

Sergio Diloy Peña

Evaluación de las conductas
docentes en educación física:
implicaciones en la motivación y la
práctica de actividad física de
jóvenes aragoneses

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Tesis Doctoral

EVALUACIÓN DE LAS CONDUCTAS DOCENTES
EN EDUCACIÓN FÍSICA: IMPLICACIONES EN LA
MOTIVACIÓN Y LA PRÁCTICA DE ACTIVIDAD
FÍSICA DE JÓVENES ARAGONESES

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**EVALUATION OF MOTIVATING TEACHING
BEHAVIORS IN PHYSICAL EDUCATION:
IMPLICATIONS IN THE MOTIVATION AND PRACTICE
OF PHYSICAL ACTIVITY IN YOUNG PEOPLE FROM
ARAGÓN**

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2023

**Evaluación de las conductas docentes en
Educación Física: Implicaciones en la
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de jóvenes aragoneses**

*Evaluation of motivating teaching behaviors in
Physical Education: Implications in the motivation
and practice of physical activity in young people
from Aragón*

Sergio Diloy Peña

A mis padres, Pilar y Santiago,

Gracias

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Sinceramente, no puedo creer lo rápido que ha pasado todo este tiempo. Parece que fue ayer mismo cuando recibía un mensaje de WhatsApp el 13 de noviembre de 2019 a las 6:17 de la mañana, dándome la enhorabuena por haber conseguido un contrato predoctoral para estos cuatro fantásticos años. Todavía me acuerdo como me levante gritando de la cama despertando a mis padres para darles la noticia. No me digáis porque pero esa misma noche me fui a dormir con la sensación de que algo bueno iba a llegar, y bueno pues unas horas más tarde llegó la noticia que llevábamos meses esperando. Pero bueno, no voy a ponerme muy “filosófico” que la temática de esta Tesis Doctoral es la Educación Física y no la Filosofía. En las siguientes líneas me gustaría agradecer a todas las personas que han participado en este pequeño camino que ha durado cuatro años y que solamente acaba de comenzar.

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enseñarme los pequeños detalles que tiene esta nuestra profesión. Gracias **Eduardo** por dirigir el grupo todo este tiempo, has sido la persona perfecta para remarcar la unión del grupo y la importancia de las personas. No tengo dudas de que has dejado el grupo en muy buenas manos y con un gran futuro por delante con **Alberto Aibar** a la cabeza. Hacemos un gran grupo y estoy muy orgulloso de decir que pertenezco a esta pequeña familia investigadora.

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***Nota:** a continuación se listan las Tablas y Figuras que aparecen a lo largo de toda la Tesis Doctoral. Con el objetivo de facilitar la comprensión de los resultados, se ha optado por reiniciar la numeración de las tablas y figuras en cada sección de la Tesis Doctoral.

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CONSIDERACIONES PRELIMINARES

Consideraciones Preliminares

Siguiendo las consideraciones establecidas por la Real Academia Española (RAE) y la mayoría de los lingüistas, quienes aprueban el uso de determinadas palabras que engloban personas de género masculino y femenino, y con el objetivo de simplificar la legibilidad y la lectura de la presente Tesis Doctoral, se ha utilizado a lo largo de todo el documento el masculino genérico. De esta manera, se anticipa la no existencia de desconsideraciones hacia ninguna identidad de género. Además, de acuerdo con el área de las ciencias sociales, para el desarrollo de la presente Tesis Doctoral se han seguido las normas de la Asociación Psicológica Americana (APA, 7ª Edición). A lo largo de la presente Tesis Doctoral, algunos apartados como el resumen, los objetivos, los estudios y las conclusiones aparecen redactados en inglés de acuerdo con la normativa de la Escuela de Doctorado de la Universidad de Zaragoza para optar al título de Doctor con mención internacional.

Contexto del Investigador durante la Realización de la Tesis Doctoral

La presente Tesis Doctoral se ha desarrollado junto al grupo de investigación de referencia EFYPAF “Educación Física y Promoción de Actividad Física” (S17_23R; Resolución BOA 20/03/2023), dirigida por el Dr. Luis García González y el Dr. Ángel Abós Catalán, ambos miembros de este grupo de investigación.

El doctorando, Sergio Diloy Peña, ha sido beneficiario de un contrato predoctoral de 48 meses financiado por el Gobierno de Aragón (ORDEN IIU/796/2019, de 27 de junio por la que se convocan subvenciones destinadas a la contratación de personal investigador predoctoral en formación para el período 2019-2023 del Gobierno de Aragón). Asimismo, siguiendo la normativa de la Escuela de Doctorado de la Universidad de Zaragoza para optar al título de Doctor con mención internacional, el doctorando ha realizado dos estancias de investigación internacionales con una duración de tres meses cada una. La primera, bajo la supervisión del Dr. Henri Tilga, que tuvo lugar en la Universidad de Tartu desde el día 1 de abril de 2022 hasta el 1 de julio de 2022, y que fue financiada por el Programa CAI-Ibercaja para estancias de investigación y por la Fundación-Empresa Universidad de Zaragoza (FEUZ) para la bolsa de prácticas Erasmus+. La segunda, bajo la supervisión de la Dra. Leen Haerens, que tuvo lugar en la Universidad de Gante desde el día 22 de marzo del año 2023 hasta el 22 de junio de 2023, y que fue financiada por las Subvenciones de fomento a la movilidad de personal investigador predoctoral en formación de la Universidad de Zaragoza perteneciente al

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Gobierno de Aragón y por Campus Iberus y Erasmus + (Ayuda para la realización de prácticas en empresas o instituciones europeas para doctorandos).

Abreviaturas

A continuación, se detallan las abreviaturas utilizadas a lo largo de la presente Tesis Doctoral con el objetivo de facilitar la comprensión del documento:

Abreviatura	Significado
AIC	Akaike Information Criterion
AF	Actividad Física
BCH	Bolck-Croon-Hagenaars
BIC	Bayesian Information Criterion
BPN	Basic Psychological Needs
CEICA	Comité de Ética de la Investigación de la Comunidad Autónoma de Aragón
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CI	Confidence Interval
DF	Degrees of Freedom
DT	Desviación Típica
EFYPAF	Educación Física y Promoción de la Actividad Física
ESEM	Exploratory Structural Equation Modeling
ESO	Educación Secundaria Obligatoria
LPA	Latent Profile Analysis
LRT	Lo-Mendell-Rubin Likelihood Ratio
M	Media/Means

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MANOVA	Multivariate Analyses of Variance
MANCOVA	Multivariate Analyses of Covariance
MLR	Robust Maximum Likelihood
NPB	Necesidades Psicológicas Básicas
PA	Physical Activity
RMSEA	Root Mean Square Error of Approximation
SD	Standard Deviation
SDT	Self-Determination Theory
SEM	Structural Equation Modeling
SPSS	Statistical Package for Social Sciences
SSA-BIC	Sample-Size Adjusted Bayesian Information Criterion
TAD	Teoría de la Autodeterminación
TLI	Tucker-Lewis Index

RESUMEN/ABSTRACT

Resumen

El profesorado de Educación Física (EF) juega un papel fundamental con su estilo motivacional docente en el proceso motivacional y psicológico del alumnado, tanto de forma positiva como negativa. Dicho estilo motivacional docente se ha examinado en profundidad desde la perspectiva de la teoría de la autodeterminación (TAD) durante las últimas décadas, poniendo especial atención en el estilo de apoyo a la autonomía implementado por el profesorado en las clases de EF. Con el avance de la investigación, se empezó a ampliar dicho objeto de estudio con la inclusión de un estilo relacionado con la estructura añadido al anteriormente comentado como facilitadores de la satisfacción de la autonomía, competencia y relación social del alumnado. En los últimos años, recientes investigaciones han puesto un mayor foco de atención en los estilos que amenazan las necesidades psicológicas básicas (NPB) del alumnado como son el estilo controlador o el estilo caótico.

Ante este continuo y constante desarrollo de la investigación educativa basada en los estilos motivacionales implementados por el docente de EF en el aula, surgen nuevas evidencias en la literatura científica, basadas en la TAD, que muestran desde una perspectiva circular la representación de cuatro estilos motivacionales docentes y ocho conductas. Esta nueva visión circular recoge una imagen más completa y refinada del estilo motivacional docente, aportando nuevos horizontes en la implementación de los diferentes estilos motivacionales, y más importante, que efectos tienen dichos estilos sobre el proceso motivacional del alumnado. No obstante, la investigación científica referente a este reciente modelo circular en EF aún es limitada. Dado el potencial impacto que el estudio del estilo motivacional docente podría tener en mejorar los procesos motivacionales del alumnado y proporcionar una mejor dirección en los planes de formación del profesorado, resulta crucial profundizar en su estudio científico.

Siguiendo la TAD y la perspectiva del modelo circular, el objetivo general de la presente Tesis Doctoral es analizar el estilo motivacional docente del profesorado de EF, desde la perspectiva del alumnado, y examinar su efecto sobre el proceso motivacional de los estudiantes. Para llevarlo a cabo, participaron 1124 estudiantes de Educación Secundaria y Bachillerato ($M=14.65$, $DT=1.47$, 52% chicas) pertenecientes a ocho centros de enseñanza de la Comunidad Autónoma de Aragón. Además, también se contó con una muestra de 601 estudiantes de Educación Secundaria de Estonia ($M=14.59$, $DT=1.90$; 56% chicas) para la realización del estudio transcultural (estudio 3). Las

variables evaluadas dentro del contexto de la EF fueron el estilo motivacional docente, la satisfacción y frustración de las NPB, diversión, aburrimiento, experiencias percibidas, aprendizaje percibido e intención de práctica de AF.

En relación al primer estudio, este tuvo como objetivo particular examinar las posibles diferencias en la percepción del alumnado sobre los estilos motivadores (i.e., apoyo a la autonomía y estructura) y desmotivadores (i.e., control y caos) del profesorado de EF y de sus ocho conductas (dos por estilo motivacional) en función de distintas variables sociodemográficas de los estudiantes (i.e., género y curso escolar), y en función de diferentes tipos de consecuencias (i.e., experiencias, aprendizaje e intención de ser activo). Los resultados de este estudio mostraron como los chicos percibieron en mayor medida conductas caóticas (i.e., abandonadas y a la espera) y dominadoras que las chicas. Respecto al curso, el alumnado perteneciente a cursos más altos percibió significativamente más conductas de apoyo a la autonomía (i.e., participativas y adaptativas) y estructuradas (i.e., orientadoras y clarificadoras) que el alumnado de cursos inferiores. Asimismo, el alumnado de cursos más bajos percibió significativamente en mayor medida las conductas dominadoras y caóticas (i.e., abandonadas y a la espera) que el alumnado de cursos superiores. En relación con las consecuencias, el alumnado que señaló tener experiencias más positivas en EF, percibir un mayor aprendizaje, y tener una mayor intención de ser activo, reportó valores significativamente superiores en las conductas motivacionales de apoyo a la autonomía (i.e., participativas y adaptativas), estructuradas (i.e., orientadoras y clarificadoras) y demandantes, y valores significativamente inferiores en las conductas motivacionales del estilo caótico (i.e., abandonadas y a la espera). Estos resultados subrayan la importancia del género y curso académico del alumnado a la hora de impartir docencia en EF, debido a que estas variables sociodemográficas pueden afectar a como el alumnado percibe el estilo motivacional docente del profesorado durante las clases de EF.

Respecto al segundo estudio, tuvo como objetivo específico examinar el rol de los estilos motivacionales docentes (i.e., apoyo a la autonomía, estructura, control y caos) percibidos por el alumnado, en la satisfacción y frustración de las NPB de los estudiantes y en un conjunto de consecuencias dentro (i.e., disfrute y aburrimiento) y fuera de la EF (i.e., intención de AF en su tiempo libre). Los resultados del estudio mostraron como las percepciones de los estudiantes sobre el apoyo a la autonomía y la estructura del profesorado de EF, no sólo se relacionaron positivamente con el lado positivo del proceso

motivacional del alumnado en EF (i.e., satisfacción NPB y diversión) y fuera de la EF (i.e., intención de practicar AF), sino que también se asociaron negativamente con la frustración de las NPB de los estudiantes en las clases de EF. Sin embargo, sucedió lo contrario cuando los estudiantes percibieron a sus profesores de EF como caóticos. Estos hallazgos podrían proporcionar orientaciones de gran ayuda para concienciar al profesorado de EF sobre qué estrategias motivacionales deben (y no deben) implementar durante sus clases de EF si quieren conseguir el mayor impacto positivo en el proceso motivacional de su alumnado.

Con respecto al tercer estudio, el objetivo principal fue examinar las posibles diferencias transculturales en las relaciones entre las ocho conductas motivacionales docentes del modelo circular y la satisfacción de las NPB en una muestra de estudiantes de secundaria estonios y españoles en clases de EF. Los resultados del estudio mostraron como los estudiantes estonios percibieron en mayor medida conductas participativas, abandonadas y a la espera (i.e., conductas de baja directividad), mientras que los estudiantes españoles percibieron de forma significativa más conductas clarificadoras, demandantes y dominadoras (i.e., conductas de alta directividad). Además, los análisis revelaron como la satisfacción de la autonomía de los estudiantes estonios y españoles fue predicha positivamente por las conductas participativas, adaptativas y orientadoras, mientras que fue predicha negativamente por las conductas abandonadas. Las conductas participativas, adaptativas, orientadoras y dominadoras predijeron positivamente la satisfacción de la competencia de los estudiantes estonios, mientras que las conductas abandonadas la predijeron negativamente. La satisfacción de la competencia de los estudiantes españoles se predijo positivamente por las conductas adaptativas y orientadoras, mientras que se predijo negativamente por las conductas clarificadoras y abandonadas. La satisfacción de la relación social de los estudiantes estonios y españoles fue predicha positivamente por las conductas adaptativas, mientras que fue predicha negativamente por las conductas abandonadas. Por último, las conductas participativas predijeron positivamente la relación social sólo entre los estudiantes estonios. Dichos resultados subrayan la relevancia social y cultural a la hora de comprender como las distintas conductas motivacionales docentes pueden influir en el proceso motivacional del alumnado en las clases de EF.

Finalmente, el cuarto estudio tuvo como objetivo identificar diferentes combinaciones de conductas motivacionales docentes (organizadas según su nivel de

directividad) percibidas por el alumnado en las clases de EF, y examinar hasta qué punto los resultados de los perfiles de las conductas motivacionales docentes identificados eran más o menos óptimos en términos de la satisfacción y frustración de las NPB de los estudiantes. Los resultados del estudio mostraron como las conductas más directivas (i.e., orientadoras, clarificadoras, demandantes y dominadoras) se combinaron en cuatro perfiles: "alta estructura-moderado control", "muy alta estructura-alto control", "moderada estructura-control" y "baja estructura-control". Asimismo, el perfil "muy alta estructura-alto control" mostró los resultados más óptimos en cuanto a las NPB del alumnado, mientras que ocurrió lo contrario con el perfil "baja estructura-control". Respecto a las conductas menos directivas (i.e., participativas, adaptativas, abandonadas y a la espera), surgieron también cuatro perfiles: "alto apoyo a la autonomía-bajo caos", "bajo apoyo a la autonomía-alto caos", "alto apoyo a la autonomía-muy alto caos, y "moderado apoyo a la autonomía-caos". Si bien el "alto apoyo a la autonomía-bajo caos" presentó los resultados más adaptativos en cuanto a la satisfacción y frustración de las NPB del alumnado, lo contrario sucedió con el perfil "bajo apoyo a la autonomía-alto caos". Por lo tanto, teniendo en cuenta los resultados del estudio parece importante resaltar que los futuros programas de formación no solo se centren en fomentar los estilos motivacionales de apoyo a la autonomía y la estructura, sino también en reducir los estilos controladores y caóticos del profesorado en las clases de EF debido a su coexistencia y sus efectos negativos sobre el alumnado.

