docentes de STEM no manifiestan la necesidad de control en comparación con los de EF. En este sentido, los estudiantes de MAES de EF tienen valores más altos de motivación externa (regulación integrada y regulación externa), así como de amotivation. Por otro lado, autores como (Burgueño et al. (2018)), en un estudio longitudinal, exponen la relevancia al proceso de internalización de la conducta externa (i.e., regulación integrada) como uno de los más influyentes durante el proceso de formación docente. En este sentido, conocer las regulaciones motivacionales predominantes del profesorado en formación de EF dará lugar a poder establecer estrategias motivacionales (López-García et al., 2022) influyentes en las conductas posteriores durante su proceso de formación (Haerens et al., 2016).

Diferencias Cognitivas

En el análisis entre grupos se encontraron diferencias estadísticamente significativas en la resiliencia, y no en el compromiso académico ni en la intención de ser docente. El hecho de que el profesorado en formación de todos los ámbitos comience la formación inicial docente (i.e., MAES) con similar compromiso académico es un resultado interesan-

te y, a pesar de que no existen investigaciones previas que respalden los descubrimientos del presente estudio, estos resultados pueden deberse a la influencia del contexto educativo para moldear el compromiso académico de los estudiantes (Wang & Eccles, 2013). En este sentido, el compromiso académico actúa como un elemento moldeable, proporcionando un punto de partida amplio sobre posibles formas de mejorar los programas de formación del profesorado. Con respecto a los resultados de la intención de ser docente, hay que destacar que este resultado no ha sido descrito con anterioridad debido a la falta de investigaciones que hayan medido esta variable al inicio del MAES. Este aspecto es ya una interesante contribución del presente estudio y explica que todo el profesorado en formación inicia el MAES con la intención de dedicarse a la docencia. En cuanto a la resiliencia, los futuros docentes de EF obtuvieron valores superiores a los del ámbito Artístico y Social-Lingüístico. Estos hallazgos se encuentran en consonancia con estudios previos como los de O' Brien et al. (2020) al evidenciar la existencia de niveles diferentes de resiliencia entre diferentes especialidades de profesorado en formación. Estos resultados pueden deberse a la diferencia en la formación inicial en la especialidad durante el grado (Glutsch & König, 2019), manifestando diferentes niveles de resiliencia según las particularidades de la especialidad que han estudiado. Concretamente, el profesorado en formación de EF tiene una formación de grado basada en la práctica físico-deportiva y actividades competitivas (e.g., competiciones por equipos, competiciones individuales, actividades en el medio natural, entrenamiento, etc.) lo que conlleva el desarrollo de un ambiente resiliente (Koçak et al., 2017), y puede explicar las diferencias con el profesorado en formación de los otros ámbitos cuya formación de grado es en un ambiente más tradicional de aula.

Implicaciones Prácticas

Los resultados de esta investigación ponen de manifiesto la importancia de conocer los procesos motivacionales y cognitivos con los que el futuro profesorado afronta su proceso de formación para proponer una formación basada en la evidencia (Sánchez-

Martín et al., 2022). Basándonos en los elevados valores de regulación externa y amotivación, se hace evidente que los formadores de los futuros docentes deben de reducir las conductas motivacionales externas y promover conductas motivacionales que internalicen la motivación interna de los futuros docentes de EF. Por ejemplo, a través de la creación de tareas competenciales que simulen la práctica docente (e.g., realizar prácticas simuladas que desarrollen contenido curricular), a través de la realización de retos y objetivos a lo largo del proceso de formación (e.g., diseñar una planificación anual para el alumnado), o por medio del fomento de los contenidos o innovación docentes (e.g., dar a conocer al profesorado en formación la importancia del fomento de la autonomía (Moreno-Murcia & Corbí, 2021; Rubio-Valdivieso et al., 2022). Asimismo, estos hallazgos exponen que los valores de compromiso académico al inicio del MAES son moderados entre los estudiantes por lo que sería recomendable incidir en actividades que desarrollen este compromiso durante el proceso de formación. Por ejemplo (ver Appleton et al., 2008), a través de un seguimiento individualizado de los alumnos, la valoración positiva del esfuerzo, y el progreso personal o la periodización y organización de los contenidos a impartir. Además, los resultados muestran que futuros docentes del ámbito Artístico y del Social-Lingüístico deberían de incrementar sus niveles de resiliencia, por lo que sería interesante que los docentes potenciaran habilidades de autosuperación de los estudiantes (Torres-Gázquez et al., 2023), así como la utilización de estrategias de resolución de problemas para el desarrollo de perfiles motivacionales más adaptativos (Mansfield & Beltman, 2019). Por último, el presente estudio evidencia la necesidad de mantener la intención de conducta futura de ser profesores entre los estudiantes del MAES. En este sentido, los formadores de docentes podrían utilizar estilos que desarrollen la autonomía del alumnado (Burgueño et al., 2022), así como, evitar la creación de climas de aula disempowering que reduzcan intención docente (López-García et al., 2023).

Fortalezas, Limitaciones y Futuras Perspectivas

Al hilo de los resultados expuestos, se pueden destacar diferentes fortalezas de esta investigación. Primero, el análisis realizado ayuda a comprender los valores cognitivo-motivacionales con los que el profesorado en formación afronta el inicio del MAES. Segundo, de manera específica, se muestra la comparación de estas variables estudiadas entre los diferentes ámbitos de conocimiento. En este sentido, el formador de profesorado podrá adaptar las estrategias y prácticas docentes a cada grupo de estudiantes con el fin de conseguir el éxito en la formación docente. Tercero, este estudio cuenta con un elevado tamaño muestral dentro de cada ámbito de conocimiento, en comparación con las muestras de la literatura actual. Cuarto, existió cegamiento entre los participantes y los investigadores que realizaron el tratamiento y análisis de los datos. A pesar de los hallazgos presentados y de las fortalezas destacadas, la presente investigación también tiene ciertas limitaciones. Primero, la información de las variables viene proporcionada por cuestionarios auto-informados, lo que puede condicionar las respuestas subjetivas de sus procesos motivacionales y cognitivos. Futuras líneas de investigación deberían estudiar la percepción de los procesos motivacionales y cognitivos utilizando diferentes instrumentos (i.e., entrevista, grupos de discusión, etc.). Segundo, el método utilizado de muestreo por conveniencia y no aleatorizado dificulta la interpretación de resultados, así como su extrapolación al conjunto de la comunidad educativa. Por último, autores como (Burgueño et al. (2022) y Wang y Eccles (2013) exponen la versatilidad de los procesos motivacionales y cognitivos durante el proceso de formación docente. En este sentido, futuros estudios deberían establecer diseños longitudinales que comparen la fluctuación de los procesos motivacionales durante el proceso de formación docente.

Conclusiones

Los hallazgos revelaron que el profesorado en formación de EF mostró diferencias en la MI al logo, regulación integrada, regulación externa y amotivation. En este sentido, el formador de profesorado debería de tener en cuenta esta regulación externa del profe-

sorado en formación de EF para, en consecuencia, poder dirigir y reconducir al alumnado hacia procesos motivacionales más autodeterminados. En relación con el resto de variables, los resultados mostraron que tan solo la resiliencia mostró diferencias entre los estudiantes de EF y los del ámbito Artístico y Social-Lingüístico. Por ello, a pesar de las características de la formación de los estudiantes de EF (e.g., espíritu de superación, retos, competitividad, etc.), se recomendaría que en la formación inicial de grado se propusieran también actividades basadas en retos y desafíos que desarrollaran conductas resilientes entre los estudiantes del resto de los ámbitos de conocimiento.

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CONCLUSIONES

Conclusiones

En esta tesis doctoral se deben de establecer cinco conclusiones para dar respuesta a cada uno de los objetivos de investigación:

- Estudio 1:
  - En primer lugar, se resalta la importancia del estilo interpersonal docente de apoyo a la autonomía sobre el compromiso académico del profesorado en formación, así como la mediación del clima motivacional hacia la maestría entre el apoyo a la autonomía y el compromiso académico. Asimismo, el estilo docente controlador se relaciona positivamente con el incremento del compromiso académico. De esta manera, en un contexto resiliente, para elevar el compromiso académico entre el profesorado en formación se recomienda a los docentes utilizar estilos motivantes y el uso de estrategias de instrucción centradas en la provisión de elección, iniciativa y justificación significativa.
- Estudio 2:
  - Esta investigación muestra la asociación entre el estilo motivacional *disempowering* y su influencia en el lado negativo de la motivación como promotores negativos de la intención de ser docente en profesorado en formación. Además, esta investigación revela la influencia mediadora de carácter negativo que el compromiso académico tiene como consecuencia del lado negativo de la motivación sobre la intención

de ser docente. Por último, los hallazgos de este estudio desprenden la importancia de la motivación controlada sobre el compromiso académico del profesorado en formación como mediador positivo entre el clima motivacional *disempowering* y la intención de ser docentes. Por ello, los formadores de docentes deberían evitar el clima *disempowering* por las consecuencias negativas sobre el compromiso académico a través del lado oscuro (*dark side*) de la motivación, exceptuando cuando el alumnado perciba una motivación controlada durante su proceso de formación docente.

- Estudio 3:
  - Uno de los hallazgos más destacables de este estudio hace referencia a los valores medios más altos de motivación intrínseca hacia el logro y el compromiso académico en las mujeres que en los varones. Además, son resaltables las diferencias en las diferentes variables estudiadas (i.e., motivación y compromiso académico) entre profesorado en formación de grado (futuros docentes de EF primaria) y de máster (futuros docentes de EF de secundaria). Los futuros maestros de primaria están intrínsicamente más motivados en sus estudios que los futuros docentes de secundaria, que alcanzan valores más altos regulación externa y desmotivación.

- Estudio 4:
  - El profesorado de EF en formación que percibe la necesidad de autonomía, competencia y novedad satisfecha, presenta altos valores de motivación autónoma, así como altos grados de compromiso académico. No obstante, aunque se sienta competente, desarrolla la motivación controlada durante su proceso de formación, lo que también incrementa el compromiso académico. Por último, para los futuros docentes de EF la relación con los demás no influye en sus conductas motivacionales durante el proceso de formación.
- Estudio 5:
  - Los docentes en formación de EF tienen valores más elevados de regulación motivacional menos autodeterminadas que el resto de los ámbitos, aspecto que debería de tener en cuenta el formador de estos futuros profesores para dirigir y reconducir al alumnado hacia procesos motivacionales más autodeterminados. Además, en comparación con el profesorado en formación del ámbito Artístico y Social-Lingüístico, los de EF presentan valores más elevados de resiliencia. Por ello, teniendo en cuenta algunos de los aspectos que caracterizan la formación inicial de grado de los estudiantes de EF (e.g., espíritu de superación, retos, competitividad, etc.), es recomendable que en la formación inicial de grado de los estudiantes del resto de los ámbitos de conocimiento se propu-

sieran también actividades basadas en retos y desafíos que desarrollaran conductas resilientes.

ANEXOS

Escalas utilizadas

Cuestionario de Compromiso Académico (UWES-SS)

(Schaufeli et al., 2002)

En una escala del 1 al 5 (donde 1 = nunca y 5 = siempre), indica tu grado de desacuerdo o de acuerdo con las siguientes afirmaciones en relación con tus clases universitarias.

1. En mis estudios me siento lleno/a de energía	1	2	3	4	5
2. Mis estudios tienen sentido	1	2	3	4	5
3. El tiempo vuela cuando estoy estudiando	1	2	3	4	5
4. Soy fuerte y enérgico/a en mis estudios	1	2	3	4	5
5. Estoy entusiasmado/a con mis estudios	1	2	3	4	5
6. Cuando estoy estudiando olvido todo lo que pasa a mi alrededor	1	2	3	4	5
7. Mis estudios son estimulantes e inspiradores	1	2	3	4	5
8. Cuando me levanto por las mañanas tengo ganas de ir a la facultad	1	2	3	4	5
9. Cuando estoy absorto/a en mis estudios, me siento bien	1	2	3	4	5
10. Estoy orgulloso/a de mis estudios	1	2	3	4	5
11. Estoy inmerso/a y concentrado/a en mis estudios	1	2	3	4	5
12. Puedo continuar trabajando en mis estudios durante largos períodos de tiempo	1	2	3	4	5
13. En mis estudios se presentan nuevos retos	1	2	3	4	5
14. Me «dejo llevar» por mis estudios	1	2	3	4	5
15. Soy persistente en mis estudios	1	2	3	4	5
16. Aprendo cosas nuevas e interesantes en mis estudios	1	2	3	4	5
17. Incluso cuando las cosas no van bien, continúo estudiando	1	2	3	4	5

Estilo Interpersonal Docente en Educación Superior (EIDES)

(Granero-Gallegos et al., 2021)

En una escala del 1 al 5 (donde 1 = completamente en desacuerdo y 5 = completamente de acuerdo), indica tu grado de desacuerdo o de acuerdo con las siguientes afirmaciones:

1. Mi profesor/a ha sido menos amable con quienes no se esforzaron por ver las cosas a su manera	1	2	3	4	5
2. Mi profesor/a ha ofrecido diferentes oportunidades y opciones durante la clase	1	2	3	4	5
3. Mi profesor/a ha pensado que es importante que participáramos en clase porque realmente queramos hacerlo	1	2	3	4	5
4. Mi profesor/a ofreció menos apoyo a los/as alumnos/as que no tuvieron buen rendimiento en clase	1	2	3	4	5
5. Mi profesor/a ha prestado menos atención a los/as alumnos/as que le desagradaron	1	2	3	4	5
6. Mi profesor/a ha respondido a las preguntas de los/as alumnos/ de forma clara	1	2	3	4	5
7 Mi profesor/a aceptó menos a los/as alumnos/as que le decepcionaron	1	2	3	4	5
8. Mi profesor/a solo recompensó a los alumnos/as si tenían buen rendimiento académico en clase	1	2	3	4	5
9. Cuando el profesor/a nos pidió que hiciéramos algo en clase, explicó por qué era bueno realizarlo	1	2	3	4	5
10. Mi profesor/a nos amenazó con castigos o sanciones durante la clase	1	2	3	4	5
11. Mi profesor/a ha pensado que es importante que participáramos en las clases porque nos resultan importantes	1	2	3	4	5

Satisfacción de las Necesidades Psicológicas Básicas en contexto educativo (SNPB)

(González-Cutre et al., 2020; León et al., 2011)

En una escala del 1 al 5 (donde 1 = completamente en desacuerdo y 5 = completamente de acuerdo), indíca tu grado de desacuerdo o de acuerdo con las siguientes afirmaciones:

1. Me siento libre en mis decisiones	1	2	3	4	5
2. Siento mucha simpatía por las personas con las que me relaciono	1	2	3	4	5
3. A menudo me siento muy competente	1	2	3	4	5
4. Siento que hago cosas novedosas	1	2	3	4	5
5. Generalmente me siento libre para expresar mis opiniones	1	2	3	4	5
6. Me siento bien con las personas con las que me relaciono	1	2	3	4	5
7. Tengo la sensación de hacer las cosas bien	1	2	3	4	5
8. Siento que a menudo hay novedades para mí	1	2	3	4	5
9. Experimento nuevas sensaciones	1	2	3	4	5
10. Tengo la posibilidad de tomar decisiones sobre los programas de las asignaturas	1	2	3	4	5
11. Las personas que me rodean me valoran y me aprecian	1	2	3	4	5
12. Creo que puedo responder a las exigencias de los programas de las asignaturas	1	2	3	4	5
13. Participo en la elaboración de mi programa de asignatura	1	2	3	4	5
14. Creo que se plantean situaciones novedosas para mí	1	2	3	4	5
15. Creo que descubro cosas nuevas a menudo	1	2	3	4	5
16. Considero mis amigos a las personas con las que me relaciono normalmente	1	2	3	4	5
17. Tengo muchas posibilidades de demostrar de qué soy capaz	1	2	3	4	5
18 Puedo opinar sobre la elaboración de los programas de las asignaturas	1	2	3	4	5
19 Me siento a gusto con los demás	1	2	3	4	5
20. A menudo siento que puedo hacerlo bien	1	2	3	4	5

Frustración de las Necesidades Psicológicas Básicas en contexto educativo (FNPB)

(Cuevas et al., 2015; González-Cutre et al., 2020)

En una escala del 1 al 5 (donde 1 = completamente en desacuerdo y 5 = completamente de acuerdo), indica tu grado de desacuerdo o de acuerdo con las siguientes afirmaciones

1. Me siento impedido para tomar decisiones respecto a las tareas que realizo	1	2	3	4	5
2. Hay ocasiones en las que me siento incompetente porque los demás se hacen expectativas poco realistas de mí	1	2	3	4	5
3. Me siento rechazado por los que me rodean	1	2	3	4	5
4. Lo que hago se me hace repetitivo	1	2	3	4	5
5. Me siento presionado a comportarme como los demás me dicen o quieren	1	2	3	4	5
6. Hay veces en las que dicen cosas que me hacen sentir incompetente	1	2	3	4	5
7. Siento que se dan siempre las mismas situaciones	1	2	3	4	5
8. Siento monotonía	1	2	3	4	5
9. Siento que otros tienen una actitud despectiva hacia mí	1	2	3	4	5
10. Me siento obligado a seguir las decisiones de los demás	1	2	3	4	5
11. Hay situaciones donde me siento incapaz	1	2	3	4	5
12. Siento que no le gusto a otras personas	1	2	3	4	5
13. Siento que lo que hago es rutinario	1	2	3	4	5
14. Siento que siempre hago lo mismo	1	2	3	4	5
15. Me siento presionado a asumir las decisiones que otros/as han tomado	1	2	3	4	5
16. Me siento incompetente porque no me dan la oportunidad de desarrollar mi potencial	1	2	3	4	5
17. Percibo que algunos compañeros con los que me rodeo sienten envidia cuando tengo éxito	1	2	3	4	5

Resiliencia

(Notario-Pacheco et al., 2011)

En una escala del 1 al 5 (donde 1 = nunca y 5 = siempre), indica tu grado de desacuerdo o de acuerdo con las siguientes afirmaciones

1. Soy capaz de adaptarme cuando ocurren cambios	1	2	3	4	5
2. Puedo enfrentarme a cualquier cosa	1	2	3	4	5
3. Intento ver el lado divertido de las cosas cuando me enfrento con problemas	1	2	3	4	5
4. Enfrentarme a las dificultades puede hacerme más fuerte	1	2	3	4	5
5. Tengo tendencia a recuperarme pronto tras enfermedades, heridas u otras privaciones	1	2	3	4	5
6. Creo que puedo lograr mis objetivos, incluso si hay obstáculos	1	2	3	4	5
7. Bajo presión me centro y pienso claramente	1	2	3	4	5
8. No me desanimo fácilmente con el fracaso	1	2	3	4	5
9. Creo que soy una persona fuerte cuando me enfrento a los retos y dificultades de la vida	1	2	3	4	5
Soy capaz de manejar sentimientos desagradables y dolorosos como tristeza,temor y enfado	1	2	3	4	5

Clima Motivacional en Educación Superior (CMES)

(Granero-Gallegos et al., 2020)

En una escala del 1 al 5 (donde 1 = completamente Desacuerdo y 5 = completamente de acuerdo), indica tu grado de desacuerdo o de acuerdo con las siguientes afirmaciones