En conclusión, este conjunto de resultados denota la necesidad de implementar conductas motivacionales docentes basadas en el apoyo a la autonomía (i.e., participativas y adaptativas) y estructura (i.e., orientadoras y clarificadoras) que satisfagan las NPB del alumnado desencadenando consecuencias adaptativas. Al mismo tiempo, parece importante que el profesorado de EF se aleje de las conductas basadas en el estilo controlador (i.e., demandantes y dominadoras) y caótico (i.e., abandonadas y a la espera), especialmente de este último, ya que favorece activamente la frustración de las NPB y conducen hacia consecuencias desadaptativas. Es necesario señalar también como el profesorado puede combinar distintos estilos motivacionales docentes de baja o alta directividad (i.e., apoyo a la autonomía y caos, o estructura y control, respectivamente) en sus sesiones diarias. Asimismo, es crucial que estas combinaciones destaquen por la baja presencia de estilos controladores y caóticos, debido a que son estos estilos los que, cuando se combinan con los estilos de apoyo a la autonomía y estructura, pueden dar

lugar a procesos motivacionales desadaptativos. A lo largo de los cuatro estudios se aportan diferentes ideas basadas en la teoría para que el profesorado de EF pueda tenerlas en cuenta e implementarlas con el objetivo de optimizar los procesos motivacionales de su alumnado durante las clases. Por lo tanto, estos resultados pueden servir para sentar las bases de formaciones específicas centradas en el modelo circular y ayudar así en la formación continua e inicial del profesorado de EF con el objetivo que adopten los estilos de enseñanza más adaptativos durante sus clases.

Abstract

The Physical Education (PE) teacher plays a crucial role with his/her (de-) motivating teaching style in the students' motivational and psychological process, both positively and negatively. This (de-)motivating teaching style has been examined in depth from the perspective of Self-Determination Theory (SDT) during the last decades, with a special focus on the autonomy-supportive style implemented by teachers in PE lessons. With the advance of research, this object of study has started to extend with the inclusion of a style related to structure in addition to the above-mentioned facilitator of the students' satisfaction of autonomy, competence, and relatedness. In the last years, the focus of recent research has been more on styles that thwart the students' basic psychological needs (BPN) such as the controlling style or the chaotic style.

Given this continuous and regular development of educational research based on (de-)motivating teaching styles implemented by PE teachers in their lessons, new evidence has emerged in the scientific literature, based on SDT, which shows from a circular structure the representation of four (de-)motivating teaching styles and eight approaches. This new circumplex perspective provides a more complete and refined description of the (de-)motivating teaching style, bringing new horizons in implementing the different (de-) motivating teaching styles, and more significantly, what effects these styles have on the students' motivational process. However, scientific research concerning this recent circumplex model in PE is still limited. Due to the potential impact that the study of teachers' (de-)motivating style could have on improving students' motivational processes and providing a better direction for teacher training plans, it is crucial to deepen its scientific study.

From the SDT perspective and the circumplex model, the general aim of this Doctoral Thesis is to examine the (de-)motivating teaching style of PE teachers, from the students' perception, and to examine its effect on the students' motivational process. To carry it out, 1124 secondary school students ($M=14.65$, $SD=1.47$, 52% girls) from eight schools in the Aragon Region participated in the study. In addition, a sample of 601 secondary school students from Estonia ($M=14.59$, $SD=1.90$; 56% girls) was also included in the cross-cultural study (study 3). The variables measured within the context of PE were (de-)motivating teaching style, BPN satisfaction and frustration, enjoyment, boredom, perceived experiences, perceived learning, and intention to do PA.

In the first study, the aim was to examine possible differences in students' perceptions of the motivating (i.e., autonomy support and structure) and demotivating (i.e., control and chaos) styles of PE teachers and their eight approaches (two per (de-)motivating teaching style) with respect to students' socio-demographic variables (i.e., gender and school year), and regarding of different types of outcomes (i.e., experiences, learning, and intention to do PA). The results of this study showed that boys perceived more chaotic (i.e., abandoning and awaiting) and domineering approaches than girls. Regarding the school-year, students in higher academic years perceived significantly more autonomy-supportive (i.e., participative and attuning) and structuring (i.e., guiding and clarifying) approaches than students in lower academic years. Also, students in lower academic years perceived significantly more domineering and chaotic (i.e., abandoning and awaiting) approaches than students in higher academic years. According to the outcomes, students who reported having more positive experiences in PE, perceiving more learning, and having a greater intention to be active, reported significantly higher values of autonomy-supportive, structuring, and demanding approaches, and significantly lower values for chaotic approaches (i.e., abandoning and awaiting). These results highlight the importance of students' gender and school year when teaching PE, because these sociodemographic variables can affect how students perceive the teachers' (de)motivating teaching style during PE classes.

The second study specifically aimed to examine the role of students' perception of (de-)motivating teaching styles (i.e., autonomy support, structure, control, and chaos) on students' BPN satisfaction and frustration and on a set of consequences within (i.e., enjoyment and boredom) and outside of PE (i.e., intention to do PA in leisure time). Results showed how students' perceptions of autonomy support and structure from their PE teachers were not only positively related to the bright side of students' motivational process in PE (i.e., BPN satisfaction and enjoyment) and outside of PE (i.e., PA intention), but were also negatively associated with students' BPN frustration in PE lessons. However, the opposite was true when students perceived their PE teachers as chaotic. These findings could provide helpful guidelines to raise awareness among PE teachers about which motivational strategies they should (and should not) implement in their PE lessons if they want to achieve the greatest positive effect on their students' motivational process.

Regarding the third study, the main aim was to examine possible cross-cultural differences in the relationships between the eight (de-)motivating teaching approaches of the circumplex approach with BPN satisfaction in a sample of Estonian and Spanish secondary school students in PE classes. The results of the study showed that Estonian students perceived more participative, abandoning, and awaiting approaches (i.e., low directiveness behaviors), while Spanish students perceived significantly more clarifying, demanding, and domineering approaches (i.e., high directiveness behaviors). Furthermore, analyses showed that Estonian and Spanish students' autonomy satisfaction was positively predicted by participative, attuning, and guiding approaches, while it was negatively predicted by abandoning approach. Participative, adaptive, guiding, and domineering approaches positively predicted Estonian students' competence satisfaction, whereas the abandoning approach negatively predicted it. Spanish students' competence satisfaction was positively predicted by attuning and guiding approaches, whereas it was negatively predicted by clarifying and abandoning approaches. Estonian and Spanish students' relatedness satisfaction was positively predicted by the attuning approach, while it was negatively predicted by the abandoning approach. Finally, the participative approach positively predicted relatedness only among Estonian students. These results highlight the social and cultural relevance on understanding how different teacher motivational behaviors can influence the students' motivational process of students in PE classes.

Lastly, the fourth study aimed to identify different combinations of teacher (de-)motivating teaching approaches (organized according to their level of directiveness) perceived by students in PE lessons, and to examine to what extent the results of the identified profiles of motivating teaching approaches were more or less optimal in terms of students' BPN satisfaction and frustration. The study's findings revealed how high directiveness approaches (i.e., guiding, clarifying, demanding, and domineering) combined into four profiles: "high structure-moderate control", "very high structure-high control", "moderate structure-control", and "low structure-control." Likewise, the "very high structure-high control" profile exhibited the most optimal results in terms of students' need-based experiences, while the opposite was observed with the "low structure-control" profile. Regarding less directiveness approaches (i.e., participative, attuning, abandoning, and awaiting), four profiles also emerged: "high autonomy support-low chaos", "low autonomy support-high chaos", "high autonomy support-very high chaos", and "moderate

autonomy support-chaos". While the "high autonomy support-low chaos" profile showed the most adaptive results in terms of students' BPN satisfaction and frustration, the opposite was true for the "low autonomy support-high chaos" profile. Therefore, considering the study's results, it appears important to highlight that future training programs for teachers should not only focus on promoting autonomy-supportive and structuring styles but also on reducing controlling and chaotic styles in PE lessons due to their coexistence and their negative effects on students.

In conclusion, this set of results highlights the relevance on implementing motivating teaching styles based on autonomy support (i.e., participative and attuning) and structure (i.e., guiding and clarifying) that satisfy students' BPN, thereby triggering adaptive outcomes. Simultaneously, it is crucial for PE teachers to move away from styles rooted in controlling (i.e., demanding and domineering) and chaotic styles (i.e., abandoning and awaiting), particularly the latter, as it fosters BPN frustration and leads to maladaptive consequences. It is also necessary to point out how teachers can combine different (de-)motivating teaching styles of low or high directiveness (i.e., autonomy support and chaos, or structure and control, respectively). Moreover, it is essential that these combinations exhibit a low presence of controlling and chaotic styles because it is these styles that when combined with autonomy supportive and structuring styles, can result in maladaptive motivational processes. Throughout the four studies, different theory-based ideas are provided so that PE teachers can take them into consideration and implement them in order to optimize the students' motivational processes in their lessons. Therefore, these results can be used to set the background for specific training focused on the circumplex model to support the pre-service and in-service training of PE teachers in order to adopt the most adaptive teaching styles in their lessons.

1. INTRODUCCIÓN

1. Introducción

Los beneficios que ofrece la práctica de AF son de sobra conocidos (Chaput et al., 2020). A pesar de ello, la mayoría de los adolescentes no cumplen las recomendaciones de AF de una intensidad moderada-vigorosa (i.e., al menos 60 minutos diarios en niños y adolescentes entre los 5 y 17 años; Organización Mundial de la Salud, 2020). El carácter del problema es evidente, sin embargo, no está realmente claro cómo abordarlo para poder revertir esta tendencia (Tapia-Serrano et al., 2022). A nivel nacional, las leyes educativas apoyan la adopción de medidas para fomentar la AF diaria dirigida por profesionales con el objetivo de facilitar el desarrollo integral y adoptar un estilo de vida saludable. Esto implica que los centros educativos pueden actuar como escenarios estratégicos para mejorar la salud de los adolescentes (Sevil et al., 2019). Concretamente, la asignatura de EF, por su idiosincrasia, se configura como una de las áreas con mayor importancia para fomentar los niveles de AF en el alumnado debido a que proporciona un contexto ideal para promoverla (Vasconcellos et al., 2020). De esta manera, parece importante comprender en profundidad que aspecto o aspectos de la EF pueden contribuir a hacer frente, directa e indirectamente al problema global de salud pública derivado de los bajos niveles de AF de los adolescentes.

1.1. La Educación Física en Educación Secundaria: Marco Normativo de Referencia

Debido a sus características específicas, la asignatura de EF se destaca como una de las áreas más relevantes para fomentar un estilo de vida activo y saludable en los estudiantes. Por este motivo, parece importante describir qué características tiene la actual normativa educativa para poder entender el contexto que da soporte a la presente Tesis Doctoral. La asignatura de EF está regulada en la actualidad por la Ley Orgánica de Modificación de la Ley Orgánica de Educación (LOMLOE; Ley Orgánica 3/2020, de 29 de diciembre, por la que se modifica la Ley Orgánica 2/2006, de 3 de mayo, de Educación), que establece las directrices educativas a nivel nacional. La LOMLOE está construida en torno a elementos como la Agenda 2030 y los Objetivos de Desarrollo Sostenible, la perspectiva de género, el enfoque competencial, el desarrollo digital y un enfoque metodológico centrado en el diseño universal de aprendizaje.

Según esta ley, se establece que la EF debe ser una materia obligatoria en todos los niveles educativos, desde 1º de Educación Primaria hasta 1º de Bachillerato. Solo es en 2º de Bachillerato cuando esta asignatura resulta de libre elección para todo el alumnado, independientemente de la modalidad cursada. La distribución de los periodos

lectivos semanales de EF es determinada por cada comunidad autónoma a través de la concreción autonómica del currículo educativo. Atendiendo al contexto de la presente Tesis Doctoral (i.e., Comunidad Autónoma de Aragón y Educación Secundaria), el Anexo III de la ORDEN ECD/1172/2022, de 2 de agosto, por la que se aprueban el currículo y las características de la evaluación de la Educación Secundaria Obligatoria y se autoriza su aplicación en los centros docentes de la Comunidad Autónoma de Aragón, determina que durante la etapa de secundaria la EF dispone de dos periodos lectivos semanales. Las clases, salvo excepciones muy particulares, son mixtas, lo que permite promover la igualdad de género. Las programaciones de la asignatura se estructuran en base a cinco competencias específicas que indican qué conocimientos se deben alcanzar al terminar la etapa. Estas competencias abarcan aspectos como la resolución de diferentes situaciones motrices según su lógica interna, la comprensión de las distintas manifestaciones de la cultura motriz, la compartición de diferentes espacios de práctica físico-deportiva con independencia de las características intrínsecas de los participantes y entorno, la adopción de un estilo de vida sostenible y ecosocialmente responsable y la incorporación intencionada de actividades físicas en la vida diaria con el objetivo de alcanzar una salud integral. Dentro de estas competencias específicas, la competencia de resolución de problemas de situaciones motrices se considera fundamental, ya que articula las programaciones de EF y se enfoca en el desarrollo de habilidades para resolver desafíos motrices. Se sugiere que el peso de las otras competencias sea menor y se aborden de manera transversal, es decir, que se integren en diferentes contextos y actividades a lo largo del curso escolar, sin centrarse exclusivamente en ellas. Esto permite que los estudiantes adquieran habilidades y conocimientos en diversos ámbitos, fortaleciendo así su desarrollo integral. Finalmente, el papel del docente de EF y los departamentos de los centros educativos es crucial para configurar la asignatura de EF de manera específica, de acuerdo con su propia perspectiva y en concordancia con las sugerencias curriculares establecidas. Dichas figuras tienen la responsabilidad y la potestad de diseñar y desarrollar las programaciones didácticas y actividades que conforman la experiencia de aprendizaje de los estudiantes en EF.

1.2. La Influencia del Docente de Educación Física

El docente de EF, como experto en la materia, cuenta con los conocimientos pedagógicos y técnicos necesarios para seleccionar y adaptar los contenidos, métodos y recursos didácticos más adecuados a las características y necesidades del alumnado.

Numerosos estudios han identificado al profesorado de EF como un agente educativo clave en la promoción de los niveles de AF del alumnado (Koka et al., 2020; Trigueros et al., 2019). El profesorado puede desempeñar este rol tanto directa como indirectamente, a través de la acumulación de minutos de AF en las clases de EF o con la transferencia de conocimientos y actitudes necesarias para que el alumnado adopte un estilo de vida más activo (Kelso et al., 2020; Slingerland & Borghouts, 2011; Truelove et al., 2020). Debido a las características específicas que rodean esta asignatura, una de las prioridades del profesorado de EF es proporcionar al alumnado los conocimientos, habilidades y actitudes necesarias que garanticen una práctica de AF en su tiempo libre (Hagger & Chatzisarantis, 2012; Taylor et al., 2009). Siguiendo esta misma línea, la investigación dentro del contexto educativo de la EF ha señalado como las experiencias vividas en las clases durante los primeros años académicos pueden influir en la intención de realizar AF (Ladwig et al., 2018). En cambio, las experiencias negativas acumuladas en las clases de EF pueden generar una mayor sensación de incompetencia entre los jóvenes y disminuir la práctica físico-deportiva de forma paulatina (Beltrán-Carrillo et al., 2012). Para lograr estas experiencias adaptativas, parece importante que el profesorado de EF pueda implementar diferentes estrategias didácticas que desencadenen un proceso motivacional adaptativo en EF y, en consecuencia, puedan servir de elemento promotor de la AF tanto dentro como fuera del aula (Ahmadi et al., 2023; Vasconcellos et al., 2020).

1.3. El Proceso Motivacional del Alumnado desde la Teoría de la Autodeterminación

La TAD (Deci & Ryan, 1985; Ryan & Deci, 2000, 2017, 2020, 2022) es una macroteoría motivacional que explica los procesos que subyacen en el comportamiento humano, así como el desarrollo psicológico y bienestar personal. Durante las cuatro últimas décadas, diferentes investigaciones dentro del contexto educativo de la EF han utilizado este marco teórico para comprender qué factores pueden llegar a influenciar la práctica de AF (Curran & Standage, 2017; Sun et al., 2017; Vasconcellos et al., 2020; White et al., 2021). Los constructos principales sobre los que se apoya la TAD para comprender el comportamiento humano son las NPB y la motivación autodeterminada. Ambos conceptos, junto al estilo motivacional docente y otras consecuencias afectivas, cognitivas y comportamentales, forman parte del cuerpo central de la presente Tesis Doctoral.

1.3.1. Estilo Motivacional Docente: una Nueva Visión desde el Modelo Circular

De acuerdo con la TAD (Ryan & Deci, 2017), el estilo motivacional docente del profesorado de EF puede tener un impacto significativo en la satisfacción o frustración de las NPB de los estudiantes, lo que a su vez puede afectar a su motivación y al desarrollo de distintas consecuencias afectivas, cognitivas y comportamentales (Vasconcellos et al., 2020). Para comprender el estilo motivacional docente, se ha postulado recientemente un modelo más integrador y detallado denominado “modelo circular”, que identifica cuatro estilos motivacionales (i.e., apoyo a la autonomía, estructura, control y caos), divididos a su vez en dos conductas motivacionales cada uno (i.e., participativas, adaptativas, orientadoras, clarificadoras, demandantes, dominadoras, abandonadas y a la espera) a lo largo de dos ejes (Aelterman et al., 2019). El eje vertical se articula en función del nivel de directividad y el eje horizontal en función del apoyo o amenaza de las NPB (ver Figura 1; Aelterman et al., 2019). El eje horizontal hace referencia al nivel de apoyo a las NPB, con los estilos de apoyo a la autonomía y estructura como los estilos motivacionales que más apoyan las NPB y con el control y el caos como los estilos motivacionales que más frustran las NPB. En cambio, el eje vertical expresa el nivel de directividad del profesorado, con la estructura y el control como los estilos motivacionales más directivos y el apoyo a la autonomía y el caos como los estilos motivacionales menos directivos.

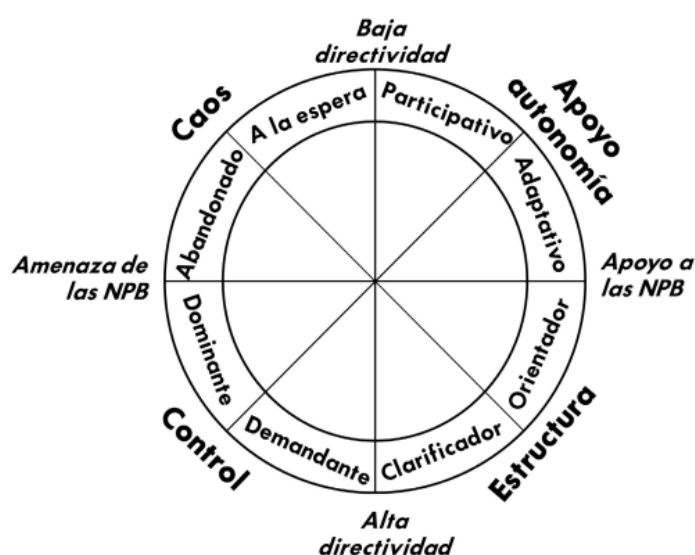


Figura 1. Representación gráfica de los estilos y conductas motivacionales docentes según el modelo circular. Traducido de Aelterman et al. (2019). Tomado de García-González et al. (2021).

Siguiendo las premisas del modelo circular, el docente de EF implementa un estilo de apoyo a la autonomía cuando adopta una actitud curiosa y abierta, que permite identificar, nutrir y empatizar con los intereses, preferencias y sentimientos del alumnado, involucrándose con el alumnado de forma voluntaria. Dicho estilo motivacional está conformado por las conductas participativas y adaptativas. Un docente participativo identifica los intereses personales del alumnado a través del diálogo y preguntando por su opinión, siguiendo el ritmo de los estudiantes y ofreciendo opciones, mientras que un docente adaptativo fomenta los intereses personales del alumnado proporcionando razones significativas, aceptando las aportaciones o expresiones de afecto negativo por parte del alumnado y ofreciendo ejercicios interesantes y placenteros (Aelterman et al., 2019; Burgueño, Abós, et al., 2023; Escrivá-Boulley et al., 2021). El profesor de EF implementa un estilo estructurado cuando se centra en el progreso del alumnado y les proporciona claridad e información sobre qué hacer y cómo hacerlo. Dicho estilo motivacional se compone de las conductas orientadoras y clarificadoras. Un docente orientador fomenta el progreso del alumnado ofreciendo ayuda y asistencia, expresando confianza en las habilidades del alumnado y proporcionando feedback positivo y constructivo, mientras que un docente clarificador establece expectativas transparentes comunicando una visión general de lo que se espera., al mismo tiempo que supervisa el progreso del alumnado hacia estas expectativas (Aelterman et al., 2019; Burgueño, Abós, et al., 2023; Escrivá-Boulley et al., 2021).

Continuando con las conductas de alta directividad, el profesor de EF implementa un estilo controlador cuando ejerce presión sobre su alumnado para que se comporte de la manera deseada por el mismo. Dicho estilo motivacional se compone de las conductas demandantes y dominadoras. Un docente demandante se basa en el control externo mediante el uso de sanciones y recompensas, centrándose en la disciplina y los resultados, y utilizando un lenguaje autoritario, mientras que un docente dominador se basa en el control interno avergonzando a los estudiantes o usando la inducción de culpa, de este modo el profesor de EF ejerce poder atacando personalmente o criticando a los estudiantes (Aelterman et al., 2019; Burgueño, Abós, et al., 2023; Escrivá-Boulley et al., 2021). Finalmente, el profesor de EF implementa un estilo caótico cuando adopta una mentalidad de "dejar hacer" al dejar a los estudiantes a su suerte y no proporcionarles ninguna guía. Dicho estilo motivacional se compone de las conductas abandonadas y a la espera. Un docente con un perfil abandonado se da por vencido con el alumnado y le

permite hacer lo que quiera, mientras que un docente con un perfil de a la espera no planifica demasiado y espera a que los estudiantes tomen la iniciativa (Aelterman et al., 2019; Burgueño, Abós, et al., 2023; Escrive-Boulley et al., 2021).

Una de las contribuciones del modelo circular es, como se ha mencionado anteriormente, situar estos cuatro estilos y ocho conductas en una estructura circular. Esto implica un paso en la comprensión del estilo motivacional docente desde un punto de vista categórico a un punto de vista más gradual e integrador, donde unos estilos están cercanos a otros y pueden superponerse (Aelterman et al., 2019; Burgueño, Abós, et al., 2023; Escrive-Boulley et al., 2021). Asimismo, esta clasificación gradual aporta sugerencias importantes en la comprensión del proceso motivacional de los estudiantes. Por ejemplo, las conductas orientadoras y adaptativas situadas en el extremo derecho del eje de apoyo a las NPB (ver Figura 1) son, por definición, las que podrían generar una mayor satisfacción de las NPB en el alumnado. Sin embargo, si bien las conductas participativas y clarificadoras, situadas más en los extremos del eje de directividad, podrían estar igualmente asociadas con una satisfacción de las NPB de los estudiantes, parece que el impacto que podrían tener sería menor e incluso quedarse en una mera activación de las mismas (Aelterman et al., 2019). Por el otro lado, las conductas dominadoras y de abandono, ubicadas en la parte izquierda del eje vertical, generan por definición una frustración activa de las NPB de los estudiantes. En cambio, las conductas demandantes y a la espera, si bien podrían frustrar las NPB igualmente, parecen facilitar en mayor medida una privación de la satisfacción de las mismas (Aelterman et al., 2019). Los resultados de Aelterman et al. (2019) en el contexto educativo, refuerzan estas ideas mostrando cómo las conductas adaptativas, orientadoras y clarificadoras son las que desplegaron una relación más fuerte con la motivación autónoma o persistencia en la tarea. Por otro lado, las conductas demandantes, dominadoras y de abandono mostraron una relación más fuerte con la desmotivación y oposición desafiante del alumnado (Aelterman et al., 2019). Más concretamente, el estudio de Burgueño, Abós, et al. (2023) en el contexto de la EF observó como las conductas participativas, adaptativas, orientadoras y clarificadoras mostraron una relación más fuerte con la satisfacción de las NPB, mientras que las conductas dominadoras, abandonadas y a la espera se relacionaron más fuerte con la frustración de las NPB del alumnado.

En base a esta clasificación gradual renovada de los estilos motivacionales docentes, se puede observar como las ocho conductas diferenciadas en el modelo circular

tienen un patrón de correlaciones notablemente ordenado. Es decir, las correlaciones entre una conducta y las conductas adyacentes son más fuertes y positivas, mientras que dichas correlaciones van disminuyendo de intensidad e incluso se vuelven negativas cuando las conductas están más separadas (Aelterman et al., 2019). De este modo, se ha demostrado como estos estilos motivacionales inciden directamente sobre las NPB, tal y como se muestra en el apartado siguiente.

1.3.2. Necesidades Psicológicas Básicas

La TAD plantea como uno de sus principios básicos la existencia de tres necesidades humanas innatas y universales (i.e., autonomía, competencia y relación social) las cuales, pueden ser satisfechas o frustradas, lo que condiciona el desarrollo psicológico y bienestar personal de los individuos (Deci & Ryan, 1985; Vansteenkiste & Ryan, 2013). En este sentido, es importante tener en cuenta que la satisfacción y frustración de las NPB no son dos polos opuestos de un mismo continuo (Vansteenkiste et al., 2020). Asimismo, existe evidencia empírica que demuestra que una falta de satisfacción no implica por definición una frustración de las NPB (Bartholomew et al., 2011; H. Jang, Kim, et al., 2016). Esto tiene consecuencias en el proceso motivacional de los estudiantes ya que ambos procesos (i.e., satisfacción y frustración de las NPB) se relacionan de forma diferente con distintas consecuencias y antecedentes (White et al., 2021). La satisfacción de la autonomía se refiere a sentirse el origen de las propias acciones y decisiones. La satisfacción de la competencia se define como la sensación de sentirse eficaz en la realización de las propias acciones o actividades llevadas a cabo. Finalmente, la satisfacción de relación social se refiere a la conexión y sentimiento de ser aceptado por otras personas significativas (Ryan & Deci, 2020; Vansteenkiste et al., 2020). En cambio, la frustración de autonomía se define como la sensación de sentirse presionado durante las actividades realizadas. La frustración de competencia se define como aquellos sentimientos de fracaso e inferioridad en las actividades. Por último, la frustración de la relación social emerge cuando se experimentan sentimientos de soledad y alienación con el entorno que le rodea (Ryan & Deci, 2020; Vansteenkiste et al., 2020). Así, investigaciones previas en el ámbito de la EF basadas en la TAD han evidenciado como la satisfacción de estas tres NPB pueden generar una motivación más autodeterminada, así como una gran diversidad de consecuencias adaptativas (e.g., diversión, aprendizaje, experiencias positivas, intención de AF, etc.) (Vasconcellos et al., 2020; White et al., 2021). Por el contrario, la frustración de las mismas puede

desencadenar una motivación menos autodeterminada y sus posteriores consecuencias desadaptativas (e.g., aburrimiento, oposición desafiante, poca participación en las clases de EF, etc.) (Vasconcellos et al., 2020; White et al., 2021).

Si bien las consecuencias de la satisfacción y frustración de las NPB son importantes para conocer cómo se desarrolla la motivación del alumnado, también parece relevante saber que antecedentes dan lugar ambos procesos (i.e., satisfacción y frustración de las NPB) en el alumnado. Así, el profesorado de EF ocupa una posición clave en el entorno social del aula y su estilo motivacional puede servir como antecedente contextual y satisfacer o frustrar las NPB del alumnado (Burgueño, Abós, et al., 2023; García-González et al., 2023; Ryan & Deci, 2020; Vasconcellos et al., 2020). La literatura científica previa ha señalado que los estilos motivacionales de apoyo a la autonomía y estructura se asocian positivamente con la satisfacción de las NPB del alumnado. Particularmente, el estilo motivacional docente de apoyo a la autonomía está más estrechamente relacionado con la satisfacción de la autonomía y el estilo estructurado más intensamente asociado con la satisfacción de la competencia de los estudiantes (Curran & Standage, 2017; García-González et al., 2023; Ryan & Deci, 2020; Vasconcellos et al., 2020). Concretamente, el estudio realizado con el modelo circular en contexto educativo de Burgueño, Abós et al. (2023) en EF mostró como los estilos de apoyo a la autonomía y estructura se correlacionaron positivamente con la satisfacción de las NPB del alumnado. Más específicamente, las conductas motivacionales docentes de dichos estilos (i.e., participativas, adaptativas, orientadoras y clarificadoras) se relacionaron también de forma positiva y significativa con la satisfacción de dichas necesidades en el alumnado (Burgueño, Abós, et al., 2023; Van Doren et al., 2023).

Aunque la evidencia de estos estilos motivacionales es consistente en el ámbito de la EF (Vasconcellos et al., 2020; White et al., 2021), hay menos investigación sobre cómo los estilos motivacionales de control y caos pueden influir en la satisfacción de las NPB en la EF. En cuanto al estilo controlador, mientras algunos estudios en EF han mostrado asociaciones negativas con la satisfacción de las NPB de los estudiantes (e.g., (Burgueño et al., 2022; Burgueño, Abós, et al., 2023; Burgueño & Medina-Casaubón, 2021; Leo, Behzadnia, et al., 2022), otros estudios no han hallado significatividad en dichas asociaciones (Behzadnia et al., 2018; Cronin et al., 2019; Tilga, Kalajas-Tilga, et al., 2020). Siendo más precisos, algunos estudios que han diferenciado entre conductas demandantes y dominadoras han mostrado como tanto las conductas demandantes como

dominadoras se relacionaban positivamente con la satisfacción de las NPB (Burgueño, Abós, et al., 2023), mientras que otros señalaron una relación negativa de ambas con la satisfacción de dichas necesidades (García-González et al., 2023). Con respecto al caos, los estudios de Behzadnia, (2021) y Burgueño, Abós et al. (2023) han arrojado una relación significativa y negativa con la satisfacción de las NPB, aunque también existen otros estudios que no han encontrado relaciones significativas entre ambas variables (Burgueño & Medina-Casaubón, 2021; Teraoka et al., 2023). Más en particular, un estudio reciente basado en el modelo circular en EF ha mostrado como las conductas abandonadas se relacionaron de forma significativa y negativa con la satisfacción de las NPB, mientras que lo mismo no sucede con las conductas a la espera (Burgueño, Abós, et al., 2023).

Por el lado contrario, si bien existen estudios que han analizado como el estilo motivacional docente en EF se relaciona con la satisfacción de las NPB, también han proliferado en los últimos años aquellos que han explorado la relación con la frustración de las NPB. En relación con el apoyo a la autonomía, mientras algunos estudios en EF han mostrado una relación negativa con la frustración de las NPB de los estudiantes (Behzadnia et al., 2018; Burgueño, Abós, et al., 2023; Haerens et al., 2015; Liu et al., 2017; Van Doren et al., 2023), otros no han hallado dichas relaciones significativas (Cronin et al., 2019; Tilga, Hein, et al., 2020). Además, algunos de ellos han mostrado como tanto las conductas participativas como adaptativas se asocian negativamente y significativamente con la frustración de las NPB (Burgueño, Abós, et al., 2023), reforzando la visión gradual que sostiene el modelo circular (Aelterman et al., 2019). Respecto al estilo estructurado, diferentes estudios han mostrado una asociación significativa y negativa con la frustración de las necesidades del alumnado (Behzadnia et al., 2018; Burgueño, Abós, et al., 2023; García-González et al., 2023). Sin embargo, otros estudios no han hallado significatividad en dichas asociaciones, especialmente con la frustración de la autonomía y relación social (Burgueño et al., 2022; Burgueño & Medina-Casaubón, 2021). Más concretamente, se ha podido observar de forma diferenciada como las conductas orientadoras y clarificadoras, basadas en el modelo circular en EF, tuvieron una relación significativa y negativa con la frustración de las NPB (Burgueño, Abós, et al., 2023). En relación al estilo controlador, diferentes estudios han mostrado una consistencia en su relación positiva con la frustración de las NPB del alumnado, especialmente con la frustración de la autonomía (Aelterman et al., 2019; De Meyer et

al., 2014; Haerens et al., 2015; Van Doren et al., 2021). Particularmente, varios estudios que han abordado la distinción entre conductas demandantes y dominadoras, han mostrado como ambas conductas motivacionales correlacionan de forma positiva con la frustración de las NPB (Abós et al., 2022; García-González et al., 2023). Sin embargo, el estudio basado en el modelo circular en EF de Burgueño, Abós et al. (2023), observó que las conductas demandantes se relacionaron negativamente, mientras que las dominadoras lo hicieron positivamente con la frustración de estas necesidades. Con relación al estilo caótico, diferentes estudios observaron una relación positiva con la frustración de las NPB, fundamentalmente con la frustración de la competencia (Behzadnia, 2021; Burgueño, Abós, et al., 2023; Burgueño & Medina-Casabón, 2021). Siendo más precisos, el estudio de Burgueño, Abós et al. (2023) mostró de forma diferenciada como las conductas abandonadas y a la espera se relacionaban de forma positiva con la frustración de las NPB. A pesar de toda la literatura científica existente acerca de las conductas motivacionales docentes en EF, se necesitan más investigaciones para comprender con más profundidad cómo los diferentes estilos motivacionales, así como sus respectivas conductas, pueden influir de manera diferente en el proceso motivacional del alumnado en las clases de EF.