1. El/la profesor/a espera que aprendamos nuevas habilidades y obtengamos nuevos conocimientos y habilidades	1	2	3	4	5
2. El/la profesor/a solo tiene en cuenta a los estudiantes con mejor rendimiento	1	2	3	4	5
3. El/la profesor/a se involucra para ampliar nuestra comprensión de los contenidos de la asignatura	1	2	3	4	5
4. El/la profesor/a presta más atención a los estudiantes con éxito	1	2	3	4	5
5. El/la profesor/a anima a los estudiantes a practicar habilidades con las que aún no han tenido éxito	1	2	3	4	5
6. El/la profesor/a anima a los estudiantes a superar a los demás	1	2	3	4	5
7. La mejora es importante para cada estudiante	1	2	3	4	5

Intención de ser Docente

(Burgueño et al., 2022)

En una escala del 1 al 7 (donde 1 = Totalmente improbable y 7 =Totalmente probable), indica tu grado de desacuerdo o de acuerdo con las siguientes afirmaciones

1. El/la profesor/a espera que aprendamos nuevas habilidades y obtengamos nuevos conocimientos y habilidades	1	2	3	4	5	6	7
2. El/la profesor/a solo tiene en cuenta a los estudiantes con mejor rendimiento	1	2	3	4	5	6	7
3. El/la profesor/a se involucra para ampliar nuestra comprensión de los contenidos de la asignatura	1	2	3	4	5	6	7

Clima Motivacional *Disempowering*

(Granero-Gallegos et al., 2021)

En una escala del 1 al 5 (donde 1 = Completamente Desacuerdo y 5 = Completamente de Acuerdo), indica tu grado de desacuerdo o de acuerdo con las siguientes afirmaciones

1. Mi profesor/a ha sido menos amable con quienes no se esforzaron por ver las cosas a su manera	1	2	3	4	5
2. Mi profesor/a ofreció menos apoyo a los/as alumnos/as que no tuvieron buen rendimiento en clase	1	2	3	4	5
3. Mi profesor/a ha prestado menos atención a los/as alumnos/as que le desagradaron	1	2	3	4	5
4. Mi profesor/a aceptó menos a los/as alumnos/as que le decepcionaron	1	2	3	4	5
5. Mi profesor/a solo recompensó a los alumnos/as si tenían buen rendimiento académico en clase	1	2	3	4	5
6. Mi profesor/a nos amenazó con castigos o sanciones durante la clase	1	2	3	4	5
7. El/la profesor/a solo tiene en cuenta a los estudiantes con mejor rendimiento	1	2	3	4	5
8. El/la profesor/a presta más atención a los estudiantes con éxito	1	2	3	4	5
9. El/la profesor/a anima a los estudiantes a superar a los demás	1	2	3	4	5

Escala de Motivación Académica

(Burgueño et al., 2017)

Es una escala del 1 al 5 (donde 1=No se corresponde en absoluto y 5=corresponde exactamente). Indica si no corresponde nada o completamente las siguientes afirmaciones relacionadas con las clases de Educación Física:

1. Sinceramente no lo sé; verdaderamente, tengo la impresión de perder el tiempo en el Máster	1	2	3	4	5
2. Porque sólo con el Grado no podría encontrar un empleo bien pagado	1	2	3	4	5
3. Para demostrarme que soy capaz de terminar un Máster	1	2	3	4	5
4. Porque pienso que este Máster me ayudará a preparar mejor lo que quiero ser	1	2	3	4	5
5. Porque está de acuerdo con mi forma de vida.	1	2	3	4	5
6. Porque para mí es un placer y una satisfacción aprender cosas nuevas	1	2	3	4	5
7. Por la satisfacción que siento cuando me supero en mis estudios	1	2	3	4	5
8. Por los intensos momentos que vivo cuando comunico mis propias ideas a los demás	1	2	3	4	5
9. Por los intensos momentos que vivo cuando comunico mis propias ideas a los demás	1	2	3	4	5
10. Para conseguir en el futuro un trabajo de más prestigio y mejor pagado	1	2	3	4	5
11. Porque aprobar en la Universidad me hace sentirme importante	1	2	3	4	5
12. Porque posiblemente me permitirá entrar en el mercado laboral dentro del campo que a mí me guste	1	2	3	4	5
13. Porque considero que forma parte de mí	1	2	3	4	5
14. Por el placer de descubrir cosas nuevas desconocidas para mí	1	2	3	4	5
15. Por la satisfacción que siento al superar cada uno de mis objetivos personales	1	2	3	4	5
16. Por el placer de leer temas interesantes	1	2	3	4	5
17. No sé por qué me he matriculado en este Máster, me trae sin cuidado	1	2	3	4	5
18. Porque en el futuro quiero tener una buena vida	1	2	3	4	5
19. Para demostrarme a mí mismo que soy una persona inteligente	1	2	3	4	5
20. Porque me ayudará a elegir mejor mi orientación profesional.	1	2	3	4	5
21. Porque lo veo como una parte fundamental de lo que soy	1	2	3	4	5
22. Por el placer de saber más sobre las cuestiones que me atraen	1	2	3	4	5
23. Por la satisfacción que siento cuando logro realizar actividades académicas difíciles	1	2	3	4	5
24. Por el placer que experimento al sentirme completamente absorbido por tratar ciertos temas	1	2	3	4	5

25. No lo sé, no consigo comprender qué hago matriculado en este Máster	1	2	3	4	5
26. Para tener en el futuro un mejor sueldo	1	2	3	4	5
27. Porque quiero demostrarme que soy capaz de tener éxito en mis estudios	1	2	3	4	5
28. Porque creo que unos pocos años más de estudios van a mejorar mi competencia como profesional	1	2	3	4	5
29. Porque considero está de acuerdo con mis valores	1	2	3	4	5
30. Porque este Máster me permite continuar aprendiendo un montón de cosas que me interesan	1	2	3	4	5
31. Porque la universidad me permite sentir la satisfacción personal en la búsqueda de la perfección dentro de mis estudios	1	2	3	4	5
32. Porque me gusta "meterme de lleno" cuando leo diferentes temas interesantes	1	2	3	4	5

Artículos publicados

frontiers | Frontiers in Psychology

TYPE Original Research
PUBLISHED 13 October 2022
DOI 10.3389/fpsyg.2022.992665

OPEN ACCESS

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SPECIALTY SECTION
This article was submitted to Educational Psychology, a section of the journal Frontiers in Psychology

RECEIVED 02 September 2022
ACCEPTED 26 September 2022
PUBLISHED 13 October 2022

CITATION
López-García GD, Carrasco-Poyatos M, Burgueño R and Granero-Gallegos A (2022) Teaching style and academic engagement in pre-service teachers during the COVID-19 lockdown: Mediation of motivational climate.
Front. Psychol. 13:992665.
doi: 10.3389/fpsyg.2022.992665

Teaching style and academic engagement in pre-service teachers during the COVID-19 lockdown: Mediation of motivational climate

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COVID-19 and the resulting confinement has had a great impact on the educational environment. Although research in initial teacher education has focused on studying the factors that lead to increased academic engagement, there is no evidence that examines the role of teacher interpersonal style and motivational classroom in a virtual learning context. The aim of this research was to analyze the mediating role of motivational climate between teacher interpersonal style (i.e., autonomy support and controlling style) and academic engagement climate in pre-service teachers in a resilient context. The research design was observational, descriptive, cross-sectional, and non-randomized. A total of 1,410 university students (pre-service teachers) participated (M_{age} = 23.85; SD = 5.13) (59.6% female; 40.3% male; 0.1% other). The scales of interpersonal teaching style, classroom motivational climate, academic commitment, and resilience were used, and a structural equation analysis with latent variables was carried out controlling resilience and gender. The results of the structural equation model show the importance of student perception of teacher autonomy support on academic engagement of the pre-service teachers, as well as the mediation of the mastery climate between autonomy support and academic engagement. For this reason, in order to increase academic engagement in pre-service teachers, it is recommended the use of motivating styles and instructional strategies focused on supporting the decision-making process, initiative, and significant learning.

KEYWORDS

autonomy support, controlling style, mastery motivational climate, performance motivational climate, resilience

Introduction

The situation caused by the COVID-19 pandemic has meant a change of approach to the teaching-learning process at all educational levels, including in initial teacher training (Camargo et al., 2020). During the first phase of the pandemic, characterized by a period of confinement, initial teacher training programs had to adapt quickly and abruptly to the new training reality, which meant moving from a face-to-face training model to a virtual one (Lorenzo-Lledó et al., 2021). For pre-service teachers, this new scenario meant facing both the inconveniences related to a virtual educational model (e.g., lack of digital competence, lack of technological resources, problems with the Wi-Fi connection, or lack of planning), and with their home conditions (e.g., sharing spaces with other family members, stress, or difficulties in concentrating), which led to them experiencing low engagement levels toward their initial training program (Scull et al., 2020).

Academic engagement has been identified as the cornerstone of all educational outcomes as it is closely linked to the quality of the training process for every student, including pre-service teachers (OECD, 2014). Indeed, it is thought that academic engagement could be influenced to a greater extent by the role that the teacher trainer, as a teacher, might adopt within the classroom. According to the Achievement Goal Theory (AGT; Ames, 1992), the teacher's role is recognized as being amongst the environmental factors that can influence different variables at the academic level (e.g., academic engagement) and that the motivational climate generated in the classroom by the teacher is so important that some authors emphasize it may be responsible for the academic success or failure of students (Ntoumanis and Biddle, 1999). Previous studies (Milton et al., 2018; Mastagli et al., 2021) have shown the need to combine Self-Determination Theory (SDT; Ryan and Deci, 2017) with the AGT (Ames, 1992) when delving into the influence of the classroom social environment, for example, taking into account the interpersonal teaching style. However, to date, no recorded studies have examined the effects of the classroom social environment generated by the teacher trainer on the academic engagement of pre-service teachers during confinement, a period characterized by a virtual training model and a resilient environment (i.e., one that favors both the capacity for recovery in the face of adversity and for adapting to changing demands; Tugade and Fredrickson, 2004). Therefore, this research aims to analyze the potential role that social and environmental factors in the classroom (i.e., interpersonal teaching style and motivational climate) might play in favoring academic engagement in future teachers within a resilient context, acquiring an important role in the context provoked by the COVID-19 pandemic.

Academic engagement

Academic engagement has been conceptualized as the positive affective and mental state related to academic work, characterized by high levels of energy, enthusiasm, and immersion in activities in which time goes by unnoticed (Schaufeli et al., 2006). The previous research (Schaufeli et al., 2006) operationalized academic engagement through the dimensions of vigor (the perception of high energy levels during study), dedication (the perception of high involvement in studies) and absorption (the perception of high levels of immersion and concentration presented by any academic task). Previous studies have shown the positive relationship between academic engagement and a number of adaptive educational consequences, such as persistence during the teacher training program (Fokkens-Bruinsma and Canrinus, 2015), teacher effectiveness (Kim and Corcoran, 2018) and the intention to complete the training program (Rots et al., 2014), amongst teachers in initial training. Given the importance of academic engagement to the training process of the future, it is necessary to delve into those factors that might determine it in the context of initial teacher training. Specifically, previous research has shown that academic engagement could be greatly influenced by an environment characterized by resilience (Ojo et al., 2021; Wang et al., 2021; Zhang et al., 2021), as well as by prior motivational experiences (Howard et al., 2021). Accordingly, the possible role of the motivational climate in the classroom is considered a proximal factor of teachers' academic engagement in initial training (OECD, 2014).

Motivational climate

One of the theories that can explain the motivational aspects related to academic engagement is the AGT (Ames, 1992). AGT is a verified theory in the educational field. It states that, in an achievement-related situation, a person's motivation and associated behaviors are affected by how success is perceived, and how competence is evaluated. Motivational climates indicate how the different goal factors of the educational context influence achievement in the school environment (Alonso-Tapia et al., 2019). According to the AGT, there are two predominant motivational climates in social contexts of achievement situations: the mastery climate (MC) and the performance climate (PC) (Walling and Duda, 2016). The MC refers to that focused on cooperation between students, where each plays a role in the class and success is based both on the learning process and on intrapersonal criteria related to effort and personal improvement. The PC favors success based on normative and interpersonal criteria, where a punitive response to errors is found and where there is rivalry between students (Ames, 1992). According to the existing literature, the

motivational climate in the classroom can affect the adaptive patterns of students (Madjar et al., 2019). Conversely, PC is negatively related to variables such as perceived competence (Granero-Gallegos et al., 2021) and academic performance (Gutiérrez and Tomás, 2018). Various studies have shown that a positive MC is associated with better cognitive and motivational outcomes, including academic engagement (Patrick et al., 2011; Reyes et al., 2012). Research has also suggested that the motivational climate in the classroom might be partly due to the type of teaching style used by the teacher trainer (Granero-Gallegos et al., 2021).

Interpersonal teaching style

SDT understands interpersonal style to be the way in which the teacher trainer interacts, communicates, and relates to teachers in initial training during the teacher-training program (Ryan and Deci, 2020; Ryan et al., 2021). SDT differentiates at least two types of interpersonal styles—a support for autonomy style, referring to those teaching strategies that provide the student with opportunities to choose and make decisions, giving reasoned explanations for tasks, recognizing the opinions of students and identifying their interests (Ryan and Deci, 2020; Ryan et al., 2021), and a controlling style, referring to those teaching strategies that pressure students into thinking, behaving and feeling in a way that is pre-established by the teacher, where the teacher imposes his/her own agenda and the requirements to be met by the student, regardless of the students' interests (Ryan and Deci, 2020; Ryan et al., 2021).

SDT-based research has shown that the autonomy support style and the controlling style are two independents, yet related, variables (Reeve et al., 2014; Ryan and Deci, 2017; Opdenakker, 2021). This implies that both interpersonal styles can coexist in the same context and contribute in a differentiated way to the prediction of specific consequences. Specifically, it is argued that the autonomy support style would not only favor positive consequences but would also dampen negative experiences. Conversely, it is believed that the controlling style would facilitate maladaptive consequences and, at the same time, undermine positive experiences (Opdenakker, 2021). Previous studies with university students have observed that the autonomy support style was positively related to both MC (Granero-Gallegos et al., 2021) and to academic engagement (Jiang and Zhang, 2021; Ma, 2021). In contrast, the controlling style was positively associated with maladaptive consequences, such as PC (Moreno-Murcia et al., 2018), while it was negatively related to adaptive consequences (Moreno-Murcia et al., 2018).

The present study

Despite the importance attributed to academic engagement as a cornerstone of the pre-service teacher training process, little is known about the role that interpersonal style and the motivational climate generated by the teacher trainer might play in the academic engagement of pre-service teachers. To date, no scientific evidence has been found that studies this relationship while also considering the resilience of pre-service teachers in terms of the motivational and cognitive abilities provoked by the pandemic environment caused by COVID-19. This aspect is also significant, and an important contribution to the scientific literature given the scarcity of studies looking at the influence of interpersonal teaching styles on motivational and cognitive variables affecting pre-service teachers in the pandemic period. Therefore, the objective of this study is to analyze the mediating role of the motivational climate between the interpersonal teaching style and academic engagement in trainee teachers in a resilient context. The following hypotheses were established: First, that the perception of autonomy support will be positively related to academic engagement (H1); second, that the controlling style will be negatively related to academic engagement (H2); third, that the MC will be positively associated with academic engagement (H3): fourth, that the PC will be negatively associated with academic engagement (H4); fifth, that the MC acts as a positive mediator between autonomy support and academic engagement (H5); and sixth, that the PC acts as a negative mediator between the controlling style and academic engagement (H6); (**Figure 1**). The *Strengthening the Reporting of Observational Studies in Epidemiology* (STROBE) *Initiative* (Von Elm et al., 2007) was used for the study description.

Materials and methods

Design

The research design was observational, descriptive, cross-sectional, and non-randomized. The sample was made up of university students from several Andalusian universities. The data were collected at the end of the 2020/2021 academic year. The following inclusion criteria were established: (i) to be a student of the Master's Degree in Secondary and Upper-Secondary Education Teaching, Vocational Training and Language Teaching or a student of a University Degree (face-to-face study) dedicated to the initial training of teachers. The exclusion criteria were: (i) not consenting to the use of data in the study; (ii) not completely filling in the data collection form.

Instruments

Interpersonal teaching style in higher education (EIDES)

The Spanish version by Granero-Gallegos et al. (2021) was used, comprising 11 items that measure the students' perception of the teacher's controlling style (6 items) (e.g., "My teacher has paid less attention to students he/she disliked") and support

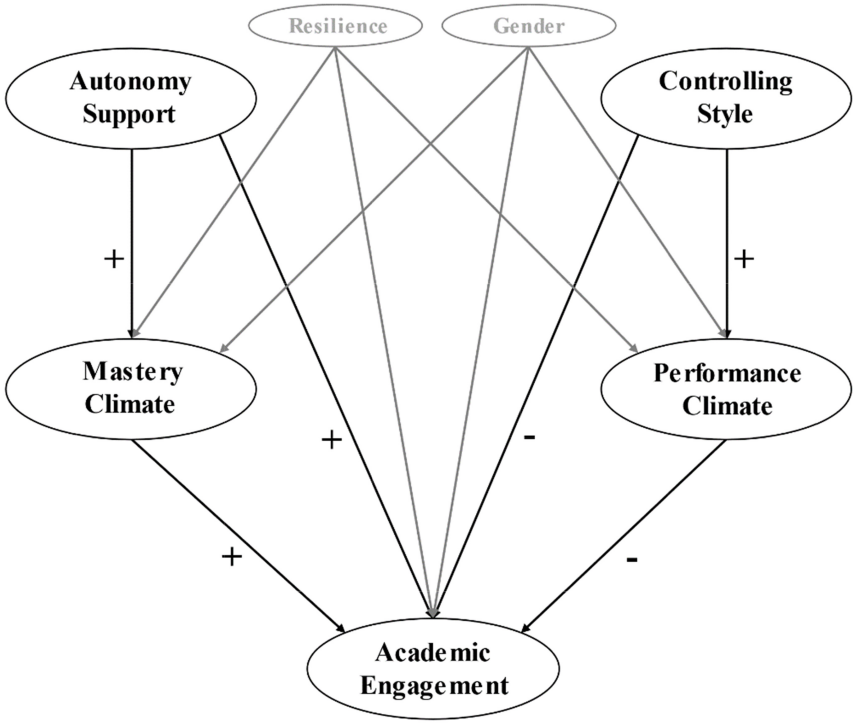

FIGURE 1
Predictive relationships of the interpersonal teaching style on academic engagement through the mediating role of the motivational climate, controlling the gender and resilience variables.

for teacher autonomy (5 items) (e.g., "My teacher has offered different opportunities and options during the class"). The responses were collected on a Likert scale ranging from 1 (*completely disagree*) to 5 (*completely agree*).

Motivational climate in higher education (MCES)

The Spanish version by Granero-Gallegos and Carrasco-Poyatos (2020) was used. The instrument comprises a total of seven items that make up two factors measuring the motivational climate of the classroom: the mastery climate (4 items) and the performance climate (3 items). The responses were collected on a Likert scale ranging from 1 (*completely disagree*) to 5 (*completely agree*).

Academic engagement

The Spanish version of the *Utrecht Work Engagement Student Scale* (UWES-SS) (Schaufeli et al., 2002) was used. The instrument consists of 17 items that make up three factors: vigor (6 items) (e.g., "In my studies I feel full of energy"), dedication (5 items) (e.g., "My studies are stimulating and inspiring") and absorption (6 items) (e.g., "I am immersed and focused on my studies"). The responses were collected on a Likert scale ranging from 1 (*completely disagree*) to 5 (*completely agree*). Academic engagement was calculated as the average value of the scores for each of the factors that comprise it.

Resilience

The reduced version by Notario-Pacheco et al. (2011), adapted to the Spanish university context, was used. This instrument comprises 10 items (e.g., I can adapt to changes) that are organized in a dimension that measures resilience in young adults. The responses were collected on a Likert scale ranging from 0 (*never*) to 4 (*always*). High scores on the scale indicate a high level of resilience.