1.3.3. Regulaciones Motivacionales

La TAD detalla cómo es el continuo de motivación (i.e., proceso por el cual una persona es el principal agente causal de una acción) el que determina la internalización del comportamiento, donde se pueden diferenciar de mayor a menor nivel de autodeterminación: la motivación intrínseca, la regulación integrada, la regulación identificada, la regulación introyectada, la regulación externa, y la desmotivación (Ryan & Deci, 2000, 2017). Cuando un estudiante está impulsado por el verdadero placer, satisfacción y disfrute que supone participar en las actividades de la clase de EF, su motivación es intrínseca. En cambio, cuando el estudiante participa en las clases de EF movido por incentivos externos como recibir una calificación o evitar un castigo, su motivación es extrínseca. Esta motivación extrínseca, engloba hasta cuatro regulaciones (i.e., regulación integrada, identificada, introyectada y externa) con diferentes grados de internalización. La regulación integrada se da cuando el estudiante se esfuerza en EF porque es congruente con su estilo de vida, su identidad como persona y sus valores. La regulación identificada tiene lugar cuando el estudiante participa activamente porque reconoce los beneficios que la EF puede tener y valora conscientemente el papel que

realiza en su aprendizaje, en su formación y en su salud. La regulación introyectada emerge cuando el estudiante participa activamente y se esfuerza en las clases de EF, porque de lo contrario, se sentiría culpable. Por último, la regulación externa tiene lugar cuando el estudiante se esfuerza en las clases con la única intención de obtener una recompensa externa o evitar ser castigado. Finalmente, la desmotivación se produce cuando un estudiante no percibe ninguna razón -ni intrínseca ni extrínseca- para esforzarse ni participar en las clases de EF, con una falta de implicación absoluta con la asignatura (Ryan & Deci, 2000, 2017).

Una revisión sistemática con metaanálisis realizada con 265 estudios de EF basados en la TAD y una muestra de 18.947 estudiantes arrojó como la satisfacción de las tres NPB conduce a la obtención de las formas de motivación más autodeterminadas (Vasconcellos et al., 2020), lo cual, también ha sido empíricamente demostrado en revisiones sistemáticas cualitativas (White et al., 2021). Asimismo, la frustración de las NPB se ha relacionado de forma positiva con la motivación menos autodeterminada y la desmotivación (Abós et al., 2022; Burgueño, García-González, et al., 2023; García-González et al., 2023). En este sentido, si los estudiantes sienten que tienen la oportunidad de tomar sus propias decisiones y asumir responsabilidades (i.e., satisfacción de autonomía), se perciben eficaces en las tareas que participan (i.e., satisfacción de competencia), y tienen relaciones positivas con sus compañeros de clase (i.e., satisfacción de relación social) puede conducir a un comportamiento más autónomo o autodeterminado (Ryan & Deci, 2017; Vasconcellos et al., 2020). Por otro lado, si los estudiantes se sienten alienados y presionados en las tareas que realizan (i.e., frustración de autonomía), experimentan sentimientos de inferioridad y fracaso al intentar superar con éxito una tarea (i.e., frustración de competencia) y se sienten rechazados o poco integrados en el grupo de clase (i.e., frustración de la relación social), pueden desarrollar un comportamiento menos autodeterminado o incluso desmotivado (Ryan & Deci, 2017).

1.3.4. Consecuencias del Proceso Motivacional

La TAD sostiene que el estilo motivacional docente puede desencadenar un amplio conjunto de consecuencias adaptativas o desadaptativas en el alumnado a través de su satisfacción o frustración de las NPB y su motivación autodeterminada (Vasconcellos et al., 2020). Estudios recientes han indicado como los estilos motivacionales de apoyo a la autonomía y estructura pueden estar relacionados positivamente con un gran número de consecuencias positivas de diferente tipo: afectivas

(e.g., experiencias positivas, diversión, compromiso, autorregulación, vitalidad, etc.), cognitivas (e.g., aprendizaje, rendimiento académico, mayor atención, etc.) o comportamentales (e.g., intención de AF, participación en las clases de EF, etc.) (Aibar et al., 2021; Behzadnia et al., 2019; Cheon et al., 2020; H. Jang et al., 2010; H. Jang, Reeve, et al., 2016; Reeve et al., 2020; Van Doren et al., 2021; Vansteenkiste et al., 2012; Wang et al., 2016), y en menor medida con consecuencias negativas (Vasconcellos et al., 2020). Respecto al estilo controlador, existe una menor evidencia científica que haya observado una asociación positiva con una serie de consecuencias negativas en las clases de EF (e.g., aburrimiento, oposición desafiante, miedo al fracaso, menor compromiso, etc.) (Abós et al., 2022; Bartholomew et al., 2018; Behzadnia et al., 2018; Curran & Standage, 2017; De Meyer, Soenens, Vansteenkiste, et al., 2016; García-González et al., 2023; Haerens et al., 2015; Liu et al., 2017; Vansteenkiste et al., 2020) y negativamente, aunque en menor medida, con consecuencias adaptativas (e.g., intención de AF y utilidad e importancia de la EF) (Leo, Behzadnia, et al., 2022). Finalmente, muy pocos estudios han examinado la asociación entre el estilo caótico y sus posibles consecuencias. Sin embargo, con la emergencia del modelo circular un creciente número de estudios han mostrado una relación negativa entre el estilo caótico con diferentes consecuencias positivas (e.g., el compromiso conductual y emocional del alumnado) (Leo, Behzadnia, et al., 2022). No obstante, se requieren más estudios que examinen la relación entre el estilo caótico del docente con posibles consecuencias afectivas, conductuales y cognitivas en el contexto de EF. Asimismo, parece importante que, a través del modelo circular, se profundice en como las conductas asociadas a los cuatro estilos motivacionales, pueden explicar diferenciadamente distintas consecuencias del proceso motivacional del alumnado.

La secuencia motivacional completa de la TAD que se ha ido explicando, paso por paso, en los apartados anteriores, puede verse representada en la Figura 2, teniendo en cuenta las variables de la presente Tesis Doctoral. La implementación de los estilos y conductas motivacionales docentes de apoyo a la autonomía (i.e., participativas y adaptativas) y estructura (i.e., orientadoras y clarificadoras), junto con la satisfacción de las NPB origina el desarrollo el lado claro de la motivación, el cual desencadena consecuencias adaptativas en el alumnado. Por el otro lado, los estilos y conductas motivacionales docentes de control (i.e., demandantes y dominadoras) y caos (i.e., abandonadas y a la espera) sumados a la frustración de las NPB favorece el desarrollo del

lado oscuro de la motivación, y a su vez se relaciona con una serie de consecuencias desadaptativas (Ryan & Deci, 2020; Vansteenkiste et al., 2020; Vansteenkiste & Ryan, 2013). En este sentido, a lo largo de los cuatro estudios de la presente Tesis Doctoral, se prueban diferentes relaciones, asociaciones, combinaciones y predicciones de esta secuencia motivacional con el objetivo de expandir la literatura previa y obtener una comprensión más profunda del estilo motivacional docente en EF bajo la óptica del modelo circular.

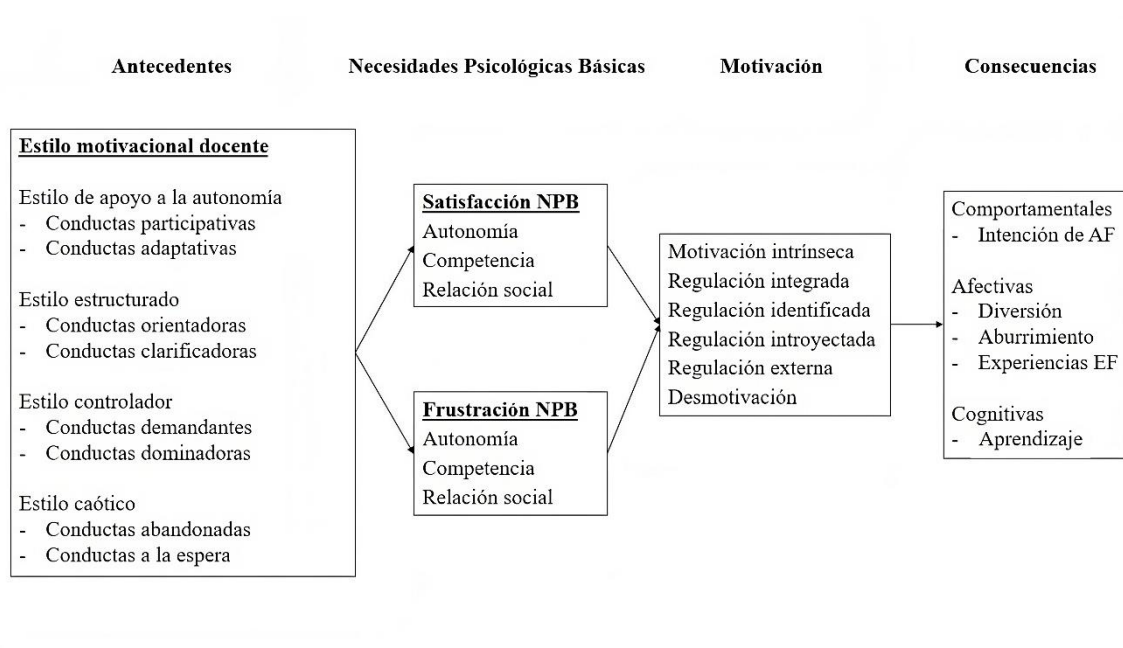


Figura 2. Secuencia motivacional postulada por la TAD, en relación con las variables de la presente tesis doctoral (Ryan & Deci, 2017, 2022).

2. OBJETIVOS

2. Objetivos

A partir de la revisión exhaustiva de los antecedentes previos en la literatura científica, en línea con la TAD (Deci & Ryan, 1985; Ryan & Deci, 2000, 2017, 2020, 2022) y el modelo circular (Aelterman et al., 2019; Burgueño, Abós, et al., 2023; Escrivá-Boulley et al., 2021), esta Tesis Doctoral pretende analizar el estilo motivacional docente del profesorado de EF, desde la perspectiva del alumnado, y examinar su efecto sobre el proceso motivacional de los estudiantes. Este objetivo general, está dividido en cuatro objetivos más específicos que se corresponden con cada uno de los cuatro estudios que engloba la presente Tesis Doctoral. Dichos objetivos específicos son:

- **Estudio 1:** Examinar las diferencias en la percepción del alumnado sobre los distintos estilos y conductas motivacionales de los docentes en EF en función del género y curso escolar del alumnado, y en función de consecuencias de carácter afectivo (i.e., experiencias), cognitivo (i.e., aprendizaje) y comportamental (i.e., intención de práctica de AF).
- **Estudio 2:** Examinar cómo los cuatro estilos motivacionales docentes del modelo circular explican diferenciadamente el proceso motivacional del alumnado en EF.
- **Estudio 3:** Examinar cómo las ocho conductas motivacionales docentes del modelo circular explican diferenciadamente la satisfacción de las NPB del alumnado y explorar si existen diferencias en dichas relaciones en función del país (i.e., España vs. Estonia).
- **Estudio 4:** Identificar diferentes combinaciones de las percepciones del alumnado sobre las conductas motivacionales de sus profesores de EF, y examinar en qué medida los perfiles identificados son más o menos óptimos en relación con la satisfacción y frustración de las NPB del alumnado.

2. Aims

Based on the exhaustive review of previous antecedents in the scientific literature, in line with the SDT (Deci & Ryan, 1985; Ryan & Deci, 2000, 2017, 2020, 2022) and the circumplex model (Aelterman et al., 2019; Burgueño, Abós, et al., 2023; Escriva-Boulley et al., 2021), the Doctoral Thesis aims to analyse (de-)motivating teaching style of PE teachers, from the students' perspective, and to examine its effect on the students' motivational process. This general objective is divided into four more specific objectives that correspond to each of the four studies included in this Doctoral Thesis. These specific objectives are:

- **Study 1:** To examine differences in students' perceptions of different (de-)motivating teaching styles and approaches in terms of students' gender and school level; and in function of a type of affective (i.e., experiences), cognitive (i.e., learning) and behavioral (i.e., intention to practice PA) consequences.
- **Study 2:** To examine how the four teaching (de-)motivating teaching styles of the circumplex model differentially explain the students' motivational process in PE.
- **Study 3:** To examine how the eight (de-)motivating teaching approaches of the circular model differentially explain BPN satisfaction and to explore whether there are differences in these relationships by country (i.e., Spain vs. Estonia).
- **Study 4:** To identify different combinations of students' perceptions of (de-)motivating teaching approaches from their PE teachers, and to examine the extent to which the identified profiles are more or less optimal in terms of students' BPN satisfaction and frustration.

3. METODOLOGÍA GENERAL

3. Metodología General

3.1. Aspectos Éticos

Para el desarrollo del presente proyecto de Tesis Doctoral se siguieron las directrices éticas generales de la Declaración de Helsinki (2013) conforme a la relación con seres humanos, consentimiento y confidencialidad de los datos obtenidos durante las respuestas. Del mismo modo, el proyecto se apoyó en un dictamen ético favorable para su realización por parte del Comité de Ética de la Investigación de la Comunidad Autónoma de Aragón (CEICA) en la reunión realizada el día 07 de noviembre de 2022, Acta N° 15/2022 (C.I. PI22/363) (ver Anexo 1). A continuación, después de conseguir la aprobación de los diferentes centros educativos, se proporcionó a todo alumnado un documento informativo (ver Anexo 2) para que sus padres/tutores legales tuvieran conocimiento de la realización del presente proyecto y pudieran firmar el consentimiento informado de la participación en el mismo. Dicho consentimiento informado, también sirvió para obtener su aprobación para participar en la investigación de forma voluntaria (ver Anexo 3).

3.2. Diseño del Proyecto

Para llevar a cabo el objetivo general y los cuatro objetivos específicos enmarcados en el presente proyecto de Tesis Doctoral se realizó un diseño ex post facto, descriptivo y correlacional de corte transversal basado en la técnica de encuestación (Fontes de Gracia et al., 2010).

3.3. Procedimiento General

De forma previa al comienzo de la Tesis Doctoral, se iniciaron los contactos con diferentes centros educativos de la Comunidad Autónoma de Aragón para explicarles los objetivos del presente proyecto y solicitarles su colaboración. El propósito de este primer contacto era presentarles el proyecto como un recurso que les permitiera conocer cómo sus estudiantes percibían el estilo docente del profesorado de EF y que implicaciones podría tener en su aprendizaje, experiencias o intención de práctica de AF en su tiempo libre. Después de conseguir la aprobación de los diferentes centros educativos, se especificó el procedimiento a realizar para dar visibilidad a la investigación y proceder con la toma de datos correspondiente. En primer lugar, se informó al profesorado de EF de los centros respectivos para solicitar su apoyo en la distribución de los distintos cuestionarios durante sus propias clases. En segundo lugar, como se ha explicado en el

apartado 3.1. de aspectos éticos se proporcionó los respectivos consentimientos informados para que las familias tuvieran conocimiento del presente proyecto y dieran su aprobación para participar en la investigación de forma voluntaria.

La recogida de datos tuvo lugar durante distintos cursos académicos debido a las restricciones de acceso del personal externo a los centros educativos que existieron durante la pandemia originada por el Coronavirus (SARS-CoV-2). Así, la primera toma de datos se realizó durante el segundo año del presente proyecto en el curso 2020-2021. Con la intención de obtener una muestra más amplia y representativa que permitiese abordar todos los objetivos de la investigación, se realizó una segunda toma de datos adicional durante el curso 2021-2022. En ambas tomas de datos, el alumnado cumplimentó los cuestionarios en papel en un ambiente tranquilo, con el mobiliario adecuado en un aula habitual del propio centro educativo. La recogida de la información duró entre 25-30 minutos aproximadamente. Durante el proceso de la recogida de datos, el investigador principal siempre estuvo presente para poder solventar cualquier duda que surgiera durante el proceso. Al mismo tiempo, es preciso destacar la ausencia del docente de EF durante este tiempo para que el alumnado no se viera influido y tuviera la posibilidad de contestar con libertad las respuestas de los distintos cuestionarios. Antes de empezar, se recalcó la voluntariedad del estudio, así como la confidencialidad de los datos obtenidos, recordando que los cuestionarios eran totalmente anónimos y que solo los investigadores tendrían acceso a ellos. Finalmente, los cuestionarios recogidos en los distintos centros educativos fueron volcados en una misma base de datos. Esta acción fue llevada a cabo por una sola persona con el propósito de evitar confusiones y eliminar aquellos cuestionarios incompletos o respondidos de forma errónea.

3.4. Muestreo y Participantes

Para el desarrollo de la Tesis Doctoral se realizaron las dos tomas de datos explicadas en el apartado anterior siguiendo un muestreo no probabilístico de conveniencia (Fontes de Gracia et al., 2010). Una de las principales razones para seguir este procedimiento de muestreo fue las dificultades generadas por la pandemia del Coronavirus (SARS-CoV-2) y las restricciones impuestas por los centros educativos para la admisión de personal externo al centro. A pesar de estas dificultades, se ha intentado obtener una imagen lo más representativa posible de todo el alumnado en las clases de EF perteneciente a la Comunidad Autónoma de Aragón, contando en la muestra con

estudiantes de diferentes géneros, edades, cursos y tipos de centro, lo que garantiza una alta validez externa (Fontes de Gracia et al., 2010).

En la Tabla 1 se recogen las principales características de la muestra recogida, respecto al número de participantes, género, edad, curso académico. La primera toma de datos (i.e., transversal; n=669) fue realizada durante los meses de marzo, abril, mayo y junio de 2021. La segunda toma de datos (i.e., transversal; n=455) fue realizada durante los meses de marzo y abril de 2022.

Tabla 1. Número de participantes, género, edad media y curso académico de las dos tomas de datos.

	Muestra transversal I		Muestra transversal II		Muestra total	
<i>n</i>	669		455		1124	
Género	347 alumnas, 322 alumnos		240 alumnas, 215 alumnos		587 alumnas, 537 alumnos	
Edad	$M=14.65(DT=1.47)$		$M=14.52(DT=1.56)$		$M=14.60(DT=1.51)$	
Curso	1° ESO	197	1° ESO	102	1° ESO	299
	2° ESO	161	2° ESO	75	2° ESO	236
	3° ESO	141	3° ESO	116	3° ESO	257
	4° ESO	102	4° ESO	93	4° ESO	195
	1° Bachillerato	68	1° Bachillerato	69	1° Bachillerato	137

3.5. Variables e Instrumentos

Para medir las variables recogidas en la Tabla 2 y llevar a cabo los cuatro estudios de la presente Tesis Doctoral se utilizaron diferentes instrumentos validados en español en el contexto educativo. El enunciado de alguno de los cuestionarios se adaptó ligeramente a la asignatura de EF ya que no existían cuestionarios específicos validados para dicha área. Más adelante, en los respectivos estudios, se explica con mayor detalle los instrumentos utilizados para la medición de las distintas variables.

Tabla 2. Variables, factores e instrumentos utilizados en la muestra transversal de la Tesis Doctoral.

Variables	Instrumentos
Estilo motivacional docente - <i>Apoyo a la autonomía, Estructura, Control y Caos</i>	Situations-in-School Questionnaire in PE (SIS-PE; Escrivá-Boulley et al., 2021; Burgueño, Abós, et al., 2023)
Satisfacción de las NPB - <i>Autonomía, Competencia y Relación social</i>	Basic Psychological Needs in Exercise Scale (BPNES; Vlachopoulos & Michailidou, 2006; Moreno-Murcia et al., 2008;)
Frustración de las NPB - <i>Autonomía, Competencia y Relación social</i>	Psychological Need Thwarting Scale (BPNES; Bartholomew et al., 2011; Sicilia et al., 2013)
Diversión y aburrimiento	Sport Satisfaction Instrument (SSI; Duda & Nicholls, 1992; Baena-Extremera et al., 2012)
Intención de práctica de AF	Theory of Planned Behavior Questionnaire (TPB; Hagger & Chatzisarantis, 2009; Tirado et al., 2012)
Experiencias en EF	Se usó una pregunta ad-hoc: “Como son tus experiencias en EF?”
Aprendizaje en EF	Se usó una pregunta ad-hoc: “Cuánto aprendes en EF?”

Asimismo, junto a las variables recogidas en la tabla anterior, durante la recogida de datos también se midieron una serie de variables sociodemográficas como el género, edad, curso académico (1º ESO, 2º ESO, 3º ESO, 4º ESO y 1ºBach), titularidad del centro de enseñanza (público, concertado, privado), nombre del centro y docente.

3.6. Plan de Análisis

Para el desarrollo de la Tesis Doctoral, se presentan en este apartado de forma resumida los análisis estadísticos más relevantes. Más adelante, en cada uno de los estudios incluidos en el documento se realiza una descripción más detallada y específica.

En los cuatro estudios realizados se reportaron los estadísticos descriptivos (*M* y *DT*) de las variables utilizadas. Conforme a los instrumentos, a pesar de que estaban validados en el contexto educativo y/o de la EF, se consideró necesario realizar un análisis factorial confirmatorio (AFC) en cada uno de los estudios para cada una de las muestras utilizadas. El principal objetivo de este tipo de análisis es contrastar y confirmar la estructura conceptual del instrumento en la muestra participante en el estudio. Este tipo de análisis ayuda a corregir las deficiencias inherentes a la perspectiva exploratoria y a

tener una mayor delimitación de las hipótesis contrastadas para los estudios (Batista-Foguet et al., 2004). Realizada la comprobación de la validez estructural para descartar posibles errores sistemáticos en la medición, se analizó la fiabilidad para conocer el grado de error aleatorio entre los ítems utilizados. Para reportar la consistencia interna de los instrumentos implementados y controlar la posible variabilidad de las respuestas de los participantes, se utilizó omega de McDonald (ω) (McDonald, 1970), la cual tiene en cuenta el error de medida y no asume cargas factoriales igualitarias para todos los ítems (Dunn et al., 2014).

El estudio 1 se llevó a cabo utilizando análisis multivariante de diferencias de la covarianza (MANCOVA). Respecto a este estudio, dichos análisis examinaban las posibles diferencias en la percepción del alumnado sobre distintos estilos/conductas motivacionales docentes en función de una serie de variables sociodemográficas del alumnado y otras variables como las experiencias en EF, el aprendizaje percibido en EF y la intención de práctica de AF. Para la inspección de las diferencias significativas, se aplicaron las pruebas post hoc mediante el método de Bonferroni.

Para la elaboración del estudio 2 con un enfoque centrado en la variable, se realizó un análisis de correlaciones latentes y un modelo de ecuaciones estructurales (SEM, por sus siglas en inglés) (Marsh et al., 2004). Dichas correlaciones latentes se realizaron debido a que tienen en cuenta los pesos de regresión y errores de medida de las variables analizadas. Además, por criterios de parsimonia, y con el propósito de conseguir un modelo más estable e interpretable (Kline, 2016), las construcciones latentes de los estilos motivacionales docentes (i.e., apoyo a la autonomía, estructura, control y caos) fueron realizadas con una estructura de modelos de ecuaciones estructurales exploratorios (ESEM, por sus siglas en inglés) debido a que puede proporcionar ventajas metodológicas al permitir estimar libremente las cargas factoriales cruzadas entre los ítems (Asparouhov & Muthén, 2009).

Respecto al estudio 3, con el objetivo de realizar un estudio transcultural se realizaron unas correlaciones bivariadas y un análisis multigrupo mediante un *path analysis*. Concretamente, se analizaron las correlaciones entre las variables del estudio utilizando el coeficiente de correlación de Pearson. Conforme a los análisis principales del estudio, el análisis multigrupo permite examinar posibles diferencias significativas en las estimaciones de los parámetros específicos de cada grupo (Hair et al., 2022). Estas posibles diferencias también pueden poner de manifiesto el error asociado al tratamiento

incorrecto de estas subpoblaciones como un único grupo homogéneo (Schwartz, 2004). Para obtener las diferencias multigrupo se basó en un resultado de *bootstrapping*, permitiendo comprobar las diferencias entre dos modelos idénticos para grupos diferentes.

Respecto al estudio 4, se realizó un enfoque basado en la persona, para conseguir diferentes perfiles de las conductas motivacionales docentes. Para la realización de dichos perfiles se ejecutaron análisis de perfiles latentes o *latent profiles* (LPA, por sus siglas en inglés). Partiendo de una solución de un solo perfil, se fueron añadiendo perfiles adicionales de forma iterativa hasta llegar a una solución con seis perfiles (Weller et al., 2020). Finalmente, para examinar en qué medida los perfiles encontrados fueron similares o diferentes en relación a la satisfacción y frustración de las NPB, se realizaron pruebas de chi-cuadrado (χ^2) de Wald (Muthén & Muthén, 2017). Este análisis implica llevar a cabo comparaciones post hoc de medias de perfiles basadas en las experiencias de dichas necesidades.

Para realizar la evaluación de los modelos realizados para esta Tesis Doctoral (i.e., CFA, SEM, ESEM y *path analysis*), se utilizaron los siguientes parámetros de bondad de ajuste: *Comparative Fit Index* (CFI), *Tucker-Lewis Index* (TLI), y el *Root Mean Square Error of Approximation* (RMSEA). Los valores que superan 0.90 y 0.95 para el CFI y el TLI, respectivamente, señalan ajustes adecuados y excelentes. De manera similar, valores por debajo de 0.08 y 0.06 para el RMSEA se consideran indicadores adecuados y excelentes (Marsh et al., 2004). Para realizar dichos modelos se implementaron los estimadores más utilizados para las investigaciones en ciencias sociales que se basan en escalas tipo Likert como son el *Weighted Least Squares Mean and Variance* (WLSMV) o el *Robust Maximum Likelihood* (MLR), los cuales son útiles para controlar la normalidad multivariada (Lei, 2009). Respecto al estudio 4 (i.e., LPA), para la elección del número de perfiles fue necesario observar los valores de ajuste de *Akaike Information Criterion* (AIC), *Bayesian Information Criterion* (BIC) y *Sample-Sized Adjusted Bayesian Information Criterion* (SSA-BIC). Señalar que a medida que estas puntuaciones disminuyen, señalan un mejor ajuste. También se tuvo en cuenta los valores de *Lo-Mendell-Rubin Likelihood* (LMRT) para conocer el nivel de significación en las pruebas de verosimilitud, la entropía con valores mínimos de .70 para indicar una precisión de clasificación aceptable del perfil y por último el tamaño mínimo del perfil que requiere al menos de un 5% de la muestra participante (Weller et al., 2020). Conforme al tamaño del

efecto, fue reportado durante toda la Tesis Doctoral con el estadístico eta cuadrado parcial (η_p^2), considerándose pequeño ($>.01$), medio ($>.06$) y grande ($>.14$), respectivamente (Cohen, 2013). Finalmente, el nivel de significación utilizada en todos los estudios fue $p<.05$. Para realizar todos análisis del proyecto se utilizaron los softwares estadísticos SPSS, AMOS, JASP y Mplus.

4. ESTUDIOS

4. Estudios

4.1. ESTUDIO I: Students' perceptions of Physical Education teachers' (de-) motivating styles using a circumplex approach: Differences by gender, grade level, and adaptive outcomes

Abstract

Grounded in Self-Determination Theory (SDT), a circular structure, a more integrative and fine-grained model (i.e., the circumplex model) based on teachers' autonomy-support, structure, control, and chaos styles has been proposed. The present study aims to examine possible differences in students' perceptions of PE teachers' motivating and demotivating styles and their eight different teaching approaches respectively, regarding students' socio-demographic variables (i.e., gender and school-grade level), and their affective (i.e., experiences), cognitive (i.e., learning), and behavioral (i.e., intention to participate in physical activity) outcomes. A sample of 669 secondary students (Mage=14.65; SD=1.47; 52% girls) aged 12-17 years participated in this cross-sectional study. Boys reported significantly higher values in chaotic style and domineering approach than girls. Second and third-cycle students reported significantly higher values in autonomy supportive and structuring styles, and significantly lower values in domineering approach than first-cycle students. Second-cycle students reported significantly higher values in demanding approach than first and third-cycle students, and significantly lower values in abandoning approach than first-cycle students. Finally, third-cycle students reported significantly lower values in awaiting approach than the first-cycle students. Finally, overall, students who reported positive experiences in PE perceived high learning, high intention to participate in physical activity, assigned significantly higher values in autonomy supportive, structuring styles, and demanding approach, and significantly lower values in chaotic style. The results highlight the importance of PE teachers adopting motivating styles and avoiding demotivating styles, especially in boys and lower school-grade levels, to promote students' better experiences, more learning in PE, and adopting an active lifestyle.

Keywords: self-determination theory, multidimensional scaling, physical education, teaching styles, consequences.

Introduction

In recent years, a large body of research has paid particular attention to understanding the correlates that may influence young people's physical activity (PA) level, highlighting the role of Physical Education (PE) teachers as one of the most important factors (Vasconcellos et al., 2020). Notably, according to self-determination theory (SDT; Ryan and Deci, 2017), PE teachers may generate positive experiences, knowledge, abilities, and values necessary for students' lifelong PA participation through their (de-)motivating teaching styles (Vasconcellos et al., 2020).

Recently, in line with Self Determination Theory tenets (SDT; Ryan and Deci, 2017), a more integrative and accurate perspective (i.e., circumplex model) based on teachers' autonomy-supportive, structuring, controlling, and chaotic styles within one circular structure, has been proposed in the educational domain (Aelterman et al., 2019). However, evidence in PE is still limited (Escriva-Boulley et al., 2021). This circumplex model distinguished up to eight teaching approaches within these four motivational styles (two teaching approaches per style) that varied in the level of directivity and support or thwarting of basic psychological needs (BPN) (e.g., Aelterman et al., 2019; see Figure 1). To shed light on some of the pitfalls associated with autonomy-supportive, structuring, controlling, and chaotic styles in this circumplex approach to PE, the present study has two aims: to examine, from the students' point of view, to what extent different teaching styles/approaches vary in terms of (1) students' socio-demographic variables (i.e., gender and school-grade level), and (2) their affective (i.e., experiences), cognitive (i.e., learning), and behavioral outcomes (i.e., intention to participate in PA).

(De-)motivating teaching styles/approaches based on the circumplex approach

According to SDT (Ryan and Deci, 2017), teachers' interaction styles can be more supportive or thwarting of students' BPN, with implications for students' motivation and (mal)adaptive outcomes. Recently, from a more integrative and fine-grained circumplex approach (Aelterman et al., 2019), four teaching styles (i.e., autonomy-support, structure, control, and chaos) and eight teaching approaches can be distinguished depending on the level of directiveness (i.e., high or low) and support or thwarting of BPN used by teachers to interact with students (see Figure 1).