Procedure

Firstly, the heads and teachers of the Faculties of Education Sciences and the Master's Degree in Secondary and Upper-Secondary Education Teaching, Vocational Training and Language Teaching were contacted to request permission and to ask for their collaboration in the research. The researchers then contacted the students by email. The data were collected using an online form throughout May 2021. The form briefly explained the importance of the research, the anonymity of the responses, the way to complete the scale, that the responses given would not affect any qualification in any way, and that the

participants could stop participating in the study at any time. All participants gave their consent to be included in the study prior to participating. The research was conducted in accordance with the Declaration of Helsinki and the protocol was approved by the Bioethics Committee of the University of Almería (Ref: UALBIO2021/009).

Risk of bias

Regarding the risk of bias, it should be noted that there was no sample randomization since convenience sampling was employed. However, there was blinding between the participants and the researchers in charge of data treatment and analysis. With respect to selection bias, participation was voluntary and communication with participants was conducted by email.

Sample size

An *a priori* analysis was carried out on the statistical power of the adequate sample size for meeting the study objective. Using the *Free Statistics Calculator* v.4.0 software (Soper, 2022), it was estimated that a minimum of 1,401 participants were needed for $f^2 = 0.15$ effect sizes with a statistical power of 0.99 and a significance level of $\alpha = 0.05$ in a structural equation model with six latent variables and 32 observable variables. In the actual study, 1,410 university students took part.

Data analysis

The descriptive statistics of each factor were calculated as well as the asymmetry, kurtosis, Cronbach's alpha (α), and the correlation between dimensions, using SPSS v.27 software. The hypothesized predictive relationships of the interpersonal teaching style on academic engagement, mediated by the motivational climate, were verified with a structural equations model (SEM) of the latent variables using AMOS v.25. Following the proposal of Wang et al. (2017), model analysis was performed using the two-step method. In the first step, the saturated model was examined by relating all the dimensions to each other. In the second step, the predictive relationships of the hypothesized model were evaluated. The evaluation of the models was performed taking into account the following goodness-of-fit indices: the values of the χ^2/gl ratio, CFI (*Comparative Fit Index*), TLI (*Tucker–Lewis Index*), RMSEA (*Root Mean Square Error of Approximation*) with its 90% confidence interval (CI), and SRMR (*Standardized Root Mean Square Residual*). For the χ^2/gl ratio, values < 5.0 are considered acceptable (Hu and Bentler, 1999); CFI and TLI values between 0.90 and 0.95, and RMSEA and SRMR values < 0.08, are considered to have acceptable goodness-of-fit indices (Marsh et al., 2004; Hooper et al., 2008). In addition, RMSEA values < 0.06 and SRMR values < 0.05 are considered to have excellent model goodness-of-fit indices (Hu and Bentler, 1999; Hooper et al., 2008). The internal consistency of each scale was evaluated with different parameters: α, composite reliability (CR), H coefficient, and AVE (*Average Variance Extracted*) to measure convergent validity. Reliability values ≥ 0.70 and AVE values > 0.50 are considered acceptable (Dominguez-Lara, 2017; Hair et al., 2018).

In the hypothesized model, the following direct relationships were established: between the dimensions of the interpersonal teaching style and the two dimensions of motivational climate and academic engagement; and between MC, PC and academic engagement. Indirect relationships were established between autonomy support, controlling style and academic engagement through the MC and PC. As the Mardia coefficient values were high (> 123.67; $p < 0.001$), the analyses were performed using the maximum likelihood estimation method and the 5,000-iteration *bootstrapping* procedure (Kline, 2016). In addition, R^2 was used for the effect sizes (ES) in order to improve the results interpretation, since it estimates the degree of influence by quantifying the variance percentage of the dependent variable explained by the predictors (Dominguez-Lara, 2017). The cut-off points were: 02, 0.13, and 0.26, for small, medium, and large effect sizes, respectively (Cohen, 1992). Furthermore, the confidence intervals (CI: 95%) were calculated to ensure that no R^2 value was < 0.02, as this is the minimum required for the interpretation.

Results

Participants

A total of 1,410 university students participated (841 women, 568 men, 1 other) from the Master's Degree in Secondary and Upper-Secondary Education Teaching, Vocational Training and Language Teaching from eight Andalusian public universities (Spain). The age of the participants was between 21 and 60 years ($M = 23.85$; $SD = 5.13$). There were no missing values in the included sample data.

Preliminary analyses

The descriptive statistics and the correlations between the study's latent variables are presented in **Table 1**.

Main analyses

In Step 1, the model presented acceptable goodness-of-fit indices: χ^2/gl = 2.662, $p < 0.001$; CFI = 0.944; TLI = 0.937; RMSEA = 0.043 (90%CI = 0.040;0.045; p_{close} = 1,000),

TABLE 1 Descriptive statistics and correlation between variables.

Variable	*M*	*SD*	Q1	Q2	α	CR	AVE	H	2	3	4	5	6
1. Autonomy Support	3.65	0.83	−0.38	−0.25	0.85	0.82	0.53	0.83	−0.36**	0.38**	0.79**	−0.17	0.56**
2. Controlling Style	2.30	0.95	0.44	−0.51	0.88	0.88	0.54	0.88		−0.15**	−0.31**	0.71**	−0.07
3. Resilience	4.09	0.68	−0.40	−0.62	0.09	0.89	0.52	0.90			0.32**	−0.04	0.37**
4. Mastery Climate	3.88	0.76	−0.51	−0.01	0.78	0.79	0.51	0.82				−0.17	0.59**
5. Performance Climate	2.47	0.97	0.45	−0.29	0.72	0.74	0.51	0.84					−0.02
6. Academic Engagement	3.51	0.82	−0.31	−0.07	0.90	0.89	0.54	0.91					

**The correlation is significant at the 0.01 level. *M*, mean; *SD*, standard deviation; Q1, skewness; Q2, Kurtosis; α, Cronbach's alpha; CR, composite reliability; AVE, average mean extracted; *H*, H coefficient.

SRMR = 0.049. In Step 2, the predictive SEM model showed the following acceptable goodness-of-fit index: χ^2/gl = 3.470, $p < 0.001$; CFI = 0.945; TLI = 0.938; RMSEA = 0.042 (90%CI = 0.040;0.044; p_{close} = 1,000), SRMR = 0.047. The explained variance was 63% for the MC, 51% for the PC, and 44% for academic engagement. In the SEM model, after controlling for gender and resilience, the direct relationships between the perception of a controlling style by the teacher and the MC, as well as the direct relationship between the PC and academic engagement, were not significant; nor were the direct effects of resilience on the two dimensions of motivational climate and PC on academic engagement. In contrast, the direct relationships between the perception of autonomy support and MC, and between PC and academic engagement, were statistically significant, as were the direct effects of the controlling style, the PC and academic engagement. Finally, the direct relationship between resilience and academic engagement was also statistically significant, as was the gender variable, which showed that, among women, the relationship between the prediction and academic engagement was higher.

Regarding the effects of mediation, the MC was a mediator between the teacher autonomy support style and academic engagement (β = 0.29; $p < 0.001$). However, the PC did not act as a mediator between any of the interpersonal teaching style factors and academic engagement. With regard to the total effects, it is noteworthy that the prediction of the perception of autonomy support on academic engagement, mediated by the MC, supposes an increase in the predictive relationship (β = 0.54; $p < 0.001$) between the above two variables. **Figure 2** shows the CI (95%) of R^2, which can be considered as ES measures (Dominguez-Lara, 2017) and, in all cases, this is large.

Discussion

The objective of this research was to analyze the relationships of both the interpersonal teaching style of autonomy support and the controlling style on academic engagement in a sample of teachers in initial training, examining the mediating role of the motivational climate in the resilient context caused by the pandemic. The main results highlight the importance of the mediation of MC between the autonomy support style and academic engagement.

In accordance with the posited hypotheses, the results reveal that, during the training process, the autonomy support style had a positive direct effect on the academic engagement of future teachers (H1) as well as a positive indirect effect mediated by the MC (H5). Although both relationships were statistically significant, it should be noted that the magnitude of the effect size was greater in the relationship between autonomy support and academic engagement mediated by the MC. These results corroborate previous studies that showed the importance of motivational climate mediation on mastery between the teaching styles and the cognitive (Jiang and Zhang, 2021) and behavioral (Granero-Gallegos et al., 2021) consequences in the university environment. In this way, teacher trainers who support student autonomy will generate a motivational climate oriented toward a process that will develop greater learning engagement from teachers in initial training. This might be because MC is a positive predictor of more self-determined motivational styles, regulating the students' behavior to incorporate learning-directed skills (Standage et al., 2003; Kipp and Amorose, 2008; Hodge and Gucciardi, 2015). In fact, using autonomy-supporting teaching styles tends to motivate students toward the self-realization of their goals and making it more likely that they develop higher levels of interest (Ryan and Aikenhead, 1992); that is to say, support for student autonomy has an effect on intrinsic motivation, resulting in students being more interested in the task they are performing (Reeve, 2009). Therefore, establishing motivational climates that foster interpersonal relationships in the classroom leads to students adopting a self-regulated approach to the work they are undertaking and results in increased academic engagement (Carmichael et al., 2017).

In addition to examining the indirect relationship of autonomy support to academic engagement, the present research also showed the positive direct relationship of MC on academic engagement (H3). These results are in line with previous studies, such as those by Sevil Serrano et al. (2016) and Gutiérrez and Tomás (2018), underlining the importance of generating a process-focused socio-contextual climate, which

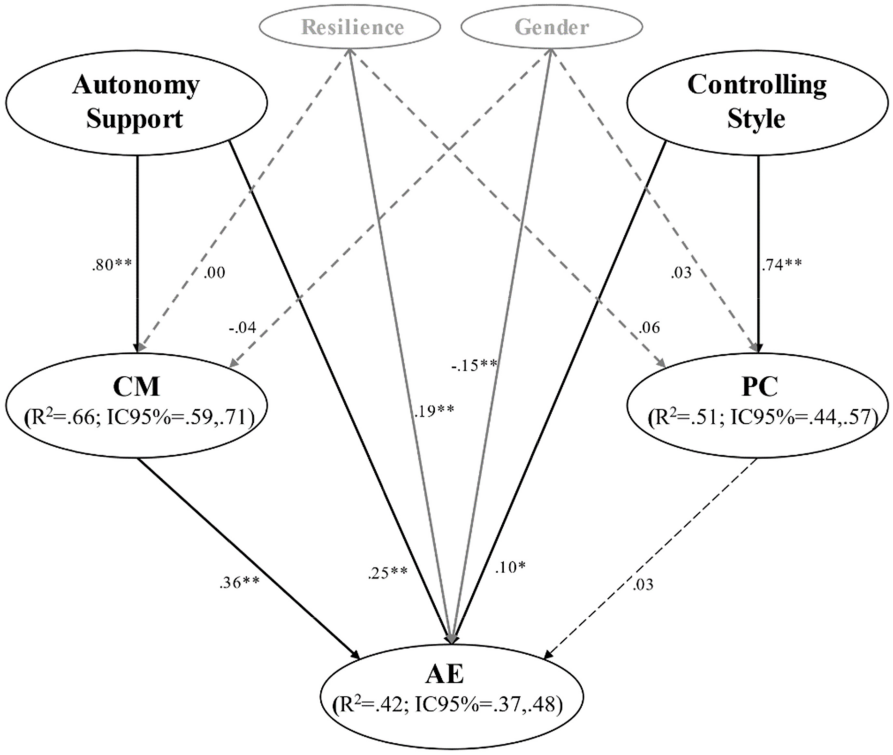

FIGURE 2
Predictive relationships of the interpersonal teaching style on academic engagement through the mediating role of the motivational climate, controlling the gender and resilience variables. $^{**}p < 0.001$. AE, Academic engagement; MC, Motivational climate; PC, Performance climate; R^2, Explained variance; CI, Confidence interval. The dashed lines represent non-significant relationships.

can contribute to improving learning outcomes in initial teacher training. This may be due to the importance of the educational context in shaping the students' academic engagement (Wang and Eccles, 2013). Specifically, the MC regulates the behavior patterns of students to incorporate skills directed toward the learning process (Hodge and Gucciardi, 2015). Therefore, the future teachers will perceive a social environment in the classroom particularized by participation, effort, cooperation, and improvement when undertaking learning tasks and thus they will feel academically involved in the training process.

The findings reveal that when a controlling style is perceived, it has a direct positive effect on the academic engagement of future teachers, thus falsifying H2. The present research also showed the absence of a relationship between the PC and academic commitment, discounting H4 and H6. Although the PC does not act as a mediator between the controlling teaching style and academic engagement (H6), the direct relationship between the controlling style and the PC is statistically significant and positive, thus meeting H7. However, perceiving a controlling style on the part of the teacher can generate a positive predictive relationship to academic engagement, although less than the predictive relationship of perceiving an autonomy support style. These results do not support the findings of previous research, such as those of Soenens et al. (2012) and De Meyer et al. (2014), in showing a negative relationship between the controlling teaching style and student engagement. This contradictory result could be due to the traditional use in classrooms of a controlling teaching style by teachers in the academic field, as expressed by authors such as Assor et al. (2002), which may mean that some students are used to being directed and need to feel controlled during the learning process in order to advance.

Following the hypothesized model, the findings of the present research contribute to the scientific evidence on the relationship between resilience and academic engagement. Previous studies, such as Medina et al. (2020) or Koob et al. (2021) corroborate the significant and positive relationship between resilience and academic engagement in a virtual training context caused by the COVID-19 pandemic. These results may be due to the protective role that resilience plays on the uncertainty factors caused by COVID-19 in students (Gundogan, 2021; Herbers et al., 2021). Thus, trainee teachers who have a greater capacity to overcome adverse situations will experience greater study engagement. In addition, the results of the present study demonstrate a greater predictive relationship to academic engagement among girls than among boys. This

result corroborates the findings of several previous works in this field (Driessen and van Langen, 2013; Kim and Corcoran, 2017). Studies such as those of Tison et al. (2011) and Kessels et al. (2014) demonstrate higher average values of academic engagement in women than in men. One possible explanation may be due to the important role of gender identity, socially created for teaching careers (Kessels et al., 2014). As a result, female teachers in training will be more academically engaged in their studies.

Finally, the educational relevance of the MC should be highlighted. This is generated through the interpersonal teaching style of autonomy support in a context of resilience, resulting in greater academic engagement in teachers undergoing training.

Limitations and future prospects

Despite the above findings, the present research also has certain limitations. First, the convenience sampling method used means the results obtained should be interpreted with caution. Second, no experimental intervention was established with different teaching styles to allow us to verify their effects on the students' perceptions. As future lines of research, it would be important to establish intervention protocols that measure the effect of different teaching styles on the academic engagement of trainee teachers by creating both motivational classroom climates. Finally, the measurement of teaching intervention styles and motivational classroom climates was only carried out *via* questionnaires. Therefore, it is recommended that future lines of research use complementary observational instruments to triangulate the data obtained.

Practical implications for initial teacher training

The results of this study suggest the need to use motivating styles characterized by autonomy support, and to generate mastery climates that foster academic engagement in future teachers. In this regard, teacher trainers need to use instructional strategies focused on providing meaningful choice, initiative, and justification: (a) providing coherent explanations on course objectives, content, homework, and other learning tasks. (b) Using cooperative learning strategies based on group training in which students can work cooperatively by discussing ideas, providing feedback, and sharing the necessary resources with the rest of their classmates. (c) Establishing opportunities of choice to learn and develop knowledge and to perform learning tasks around their preferences and interests. (d) Establishing assessment processes that promote student feedback in the teaching process.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Ethics statement

The studies involving human participants were reviewed and approved by University of Almería (Ref: UALBIO2021/009). The patients/participants provided their written informed consent to participate in this study.

Author contributions

AG-G, GL-G, and RB conceived the hypothesis of this study. AG-G, GL-G, and MC-P participated in data collection. RB and AG-G analyzed the data. GL-G, AG-G, RB, and MC-P wrote the manuscript with the most significant input from AG-G. All authors contributed to the data interpretation of statistical analysis and read and approved the final manuscript.

Funding

This work was carried out thanks to the help received from the "I + D + i" research project entitled "Is the empowering-disempowering motivational climate perceived by undergraduate students related to their intention to become teachers? A longitudinal study with teachers in training" (Ref. P20_00148), funded by the Andalusian Plan for Research, Development, and Innovation (PAIDI, 2020) of the Junta de Andalucía, as well as by the University of Almería's Own Plan for Research and Transfer 2021 (Ref. PPUENTE2021/002).

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's note

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International Journal of
Environmental Research and Public Health

MDPI

Article

Detrimental Effects of Disempowering Climates on Teaching Intention in (Physical Education) Initial Teacher Education

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Abstract: Previous research has looked at the positive consequences generated by teacher-generated climates on the motivational experiences of pre-service teachers. However, there is scant research focusing on the adverse motivational consequences that affect the perceptions of future teachers during the training process. The objective of this study was to explore the dark side of Duda's multidimensional conceptualization, its influence on academic engagement, and the intention of pre-service teachers to be educators. A total of 1,410 university students in initial teacher training (including physical education pre-service teachers) (59.6% women; 40.3% men; 0.1% other; M_{age} = 23.85; *SD* = 5.13) participated. The following scales were used: disempowering motivational climate, frustration of basic psychological needs, academic motivation, academic engagement, and the intention to choose teaching. The results of the structural equation model with latent variables show the positive prediction of the disempowering climate on the dark side and its negative influence on the intention to be a teacher. Controlled motivation preceded by academic engagement significantly mediates the relationship between a disempowering climate and the intention to be a teacher, increasing the total effect on the latter variable. Therefore, this research highlights for both teachers and researchers the impact of a disempowering motivational style, as well as its influence on the dark side as a negative promoter in trainee teachers regarding their intention to become teachers.

Keywords: teacher education; choose teaching as a profession; basic psychological needs; controlled forms of motivation; dark side; self-determination theory

Citation: López-García, G.D.; Granero-Gallegos, A.; Carrasco-Poyatos, M.; Burgueño, R. Detrimental Effects of Disempowering Climates on Teaching Intention in (Physical Education) Initial Teacher Education. *Int. J. Environ. Res. Public Health* **2023**, *20*, 878. https://doi.org/10.3390/ijerph20010878

Academic Editor: Joachim Kimmerle

Received: 14 November 2022
Revised: 28 December 2022
Accepted: 29 December 2022
Published: 3 January 2023

1. Introduction

The high rate of teacher dropout during the first years of professional work has heightened the level of concern within the initial teacher training programs [1]; these are undertaken at a complicated and sensitive time and have a significant impact on the development of future teachers [2–4]. Among the reasons for the problems that arise are the abandonment of the profession during the first few years [5], and the decision to opt for other careers with better job opportunities [6]. Given this growing concern, authors such as Hong et al. [1] have identified the main causes of teaching abandonment, one of which is a lack of initial motivation to pursue the profession [7]. Accordingly, the prior intention towards teaching behaviour (i.e., the intention to choose teaching) has been considered in recent literature [8] as one of the relevant cognitive consequences for completing a teacher training program, as well as being necessary for practising the profession in the future. Understanding the influential factors involved in choosing teaching as a professional career is necessary to improve the quality of teaching [9]. In this regard, authors such as Fokkens-Bruinsma and Canrinus [10] mainly highlight motivation and the social-psychological environment (i.e., the educational environment) as the key outcomes influencing the choice of teaching as a career.