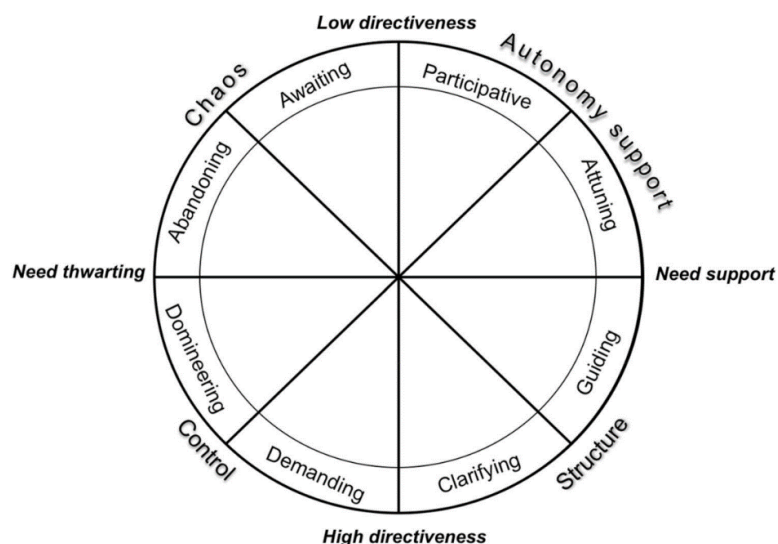


Figure 1. Graphical representation of the circumplex model (Aelterman et al., 2019).

The first (de-)motivating teaching style, characterized by a low level of directiveness and a high level of need-support is autonomy support (i.e., understanding students' interests, preferences, and feelings). This style consists of participative and attuning approaches. A participative teacher identifies students' personal preferences by listening to their points of view and suggestions and tries to offer various meaningful options so that the students can continue their learning according to their level and at their own pace. An attuning teacher tries to find ways to make the exercises more interesting and enjoyable to nurture the students' interest, providing a meaningful rationale for each task (Aelterman et al. 2019). The second (de-)motivating teaching style, characterized by a high level of directiveness and a high level of need-support is structure (i.e., knowing students' capabilities and abilities to guide and assist them in their learning). It consists of guiding and clarifying approaches. A guiding teacher helps students to progress in their learning through clear, constructive, and valuable feedback and shows them how to complete the tasks in various steps. A clarifying teacher informs students about their expectations clearly and transparently (Aelterman et al. 2019).

The third (de-)motivating teaching style, characterized by a high level of directiveness and a high level of need-thwarting, is control (i.e., pressuring and forcing students to think, feel, and behave in a certain way). This style consists of demanding and domineering approaches. A demanding teacher requires discipline from their students through controlling informational language (e.g., "you must") to clarify what they should do. This teacher does not tolerate contradictions and threatens with punishments or

sanctions if the students do not comply. A domineering teacher pressures students to comply with these requests by inducing feelings of guilt, inferiority, disappointment, and shame (Aelterman et al., 2019). The last (de-)motivating teaching style, characterized by a low level of directiveness and a high level of need-thwarting, is chaos (i.e., allowing the students to learn independently with no clear guidelines). This style consists of abandoning and awaiting approaches. An abandoning teacher disengages from the students because they think students should learn to be responsible for their behavior. An awaiting teacher gives the entire initiative to act to the students (i.e., laissez-faire climate), not planning lessons very much because they prefer to wait and see how things go (Aelterman et al. 2019).

Differences in students' perceptions of (de-)motivating teaching styles in terms of gender and school-grade level

The studies on how students' gender and school-grade level can affect the perception of PE teachers' (de-)motivating styles have found mixed results. Regarding gender, whereas Burgueño and Medina-Casabón (2021) and Leo et al. (2022) found no differences in students' perceptions of autonomy support in terms of gender, Viira and Koka (2010) found that boys perceived more autonomy and structure teaching than girls. Contrary, Leo et al. (2022) and Burgueño and Medina-Casabón (2021) found that girls perceived more structure support than boys. Similarly, other studies reported no gender differences in perception of controlling style (Abós et al. 2022; Koka and Sildala 2018). However, while other studies have found that boys perceived more controlling (Burgueño & Medina-Casabón, 2021; Leo, Pulido, et al., 2022) and chaotic (Burgueño and Medina-Casabón 2021; Leo et al. 2022) styles than girls, one study found that girls perceived their PE teachers as more controlling than boys (De Meyer et al., 2014).

Regarding school-grade level, Burgueño and Medina-Casabón (2021) found that older secondary students perceived more need-supportive teaching behaviors and fewer need-thwarting teaching behaviors than younger students, except for the chaotic style where no differences were observed. In this line, Leo et al. (2022) found that high educational level (i.e., elementary school students vs. secondary school students) correlated positively with need-supportive behaviors and negatively with need-thwarting behaviors. Conversely, other studies revealed that students in higher school grades reported less teacher autonomy supportive (De Meyer et al., 2014) or controlling styles (H. R. Jang et al., 2020) than students in lower grades of secondary education. Finally,

some studies have found no significant relationship between students' age and autonomy supportive (Tilga, Hein, et al., 2020; Van Doren et al., 2021), structuring (Van Doren et al., 2021) or controlling styles (De Meyer, Soenens, Aelterman, et al., 2016; Tilga, Hein, et al., 2020; Van Doren et al., 2021). In light of these inconsistent results and the lack of studies based on the eight teaching approaches proposed by the circumplex model, further investigation is warranted of possible gender and school-grade level differences in students' perceptions of PE teachers' (de-)motivating styles to target interventions for priority students.

Differences in students' perceptions of (de-)motivating teaching styles in terms of adaptive outcomes

Based on SDT (Ryan and Deci, 2017), PE teachers' (de-)motivating styles have been related to a broad range of students' (mal-)adaptive consequences via need satisfaction or frustration (Vasconcellos et al., 2020). Previous research has indicated that students' perceptions of PE teachers' autonomy supportive and structuring styles are positively related to an array of positive affective (e.g., experiences), cognitive (i.e., learning-related outcomes), and behavioral outcomes (i.e., intention to be active) and negatively, albeit to a lesser extent, to maladaptive outcomes (Vasconcellos et al., 2020). Furthermore, but with less evidence, PE teachers' controlling style has been positively related to negative consequences (e.g., fear of failure, less engagement, etc.) in PE lessons and negatively, albeit to a lesser extent, to adaptive outcomes (Vasconcellos et al., 2020). Finally, relatively few studies have examined the association between chaotic style and different (mal-)adaptive outcomes in PE lessons. González-Peño et al. (2021) found no relationship between PE teachers' chaotic style and students' engagement through a study carried out with observational methodology. Nevertheless, Leo et al. (2022) recently found that students' perception of PE teachers' chaotic style was negatively related to their behavioral and emotional engagement. Therefore, more studies are required examining the relationship between teachers' chaotic style and the eight teaching approaches of the circumplex model and affective, behavioral, and cognitive outcomes in the PE domain.

The present study

To our knowledge, previous studies based on the circumplex approach in different contexts (e.g., sport, education, health, etc.) have shown how different (de-)motivating

teaching styles/approaches can trigger different outcomes. Participative and attuning (i.e., autonomy support) and guiding and clarifying approaches (i.e., structure) have been positively related in most studies to adaptive outcomes and negatively related to maladaptive outcomes. In contrast, the opposite pattern of correlations has been found for demanding and domineering (i.e., control) and abandoning and awaiting approaches (i.e., chaos) (Aelterman et al. 2019; Delrue et al. 2019; Escriva-Boulley et al. 2021). However, although a recent study was carried out exclusively with PE teachers (Escriva-Boulley et al., 2021), there are still no studies examining these relationships in students in PE lessons. Therefore, grounded on the circumplex model, the present study has two aims: to examine differences in students' perceptions of different (de-)motivating teaching styles/approaches in terms of (1) gender and school-grade level; and (2) affective (i.e., experiences), cognitive (i.e., learning), and behavioral outcomes (i.e., intention to be active). Regarding the first aim, no hypothesis was formulated, given the inconsistent results found in previous studies. Regarding the second aim, consistent with previous studies based on the circumplex model in other domains (Aelterman et al. 2019; Delrue et al. 2019; Escriva-Boulley et al. 2021) and SDT framework in PE lessons (Vasconcellos et al., 2020), students who report more positive experiences, a higher perception of learning, and a higher intention to participate in PA are expected to report higher perceptions of participative and attuning (i.e., autonomy support) and guiding and clarifying (i.e., structure) approaches, and fewer demanding and domineering (i.e., control) and abandoning and awaiting (i.e., chaos) approaches, compared to students who report negative experiences, a lower perception of learning, and a lower intention to participate in PA.

Method

Participants

A convenience sample of 669 high school students ($M_{age}=14.65\pm 1.47$; 52% girls; Year-8=197, Year-9=161, Year-10=141, Year-11=102, and Year-12=68) from different high schools located in Northeastern Spain participated in this cross-sectional study. Student responses regarding (de-)motivating teaching styles referred to 10 different PE teachers ($M_{age}=38.56\pm 7.18$; 20% women) with previous teaching experience ($M=10.77\pm 7.18$).

Instruments and variables

Socio-demographic variables

Gender (boy or girl), school-grade level, and age were self-reported by students. In line with the Spanish educational structure, school grade was categorized into 1st cycle (i.e., Year-8 and -9), 2nd cycle (i.e., Year-10 and -11), and 3rd cycle (i.e., Year-12).

Teaching styles

Students' perception of PE teachers' (de-)motivating teaching styles was assessed using a Spanish translation of the Situations in School Questionnaire in PE (SIS-PE; Escrivá-Boulley et al., 2021). The SIS-PE presents 12 situations with four items each, commonly occurring in PE lessons. The 48 items are divided into two motivating styles (i.e., autonomy support and structure) and two demotivating styles (i.e., control and chaos), which, in turn, are divided into two teaching approaches each, resulting in a total of eight teaching approaches. Four items refer to participative, eight to attuning, seven to guiding, five to clarifying, seven to demanding, five to domineering, eight to abandoning, and four to awaiting approaches (for more information on the SIS-PE questionnaire, see Escrivá-Boulley et al., 2021). Students are asked to indicate to what extent each item reflects their PE teachers' actions on a 7-point Likert scale ranging from 1 ("does not describe my PE teacher at all") to 7 ("describes my PE teacher extremely well"). In the present study, confirmatory factor analysis (CFA) showed a good fit of the data to the four-factor structure ($\chi^2(3.673, n=669)=3945.463, p<.001; CFI=0.906; TLI=0.901; RMSEA=0.064; 90\% CI= 0.061-0.066$).

PE experiences

In line with previous research (Diloy-Peña et al., 2021), students' experiences in PE classes were assessed using the question: "How are your experiences in PE lessons?" The response possibilities were: (1) "very bad," (2) "bad," (3) "regular," (4) "good," and (5) "very good." "Very bad," "bad," and "regular" experiences were categorized as "negative," whereas "good" and "very good" experiences were categorized as "positive."

Learning perceived in PE

In line with previous research (Aelterman et al. 2016), students' perception of learning in PE was assessed using the question: "How much do you learn in PE?" The response possibilities were: (1) "nothing," (2) "little," (3) "enough," and (4) "a lot." Given

the low number of option (1) responses ("nothing"), it was grouped with option (2) "little" for subsequent analyses.

Intention to participate in PA

Students' intention to participate in PA was assessed using three items (e.g., "I intend to do active sports and/or physical activities during my leisure time in the next 5 weeks...") of the Spanish version of the Theory of Planned Behavior Questionnaire (Tirado et al., 2012). This scale is rated on a 7-point Likert scale ranging from 1 (strongly agree) to 7 (strongly disagree). For subsequent analyses, students were categorized by cluster analysis into "very low" ($n=46$; $M=1.42\pm 0.46$), "medium" ($n=181$; $M=3.66\pm 0.69$), and "very high" ($n=442$; $M=6.30\pm 0.70$) intention to participate in PA.

Procedure

Before starting the study, the main researcher contacted the schools' boards and PE teachers to inform them about the aims and request their collaboration. Next, families or legal guardians were asked to sign the informed consent form for their children to participate in this research. The questionnaires were completed in paper-pencil format in approximately 25 minutes in a quiet classroom. The main researcher was present during the administration of the questionnaires to resolve any doubts. The PE teachers were not present while the students filled out the questionnaires to avoid distorting their answers. Beforehand, the participants were informed that the data were confidential and anonymous and would only be used for research purposes. The study was approved by the Ethics Committee for Clinical Research.

Data analysis

As preliminary analyses, descriptive statistics (M and SD), reliability (using McDonald's omega ω), and Pearson's bivariate correlations were calculated for the study variables, except for gender, for which Spearman's coefficient was used because it is dichotomic (i.e., boy or girl). Next, differences in students' perceptions of motivating (i.e., autonomy support and structure) and demotivating (i.e., control and chaos) teaching styles across teachers ($n=10$) were calculated through a multivariate analysis of variance (MANOVA) to explore whether to include it as a covariate in subsequent analyses. Subsequently, we performed a multivariate analysis of covariance (MANCOVA) of students' perceptions of PE teachers' (de-)motivating teaching styles and the eight teaching approaches across students' gender and school-grade level. Based on these

results, gender and school-grade level were also considered covariates in subsequent analyses. Finally, we performed a MANCOVA of students' perceptions of PE teachers' (de-)motivating teaching styles and approaches in terms of PE experiences, perceived learning in PE, and intention to participate in PA. In all analyses, if significant differences were found, post-hoc tests were performed using the Bonferroni method. The level of statistical significance was set at $p < .05$. Effect sizes (η^2p) of .01 were considered low, above .06 moderate, and above .14 high. Analyses were carried out using SPSSv25.

Results

Preliminary results

Descriptive statistics reliability (ω) and bivariate correlations of the study variables are reported in Table 1.

Before performing the main analyses, a significant multivariate effect of teacher on students' perceptions of teaching styles was obtained (Wilks' $\lambda=0.55$, $F(72, 39)=5.56$, $p < .001$, $\eta^2p=.070$). Therefore, teacher was controlled as a covariate in the subsequent analyses.

Table 1. Descriptive statistics, Omega (ω) reliability coefficients, and correlations among study variables.

Variables	<i>M (SD)</i>	ω	Participative	Attuning	Guiding	Clarifying	Demanding	Domineering	Abandoning	Awaiting	Gender	School grade	Experiences	Learning	Intention to PA
Participative	4.01 (1.50)	.70	1	.72**	.61**	.52**	.42**	.21**	-.06	.00	.01	.20**	.33**	.39**	.15**
Attuning	4.60 (1.27)	.81		1	.77**	.70**	.51**	.18**	-.23**	-.06	.01	.17**	.44**	.44**	.21**
Guiding	5.18 (1.22)	.82			1	.70**	.55**	.12**	-.33**	-.16**	-.04	.16**	.44**	.42**	.17**
Clarifying	5.22 (1.08)	.67				1	.58**	.22**	-.22**	-.11**	-.05	.16**	.35**	.38**	.15**
Demanding	4.75 (0.97)	.62					1	.44**	-.00	.04	-.00	.04	.23**	.26**	.14**
Domineering	3.77 (1.19)	.58						1	.43**	.27**	.12**	-.13**	-.06	.03	.05
Abandoning	2.56 (1.24)	.82							1	.57**	.11**	-.09*	-.21**	-.13**	-.05
Awaiting	2.63 (1.29)	.65								1	.10**	-.11**	-.09*	-.05	-.06
Gender ^a	52% ^b										1	-.10**	.16**	.06	.17**
School grade	53% ^c 36% ^d	11% ^e										1	.10**	-.09*	.02
Experiences	4.18 (0.67)	-											1	.53**	.27**
Learning	3.23 (0.35)	-												1	.22**
Intention to PA	5.22 (0.64)	.93													1

Note: * $p < .05$; ** $p < .01$; ^a = Spearman's rho correlation; ^b = % of girls in the sample; ^c = % of students in 1st cycle; ^d = % of students in 2nd cycle; ^e = % of students in 3rd cycle.