Recent advances in the educational field have tried to examine how socio-contextual classroom environments (i.e., the social-psychological environment) affect motivational processes, as well as the role the teacher trainer might adopt in the initial teacher training context [11–14]. In this sense, following self-determination theory (SDT) [15], various interpersonal teaching styles are recognised (e.g., autonomy support and controlling style) in the teaching intervention. Likewise, achievement goal theory (AGT) [16] recognizes the role of the teacher as among those environmental or climate factors that can influence different variables at the academic level (e.g., task-involving and ego-involving climates). In this regard, Duda and Appleton [17] suggested a conceptualization of the motivational climate integrating the dimensions of the classroom social environment of the AGT [16] and the motivational style of the SDT [15]. This new conceptualization combines AGT and SDT in a multidimensional motivational climate of greater empowering or disempowering created by the teacher, which can influence the way students think, feel and act [17,18]. Although the existence of both climates has been taken together since their conceptualization (see [17]), the disempowering motivational climate has hardly received any attention in the scientific literature [19]. The few studies that do exist [18,20] have focused on evaluating the psychometric properties of the scale, or they have not looked in detail at the development and discussion of the motivational aspects present in a disempowering motivational climate, even though they evaluated both climates [21].To date, there is no record of studies focused on the effects of a disempowering motivational climate in terms of its maladaptive and cognitive motivational consequences for students. Therefore, the present research aims to analyse the potential role that social and environmental classroom factors (i.e., a disempowering climate) might play on the intention to be a teacher, examining the possible mediating role of maladaptive motivational (i.e., the dark side of motivation) and cognitive (i.e., academic engagement) processes in the context of initial teacher training.

1.1. Disempowering Motivational Climate

A disempowering climate is characterized as having a greater ego-involving and controlling style (see [17]). The controlling style [15] establishes ways of thinking, acting and behaving that are imposed by the teacher, independent of the students' interests, while the ego-involving climate [16] focuses on criticising students' mistakes and rewarding the most competent. On the one hand, Duda's disempowering climate framework has been negatively related to cognitive variables (e.g., academic engagement or the intention to teach). Specifically, authors such as Guo et al. [22] have only examined the relationship between an empowering climate and academic engagement, leaving aside the possible maladaptive influence of a disempowering climate. The possible negative influence of a disempowering climate on the intention of future behaviours (i.e., the intention to choose teaching as a career) has not yet been examined, despite its influence on the teacher training context. On the other hand, a disempowering climate has been positively related to the maladaptive motivational outcomes encompassed within the SDT [17]. For example, in a study on teachers in initial training, a disempowering climate positively predicted basic psychological needs frustration [21]. This relationship between maladaptive social environments created by the teacher (i.e., perceived controlled behaviours) and negative self-determined motivation variables (e.g., basic psychological needs frustration) has been conceptualized in previous works as the dark side of motivational processes [23]. However, despite its importance in the educational field, recent studies based on the dark side [24,25] have not taken into account the possible role of the ego-involving climate, as conceptualized by Duda and Appleton [17] with regard to educational and motivational outcomes.

1.2. Dark Motivational Pathway

SDT [26,27] suggests that the socio-contextual environment influences the motivational behaviours of individuals, including in the educational setting. Specifically, the perception of external pressures and the use of ego-centred coercive means by the teacher will lead to the frustration of the students' basic psychological needs (FBPN), understood as the so-called dark side. Basic psychological needs (BPN) are viewed as the essential and universal nutrients for optimal development, growth and well-being [17,28]. In this sense, FBPN is explained as: the frustration of autonomy (i.e., the degree of pressure and internal feeling carried out by an individual), the frustration of competence (i.e., the degree of inferiority or failure to execute a task at a certain level), the frustration of relatedness (i.e., the degree of perceived loneliness and alienation) and the frustration of novelty (i.e., the degree of perceived monotony and invariability) [28,29]. Likewise, authors such as Viksi and Tilga [25] have evaluated the dark side via the trans-contextual model of motivation, comprising the least self-determined types of motivation: controlled motivation (CM) and amotivation [26]. CM is conceived as both introjected and external regulation, while amotivation is understood as the absence of self-determination and regulation towards the desired behaviour. In this regard, SDT postulates that the dark side of motivation (i.e., FBPN, CM, and amotivation) will reduce the affective, cognitive and behavioural consequences in an adaptive way within the teacher training context. In the educational context, several authors have noted the negative relationship between the dark side and cognitive outcomes such as academic engagement or the intention to teach. Specifically, academic engagement has been negatively related to the dark side: CM [30], amotivation [31] and FBPN [32]. In addition, authors such as Burgueño et al. [8] have negatively linked FPBN to the intention to teach in pre-service teachers. Although recent research has analysed the dark side in an educational context [24,25], to date, no analysis has taken into account the less self-determined end of the trans-contextual model of motivation together with FPBN in trainee teachers.

1.3. Academic Engagement

Academic engagement has been conceptualized as the positive affective and mental state related to academic work, involving the intention, interest and effort invested by students in the learning process [33]. Previous research [33] has operationalized academic engagement across different dimensions: vigour, dedication, and absorption. Specifically, research in the teacher training context has shown the importance of academic engagement both as a consequence of socio-contextual classroom environments [14] and as a mediator between educational outcomes [13]. Although the use of academic engagement as an antecedent of future behaviours has been evidenced [34], few studies have evaluated its possible positive influence on behavioural intention (i.e., the intention to be a teacher) [35] despite its relevance in the teacher training context [8,10,36].

1.4. Theory of Planned Behaviour

The intention to be a teacher is a construct created from the behavioural intention encompassed in the theory of planned behaviour [37]. Behavioural intent (i.e., the intention to choose teaching as a career) represents an immediate antecedent of a person's degree of effort to act. Specifically, in the context of initial training, the intention to be a teacher reflects the degree of planning and effort that pre-service teachers employ in working as teachers. Likewise, according to Ajzen [37,38], the intention to choose teaching as a career is influenced by: (i) the attitude towards the behaviour, that is, a positive or negative behavioural assessment of teaching; (ii) the subjective norm, i.e., the individual's beliefs, which indicates whether there is social pressure to engage in certain behaviours; (iii) the perceived behavioural control, i.e., the degree of perceived ease or complexity associated with performing the future behaviour. Thus, previous intentions towards

teaching behaviour are considered relevant cognitive consequences for the future professional practice of trainee teachers.

1.5. The Present Study

Given the importance of the intention to teach in pre-service teachers, both during their training and while practising professionally as teachers, a predictive analysis is required of the motivational and engagement variables affecting the intention to teach. Furthermore, to the best of our knowledge, no analysis of the mediating role played by the dark side of motivation between a disempowering motivating climate and the intention to teach in pre-service teachers has been addressed in the scientific literature. Taking into account the postulates of the SDT and AGT, as well as a review of previous studies, a hypothesized model (see Figure 1) was created to examine the above-mentioned relationships. Therefore, the objective of this study was to analyse the mediation of academic engagement and the dark side motivational variables between a disempowering climate and the intention to choose teaching as a career in pre-service teachers. The following hypotheses were established: (i) a disempowering climate negatively predicts the intention to become a teacher (H1); (ii) the dark side of motivation (i.e., CM, amotivation, and FBPN) negatively mediates the relationship between a disempowering climate and the intention to become a teacher (H2); (iii) academic engagement negatively preceded by the dark side of motivation (i.e., CM, amotivation, and FBPN) mediates the relationship between a disempowering climate and the intention to become a teacher (H3). The Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) Initiative [39] was used for the study description.

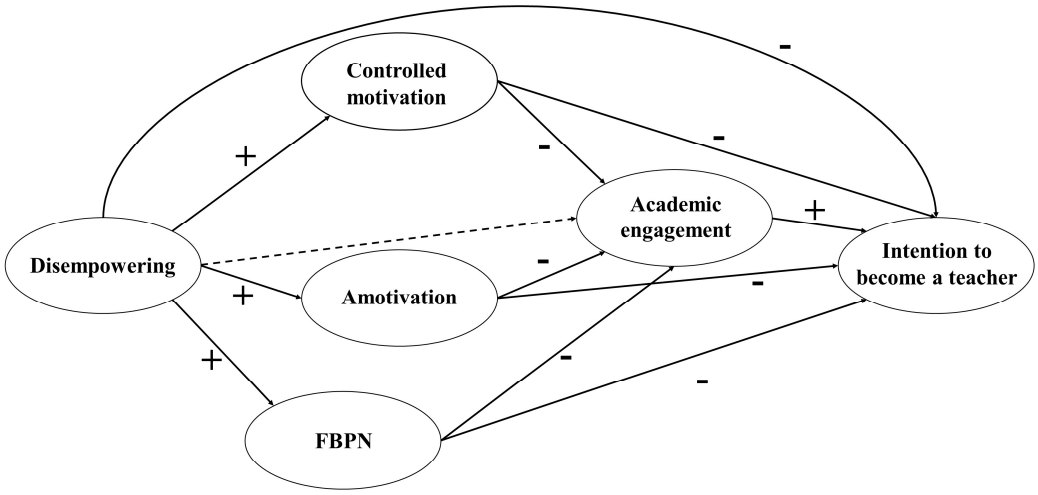

Figure 1. Hypnotized model. Note**:** the dashed lines represent non-significant relationships; FBPN = frustration of basic psychological needs.

2. Materials and Methods

2.1. Design

The study took a cross-sectional, non-randomized and descriptive design. The participating sample included students from eight Andalusian universities and the data collection process took place in May 2021. The potential participants had to meet the following inclusion criteria: i) to be enrolled in the master's degree in secondary and upper-secondary education teaching, vocational training and language teaching (presential modality); ii) to be a student from one of the eight Andalusian public universities; iii) to hand the informed consent for participation; and iv) to complete fully the online survey questionnaire.

2.2. Instruments

2.2.1. Disempowering Climate

Based on the theoretical assumptions of the SDT and AGT, and previous works [19], including research on Spanish university students [21], the ego-involving climate subscales from the motivational climate in education scale [40], and the controlling style from the interpersonal teaching style in higher education scale [41] were used to measure the different dimensions. The perceived disempowering climate measure included the following two subscales: the ego-involving climate (three items, e.g., "The teacher gives most attention to the successful students") and the controlling style (six items, e.g., "My teacher threatened to punish students to keep them in line during class"). Responses to each item were scored on a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The disempowering climate was calculated as the mean value of the average scores of the two factors comprising it. In the present study, the hierarchical two-factor CFA (H-CFA) model of the scale presented the following goodness-of-fit indices: $\chi^2/df = 3.59$, $p < 0.001$; CFI = 0.98; TLI = 0.98; RMSEA = 0.053 (90%CI = 0.042,.065), SRMR = 0.024. The reliability obtained was McDonald's Omega (ω) = 0.88.

2.2.2. BPN Frustration in Education

The Spanish version by Cuevas et al. [42] of the psychological need thwarting scale was used. In addition, the novelty frustration measure by González-Cutre et al. [43] was included. This instrument is composed of 17 items that measure autonomy (four items, e.g., "I feel pushed to behave in certain ways"), competence (four items, e.g., "Situations occur in which I am made to feel incapable"), relatedness (four items, e.g., "I feel I am rejected by those around me"), and novelty (five items, e.g., "I feel monotony") need frustration. Responses to each item are scored on a Likert scale from 1 (strongly disagree) to 7 (strongly agree). The FBPN was calculated as the mean value of the average scores for each of the factors comprising it. In the present study, the H-CFA model of the scale presented the following goodness-of-fit indices: $\chi^2/df = 4.52$, $p < 0.001$; CFI = 0.95; TLI = 0.95; RMSEA = 0.062 (90%CI = 0.057,0.119), SRMR = 0.044. The reliability obtained was: $\omega = 0.94$.

2.2.3. Controlled Motivation and Amotivation

The introjected regulation, external regulation, and amotivation subscales from the Spanish version [44] of the Academic Motivation Scale [45] were used. The scale is grouped into four items per dimension to measure introjected regulation (e.g., "Because passing at university makes me feel important"), external regulation (e.g., "Because I want to have a good life in the future") and amotivation (e.g., "I honestly don't know; truthfully, I feel like I'm wasting my time in the master's/undergraduate degree."). A Likert scale ranging from 1 (Does not correspond at all) to 5 (Corresponds exactly) was used for the responses. In accordance with the SDT [26], the CM was calculated as the mean value of the average scores for external regulation and introjected regulation. In the present study, the H-CFA model of the scale presented the following goodness-of-fit indices: $\chi^2/df = 4.51$, $p < 0.001$; CFI = 0.97; TLI = 0.96; RMSEA = 0.062 (90%CI = 0.048,0.076), SRMR = 0.032. The reliability obtained was: $\omega = 0.75$.

2.2.4. Academic Engagement

The Spanish version for students of the Utrecht Work Engagement Student Scale (UWES-SS) was used [46]. The scale is composed of 17 items that form three dimensions: vigour (six items; e.g., "I feel strong and vigorous when I am studying or going to classes"), dedication (five items; e.g., "I am proud to follow this career"), absorption (six items; e.g., "I am immersed in my studies"). Responses to each item are scored on a Likert scale from 1 (strongly disagree) to 5 (strongly agree). Academic engagement was calculated as the mean value of the average scores for each of the factors comprising it. In the present study, the H-CFA model of the scale presented the following goodness-of-fit indices: χ^2/df

= 4.97, $p < 0.001$; CFI = 0.96; TLI = 0.94; RMSEA = 0.071 (90%CI = 0.056,0.092), SRMR = 0.052. The reliability obtained was: $\omega = 0.93$.

2.2.5. Intention to Choose Teaching as a Career

The Spanish version [8] of The Future Teaching Intention Scale (FTIS), based on Fishbein and Ajzen [47], was used. This unidimensional instrument assesses the pre-service teachers' future intention to work as teachers and is composed of three items: "I intend to work as a teacher in the next three years", "I will try to work as a teacher in the next three years", and "I am determined to work as a teacher in the next three years". Responses to each item are scored on a Likert scale from 1 (totally improbable) to 7 (extremely probable). In the present study, the CFA model presented the following goodness-of-fit indices: $\chi^2/df = 1.69$, $p < 0.001$; CFI = 0.97; TLI = 0.96; RMSEA = 0.035 (90%CI = 0.023,0.054), SRMR = 0.023. The reliability obtained was: $\omega = 0.93$.

2.3. Procedure

The research team asked the different heads of the Schools of Education and of the master's degree in secondary and upper-secondary education, vocational training and language teaching for their authorization and collaboration for this research. After obtaining all permissions, the potential survey respondents were contacted by email. The data collection process was conducted in May 2021 through an online survey questionnaire. The potential participants were informed on the relevance of the present study, the anonymous nature on responses, the manner to fill in the survey, as well as that the responses provided would not affect their grading in any way, and they could abandon their participation in the research at any time. The current study was approved by the Bioethics Committee of the University of Almeria (Ref: UALBIO2021/009) and followed all standards for human research from the Declaration of Helsinki.

2.4. Risk of Bias

As the sampling method was for convenience, a blinding process was conducted between the participants and the researcher team responsible for data collection and analysis. To control for selection bias, the potential survey respondents participated voluntarily and anonymously, and were contacted via email.

2.5. Sample Size

Free Statistics Calculator v.4.0 software [48] was used to estimate the minimum sample size required to ensure the statistical power and trustworthiness of results. Under conditions of $f^2 = 0.152$, statistical power of 0.99, and significant level of $\alpha = 0.05$ in a structural equation model with six latent variables and 18 observable variables, a minimum sample of 1401 participants was computed.

2.6. Data Analysis

Both the descriptive statistics and the correlations between the analysed variables were estimated with the SPSS program (v.28). In addition, the McDonald's omega coefficient was calculated for each of the variables, indicating that values above 0.70 would be indicative of good reliability [48]. The SEM was controlled for sex and a two-step structural equation model was performed [49,50] with AMOS (v.26) software to analyse the predictive relationships between a disempowering climate and teaching intention through need frustration, CM, amotivation, and academic engagement. In the first step (the measurement model), the robustness of the bidirectional relationships between the variables that make up the model were analysed. In the second step, the predictive effects between the variables were examined. In the event that the multivariate normality assumption might be violated (Mardia's coefficient = 55.65; $p < 0.001$), the analysis was performed using the maximum likelihood method and the 5000-iteration *bootstrapping*

procedure [50]. The goodness of fit was evaluated with <5.0 for the chi-square coefficient and degrees of freedom (χ^2/df), values >.90 for the CFI (Comparative Fit Index) and TLI (Tucker–Lewis Index), together with values as high as 0.80 for the SRMR (Standardized Root Mean Square Residual) and RMSEA (Root Mean Square Error of Approximation) [51]. To better interpret the results, the total explained variance (R^2) was considered as a measure of the effect size [52]. Small, medium, and large effect sizes were considered to have values less than 0.02, close to 0.13, and greater than 0.26, respectively [53].

3. Results

3.1. Participants

A total of 1410 pre-service teachers participated (59.6% women; 40.3% men; 0.1% other), all of whom were enrolled in the master's degree in secondary and upper-secondary education, vocational training and language teaching of various Andalusian public universities (Spain) (University of Almeria, 13.5%; University of Cádiz, 3.6% University of Cordoba, 7.6%; University of Huelva, 3.4%; University Jaen, 11.4%; University of Granada, 27.2%; University of Malaga, 27.6%; University of Sevilla, 5.8%), in various specialties (Physical Education, etc.). There were 26 pre-service teachers who decided not to take part in this research. The age of the participants ranged from 21 to 60 years (M = 23.85; SD = 5.13). The representative sample of pre-service teachers was 38.60% of the total population under study in accordance with official data from the eight Andalusian public universities (N = 3653) with a confidence interval of 95% and a 2.1% error rate. There were no missing values in the included sample data.

3.2. Preliminary Results

The descriptive statistics and the correlations between the latent study variables are presented in Table 1.

Table 1. Descriptive statistics and correlation between variables.

Variable	*M*	*SD*	Q1	Q2	ω	2	3	4	5	6
1.Disempowering	2.34	0.87	0.51	−0.18	0.88	0.31 **	0.45 **	0.43 **	−0.05	−0.07 *
2.Controlled motivation	3.22	0.77	0.02	−0.22	0.75		0.22 **	0.17 **	0.24 **	0.09 **
3.FBPN	2.41	0.85	0.33	−0.37	0.94			0.47 **	−0.23 **	−0.21 **
4.Amotivation	2.07	0.92	0.74	−0.02	0.73				−0.30 **	−0.24 **
5.Academic Engagement	3.47	0.82	−0.27	−0.09	0.93					0.26 **
6. Intention to choose teaching	5.99	1.38	−1.41	1.52	0.93					

Note. ** The correlation is significant at the 0.01 level; * The correlation is significant at the 0.05 level. *M* = mean; *SD* = standard deviation; Q1 = skewness; Q2 = Kurtosis; ω = McDonald's omega; FBPN = Frustration of the Basic Psychological Needs.

3.3. Main Results

In step 1, the model presented acceptable goodness-of-fit indices: χ^2/df = 5.193, p < 0.001; CFI = 0.94; TLI = 0.93; RMSEA = 0.068 (90%CI = 0.063; 0.073), SRMR = 0.062. In step 2, the predictive SEM model showed similar goodness-of-fit indices: χ^2/df = 5.193, p < 0.001; CFI = 0.94; TLI = 0.93; RMSEA = 0.068 (90%CI = 0.063; 0.073), SRMR = 0.062. Although the χ^2/df ratio is greater than 5.0, we must consider that the chi-square test of exact fit often rejects the null hypothesis, especially in large samples, even when the postulated model is only trivially false [54]. The explained variance achieved was 33% for amotivation, 32% for FBPN, 16% for CM, 26% for academic engagement, and 21% for intention to choose teaching. After controlling for sex, in the SEM, the direct relationships between a disempowering climate and the three dark-side variables were positive and significant (strong with amotivation and FBPN; moderate with CM). Likewise, although the direct relationship between a disempowering climate and engagement was not significant, the relationship between a disempowering climate and the intention to choose teaching was

significant and positive (low effect). In contrast, the other three dark-side variables showed significant direct effects on engagement: CM had a moderate positive effect, while FBPN and amotivation had negative effects. Of these three variables (i.e., CM, FBPN, and amotivation), only amotivation was significantly and negatively related (a moderate effect) to the intention to choose teaching. Finally, the direct effect of engagement on the intention to choose teaching was significant and positive, although low (see Figure 2).

Regarding indirect effects, only amotivation mediated between a disempowering climate and the intention to choose teaching, although with a significant negative relationship (−0.23). The overall indirect effects between a disempowering climate and engagement via the dark-side variables were not statistically significant ($p = 0.424$). The total effects of a disempowering climate on the intention to choose teaching were only increased through CM and academic engagement (0.24), whereas they decreased through FBPN and engagement (0.18), and amotivation and engagement (0.19), and were even negative when only considering the effect of amotivation (−0.02). Lastly, there was a statistically significant overall indirect effect between a disempowering climate and the intention to choose teaching (β = −0.29; CI95% = −0.22; −0.36; $p = 0.12$).

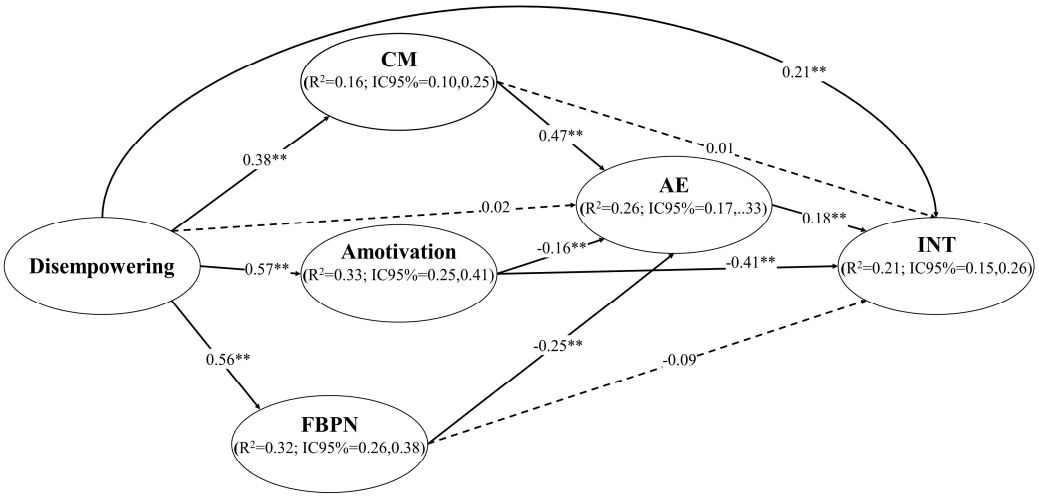

Figure 2. Predictive relationships between a disempowering motivational climate and the intention to choose teaching through the mediating role of controlled motivation, frustration of basic psychological needs, amotivation, and academic engagement. Note: ** $p < 0.001$. CM = Controlled motivation; FBPN = Frustration of Basic Psychological Needs; AE = Academic engagement; INT = intention to choose teaching; R^2 = Explained variance; CI = Confidence interval. The dashed lines represent non-significant relationships.

4. Discussion

The objective of this research was to analyse the mediating role played by academic engagement and the dark-side motivational variables between a disempowering motivational climate and the intention to choose teaching as a career in the context of initial teacher training. The main results highlight the importance of the mediation from the dark side of motivation, through academic engagement, between a disempowering motivational climate and the intention to choose teaching as a career.

In accordance with the hypothesized model, the results reveal that a disempowering motivational climate used by teacher trainers had a direct positive effect on the teaching intention of pre-service teachers (rejecting H1). These findings are not in line with the postulates of the theory of planned behaviour [37]; that is to say, following its theoretical foundation, a disempowering climate would influence the perceived behavioural control of pre-service teachers, triggering a decrease in the antecedent of future behaviour (i.e., the intention to teach). However, the present findings depart from this theoretical

foundation. In other words, pre-service teachers who perceive that their educators create a disempowering motivational climate will not have their intention to choose teaching as a career diminished, but quite the opposite. This contradictory result might be due to the effect that this multidimensional conceptualization has [17] on the motivational variables. Following the fundamentals of SDT (social factors → psychological mediators → motivation → consequence; see [15]), socio-psychological factors do not present a direct relationship on educational outcomes; if not, they are influenced by the motivational consequences that the social factors generate.

Continuing with the hypothesized model, the results reveal that the perception of a disempowering motivational climate has a direct positive effect on the dark side of motivation and, through amotivation, has a negative effect on the intention to teach (H2). In addition, only amotivation (from among the dark-side motivational outcomes used) was related to the intention to choose teaching as a career in pre-service teachers. These results contrast with other studies, such as those by Trigueros et al. [24] and Viksi and Tilga [25], and underline that neither CM nor FBPN predict the behavioural intention of students without the mediation of cognitive elements (e.g., academic engagement). A disempowering context in which students feel that their BPNs are frustrated, or feel controlled by external pressures, will not diminish their intention to choose teaching as a career. In contrast, a disempowering socio-contextual climate that promotes a lack of motivation will reduce the intention of pre-service teachers to become teachers. This might be because a lack of motivation, regardless of its causes (e.g., believing one has poor ability or poor effort, insufficient academic values, or unattractive schoolwork characteristics; see Green-Demers et al. [55]), has an influence on later teaching behaviours [23]. Specifically, amotivation is related to the lowest level of self-determination and represents a total absence of will with respect to antecedent behaviour (i.e., the intention to teach) [56]; that is to say, when pre-service teachers perceive a motivational classroom climate characterized by high degrees of disempowerment, their intention to become teachers will decrease.

Finally, the SEM showed that academic engagement preceded by the dark side of motivation acted as a mediator between a disempowering motivational climate and the intention to choose teaching as a career (H3). Although all three relationships were statistically significant, it is worth noting the negative and significant effect of amotivation and FPBN on academic engagement and the intention to teach. These results are consistent with the studies by Trigueros et al. [24] that examined the dark side through cognitive elements on educational outcomes and, in turn, with the results of Viksi and Tilga [25], which stated that the dark side influences future intention behaviours. Pre-service teachers who perceive a disempowering climate, capable of frustrating their BPNs or reducing their self-determined motivation, reduce their academic engagement and, consequently, their intention to choose teaching as a career. This can be explained by the influence of cognitive variables, such as academic engagement, on motivational processes and future intention behaviours [57]. Furthermore, in the SEM, a positive and significant predictive relationship of CM was found on academic engagement and the intention to teach based on a disempowering climate: if the disempowering climate generated by the teacher produces a behaviour based on external contingencies (i.e., CM), the pre-service teacher will increase their academic engagement and, as a consequence, increase their intention to choose teaching as a career. These results are far from the SDT [15] and other previous studies [23]. However, as Howard et al. [58] pointed out in a recent meta-analysis, a possible explanation for the above observation may be the influence of introjected regulation within the motivational processes of self-determination in the educational context. Likewise, introjection represents a partial internalization of self-determined values and, as such, can drive behaviours through ego-involvement and the use of internalized pressures [15], in such a way that, in the pre-service teachers, the internalization of controlled forms of motivation induced by a disempowering motivational climate would provoke a regulation of behaviours alien to the student, capable of favouring the development of adaptive cognitive processes. Although authors such as Howard et al. [58] have evidenced the

double role (adaptive and maladaptive) of the influences of external motivations, far from the postulates of the SDT, there is no specific scientific evidence in the educational field that provides a specific explanation for this incongruity. Therefore, future studies should aim to establish a relationship between the dark side of motivation and a multidimensional perspective of academic motivation [59].

4.1. Limitations and Future Perspectives

Based on the results presented, this research clearly contributes to developing Duda and Appleton's [17] conceptualization of the dark motivational pathway, introducing academic engagement and demonstrating its influence on the intention to choose teaching as a career. The model helps to understand how characteristic elements of a disempowering climate might influence FBPN to the extent that aspects of a need-thwarting environment could be considered. Another strength of this study is that direct and mediated relationships are established that deepen and expand our knowledge regarding maladaptive behaviours on the dark side of motivation. Despite the above findings, the present research also has certain limitations. First, the convenience sampling method used means the results obtained should be interpreted with caution. Second, the cross-sectional design of the research only represents a particular view in time, neglecting the possibility that causal relationships might be established between a disempowering motivational climate and the motivational outcomes. Therefore, longitudinal research is needed to examine the fluctuations that the social-psychological environment and the dark side of motivation have on the cognitive consequences of students throughout the teacher training process. Third, the research based its main conclusions on self-reported questionnaires completed by the pre-service teachers. Future research should examine the disempowering motivational climate using different instruments and taking into account the teachers' perceptions so as to triangulate the data. Lastly, although the present research focused on examining the consequences of a disempowering climate and the dark side of motivation, it only evaluated positive educational consequences (i.e., the intention to become a teacher and academic engagement). Therefore, future research should evaluate the influence of the dark side of motivation over a broader spectrum of maladaptive consequences (e.g., disengagement and burn out) [60]. In this way, the consequences of the dark side of motivation on educational outcomes, and their role in the educational field, could be understood in more detail and depth.

4.2. Practical Implications for Initial Teacher Training

From the results of the present research, certain educational implications of interest can be established, especially for teacher educators trying to encourage their students to participate in learning [61]. While previous research has shown the importance of generating an empowering motivational climate [19], the present results demonstrate the effects of a disempowering motivational climate on educational outcomes. Therefore, teacher educators should avoid strategies that create a disempowering climate [17,23], such as:

- Establishing threats regarding deadlines or strict rules (e.g., "Those not attending 85% of the subject will not be eligible for evaluation").
- Using normative behaviours in the classroom (e.g., "You cannot leave the classroom until the explanation has been given").
- Employing destructive criticism (i.e., "You have to know the characteristics of your students if you want to teach correctly in future").
- Denying the students' pedagogical contributions (e.g., "No, the report should be this length and have these characteristics").
- Using explicitly controlling language, such as "you must" or "you have to" (e.g., "You have to submit both tasks in order to take the exam").

In addition, a series of considerations are proposed to help teacher educators avoid generating a disempowering climate [16,17,23]: (i) The generation of a disempowering

climate does not mean that teacher educators should refrain from structuring the learning process. They can start by establishing expectations or providing a scaffold while supervising the learning process of pre-service teachers [62,63]; that is, establishing the use of norms through understanding (i.e., why is a standard introduced?) and establishment (i.e., participating in the standard-setting process with the students); (ii) The perceptions of the teacher educators regarding the classroom climate differ from those of the students [16,64,65]. Teacher educators may have an erroneous perception of the classroom climate they are trying to avoid, which conflicts with the students' perception [66]. For this, various tools such as class video recording or student self-reports [67] can be used to obtain an overview of the socio-environmental climates generated; (iii) As has been shown, some strategies for controlling the pre-service teachers' motivation can produce behavioural benefits, such as developing academic engagement and the intention to become a teacher. These outcomes are the result of specific motivational experiences caused by disempowering climates. In fact, the associated behavioural consequences of a dominating climate can exact an emotional cost, reducing psychological well-being over the long term [23].

5. Conclusions

The findings from the present study reveal the association between a disempowering motivational style and its influence on the dark side of motivation, which act as negative promoters on the intention of pre-service teachers to pursue a teaching career. In addition, the results reveal the negative mediating influence that academic engagement has as a consequence of the dark side of motivation on the intention to be a teacher. Finally, the study findings highlight the importance of CM on the academic engagement of trainee teachers as a positive mediator between a disempowering motivational climate and the intention to become a teacher. In this regard, teacher educators should avoid a disempowering motivational climate given its negative consequences on academic engagement through the dark side of motivation, except when students perceive external demands during the teacher training process.

Author Contributions: Conceptualization, G.D.L.-G. and A.G.-G., and R.B.; methodology, A.G.-G. and M.C.-P.; formal analysis, A.G.-G. and M.C.-P.; investigation, G.D.L.-G., A.G.-G., R.B. and M.C.-P.; data curation, A.G.-G. and R.B.; writing—original draft preparation, G.D.L.-G., A.G.-G., M.C.-P. and R.B.; writing—review and editing, G.D.L.-G., A.G.-G. and R.B.; project administration, A.G.-G. All authors have read and agreed to the published version of the manuscript.

Funding: This work was carried out thanks to the help received from the "I+D+i" research project entitled: "Is the empowering-disempowering motivational climate that undergraduate students perceive related to their intention to become teachers? A longitudinal study with teachers in training" (Ref. P20_00148), funded by the Andalusian Plan for Research, Development, and Innovation (PAIDI, 2020) of the Junta de Andalucía.

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki and approved by the Bioethics Committee of UNIVERSITY OF ALMERIA (protocol code UALBIO2021/009, 17 February 2022).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data presented in this study are available on request from the corresponding author. The data are not publicly available due to privacy.

Conflicts of Interest: The authors declare no conflicts of interest.

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HUMANISMO POLIÉDRICO. NUEVAS APUESTAS DE ESTÉTICA, ARTE, GÉNERO Y CIENCIAS SOCIALES

Diseño de cubierta y maquetación: Francisco Anaya Benítez

Madrid - 2022

N.º 56 de la colección Conocimiento Contemporáneo
1ª edición, 2022

ISBN: 978-84-1122-079-8

EFECTOS DE INTERACCIÓN DEL SEXO Y TIPO DE ESTUDIOS SOBRE LA MOTIVACIÓN Y EL COMPROMISO ACADÉMICO EN FUTUROS DOCENTES[334]

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1. INTRODUCCIÓN

El Sistema Educativo es uno de los principales factores del desarrollo y progreso de una Sociedad. Por ello, los dirigentes políticos gastan un gran porcentaje del presupuesto en la mejora del Sistema de Enseñanza (Rogero-García & Andrés-Candelas, 2014). Con el objetivo de analizar, mejorar y dirigir los procesos de cambio del sistema educativo, han surgido diversos informes e investigaciones de carácter nacional (García, 2020; Tiana-Ferrer, 2018) e internacional (Comision Europea/EACEA/Eurydice, 2015; ENQA, 2015; UNESCO, 2015). Ante los resultados de los informes y para responder los nuevos retos y cambios de la sociedad del conocimiento los sistemas educativos se

334 Este trabajo se ha llevado a cabo gracias a la ayuda recibida en el proyecto de investigación titulado "¿El clima motivacional empowering-disempowering que perciben los estudiantes de grado está relacionado con la intención de ser docente?" (Ref. P20_00148), financiado por el Plan Andaluz de Plan Andaluz de Investigación, Desarrollo e Innovación (PAIDI 2020) de la Junta de Andalucía y por el Plan Propio de Investigación y Transferencia de la Universidad de Almería (Ref. PPUENTE2021/002).

encuentran en un proceso de constante transformación (Esteve, 2006; Gomendio, 2021). Por ello, existe en la literatura el debate sobre el papel que suscita el profesorado dentro del contexto educativo(Muñoz-Fernández et al., 2018). Entre los aspectos que definen el rol del profesorado, la formación constituye una gran incidencia en el posterior desarrollo de su labor docente, que junto con su experiencia forman un importante indicador de calidad educativa de un país (Coelho et al., 2011).

A pesar del objetivo de homogeneización e internacionalización a nivel europeo, actualmente existen diferencias entre los distintos sistemas de formación de profesorado (Rebolledo-Gámez, 2015). Por ello, es importante destacar la importancia de la formación inicial en promover y despertar en el profesorado en formación, una fuerte motivación para la adquisición de nuevos aprendizajes para mejorar su desempeño laboral como docentes (Rosales, 2013) Según Garcia (2011) y Tang et al. (2020), cabe resaltar, que el alumnado que durante su formación inicial en la universidad desarrolle un mayor interés profesional, conseguirá con mayor rapidez y efectividad su inserción en el mundo laboral, por el contrario, aquellos que no lo consigan serán más susceptibles al abandono de su profesión en los primeros años. Por ello, resulta de gran interés para el ámbito educativo analizar los factores predictores de resultados educativos positivos y las formas motivacionales que afectan al profesorado en formación inicial, durante su proceso formativo

1.1. Compromiso Académico

Entre las diferentes variables responsables de resultados educativos positivos que forman parte del proceso de formación, destaca el compromiso académico, debido a su instauración entre la literatura científica como un indicador de calidad educativa en la educación universitaria (Vilà et al., 2019). El compromiso académico, también llamado compromiso del estudiante, es un concepto complejo y pluridimensional que cambia de un marco a otro de aprendizaje (Appleton et al., 2008; Kahu, 2013; Martin et al., 2015). Schaufeli et al., (2006) definen el compromiso como un estado afectivo y mental

positivo caracterizado por altos niveles de energía, entusiasmo e inmersión de actividades en las que el tiempo pasa desapercibido. Concretamente en el ámbito educativo, el compromiso académico alude al proceso psicológico que involucra el interés, la atención y el esfuerzo que el alumnado invierte en su proceso de enseñanza (Marks, 2000). Por lo tanto, el compromiso académico hace referencia al grado en que el alumnado está motivado para aprender y progresar en el centro escolar (Libbey, 2004). Debido a su carácter multidimensional el compromiso académico está constituido por tres factores: vigor, absorción y dedicación (Schaufeli et al., 2002). El vigor se caracteriza por altos niveles de energía y resiliencia mental durante el estudio; la dedicación, por una alta implicación de los estudiantes hacia sus tareas académicas, y la absorción se relaciona con los altos niveles de concentración que presenta una tarea. Estos factores, como manifiestan Schaufeli et al. (2002), determinan el nivel de compromiso académico de los estudiantes.

Estudiar el grado de compromiso académico de los estudiantes ha sido uno de los objetivos de muchos docentes e investigadores (Loera et al., 2013; Ross et al., 2008). La evidencia científica en el área, ha estudiado el nivel de compromiso académico en los diferentes ámbitos educativos (i.e., primaria, secundaria y universidad)(Friedman et al., 1988; Perkmann et al., 2021; Zhao et al., 2021), acentuando la importancia que este constructo tiene en el ámbito escolar. El alumnado con altos niveles de compromiso académico tendrá un mejor desempeño educativo (Oriol et al., 2016), invertirá tiempo y energía en su proceso de aprendizaje (Martin & Dowson, 2009) y tendrá una mejor adaptación a sus estudios(Merino-Tejedor et al., 2018). Por consiguiente, el alumnado comprometido académicamente con sus estudios desarrollará habilidades y destrezas para afrontar las tareas y desafíos que aparezcan durante su proceso de formación. Por el contrario, el alumnado con bajo compromiso académico tendrá altos niveles de agotamiento y altos síntomas depresivos (Upadyaya & Salmela-Aro, 2013). Es decir, los estudiantes con menor compromiso académico gozarán de menor oportunidad para adquirir un aprendizaje de calidad. Congruentemente, estudiar los componentes del compromiso es un progreso hacia el

aumento de la calidad de la educación en el profesorado en formación, dado que se incrementaría el conocimiento y habilidades de los estudiantes (Zhao et al., 2020). En consecuencia, mejorar de la calidad de la enseñanza del profesorado en formación resultaría de gran interés para su estudio.