Differences in (de-)motivating teaching styles across gender and academic grade (aim 1)

Differences in students' perceptions of PE teaching styles/approaches in terms of gender and school-grade level are reported in Table 2. The multivariate effects of gender on teaching styles/approaches (Wilks' $\lambda=0.96$, $F(8, 65)=3.10$, $p=.002$, $\eta^2=.036$) were significant. Compared to girls, boys reported significantly higher values for chaotic style (including abandoning and awaiting) and domineering approach. The multivariate effects of school-grade level on teaching styles/approaches (Wilks' $\lambda=0.87$, $F(16,13)=5.71$, $p<.001$, $\eta^2=.065$) were also significant. Second (i.e., Year-10 and -11) and third-cycle students (i.e., Year-12) reported significantly higher values in autonomy supportive (i.e., participative and attuning) and structuring styles (i.e., guiding, and clarifying), and significantly lower values in domineering approach, than first-cycle (i.e., Year-8 and -9) students. Second-cycle students (i.e., Year-10 and -11) reported significantly higher values in demanding approach than first (i.e., Year-8 and -9) and third-cycle students (i.e., Year-12), and significantly lower values in chaos style (i.e., abandoning) than first-cycle students (i.e., Year-8 and -9). Finally, third-cycle students (i.e., Year-12) reported significantly lower values in awaiting approach than first-cycle students (i.e., Year-8 and -9) students.

Table 2. Differences in students' perceptions of PE teaching styles/approaches in terms of gender and school-grade level.

Gender									
			Contrast between groups						
	Girls (i) (n=347)	Boys (j) (n=322)	Mean difference (i-j)		Standard error	p	F-value	η_p^2	
	M (SD)	M (SD)							
Autonomy support	4.39 (1.25)	4.43 (1.27)	-.03		.09	.668	0.18	.000	
Participative	4.00 (1.45)	4.03 (1.56)	-.03		.10	.745	0.10	.000	
Attuning	4.58 (1.28)	4.62 (1.25)	-.04		.09	.663	0.19	.000	
Structure	5.24 (1.07)	5.14 (1.08)	.10		.08	.222	1.49	.002	
Guiding	5.22 (1.23)	5.14 (1.20)	.08		.09	.289	0.74	.001	
Clarifying	5.28 (1.06)	5.15 (1.09)	.12		.08	.123	2.39	.004	
Control	4.29 (0.89)	4.39 (0.92)	-.10		.06	.129	2.30	.003	
Demanding	4.76 (0.94)	4.74 (1.01)	.02		.07	.744	0.10	.000	
Domineering	3.63 (1.20)	3.91 (1.17)	-.28		.09	.002	9.92	.015	
Chaos	2.46 (1.06)	2.73 (1.18)	-.27		.08	.002	9.73	.014	
Abandoning	2.44 (1.21)	2.69 (1.25)	-.25		.09	.009	6.91	.010	
Awaiting	2.48 (1.16)	2.79 (1.39)	-.31		.09	.002	9.75	.014	
School-grade level									
Teaching styles/behaviors				Contrast between groups					
	1 st cycle (i) (n=358)	2 nd cycle (j) (n=243)	3 rd cycle (k) (n=68)	Mean difference		Standard error	p	F-value	η_p^2
	M (SD)	M (SD)	M (SD)						
Autonomy support	4.20 (1.32)	4.61 (1.12)	4.77 (1.12)	i-j	-.40	.09	<.001	12.45	.036
				i-k	-.56	.15	.001		
				j-k	-.15	.15	.954		
Participative	3.79 (1.53)	4.18 (1.43)	4.60 (1.32)	i-j	-.39	.11	.002	13.06	.038
				i-k	-.80	.17	<.001		
				j-k	-.41	.18	.078		
Attuning	4.41 (1.35)	4.82 (1.11)	4.85 (1.13)	i-j	-.41	.10	<.001	10.03	.029
				i-k	-.44	.15	.017		
				j-k	-.03	.16	1.000		
Structure	4.99 (1.17)	5.44 (0.89)	5.39 (0.90)	i-j	-.44	.08	<.001	14.70	.042
				i-k	-.40	.13	.011		
				j-k	.04	.14	1.000		
Guiding	4.98 (1.34)	5.40 (0.99)	5.41 (1.01)	i-j	-.42	.09	<.001	10.73	.031
				i-k	-.42	.15	.019		
				j-k	-.00	.16	1.000		
Clarifying	5.01 (1.13)	5.49 (0.93)	5.38 (1.02)	i-j	-.47	.08	<.001	15.68	.045
				i-k	-.36	.13	.026		

Control	4.36 (0.97)	4.39 (0.81)	4.09 (0.85)	j-k	.11	.14	1.000	3.00	.050
				i-j	-.03	.07	1.000		
				i-k	.26	.11	.079		
Demanding	4.66 (1.04)	4.92 (0.86)	4.60 (0.90)	j-k	.29	.12	.050	6.19	.018
				i-j	-.26	.08	.004		
				i-k	.05	.12	.1000		
Domineering	3.93 (1.23)	3.64 (1.14)	3.38 (1.08)	j-k	.31	.13	.047	8.53	.025
				i-j	.28	.09	.010		
				i-k	.54	.15	.001		
Chaos	2.71 (1.14)	2.47 (1.13)	2.39 (0.93)	j-k	.25	.16	.326	4.34	.013
				i-j	.23	.09	.035		
				i-k	.31	.14	.108		
Abandoning	2.68 (1.26)	2.43 (1.24)	2.43 (1.08)	j-k	.07	.15	1.000	3.38	.010
				i-j	.25	.10	.046		
				i-k	.24	.16	.391		
Awaiting	2.76 (1.33)	2.54 (1.28)	2.31 (0.96)	j-k	-.00	.17	1.000	4.31	.013
				i-j	.21	.10	.430		
				i-k	.44	.17	.029		
				j-k	.22	.17	.585		

Note: Teacher was introduced as covariate.

Differences in (de-)motivating teaching styles in terms of students' outcomes (aim 2)

Differences in students' perceptions of PE teaching approaches in terms of PE experiences, perceived learning in PE, and intention to participate in PA are reported in Table 3. First, the multivariate effects of teaching styles/approaches on PE experiences were significant (Wilks' $\lambda=0.85$, $F(8, 65)=13.82$, $p<.001$, $\eta^2=.144$). Students who reported positive experiences in PE showed significantly higher values in autonomy supportive (i.e., participative and attuning), structuring styles (i.e., guiding and clarifying), and demanding approach and significantly lower values in chaotic style (i.e., abandoning and awaiting). Second, the multivariate effects of teaching styles/approaches on perceived learning in PE were significant (Wilks' $\lambda=0.76$, $F(16, 13)=11.65$, $p<.001$, $\eta^2=.124$). Students who perceived a lot of learning reported significantly higher values in autonomy supportive (i.e., participative and attuning), structuring (i.e., guiding and clarifying), and controlling styles (i.e., demanding) compared to those who perceived nothing/little and/or enough/sufficient learning. On the other hand, students who perceived themselves as learning nothing/little had significantly higher values of chaotic style (i.e., abandoning) than those who reported learning enough and a lot. Third, the multivariate effects of teaching styles/approaches on intention to participate in PA were significant (Wilks' $\lambda=0.94$, $F(16,13)=5.71$, $p=.001$, $\eta^2=.030$). Students with very high intention to participate in PA reported significantly higher values of autonomy supportive (i.e., participative and attuning), structuring (i.e., guiding and clarifying), and controlling styles (i.e., demanding) compared to those with medium and/or very low intention to participate in PA. Finally, students with a medium intention to participate in PA reported significantly higher values in awaiting approach than those with a very high intention to participate in PA.

Table 3. Differences in students' perceptions of PE teaching styles/behaviors in terms of PE experiences, PE learning, and intention to participate in PA.

Teaching styles/behaviors	PE experiences			Contrast between groups					
	Negative (i) (n=96)	Positive (j) (n=573)	Mean difference (i-j)	Standard error	p	F-value	η_p^2		
	M (SD)	M (SD)							
Autonomy support	3.55 (1.35)	4.55 (1.16)	-.99	.12	<.001	64.39	.088		
Participative	3.36 (1.47)	4.12 (1.47)	-.75	.15	<.001	45.18	.037		
Attuning	3.64 (1.42)	4.76 (1.15)	-1.11	.12	<.001	98.74	.103		
Structure	4.35 (1.23)	5.34 (0.96)	-.99	.11	<.001	80.53	.108		
Guiding	4.22 (1.39)	5.34 (1.10)	-1.12	.12	<.001	99.63	.108		
Claryfing	4.53 (1.22)	5.34 (1.01)	-.80	.11	<.001	51.49	.070		
Control	4.22 (0.98)	4.36 (0.89)	-.14	.10	.153	2.04	.003		
Demanding	4.40 (1.08)	4.81 (0.94)	-.41	.10	<.001	13.27	.021		
Domineering	3.96 (1.21)	3.73 (1.19)	.23	.13	.075	4.23	.005		
Chaos	3.20 (1.17)	2.48 (1.09)	.71	.12	<.001	33.81	.048		
Abandoning	3.27 (1.38)	2.45 (1.18)	.82	.13	<.001	53.07	.052		
Awaiting	3.07 (1.18)	2.56 (1.29)	.50	.14	<.001	20.28	.019		
PE learning									
Teaching styles/behaviors	Nothing/little (i) (n=76)	Enough (j) (n=346)	A lot (k) (n=247)	Contrast between groups					
	M (SD)	M (SD)	M (SD)	Mean difference	Standard error	p	F-value	η_p^2	
Autonomy support	3.34 (1.16)	4.23 (1.12)	4.98 (1.13)	i-j	-.89	.13	<.001	78.54	.192
				i-k	-1.64	.13	<.001		
				j-k	-.74	.08	<.001		
Participative	2.94 (1.26)	3.84 (1.39)	4.59 (1.43)	i-j	-.89	.16	<.001	54.00	.140
				i-k	-1.64	.16	<.001		
				j-k	-.74	.10	<.001		
Attuning	3.53 (1.30)	4.43 (1.13)	5.17 (1.21)	i-j	-.89	.13	<.001	71.63	.178
				i-k	-1.64	.14	<.001		
				j-k	-.74	.09	<.001		
Structure	4.22 (1.26)	5.07 (0.96)	5.67 (0.90)	i-j	-.85	.12	<.001	71.18	.177
				i-k	-1.44	.12	<.001		
				j-k	-.59	.08	<.001		
Guiding	4.08 (1.48)	5.07 (1.08)	5.67 (1.03)	i-j	-.99	.13	<.001	64.27	.162
				i-k	-1.59	.14	<.001		
				j-k	-.60	.09	<.001		
Clarifying	4.42 (1.21)	5.08 (1.01)	5.66 (0.96)	i-j	-.65	.12	<.001	51.19	.134

Control	4.07 (0.96)	4.31 (0.82)	4.47 (0.96)	i-k	-1.23	.13	<.001	5.98	.018
				j-k	-.58	.08	<.001		
				i-j	-.23	.11	.100		
Demanding	4.20 (1.09)	4.72 (0.88)	4.97 (0.99)	i-k	-.39	.11	.002	19.20	.055
				j-k	-.15	.07	.117		
				i-j	-.51	.11	<.001		
Domineering	3.89 (1.14)	3.74 (1.11)	3.76 (1.32)	i-k	-.76	.12	<.001	0.53	.002
				j-k	-.25	.08	.005		
				i-j	.15	.14	.911		
Chaos	3.00 (1.05)	2.60 (1.04)	2.44 (1.24)	i-k	.12	.15	1.000	7.35	.022
				j-k	-.02	.09	1.000		
				i-j	.40	.14	.013		
Abandoning	3.08 (1.19)	2.57 (1.17)	2.39 (1.30)	i-k	.56	.14	<.001	8.97	.026
				j-k	.16	.09	.261		
				i-j	.51	.15	.003		
Awaiting	2.85 (1.17)	2.66 (1.15)	2.53 (1.29)	i-k	.68	.16	<.001	1.92	.006
				j-k	.17	.10	.267		
				i-j	.18	.16	.741		
				i-k	.32	.17	.178		
				j-k	.13	.10	.666		

Intention to participate in PA

	Very low (i) (n=46)	Medium (j) (n=181)	Very high (k) (n=442)	Contrast between groups							
				<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	Mean difference	Standard error	<i>p</i>	F-value	η_p^2
Autonomy support	3.88 (1.44)	4.17 (1.18)	4.56 (1.23)	i-j	-.28	.18	.377	12.60	.037		
				i-k	-.68	.17	<.001				
				j-k	-.39	.10	<.001				
Participative	3.56 (1.60)	3.83 (1.38)	4.14 (1.52)	i-j	-.27	.22	.669	6.10	.018		
				i-k	-.58	.21	.018				
				j-k	-.30	.12	.030				
Attuning	4.04 (1.44)	4.34 (1.24)	4.77 (1.22)	i-j	-.29	.19	<.001	13.94	.040		
				i-k	-.72	.18	<.001				
				j-k	-.43	.10	<.001				
Structure	4.71 (1.34)	5.01 (1.10)	5.32 (1.01)	i-j	-.29	.17	.235	11.33	.033		
				i-k	-.61	.16	<.001				
				j-k	-.31	.09	.002				
Guiding	4.62 (1.57)	5.01 (1.23)	5.31 (1.14)	i-j	-.39	.19	.130	9.62	.028		
				i-k	-.68	.18	.001				

				j-k	-.29	.10	.013		
Clarifying	4.84 (1.23)	5.01 (1.13)	5.35 (1.02)	i-j	-.17	.17	.977	9.92	.029
				i-k	-.50	.16	.005		
				j-k	-.33	.09	.001		
Control	4.01 (0.78)	4.27 (0.91)	4.40 (0.90)	i-j	-.25	.14	.233	4.78	.014
				i-k	-.39	.13	.014		
				j-k	-.13	.07	.269		
Demanding	4.31 (0.84)	4.64 (1.02)	4.84 (0.95)	i-j	-.32	.15	.120	7.80	.023
				i-k	-.52	.14	.001		
				j-k	-.20	.08	.054		
Domineering	3.59 (1.01)	3.75 (1.18)	3.79 (1.21)	i-j	-.16	.19	1.000	0.66	.002
				i-k	-.20	.18	.774		
				j-k	-.04	.10	1.000		
Chaos	2.72 (1.05)	2.70 (1.41)	2.53 (1.12)	i-j	.01	.18	1.000	1.95	.006
				i-k	.19	.17	.810		
				j-k	.18	.09	.213		
Abandoning	2.74 (1.22)	2.64 (1.23)	2.51 (1.24)	i-j	.09	.20	1.000	1.17	.004
				i-k	.22	.19	.732		
				j-k	.13	.11	.710		
Awaiting	2.68 (1.18)	2.83 (1.24)	2.55 (1.31)	i-j	-.15	.11	1.000	3.06	.009
				i-k	.12	.19	1.000		
				j-k	.28	.21	.042		

Note: Teacher, gender, and school-grade level were introduced as covariates.

Discussion

Based on SDT, a vast body of research has studied the role of PE teachers' controlling practices and, particularly, their need-supportive behaviors on students' motivational outcomes in PE (Vasconcellos et al., 2020). However, little is known about the influence of PE teachers' chaotic style on students' motivational outcomes. Moreover, in most prior research, inconsistent findings have been found in (de-)motivating teaching styles across gender and academic grade level. We note that none of these studies have used the recently developed circumplex model of a more integrative and detailed approach to the two teacher approaches associated with each autonomy supportive, structuring, controlling, and chaotic styles. Therefore, this study expands previous research by examining via a circumplex model the differences in students' perceptions of different (de-)motivating teaching styles/approaches in terms of (1) gender and school-grade level; and (2) affective (i.e., experiences), cognitive (i.e., learning), and behavioral outcomes (i.e., intention to be physically active).