1.2. MOTIVACIÓN ACADÉMICA

La motivación ha sido considerada como uno de los factores clave necesarios para el correcto desarrollo del profesorado en formación (Urkidi-Elorrieta et al., 2020). Diversas teorías han explicado la motivación desde diferentes perspectivas. Sin embargo, la macroteoría con respaldo empírico que explica el funcionamiento de la motivación humana es la Teoría de la Autodeterminación(TAD; Deci & Ryan, 1985). La TAD ha sido aplicada con éxito en ámbitos como el laboral (Coxen et al., 2021) o el educativo (Howard et al., 2021). Concretamente, dentro del ámbito educativo ha sido estudiado en las diferentes etapas educativas (i.e., educación primaria, educación secundaria y universidad)(Kriegbaum et al., 2018; Urdan & Bruchmann, 2018), observando el amplio respaldo científico que esta tiene en este ámbito. Siguiendo los postulados de la TAD la motivación humana no debe ser tratada como un concepto unitario, sino como un concepto multidimensional(Ryan & Deci, 2000). Ryan y Deci, (2000) desarrollaron un modelo de motivación académica que se comprende en un continuo con seis estilos diferenciados (i.e., motivación intrínseca, regulación integrada, regulación identificada, regulación introyectada, regulación externa y amotivación), asociando un comportamiento concreto para cada forma determinada de motivación.

La motivación intrínseca se define como un deseo psicológico de representar comportamientos por el placer, la satisfacción o la emoción asociados con la representación del comportamiento en sí (Ryan & Deci, 2019). Dentro del continuo que forma el modelo compuesto por Vallerand (2000) la motivación intrínseca forma parte de un constructo global compuesto por: motivación intrínseca hacia la estimulación (el comportamiento es adoptado en función a la generación de estímulos en el trascurso de la actividad), motivación intrínseca hacia el logro (el

comportamiento se adquiere en base al placer de conseguir un nuevo logro) y motivación intrínseca hacia el conocimiento (el comportamiento se interioriza en relación al disfrute que se experimenta durante el proceso formativo). Contrariamente, la motivación extrínseca hace referencia al proceso psicológico vivido por los individuos impulsados a lograr los resultados y metas diferenciados de las satisfacción de su comportamiento propio (Ryan & Connell, 1989). La motivación extrínseca, está formada por cuatro formas de regulación organizadas en función del grado de interiorización alcanzado (Ryan & Deci, 2000). Siguiendo a Ryan y Deci (2000) encontramos regulación integrada (la conducta se adhiere coherentemente a la propia identidad y sistema de valores personales), regulación identificada (la conducta se lleva a cabo debido a la conducta del valor personal percibido sean o no comportamientos inherentemente agradables), regulación introyectada (la conducta se desarrolla como resultado de la elusión de la sensación culpa) y la regulación externa (la conducta es adoptada para evadir castigos o conseguir gratificaciones). Además, dentro del continuo de motivación se encuentra la ausencia o falta de motivación, denominada desmotivación (Vallerand, 2000). Congruentemente, Vallerand (2000) identifica al entorno como un aspecto clave en la determinación de la motivación una persona. Así, la motivación académica ha sido asociada como predictora del rendimiento académico (Kusurkar et al., 2013; Wu et al., 2020), relacionada con un aprendizaje más profundo (Levesque et al., 2004), con un mayor bienestar psicológico (Amholt et al., 2020; Vansteenkiste et al., 2005), y con altos niveles de compromiso académico (Ahn et al., 2021; Datu et al., 2018; Karimi & Sotoodeh, 2020). Como se desprende de la literatura científica previa, la motivación académica de los estudiantes relacionada con el compromiso académico (Howard et al., 2021). Por ello, y dejando clara la importancia que tiene la motivación sobre los procesos de aprendizaje, creemos que es importante analizar las formas motivacionales que actúan en el proceso de aprendizaje del profesorado en formación inicial. Sin embargo, hasta la fecha no existe evidencia científica en el ámbito que compare diferentes formas motivacionales entre el alumnado de grado y el alumnado de master de secundaria dentro del proceso de formación docente.

1.3. EL PRESENTE ESTUDIO

Según lo expuesto anteriormente, estudiar las formas motivacionales y el compromiso académico en profesorado en formación, resulta de interés en el ámbito educativo de la formación superior. Es conveniente destacar la escasez de estudios que han estudiado estas relaciones en el contexto educativo universitario y, además, ninguna investigación hasta nuestro conocimiento se ha centrado en analizar los posibles efectos del tipo de estudios (i.e., estudios de grado y estudios de master) y sexo sobre las dimensiones de la motivación académica y el compromiso académico de profesorado en formación inicial. Teniendo en cuenta lo expuesto anteriormente, el objetivo del presente estudio es analizar los efectos de interacción del sexo y el tipo de estudios cursados sobre las formas motivacionales y el compromiso académico en futuros docentes.

3. METODOLOGÍA

3.1. DISEÑO Y PARTICIPANTES

El diseño del estudio fue observacional, descriptivo, transversal y no aleatorizado. La selección de la muestra fue de tipo no probabilístico y por conveniencia. Participaron 920 estudiantes en formación inicial (569 mujeres; 351 hombres) (M_{edad} = 24.73; DT = 5.34) de diversas universidades andaluzas (60.8%, Grado; 39.2%, Máster en Profesorado de Educación Secundaria).

3.2. INSTRUMENTOS

Motivación Académica. Se usó la adaptación al contexto universitario español (Burgueño et al., 2017) de la *Academic Motivation Scale* (Vallerand et al., 1989). El instrumento consta de 32 ítems agrupados en cuatro reactivos por dimensión para medir los distintos tipos de motivación académica del alumnado en formación inicial: *motivación intrínseca (MI) a la estimulación de experiencias, MI al logro, MI al conocimiento, regulación integrada, regulación identificada, regulación introyectada, regulación externa y desmotivación*. Las

respuestas son recogidas en una escala Likert entre 1 (*totalmente en desacuerdo*) y 5 (*totalmente de acuerdo*).

Compromiso Académico. Se usó la adaptación española para estudiantes de la *Utrecht Work Engagement Student Scale* (UWES-SS) (Schaufeli et al., 2002). El instrumento está compuesto por 17 ítems que se distribuyen en tres factores: *vigor* (6 ítems), *dedicación* (5 ítems), y *absorción* (6 ítems). Las respuestas son recogidas en una escala Likert entre 1 (*completamente desacuerdo*) y 5 (*completamente de acuerdo*). El compromiso académico se ha calculado como el promedio de los valores de los tres factores citados.

3.3. Procedimiento

Primero, se obtuvo el pertinente permiso de los responsables académicos del Máster en Profesorado de Educación Secundaria, Bachillerato, Formación Profesional y Enseñanzas de Idiomas, y de las facultades de Ciencias de la Educación. La solicitud de colaboración fue acompañada de una descripción y de los objetivos de la investigación. Se contactó con el alumnado a través de correo electrónico. Los datos se recogieron mediante un formulario on-line en el que se explicaba la importancia de la investigación, el anonimato de las respuestas, la forma de cumplimentar las escalas, que no afectarían en ningún modo a ninguna calificación, y que podía abandonar su participación en el estudio en cualquier momento. Todos los sujetos dieron su consentimiento para participar. La investigación se llevó a cabo siguiendo los postulados de la Declaración de Helsinki. Asimismo, el protocolo de la investigación contó con la aprobación del Comité de Bioética de la Universidad de Almería (Ref:UALBIO2020/029).

3.4. Análisis estadístico

El análisis de los diferentes ítems, homogeneidad, fiabilidad de cada factor (alfa de Cronbach), correlaciones y análisis multivariante de la varianza (MANOVA) 2 (sexo) x 2 (tipo de estudios) se efectuaron con SPSS v.27. También fueron calculados los estadísticos descriptivos, así como los valores de asimetría y curtosis de cada dimensión.

4. RESULTADOS

4.1. ANÁLISIS DESCRIPTIVO Y DE CORRELACIÓN

En la Tabla 1 se pueden comprobar los descriptivos de cada dimensión. Respecto a los valores promedio, en los factores de la motivación académica se hallaron medidas moderadas, correspondiendo las más altas a la *regulación identificada* y la *MI al conocimiento*. Mientras que la más baja correspondió a la *desmotivación*. El *compromiso académico* también mostró valores moderados. Finalmente, se pueden resaltar las altas, positivas y significativas correlaciones entre las dimensiones de la motivación intrínseca, así como la *regulación integrada* y la *regulación identificada* entre sí y con los factores de la motivación intrínseca. Las correlaciones estadísticamente significativas y más altas del *compromiso académico* fueron con la *MI a la estimulación*, *MI al logro*, *MI al conocimiento* y *regulación integrada*.

TABLA 1 *Estadísticos descriptivos, fiabilidad y correlaciones entre las diferentes subescalas.*

Subesclas	M	DT	Q1	Q2	α	2	3	4	5	6	7	8	9
1 MI a la estimulación	3.17	1.02	-.17	-.57	.85	.75**	.67**	.67**	.41**	.60**	-.02	-.12**	.54**
2 MI al logro	3.47	1.03	-.50	-.34	.85		.71**	.73**	.53**	.69**	.08*	-.21**	.58**
3 MI al conocimiento	3.85	.82	-.42	-.40	.85			.71**	.72**	.39**	.05	-.40**	.58**
4 Regulación integrada	3.58	1.04	-.54	-.35	.87				.58**	.53**	.06	-.30**	.53**
5 Regulación identificada	3.96	.79	-.54	-.40	.69					.34**	.28**	-.41**	.41**
6 Regulación introyectada	2.79	1.11	.03	-.93	.83						.21**	.11**	.33**
7 Regulación externa	3.64	.85	-.30	-.39	.69							.17**	.00
8 Desmotivación	2.07	.92	.74	-.02	.73								.30**
9 Compromiso académico	3.47	.82	-.28	-.09	.90								

* $\rho < .05$
** $\rho < .01$

Nota: M = Media; DT = Desviación típica; Q1 = Asimetría; Q2 = Curtosis.
Fuente: elaboración propia

Respecto a la consistencia interna, aunque dos dimensiones mostraron valores de fiabilidad (alfa de Cronbach) <.70 (i.e., .69; *regulación identificada* y *regulación externa*), se pueden considerar marginalmente aceptables (Taylor et al., 2008) dado el pequeño número de ítems de cada factor.

4.2. Análisis multivariante

Con objeto de comprobar los efectos de interacción del sexo y el tipo de estudios sobre las variables estudiadas, se llevó a cabo un análisis multivariante [MANOVA 2 x 2 (sexo x tipo de estudios)] en el que el sexo y el tipo de estudios (i.e., grado, máster) actuaron como variables independientes, y como variables dependientes los factores de la motivación y el compromiso académicos. Se examinó la homogeneidad de la covarianza con el test M de Box; fue rechazada la hipótesis nula de ajuste de los datos (M de Box = 351.74, $F = 2.56$, $p < .001$). Por ello, se atendieron las sugerencias de Tabachnick y Fidell, (2019) de usar la Pillai's Trace en lugar de la Lamba de Wilks para evaluar la significación multivariada de efectos principales y de las interacciones. El contraste multivariado no mostró diferencias significativas y efectos de interacción entre las dos variables independientes (i.e., sexo x tipo de estudios) (Pillai's Trace = 0.01, $F_{(9, 908)} = 0.96$, $p = .471$). Sí se hallaron diferencias significativas según la variable sexo (Pillai's Trace = 0.43; $F_{(9, 908)} = 4.58$; $p < .001$; $d = 0.424$; potencia observada = .999) y tipo de estudios (Pillai's Trace = 0.30; $F_{(9, 908)} = 43.17$; $p < .001$; $d = 1.309$; potencia observada = 1.00). Los tamaños del efecto -*effect size*- (*d*) y la *potencia observada* muestran diferencias altas, sobre todo en la variable tipo de estudios.

Según la variable sexo, las pruebas de los efectos intersujetos mostraron diferencias significativas en la *MI al logro*, *desmotivación* y *compromiso académico* (Tabla 2); las mujeres mostraron promedios más altos en la *MI al logro* y en el *compromiso académico*. En el caso de la *desmotivación*, los varones presentaron valores medios superiores.

TABLA 2 *Análisis multivariante (efectos intersujetos según sexo y tipo de estudios).*

	Sexo							Tipo de estudios						
	Hombre		Mujer					Grado		Máster				
Subescalas	M	DT	M	DT	F	p	d	M	DT	M	DT	F	p	d
1 MI estimulación	3.10	.99	3.22	1.05	.11	.744	.000	3.45	.89	2.75	1.08	104.07	.000	.674
2 MI logro	3.25	1.06	3.61	.99	11.21	.001	.220	3.75	.90	3.04	1.08	94.45	.000	.640
3 MI al conocimiento	3.76	.79	3.91	.84	2.30	.130	.110	3.99	.77	3.63	.85	34.56	.000	.387
4 Regulación integrada	3.46	1.02	3.65	1.05	.39	.533	.000	3.89	.84	3.11	1.14	126.92	.000	.746
5 Regulación identificada	3.90	.78	4.00	.80	1.86	.174	.090	4.01	.78	3.89	.81	4.40	.036	.142
6 Regulación introyectada	2.61	1.12	2.89	1.09	3.05	.081	.110	3.12	1.00	2.26	1.08	134.44	.000	.766
7 Regulación externa	3.69	.84	3.61	.85	.05	.832	.000	3.48	.80	3.89	.86	48.80	.000	.464
8 Desmotivación	2.19	.96	2.00	.89	5.32	.021	.155	2.00	.90	2.18	.95	4.62	.032	.142
9 Compromiso académico	3.34	.83	3.56	.80	11.29	.001	.220	3.52	.78	3.40	.88	2.07	.150	.090

* ρ < .05
** ρ < .01

Nota: M = Media; DT = Desviación típica; d = d de Cohen.
Fuente: elaboración propia

Teniendo en cuenta el tipo de estudios (Tabla 2), los efectos intersujetos mostraron diferencias estadísticamente significativas en todas las dimensiones de la *motivación académica*, pero no en el caso del *compromiso académico*. Se pueden resaltar, asimismo, los altos valores de tamaño del efecto. Los estudiantes de grado mostraron valores promedios significativamente más altos que el alumnado de máster en *MI a la estimulación*, *MI al logro*, *MI al conocimiento*, *regulación integrada*, *regulación identificada* y *regulación introyectada.* Por otro lado, los estudiantes de máster presentaron valores significativamente más altos de *regulación externa* y de *desmotivación*.

5. DISCUSIÓN

El objetivo presente estudio fue analizar los efectos de interacción del sexo y el tipo de estudios cursados sobre la motivación y el compromiso académico en una muestra de profesorado en formación inicial. Los

principales resultados de este estudio muestran como existen diferencias entre la variable sexo en su relación con los diferentes tipos de motivación y el compromiso académico. Además de existir diferencias significativas, con altos valores de tamaño del efecto, entre los estudiantes del grado y los estudiantes del master de profesorado.

Los resultados han mostrado diferencias significativas en algunas formas de motivación y el compromiso académico entre diferentes sexos. En primer lugar, las mujeres obtuvieron altos valores de motivación intrínseca hacia el logro, mientras que los hombres obtuvieron valores más altos de desmotivación. Estos hallazgos se encuentran en consonancia con los estudios de Naz et al. (2020) al encontrar más conductas motivadas intrínsecamente en las mujeres que en los hombres. Esto puede deberse a la vinculación que tiene el género como categoría social y cultural, en el mundo educativo (Beg et al., 2021). Por ello, debido a la trascripción social de la mujer en la escuela, tendría explicación la mayor presencia de la mujer en comparación con la de los hombres en el ámbito de la docencia (Azman, 2013). Es decir, el papel de la mujer estaría tradicionalmente reconocido en el ámbito educativo y podría desarrollar un estado de pertenencia con el futuro trabajo, incrementando así los valores de compromiso y motivación intrínseca hacia el logro. Además, en el presente estudio también se han encontrado valores promedios más altos de compromiso académico en mujeres. Este resultado se corrobora los descubrimientos de una gran cantidad de trabajos previos en este campo (Driessen & van Langen, 2013; Kim & Corcoran, 2017; Lane et al., 2012). Así, estudios como los de Kessels et al. (2014) y Tison et al. (2011) demuestran valores promedio más altos de compromiso académico en hombres que en mujeres. Esto puede deberse al importante rol de la identidad de género, creada socialmente para las carreras de docencia (Kessels et al., 2014). Como consecuencia, el profesorado en formación femenino estará más comprometido académicamente con sus estudios.

Los hallazgos de la presente investigación también reflejan diferencias significativas en las magnitudes de la motivación entre alumnado de grado y alumnado de master. Concretamente en los estudiantes de grado,

fueron más altos los promedios en los factores motivacionales de carácter intrínseco (MI hacia la estimulación, MI hacia el logro y MI hacia el conocimiento) y en todas las formas de regulación menos autodeterminadas (regulación integrada, regulación identificada y regulación introyectada), excepto la regulación externa. Por otro lado, el alumnado proveniente del master de secundaria tiene valores promedios más altos en desmotivación y regulación externa. Estos hallazgos están en consonancia con los de Burgueno et al. (2018) al presentar altos valores de regulación externa y desmotivación. Sin embargo, contrariamente a descubrimientos anteriores (Burgueno et al., 2018), los valores de motivación más intrínsecos e incluso los valores de las regulaciones externas son bajos, siendo más altos los del alumnado de grado. Una posible explicación puede deberse a la relación significativa entre la edad y el grado motivacional que desarrolle, siendo el alumnado más joven en los que se encuentra valores más altos de motivación intrínseca (Muñoz-Fernández et al., 2018). Otra posible explicación para ello, puede deberse al aumento de la carga lectiva en sus carreras educativas al tener que cursar un año de master (Rebolledo Gámez, 2015), lo que explicaría esta diferencia motivacional. Este proceso de alargamiento de la vida estudiantil al tener que cursar 5 años en vez de 4, podría reflejar valores más altos de regulación externa y desmotivación al captar este proceso como un mero trámite. Así, este distanciamiento existente entre la formación teórica ofrecida por este programa de formación y la auténtica realidad educativa de los centros españoles de educación secundaria podría explicar los valores de insatisfacción (Muñiz-Rodríguez et al., 2016).

Este trabajo es el primero en estudiar la interacción de los factores motivacionales y el compromiso académico según el sexo y tipo de estudios relacionados en una muestra de profesorado en formación inicial. Además, aporta conocimiento sobre qué dimensiones de la motivación académica influyen en estudiantes procedentes del grado (Educación Primaria, Educación Infantil y Educación Física) y procedentes del master de profesorado en Educación Secundaria. Por otro lado, este estudio también presenta importantes limitaciones, como por ejemplo el difícil acceso a la muestra, la menor participación de

varones en relación a mujeres y el uso exclusivo de escalas para la medición de las variables. Otro factor limitante, se debe al diseño trasversal de la investigación, no permitiendo asociaciones de carácter causal entre las variables. Por ello, futuros estudios deberían investigar con carácter longitudinal las relaciones aquí tratadas para poder comprender como fluctúan estas mismas variables durante el desarrollo del proceso de formación.

6. CONCLUSIONES

Por último, como resultado del análisis estadístico previo se desprenden las diversas conclusiones del presente estudio. Uno de los hallazgos más destacables hace referencia a los valores medios más altos de motivación intrínseca hacia el logro y el compromiso académico en mujeres. Además, se observa las diferencias significativas mostradas entre profesado de formación de grado y master. Destaca en los estudiantes de grado, los altos promedios en los factores de motivación intrínseca y en todas las formas de regulación menos autodeterminadas, excepto la regulación externa. Por último, se desprende los altos valores medios de regulación externa y desmotivación que tiene el profesorado en formación inicial procedente del master de profesorado en educación secundaria.

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Original Research

SAGE Open
July-September 2023: 1–11
© The Author(s) 2023
DOI: 10.1177/21582440231197507
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Relationships Between Needs Satisfaction and the Quality of Motivation With Academic Engagement in Pre-Service Physical Education Teachers

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Abstract

Building upon self-determination theory, the objective of this research was to examine the predictive associations of pre-service physical education (PE) teachers' basic psychological need satisfaction (i.e., autonomy, competence, relatedness, and novelty) with their academic engagement via the quality of their motivation. A purposive sample of 920 pre-service PE teachers (569 men and 351 women; $M_{age} = 24.73$; $SD = 5.34$) participated in this cross-sectional research. The results from structural equation modeling revealed that autonomy, competence, and novelty satisfaction positively predicted autonomous motivation, and negatively predicted amotivation. While competence satisfaction positively predicted controlled motivation, novelty satisfaction did it negatively. Autonomous motivation and controlled motivation positively predicted academic engagement, while amotivation was negatively associated with it. This research underscores the importance of considering pre-service PE teachers' autonomy, competence, and, specially, novelty satisfaction in promoting their autonomous motivation and academic engagement in initial teacher education program.

Keywords

need-based experiences, behavioral regulation, self-determined motivation, student teacher, teacher training

Introduction

Teacher shortage, and more particularly the physical education (PE) one, represents one of the main concerns for any Western country, including Spain (Organisation for Econocmic Co-operation and Development [OECD], 2018). To optimize the PE teacher students recruitment and selection process, the different public administrations have particularly turned their eyes towards the PE teachers' engagement with teaching to be built throughout their initial PE teacher education not only for successfully completing the program in question, but also for coping with the obstacles and challenges that arise throughout their future professional career in the school PE (OECD, 2017). Thus, the study of the potential antecedents of pre-service PE teachers' academic engagement has taken on particular interest for teacher educators and initial teacher education policy makers. Motivational experiences have been described as key precursors to academic engagement (e.g., Fokkens-Bruinsma & Canrinus, 2014; Jungert et al., 2014) and its examination could help to gain a better insight into academic engagement in initial PE teacher education.

Self-determination theory (SDT; Ryan & Deci, 2017) is a broad theoretical model for the study of motivation, which is receiving a growing attention to explain the influence of motivational experiences in initial PE teacher education (Zhang, 2021). This notwithstanding, no previous studies to date were found to analyze the distinctive roles that pre-service PE teachers' basic psychological

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need satisfaction and motivation may perform in their academic engagement. Furthermore, there was no evidence for novelty satisfaction as the fourth basic psychological need within the SDT framework in the specific context of initial PE teacher education. Therefore, the present research sought to examine the relationships between basic psychological need satisfaction, novelty satisfaction and the quality of motivation with academic engagement in a sample of pre-service PE teachers.

Academic Engagement in Initial PE Teacher Education

Academic engagement is typically outlined as a state of mind that expresses a personal commitment to education—in our case, to initial PE teacher education—including the time and efforts pre-service PE teachers spend in learning activities both inside and outside the classroom (Appleton et al., 2008). In accordance with Schaufeli, Martínez, et al. (2002), academic engagement consists of, at least, the elements of vigor (i.e., high energy levels and mental resilience during study), dedication (i.e., high pre-service teachers' involvement toward their academic tasks), and absorption (i.e., to high concentration and connection levels toward the presented task).

In the general context of initial teacher education, a small basis of evidence has suggested that the pre-service teachers' academic engagement is largely influenced by their motivational experiences (Fokkens-Bruinsma & Canrinus, 2014; Jungert et al., 2014). To date, only two SDT-based studies with pre-service teachers were found indicating a positive relationship between autonomous motivation and academic engagement (Kaplan & Madjar, 2017), and a negative association of amotivation with academic engagement (López-García et al., 2023). Nonetheless, there was an unclear relationship between controlled motivation and academic motivation, such that López-García et al. (2023) reported a positive association among both variables, and Kaplan and Madjar (2017), instead, revealed a non-significant relationship between them. Although these studies conducted with pre-service teachers made a valuable contribution by shedding some light on the relationship between motivation and academic engagement, it is important to underscore that the interplay between the three qualities of motivation and academic engagement remains still to be explored in the specific context of initial PE teacher education.

Motivational Processes in Initial PE Teacher Education

Unlike the classical motivational theories that operationalize motivation in exclusively quantitative terms, SDT (Ryan & Deci, 2017) conceptualizes motivation from a quantitative and qualitative perspective. This distinctiveness suggests that a great quantity of motivation does not ensure the adoption of the desired behavior, if the quality of that motivation is low (Ryan & Deci, 2017). SDT makes a clear distinction between three qualities (or types) of motivation along a self-determination *continuum* in accordance with the relative autonomy (or willingness) level present in each of them (Ryan & Deci, 2020; Ryan et al., 2021).

At one end of the self-determination *continuum* lies autonomous motivation, which represents the prototype of human motivation (Ryan et al., 2021). It refers to undertaking the target behavior guided by the inherent interest, enjoyment, curiosity, and seeking new horizons (i.e., intrinsic motivation), congruence with the person's core values and goals (i.e., integrated regulation), as well as by conscious identification of the benefits that the behavior itself brings (i.e., identified regulation). At the center of this *continuum* lies controlled motivation, which refers to undertaking the behavior driven by self-imposed pressures based on internal rewards of self-esteem for success and avoidance of anxiety, shame of guilt for failure (i.e., introjected regulation), as well as by externally imposed pressures relied on social rewards and/or punishments (i.e., external regulation). At the opposite end of the self-determination *continuum* and contrasted with autonomous and controlled motivation stands amotivation, which expresses the full absence of willingness and regulation towards the desired behavior.

Central to SDT is the assumption that the quality of motivation would depend on the satisfaction of three essential and universal psychological nutrients, broadly known as basic psychological needs. The first of them is autonomy, which concerns a sense of choice and ownership in one's actions. When people (i.e., pre-service PE teachers) perceive their need for autonomy as satisfied, they feel volition, freedom, and initiative in their behavior. Competence, second basic psychological need, refers to a sense that one can succeed and grow. When people perceive their need for competence as satisfied, they feel able to achieve their expected goals, as well as to experience mastery, efficacy, and accomplishment in their activities. The third basic psychological need is relatedness, which concerns a sense of mutual care, belonging and connection. When people perceive their need for relatedness as satisfied, they feel valued and accepted by their significant others. SDT holds the premise that need satisfaction not only would directly energize autonomous motivation (i.e., bright motivational path), but also it would buffer against experiences of controlled motivation and amotivation (i.e., cross-path) (Ryan & Deci, 2020; Vansteenkiste et al., 2020).

In addition to these three basic psychological needs, a growing body of SDT-based research has postulated the need for novelty as the fourth basic psychological need

(see González-Cutre et al., 2016, 2020, 2023; González-Cutre & Sicilia, 2019). Novelty refers to a sense of experiencing something that has not been experienced previously or that differs from the daily routine (González-Cutre et al., 2016). When people perceive their need for novelty as satisfied, they feel the tendency to look for and get involved in new activities, as well as to experience new sensations and situations (González-Cutre et al., 2020). Previous SDT-grounded research conducted with secondary students in PE has gathered evidence in support of the bright motivational path for novelty satisfaction inasmuch as positive and consistent relationships were found between novelty satisfaction and higher-quality motivation (i.e., autonomous motivation) (González-Cutre et al., 2016, 2020; González-Cutre & Sicilia, 2019). However, cross-paths from novelty satisfaction to lower-quality motivation did not empirically supported to date given that nonsignificant associations were found between novelty satisfaction and controlled motivation and amotivation (González-Cutre et al., 2020).

In the general context of initial teacher education, very little attention has been paid to the relationship between pre-service teachers' need satisfaction and the quality of their motivation. In particular, Burgueño et al.'s (2022) study showed that pre-service teachers' need satisfaction was positively associated with autonomous, relative to controlled, motivation. Furthermore, Kaplan and Madjar's (2017) research revealed, in spite of not considering autonomy satisfaction, that competence and relatedness satisfaction were positively related to autonomous motivation, while being unrelated to controlled motivation. Albeit both studies on initial teacher education meaningfully contributed to providing some clues on the role that pre-service teachers' need satisfaction played in the quality of their motivation, they failed both to consider the satisfaction of all needs separately and operationalize motivation through its three qualities following the SDT's tenets (Ryan et al., 2021). To the best of our knowledge, no studies were found to analyze the separate role that the satisfaction of each need may play in developing both the three qualities of motivation and academic motivation in the specific context of initial PE teacher education. In addition to shedding light on how the three qualities of motivation would differentially contribute to academic engagement, it is important to expand evidence for novelty satisfaction as the fourth basic psychological need in the specific context of initial PE teacher education by examining the associations with the motivational quality and academic engagement among pre-service PE teachers. This will allow us to meet a basis of evidence that helps teacher educators implement more effective need-supporting and motivating strategies in developing the pre-service PE teachers' academic engagement throughout their initial PE teacher education program.

The Present Study

Therefore, the objective of the current SDT-based research was to analyze the relationships between the satisfaction of each of the four needs and the quality of motivation with academic engagement in pre-service PE teachers. Building upon SDT (Ryan & Deci, 2017) and following previous research in the general context of initial teacher education (e.g., Burgueño et al., 2022; Kaplan & Madjar, 2017; López-García et al., 2023), we hypothesized that autonomy, competence, relatedness would be positively associated with autonomous motivation, while each would be negatively related to controlled motivation and amotivation. We also hypothesized that autonomous motivation would be positively related to academic engagement, while controlled motivation and amotivation would do it in a negative way. Guided by the previous research with secondary PE students (González-Cutre et al., 2016, 2020; González-Cutre & Sicilia, 2019), we further hypothesized that novelty satisfaction would positively associated with autonomous motivation and negatively related to controlled motivation and amotivation (see Figure 1).

Method

Participants and Setting

Previous to study, a minimum of 876 participants for the trustworthiness of the study's results under conditions of a statistical power level of .95 and a significance level of $\alpha = .05$ was estimated using *Free Statistics Calculator* v.4.0 software (Soper, 2022). Thus, a purposive and non-randomized sample of 920 pre-service PE teachers (569 men and 351 women) aged between from 20 to 57 years ($M_{age} = 24.73$; $SD = 5.34$) from eight Spanish public universities participated in this cross-sectional research. Regarding initial teacher education program, 557 (60.54%) participants were pre-service primary PE teachers who were enrolled in fourth academic course of the BSc. in Primary Teacher Education (i.e., a 4-year full-time program in which pedagogical education and subject-related education take place simultaneously), while 363 (39.46%) participants were pre-service secondary PE teachers who were enrolled in a professional master's program in education (i.e., 1-year full-time professional course in education after having completed a 4-year full-time BSc. in Sport and Exercise Sciences).

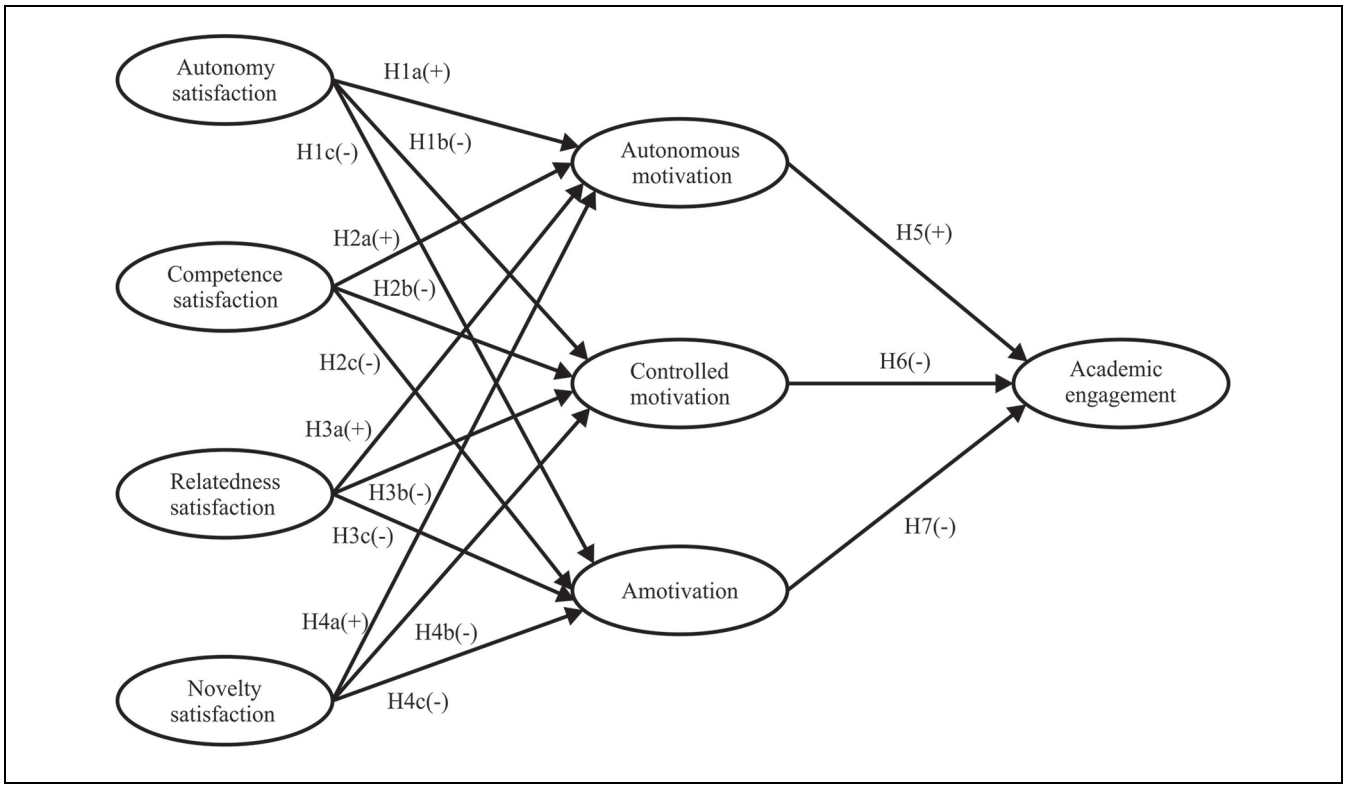

Figure 1. Theoretically hypothesized model with the expected direct paths.

Instruments

Pre-service PE teachers were asked to rate their agreement with the items on a 5-point Liker-type scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

Need Satisfaction in Initial Teacher Education. To assess the pre-service PE teachers' perception of autonomy, competence, and relatedness satisfaction, the Spanish educational version (León et al., 2011) of the *Échelle de Satisfacción des Besoins Psychologiques* (Gillet et al., 2008) was used. The instrument is headed by the stem: "In my classes …" and followed by15 items distributed over three 5-item dimensions each: autonomy satisfaction (e.g., "I feel a sense of choice and freedom in the things I undertake"), competence satisfaction (e.g., "I feel confident that I can do things well"), and relatedness satisfaction (e.g., "I feel that the people I care about also care about me"). In the present research, the three-factor correlated model obtained a good fit to the observed data: $\chi^2(df = 87) = 174.401, p < .001$, $\chi^2/df = 2.004$; CFI = 0.974; TLI = 0.967; SRMR = 0.038; RMSEA = 0.049 (90% CI = 0.040–0.058).

Novelty Satisfaction in Initial Teacher Education. To assess the pre-service PE teachers' perception of novelty satisfaction, the novelty satisfaction subscale developed by González-Cutre et al. (2020) was used. The unidimensional measure of novelty satisfaction is headed by the stem "In my classes …" and includes 5 items (e.g., "I frequently feel there are novelties for me"). In the present research, the primary-order one-factor model obtained a good fit to the observed data: $\chi^2(df = 5) = 7.100$, $p = .137$, $\chi^2/df = 1.420$; CFI = 0.998; TLI = 0.994; SRMR = 0.009; RMSEA = 0.034 (90% CI = 0.001–0.070).

Motivation for Initial Teacher Education. To assess the pre-service PE teachers' perception of autonomous motivation, controlled motivation and amotivation, the Spanish version (Burgueño et al., 2017) of the Academic Motivation Scale (Vallerand et al., 1992). The scale is headed by the stem "I am carrying out this initial teacher education programme …". It consists of 32 items and is grouped into 4 items per dimension to measure intrinsic motivation to experience motivation (e.g., "For the pleasure of reading interesting topics"), intrinsic motivation toward accomplishment (e.g., "For the satisfaction I feel in overcoming each of my personal goals"), intrinsic motivation toward knowledge (e.g., "For the pleasure of knowing more about the issues that attract me"), integrated regulation (e.g., "Because I consider it agrees with my values"), identified regulation (e.g., "Because it will

possibly allow me to enter the labour market within the field that I like"), introjected regulation (e.g., "Because passing at university makes me feel important"), external regulation (e.g., "Because I want to have a good life in the future"), and amotivation (e.g., "I honestly don't know; truthfully, I feel like I'm wasting my time in the master's/undergraduate degree"). In accordance with Howard et al. (2017), a composite score for intrinsic motivation was computed by averaging values of the three subtypes of intrinsic motivation. Guided by SDT (Ryan et al., 2021) and following previous research (Burgueño et al., 2020), a hierarchical factor for autonomous motivation was specified by intrinsic motivation, integrated regulation and identified regulation, in the same way as a hierarchical factor for controlled motivation was specified by introjected and external regulation. In the current research, the second-order three-factor model had an acceptable fit to the data: $\chi^2(df = 454) = 1{,}477$, $p < .001$, $\chi^2/df = 3.254$; CFI = 0.949; TLI = 0.944; SRMR = 0.075; RMSEA = 0.055(90% CI = 0.051–0.058).

Academic Engagement. To assess the pre-service PE teachers' perception of academic engagement, the Spanish student version (Benevides-Pereira et al., 2009) of the Utrecht Work Engagement Student Scale (Schaufeli, Salanova, et al., 2002) was used. The instrument includes 9 items, that grouped into 3 items per dimension, measure vigor (e.g., "When I get up in the morning, I feel like going to class"), dedication (e.g., "I am enthusiastic about my studies"), and absorption (e.g., "It is difficult to detach myself from my studies"). In this study, the second-order one-factor model obtained a suitable fit to the data: $\chi^2(df = 24) = 97.223$, $p < .001$, $\chi^2/df = 4.051$; CFI = 0.960; TLI = 0.931; SRMR = 0.038; RMSEA = 0.069 (90% CI = 0.056–0.083).

Procedure

The research team contacted academic managers of the BSc. in Primary Teacher Education (i.e., PE) and of the Professional Master's program in Education (i.e., PE), as well as those responsible for the Schools of Education, and their teaching staff, to request their collaboration and inform them of the object of the research. The data were collected at the end of the second semester of the 2020/2021 academic year. The administration of the questionnaire took place in quiet classroom environment using an online survey in which we explained the importance of the investigation, the anonymity in answers, the way to complete the online questionnaire, that participation in the study would not affect any qualification in any way, and that it could be abandoned at any time. All participants had to meet the following inclusion criteria: a) being a student of a BSc. in Primary Teacher Education (i.e., PE) and/or a student of a professional master's program in education (PE); b) presential initial education program; c) having content to use data in the research. Indeed, every participant gave their informed consent for inclusion before they participated in the study. The research was carried out in accordance with the Declaration of Helsinki and the protocol was approved by the Bioethics Committee of the University of Almeria (Ref: UALBIO2021/009).

Risk of Bias

At this point, it should be noted that there was no randomization of the sample, since convenience sampling was followed. There was blinding between the participants and the researchers in charge of the data treatment and analysis. Regarding selection bias, participation in the study was voluntary and communication with students was carried out by email.

Statistical Analysis

Descriptive statistics and McDonalds omega coefficient were, respectively, calculated using the *Statistical Package for the Social Sciences* v.28 (IBM, Chicago, IL, USA), whereas a two-step structural equation model (SEM) approach was run with *Mplus* v. 8.4 (Muthén & Muthén, 1998-2017). McDonalds omega shows a good level of reliability with values greater than .70 (Viladrich et al., 2017). Correlations among latent variables were values up to .85 in correlations are representative of the absence of multicollinearity among variables (Kline, 2016).

For the analysis of direct and indirect paths from need satisfaction to academic engagement via motivational quality, a two-step SEM approach was run (Kline, 2016). In the first step, the robustness of a model in which all target variables are freely correlated was tested (i.e., measurement model). In the second step, a structural model consisting of examining the predictive relationships among variables was tested. The model was controlled for gender and type of initial teacher education. The two-step SEM approach was run using the Robust Maximin Likelihood (MLR) estimator given that it provides fit and standard error rates that are robust to non-normality and Likert scales consisting of five or more response options (Muthén & Muthén, 1998/2017). The model's fit was evaluated by the coefficient between chi-squared and degrees of freedom (χ^2/df), comparative fit index (CFI), Tucker–Lewis index (TLI), standardized root mean square residual (SRMR), and root mean square error of approximation (RMSEA) paired with its confidence interval at 90% (90% CI). A good fit was achieved by scores as high as 5 for the χ^2/df coefficient, over .95 for

Table 1. Descriptive Statistics, Reliability Coefficients, and Latent Correlations Between Variables.

	Range	*M* (*SD*)	γ_1	γ_2	ω	1	2	3	4	5	6	7	8
1. Autonomy satisfaction	1–5	3.32 (0.90)	0.12	−0.62	.79	–	.42***	.32***	.53***	.41***	−.37***	−.06	.33***
2. Competence satisfaction	1–5	4.16 (0.74)	−0.73	−0.47	.80		—	.66***	.62***	.31***	.28***	−.17**	.45***
3. Relatedness satisfaction	1–5	4.16 (0.74)	−0.73	0.08	.83			—	.37***	.18***	−.15***	−.12*	.28***
4. Novelty satisfaction	1–5	3.40 (0.95)	−0.09	−0.30	.92				—	.44***	−.44***	−.11*	.54***
5. Autonomous motivation	1–5	3.61 (0.80)	−0.31	−0.31	.95					—	.29***	−.24***	.75***
6. Controlled motivation	1–5	3.21 (0.76)	0.02	−0.22	.89						—	.28***	.69***
7. Amotivation	1–5	1.65 (0.91)	1.59	1.03	.85							—	−.37***
8. Academic engagement	1–5	3.47 (0.82)	−0.28	−0.09	.90								—

Note. γ_1 = Skewness; γ_1 = Kurtosis.
*$p < .05$. **$p < .01$. ***$p < .001$.

CFI and TLI, and below .060 for SRMR and RMSEA, while values up to 3 in the χ^2/df coefficient, greater than .90 in CFI and TLI, and lower than .080 in SRMR and RMSEA are indicative of an acceptable fit (Kline, 2016). Indirect effects were also examined by the Hayes' (2017) methodological proposal, according to which an indirect (i.e., mediated) effect is statistically significant when its 95% CI does not include the zero value.

Results

Descriptive Statistics, Reliability, and Correlations Among Variables

Table 1 reports that, except for amotivation, the remaining variables under study scored higher than the midpoint of their respective measurement scale. McDonald's omega values were between .79 and .95. Moreover, correlation scores ranged from −.44 to .75. Correlation analysis further revealed that the satisfaction of each need was positively correlated with autonomous motivation and academic engagement, while being negatively related to amotivation. Autonomy, relatedness, and novelty satisfaction were negatively correlated with controlled motivation, whereas competence satisfaction did it positively.

Structural Equation Modeling

In the first step, the robustness of the measurement model was verified ($\chi^2[df = 377] = 1{,}070.214$, $p < .001$, $\chi^2/df = 2.838$; CFI = 0.939; TLI = 0.926; SRMR = 0.053; RMSEA = 0.055[90% CI = 0.052–0.058]). In the second step, the tested structural model had an appropriate fit to the observed data: $\chi^2(df = 378) = 1{,}076.558$, $p < .001$, $\chi^2/df = 2.848$; CFI = 0.935; TLI = 0.925; SRMR = 0.063; RMSEA = 0.049 (90% CI = 0.046–0.053). The total explained variance was 22% for autonomous and controlled motivation, 5% for amotivation, and 90% for academic engagement.

Figure 2 shows that, after controlling for gender and initial teacher education program, autonomy, competence, and novelty satisfaction positively predicted autonomous motivation (β = .16, $p = .009$; β = .12, $p = .015$; β = .29, $p < .001$), while negatively predicting amotivation (β = −.19, $p = .001$; β = −.17, $p = .013$; β = −.29, $p = .029$). Further, competence satisfaction positively predicted controlled motivation (β = .12, $p = .022$), whereas novelty satisfaction (β = −.36, $p < .001$) predicted it negatively. In addition, autonomous, and controlled motivation positively predicted academic engagement (β = .63, $p < .001$; β = .54, $p < .001$), while amotivation did it negatively (β = −.22, $p < .001$).

Table 2 reports indirect effects from need satisfaction to academic engagement via motivational quality. In detail, autonomous motivation significantly mediated the relationship between autonomy, competence, and novelty satisfaction and academic engagement. Controlled motivation negatively and significantly mediated the relationship between novelty satisfaction and academic engagement. Amotivation negatively mediated the relationship between autonomy and competence satisfaction with academic engagement.

Discussion

The objective of this SDT-based research was to analyze the associations of pre-service PE teachers' autonomy,

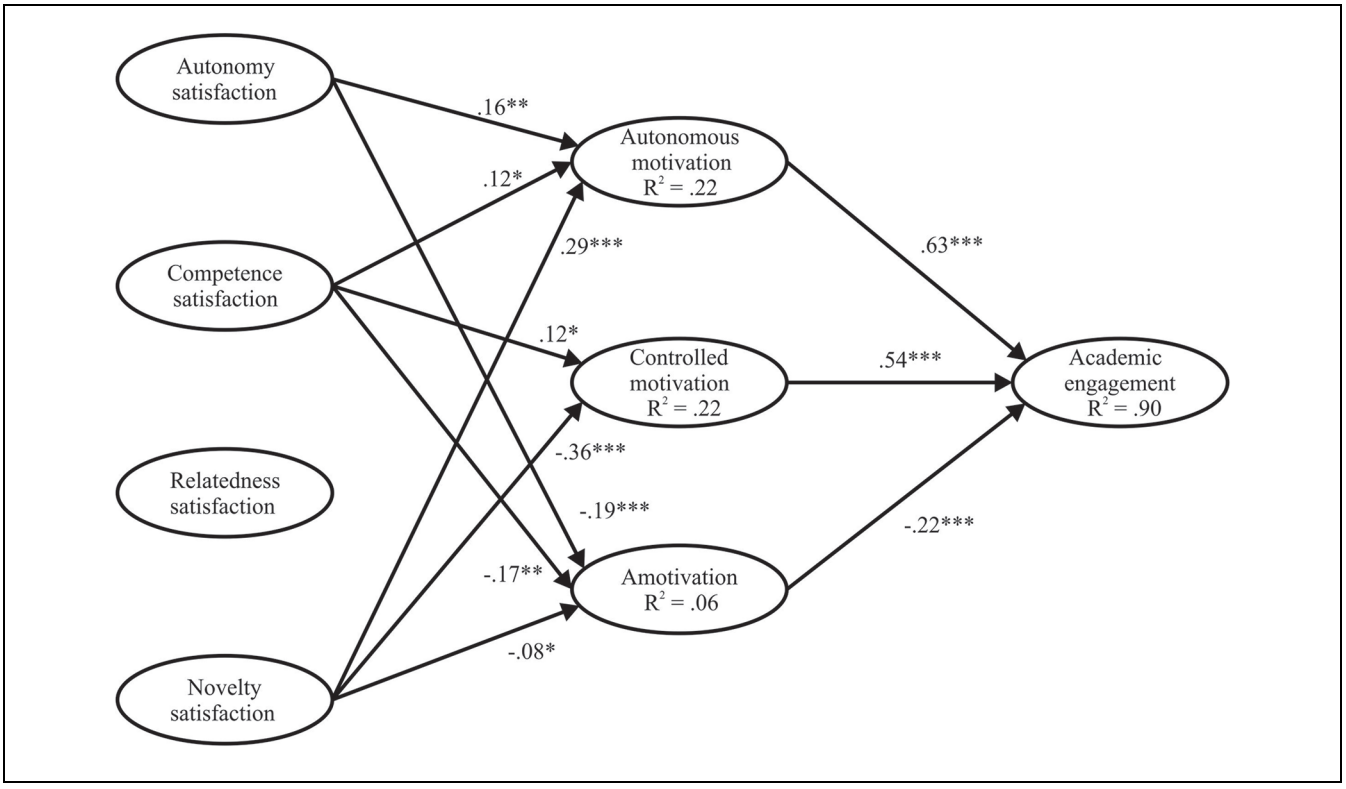

Figure 2. Direct paths from need satisfaction to academic engagement via the quality of motivation in pre-service PE teachers.
Note. Significant direct paths are only depicted.
*$p < .05$. **$p < .01$. ***$p < .001$.

Table 2. Indirect Paths of Pre-Service PE Teachers' Need Satisfaction on Their Academic Engagement Via Quality of Motivation.

	β (*SE*)	95% CI	*p*-Value
Indirect paths from autonomy satisfaction to academic engagement			
Specific indirect via autonomous motivation	.09 (.02)	[0.05, 0.13]	<.001
Specific indirect via controlled motivation	.03 (.03)	[−0.02, 0.08]	.294
Specific indirect via amotivation	.04 (.01)	[0.02, 0.06]	.003
Indirect paths from competence satisfaction to academic engagement			
Specific indirect via autonomous motivation	.07 (.03)	[0.02, 0.11]	.017
Specific indirect via controlled motivation	.08 (.04)	[0.01, 0.15]	.064
Specific indirect via amotivation	.04 (.01)	[0.01, 0.06]	.010
Indirect paths from relatedness satisfaction to academic engagement			
Specific indirect via autonomous motivation	−.01 (.02)	[−0.05, 0.02]	.488
Specific indirect via controlled motivation	−.02 (.03)	[−0.06, 0.02]	.489
Specific indirect via amotivation	.01 (.01)	[−0.01, 0.02]	.435
Indirect paths from novelty satisfaction to academic engagement			
Specific indirect via autonomous motivation	.16 (.02)	[0.12, 0.19]	<.001
Specific indirect via controlled motivation	−.23 (.06)	[−0.33, −0.12]	<.001
Specific indirect via amotivation	.02 (.01)	[−0.01, 0.03]	.070

competence, relatedness, and novelty satisfaction with their academic engagement via the quality of their motivation. The main results show that autonomy, competence, and novelty satisfaction were positively associated with autonomous motivation and academic engagement and negatively related to amotivation. In addition, competence satisfaction was positively related to controlled motivation, while novelty satisfaction did it negatively.

Consistent with our hypotheses and in line with previous research (Burgueño et al., 2022; Kaplan & Madjar, 2017), our results showed direct paths from autonomy, competence, and novelty satisfaction to autonomous motivation. Except for relatedness satisfaction, the satisfaction of the remaining three needs adopted an energizing role in developing higher-quality of motivation, which aligned with the SDT's assumptions (Ryan et al., 2021). A plausible argumentation would rest on the fact that when pre-service PE teachers perceive different choices to complete the target activity, efficacy in completing it and experiences that the task is different from usual, they will are prone to participate in the instructional practice guided by experiences both of enjoyment and because they truly want to take part into it by identifying its relevance to become a PE teacher. It is also important to stress that, in contrast to González-Cutre et al.'s (2020) research conducted with secondary PE students, novelty satisfaction was the strongest predictor of autonomous motivation in pre-service PE teachers. While González-Cutre et al.'s (2020) research revealed that secondary PE students' competence satisfaction more strongly predicted their autonomous motivation; our findings suggest that pre-service PE teachers need to have the sensation of experiencing tasks, instructional strategies, and assessment formats differing from typical rather than feeling autonomous and competent in developing autonomous reasons that lead them to complete their initial teacher education program and, in consequence, to become in-service teachers.

Contrasted with our hypotheses, pre-service PE teachers' competence satisfaction positively predicted their controlled motivation. This result differed from Kaplan and Madjar's (2017) study that revealed that both variables were unrelated in pre-service generalist teachers, while it was partially aligned with the López-García et al.'s (2023) research, given that a positive association was found from pre-service generalist teachers' need satisfaction to their controlled motivation. This finding makes us suggest that when pre-service PE teachers feel their competence as satisfied, they could also have controlled reasons toward their initial teacher education program. This would be due to when they feel able and efficient during the target activity completion, the activity in question could also be interpreted either as an obligation imposed by their teacher educator to pass a specific subject, or as a personal duty to become a good PE teacher student throughout their initial teacher education program. However, it should also be underlined that the positive path from competence satisfaction to controlled motivation might also be caused by a time characteristic of our cross-sectional research. Thus, there is a need for future longitudinal studies to explore if the positive relationship between competence satisfaction and controlled motivation would be consistently maintained over initial PE teacher education program.

In line with our hypotheses, our results showed a negative and significant path from novelty satisfaction to controlled motivation. Although this result differed from the one reported by González-Cutre et al. (2020), it was congruent with the SDT framework (Ryan et al., 2021) given that novelty satisfaction took a buffering role against controlled motivation in the specific context of initial PE teacher education. It could, likely, be explained by the fact that when pre-service PE teachers develop new activities and are trained by pedagogical models and teaching styles different than usual, they will tend to perceive less pressures in its external and self-imposed nature in completing their initial PE teacher program. On the other hand, and unlike both our expectations and the SDT's tenets (Ryan et al., 2021), our results displayed that autonomy and relatedness satisfaction failed to buffer against controlled motivation. This would be indicative that for pre-service PE teachers to have a less relevant role than theorized to reduce controlled motivation by being more important for them to feel their need for novelty as fully satisfied in their initial PE teacher education program.

In accordance with our hypotheses and following the SDT's assumptions (Ryan et al., 2021), the results from our research indicated that, except for relatedness satisfaction, negative associations were obtained from autonomy, competence, and novelty satisfaction to amotivation among pre-service PE teachers. To the best of our knowledge, this is the first research exploring the potential role of the satisfaction of each need on amotivation in initial (PE) teacher education, reporting pre-service PE teachers' need satisfaction performed a buffering role against their amotivation. Thus, it should be argued that when pre-service PE teachers feel that they have as many choices as desired for the on-going task completion, feel capable to success in its development together with the activity in question differs from the classroom routine, they will be prone to experience less futility and disinterest in their initial PE teacher education.

Partially consistent with the hypotheses of this study and following the SDT framework (Ryan et al., 2021), our results reported autonomous both autonomous and controlled motivation positively predicted academic engagement, with autonomous motivation having a higher prediction. These findings shed some light on the relationships between autonomous and controlled motivation with academic engagement in pre-service PE teachers given that Kaplan and Madjar (2017) only found a positive association of autonomous motivation on academic engagement, while López-García et al. (2023) revealed a positive relationship between controlled motivation and academic engagement. These results further suggest that a large quantity of the two

higher qualities of motivation would be enough to keep the pre-service PE teachers' academic engagement with their initial PE teacher education program. However, it is important to emphasize that when pre-service PE teachers are autonomously motivated, they get more engaged than when they are guided by controlled reasons. Indeed, it is thought that controlled motivation might be an effective way to foster short-term academic engagement among pre-service PE teachers; however, there is a need for longitudinal studies to analyze if the effects of controlled motivation on academic engagement would be maintained throughout initial PE teacher education. Moreover, and following López-García et al.'s (2023) research, our results also displayed a negative association of amotivation on academic engagement. This could be explained in that when pre-service PE teachers with levels of futility, inefficacy, undervaluation, and disinterest in their initial teacher education program, they will be prone to have a lower academic engagement with their teaching career.

Partially delineated with previous research (Karimi & Sotoodeh, 2020), our results additionally showed that pre-service PE teachers' autonomous motivation positively mediated the relationships between their autonomy, competence, and relatedness satisfaction with their academic engagement. A plausible rationale would rely on that when pre-service PE teachers feel their needs for autonomy, competence, and relatedness as satisfied, they, in turn, participated in their instructional practice guided mainly by autonomous reasons and, in consequence, they will develop a higher academic engagement during their initial PE teacher program. Moreover, the findings from this research also revealed that controlled motivation negatively mediated the relationship between novelty satisfaction and academic engagement. This would imply that when pre-service PE teachers combine experiences of new content and activity outside their classroom routine, but in conjunction with external and self-imposed pressures to participate in the lesson, they would tend to have a lower academic engagement. Lastly, amotivation positively mediated the relationships between autonomy and competence satisfaction with academic engagement. This would entail that when pre-service PE teachers feel their need for autonomy and competence as satisfied in their lessons, but accompanied by experiences of futility and disinterest, they will be prone to have less academic engagement with their initial PE teacher education and, consequently, with their future teaching profession.

Limitations and Future Research Directions

As with any scientific work, this research has several limitations. The first of them is the adoption of a convenience and non-randomized sampling method in recruiting and selecting the participating pre-service PE teachers. This type of sampling technique made it hard to generalize our results to the whole population, so that they should be interpreted with caution. Therefore, future studies should analyze in depth the studied relationships in pre-service teacher samples with more heterogeneous characteristics regarding initial teacher education to discuss or verify the results obtained. The second limitation is the use of a cross-section design, although building upon the SDT framework, makes is impossible to establish causal relationships between the variables under study. Hence, further research is needed to implement longitudinal or experimental designs to determine the causality of the variables considered in this study. The third limitation is the exclusive administration of self-reported measures of need satisfaction, motivation, and academic engagement to collect our data. Thus, additional studies are needed to combine the use of self-reports with other instruments (e.g., interviews) for the purpose of optimally triangulating data. This will allow us to a deeper insight into the role that need satisfaction and the quality of motivation play in academic engagement among pre-service PE teachers throughout their initial teacher education programme.

Conclusions

The main results from the present research show a direct path from the pre-service PE teachers' perception of autonomy, competence, and novelty satisfaction to autonomous motivation, as well as an indirect path from the satisfaction of these three needs to academic engagement via autonomous motivation. In addition, there is a direct and positive relationship between competence satisfaction and controlled motivation, while novelty satisfaction did it negatively. Further, pre-service PE teachers' autonomy, competence, and novelty satisfaction negatively predicted amotivation. Lastly, autonomous and controlled motivation positively predicted academic engagement, amotivation did it negatively. This is the first research conducted in the specific context of initial PE teacher education that adds evidence to consider the need for novelty as the fourth basic psychological need within the SDT framework. Indeed, novelty satisfaction was the highest prediction of autonomous motivation in pre-service PE teachers. Our results recommend that PE teacher educators use need-supporting and motivating teaching strategies in optimally developing pre-service PE teachers' academic engagement through the promotion of autonomy, competence, and novelty satisfaction and autonomous motivation.

Declaration of Conflicting Interests

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

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: This study is funded by the Andalusian Plan for Research, Development, and Innovation (PAIDI, 2020) of the Junta de Andalucía (Ref project: P20_00148) and the help of the Health Research Center.

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