Differences in students' perceptions of (de-)motivating teaching styles in terms of gender and school-grade level (aim 1)

In relation to the first aim, the results of this study showed that although no differences were found in motivating teaching styles (i.e., autonomy-support and structure), boys reported higher values in domineering approach, as well as in the chaotic style (i.e., abandoning and awaiting) than girls. These results are partially in line with previous studies. Burgueño and Medina-Casabón (2021) and Leo et al. (2022) found no differences in students' perceptions of teachers' autonomy support but they observed differences in teachers' structure support in favor of girls. However, in the study conducted by Viira and Koka (2010), boys assigned higher values to teachers' structure support. All these results may be explained by the fact that autonomy supportive strategies are perceived in the same way by the whole group, whereas structure support may be more specific to each student (e.g., feedback) and, consequently, could be more pronounced (or the same) in boys or girls, depending on the context. Nevertheless, our results are in line with most studies in the scientific literature indicating that in PE, boys perceived more controlling and chaotic styles (Burgueño & Medina-Casabón, 2021; Leo, Pulido, et al., 2022) than girls. Consistent with our results, a previous study conducted by De Meyer et al. (2016) also found that boys attributed higher levels of

internally controlling behaviors (i.e., domineering), but not externally controlling behaviors (i.e., demanding) than girls. These results could explain why boys and girls perceive their PE teachers' commands in the same way. However, as boys tend to present more disruptive behaviors than girls in PE lessons (Granero-Gallegos et al., 2019), perhaps the controlling behaviors of PE teachers tends to focus more on boys. Finally, the high values found in the PE teachers' chaotic style (i.e., abandoning and awaiting) in boys could be explained by the fact that adolescent girls are usually more autonomous and responsible for their learning, not so dependent on the teacher. Boys usually prefer more structured tasks or challenges in which they can demonstrate their physical qualities and win and may, therefore, be more sensitive to perceiving abandoning and awaiting approaches (Garn et al., 2011).

Regarding school-grade level, upper-school-grade level students reported higher values in autonomy supportive (i.e., participative and attuning) and structuring styles (i.e., guiding and clarifying) and significantly lower values in domineering approach and chaotic style (i.e., abandoning and awaiting) than lower school-grade level students. Although most previous studies found no relationship between students' age and (de-) motivating teaching styles (De Meyer, Soenens, Aelterman, et al., 2016; Tilga, Hein, et al., 2020; Van Doren et al., 2021), two recently conducted studies in Spain found that older students perceived more need-supportive behaviors and fewer need-thwarting behaviors than younger students (Burgueño & Medina-Casabón, 2021; Leo, Pulido, et al., 2022). In relation to autonomy support, our results could be explained because PE teachers may perceive that higher school grade students are more autonomous and responsible for their learning than earlier school grade students. In addition, the decrease in autonomous motivation in PE in the upper grades could also explain why PE teachers try to involve these students more in their learning by listening to their interests (i.e., participative) and explaining the usefulness of the tasks (i.e., attuning). In relation to structuring style and, specifically, teachers' guiding approach, our results could be due to the fact that students in higher school grades receive more constructive, clear, and valuable feedback or guidance, because of the greater complexity of the tasks, their greater knowledge of the activities, or their higher awareness of the feedback and assistance provided by teachers than students in lower grades (Leo et al., 2022). For teachers' clarifying approach, our results could be explained by the fact that students in higher school grades might be more aware of the learning objectives, whereas students in

lower grades are more limited to playing and not listening to the teacher's expectations. For teachers' domineering approach, our results could be attributed to the fact that students in lower school grades present more disruptive behaviors than students in higher school grades (Granero-Gallegos et al., 2019) and, consequently, PE teachers could use these controlling practices with younger students to reprimand these actions. Finally, regarding chaos style (i.e., abandoning and awaiting), our results could be due to the fact that PE teachers could allow a lot of freedom for students in lower school grades to do exercises their own way, trying to get them to take responsibility for their own learning (i.e., abandoning), and waiting to see how they respond (i.e., awaiting), while in the upper grades, classes might be more planned.

Differences in (de-)motivating teaching styles in terms of students' outcomes (aim 2)

Partially consistent with the hypothesis of the second aim, overall results showed that students who reported positive experiences in PE, perceived high learning, and high intention to participate in PA, also perceived significantly higher values in autonomy supportive (i.e., participative and attuning), structuring (i.e., guiding and clarifying), and controlling styles (i.e., demanding) compared to students with who reported negative experiences, little learning, and medium and/or very low intention to participate in PA.

Consistent with our results, a previous systematic review and meta-analysis found that students' perceptions of PE teachers' autonomy supportive and structuring styles were positively related to a wide range of positive affective, cognitive, and behavioral outcomes (Vasconcellos et al., 2020). These results extend previous research on the circumplex model in other areas (sport, education, health, etc.), highlighting that students who perceive that their PE teacher encourages choice and involvement in their learning (i.e., participative), provides an explanation of the usefulness of the tasks (i.e., attuning), structures the tasks in different steps and provides clear, constructive, and valuable feedback (i.e., guiding), and communicates learning objectives and goals (i.e., clarifying) are more likely to report positive experiences in PE, high perceived learning, and high intention to participate in PA.

Regarding PE teachers' controlling style, the results found were not entirely in line with most of the previous SDT-related research in PE (Vasconcellos et al., 2020). In a previous systematic review and meta-analysis, Vasconcellos et al. (2020) found that PE teachers' controlling style was positively related to a set of negative consequences in PE

lessons and negatively, albeit to a lesser extent, to adaptive outcomes (Vasconcellos et al., 2020). To our knowledge, no previous studies in PE have examined the role of PE teachers' controlling style such as demanding and domineering in students' motivational outcomes. However, one previous study in the educational context revealed that students' perceptions of demanding approach was positively related to autonomous motivation and learning-related variables (but to a lesser extent than motivating teaching behaviors), whereas domineering approach was negatively related to persistence (Aelterman et al., 2019). Moreover, consistent with our results, this study also reported a positive relationship between demanding and clarifying approaches (Aelterman et al., 2019). Therefore, demanding approach could be perceived by students as clarifying approach because they are placed next to the structuring area in the circumplex model (Aelterman et al., 2019). In this sense, students could perceive PE teachers' use of demanding language to ensure that the whole group behaves in a prescribed way as normative because they consider the teachers' underlying intention is to enhance their learning. In addition, given that many students exhibit disruptive behaviors in PE lessons (Granero-Gallegos et al., 2019), students may perceive that demanding approach are justified to prevent the group from getting out of control. Further qualitative studies are required to discover more about why demanding approach could be associated with positive consequences in PE lessons.

Finally, the lower values found in PE teachers' chaotic style (i.e., abandoning and awaiting) in students who reported positive experiences in PE, high perceived learning, and high intention to participate in PA are in line with a recent study by Leo et al., (2022), who found that students' perception of PE teachers' chaotic style was negatively related to behavioral and emotional engagement. Our results expand the evidence of the few existing studies in PE, suggesting that teachers who allow students to act independently, not providing clear indications of what they should do (i.e., abandoning), and not planning the development of the lessons (i.e., awaiting) could negatively affect both in-class (i.e., experiences and learning) and out-of-class consequences (i.e., intention to be physically active).

Limitations and future directions

Although our findings expand previous evidence of the circumplex approach in PE, it is also important to note the limitations and future directions. First, the use of a convenience sample advises interpreting the results with caution. Future studies should

use probability sampling to increase external validity. Second, a cross-sectional design was used, so no causal relationships between the study variables can be inferred. Future research using longitudinal and experimental designs to examine the causal and long-term effects of motivating and demotivating teaching styles/approaches in PE are recommended. Third, although affective, cognitive, and behavioral consequences were included, all were positive. Moreover, perceived experiences and learning in PE were evaluated with a single item. The reliance on more advanced measures might provide a more accurate and complete picture of the findings. Finally, future studies should also evaluate other negative affective (i.e., boredom), cognitive (i.e., inattention), and behavioral (i.e., oppositional defiance) consequences to obtain a more realistic picture of the relationship between the eight teaching approaches proposed by the circumplex approach and the bright and dark sides of student motivation.

Conclusions

The use of a circumplex model in the present study provided a more integrative and fine-grained model of the difficulties associated with students' perceptions of autonomy-supportive, structuring, controlling, and chaotic styles in PE lessons. First, our results showed the importance of developing gender- and grade-level strategies to improve PE teachers' (de-)motivating style, particularly in boys and lower school-grade levels in PE lessons. Second, our results revealed that PE teachers should not only use autonomy supportive (i.e., participative and attuning) and structuring (i.e., guiding and clarifying) but also avoid controlling (i.e., domineering) and chaotic styles (i.e., abandoning and awaiting), for their students to have better experiences, greater learning in PE, and adopt an active lifestyle. Although in this research, demanding approach were positively associated with adaptive consequences, more studies confirming the benefits or risks of this type of behavior seem to be lacking in PE lessons, especially in the long term. Overall, taken together, these results could help guide teacher training and school PE-based interventions so that all students, regardless of gender or grade level, will achieve adaptive experiences in PE classes through their PE teacher's optimal motivating teaching style.

4.2. ESTUDIO II: The role of (de-)motivating teaching styles on students' motivational outcomes in physical education: A circumplex approach

Abstract

Guided by self-determination theory (SDT), many studies have examined (de-)motivating teaching styles on students' motivational outcomes in Physical Education (PE). Recently, a more integrative and fine-grained circumplex model based on a circular structure has been proposed to explain teachers' autonomy-supportive, structuring, controlling, and chaotic styles. While this circumplex approach may have relevant potential in a better understanding of (de-)motivating teaching styles, evidence in PE field is scarce so far. Grounded in this circumplex approach, the present study aims to expand previous SDT-based research in PE by examining the role of students' perceptions of (de-)motivating teaching styles (i.e., autonomy support, structure, control, and chaos) from their PE teachers on students' need-based experiences and a set of outcomes inside (i.e., enjoyment and boredom) and outside of PE (PA intentions in leisure time). A sample of 669 students ($M_{age}=14.65$; $SD=1.47$; 52% girls), divided in different school grade levels (i.e., Year-8=197; Year-9=161; Year-10=141; Year-11=102; Year-12=68) participated in this cross-sectional study. First, preliminary analyses (descriptive statistics, composite reliability, and latent correlations) were explored. After that, a structural equation modeling (SEM) was conducted by including the four (de-)motivating teaching styles (i.e., autonomy support, structure, control, and chaos) as independent variables using an exploratory structural equation model (ESEM) factor structure, and adding latent CFA factors representing the need-based experiences, enjoyment, boredom, and intention to PA, as dependent variables. Direct and indirect effects were calculated and reported for each of the postulated pathways. SEM findings showed that students' perceptions of autonomy support and structure from PE teachers, not only were positively related to the bright side of the students' motivational process in PE (i.e., need satisfaction and enjoyment) and PA settings (i.e., intention to PA) but also were negatively associated with students' need frustration experiences in PE lessons, whereas the opposite was true when students perceived their PE teachers as chaotic. Further, this study showed mixed results on the effects of students' perception of controlling style from PE teachers, displaying a negative association with students' boredom, but a positive effect on their PA intentions in leisure time. This is the first study that shows, through SEM, the predictive effects of the four (de-) motivating teaching styles on students' outcomes inside

and outside of PE. This research underscores the importance of PE teachers adopting autonomy-supportive and structuring styles and avoiding a chaotic style to foster students' need-satisfaction experiences, which give rise to other affective (i.e., enjoyment) and behavioral (i.e., intention to PA) adaptive outcomes. With regard to control, more research is needed to gain a piece of more refined evidence. To sum up, these findings could provide helpful guidelines and create awareness among PE teachers about which motivational strategies should (and should not) shape their motivating teaching style if they want to make the greatest positive impact on their students.

Keywords: self-determination theory, autonomy-supportive style, structuring style, controlling style, chaotic style, physical education.

Introduction

During the last decades, a vast body of research has focused on understanding which factors (e.g., motivation, social support, physical environment, etc.) may influence young people's physical activity (PA) levels (Rhodes et al., 2017). In particular, some studies have highlighted the role of physical education (PE) teachers' (de-)motivating teaching style as one of the most important antecedents of predicting students' adaptive outcomes and lifelong PA participation (Vasconcellos et al., 2020). Grounded in self-determination theory (SDT), a fine-grained perspective (i.e., circumplex approach) based on four (de-)motivating teaching styles (i.e., autonomy-support, structure, control, and chaos) within one circular structure (i.e., differed in two axis of teacher directiveness and need-nurturing teaching styles) has been recently proposed in the educational domain (Aelterman et al., 2019). Even though an increasing body of research is focusing on exploring the validity of the circumplex approach in different contexts, including PE (Burgueño, Abós, et al., 2023; Escriva-Boulley et al., 2021) little attention so far, if any, has been paid to identifying students' outcomes of the adoption of each specific (de-)motivating teaching style in PE. To overcome that gap, this research seeks to examine how each of the four (de-)motivating teaching styles (i.e., autonomy support, structure, control, and chaos), through need-based experiences and affective outcomes in PE, may impact students' intention to PA.

(De-)motivating teaching styles through the circumplex approach in PE

According to SDT (Ryan & Deci, 2017; Vansteenkiste et al., 2020), (de-) motivating teaching styles can be either nurturing or thwarting of students' basic psychological needs with implications for students' (mal-)adaptive outcomes. As observed in Figure 1, the circumplex model represents a more integrative and fine-grained perspective that encompasses the four (de-)motivating teaching styles of autonomy-support, structure, control, and chaos within a circular structure along two axes (Aelterman et al., 2019; Escrivá-Boulley et al., 2021). The horizontal axis refers to the teacher's level of need-nurturing, with autonomy support and structure depicting more need-supportive teaching styles and with control and chaos reflecting more need-thwarting teaching styles. The vertical axis expresses the teacher's level of directiveness, with structure and control as more directive styles and with autonomy support and chaos representing less directive ones. While this study focuses on teaching styles, Aelterman et al. (2019) further sustains that each of the four (de-)motivating styles would be composed by two specific teaching approaches.

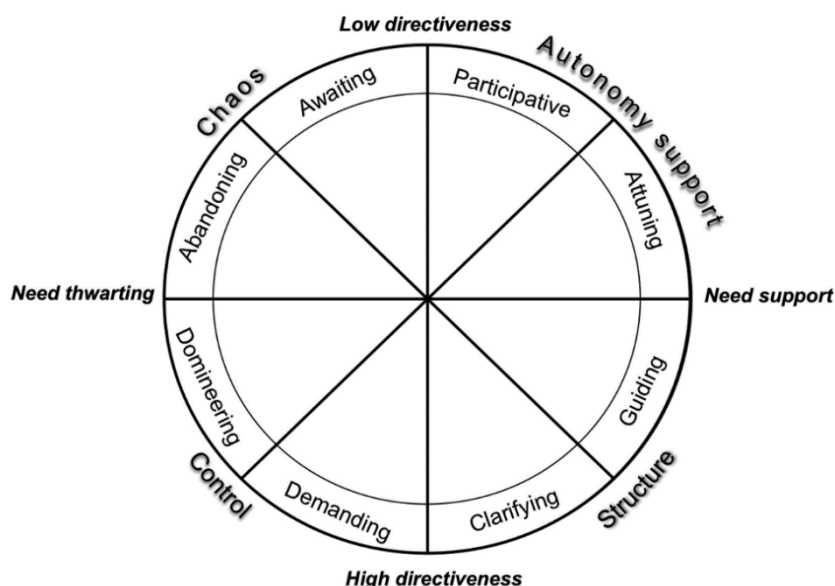


Figure 1. Circumplex approach to (de-)motivating teaching styles and approaches in physical education (Original source Aelterman et al. 2019).

Autonomy support, which comprises participative and attuning teaching approaches, is the first (de-)motivating teaching style which is characterized by a low level of directiveness and a high level of need-support (Aelterman et al., 2019). An autonomy-supportive PE teacher wants to find out the personal preferences of students, invites them to make suggestions, and finds different choices to make the PE lessons more interesting and enjoyable, allowing students to work at their own pace (Escrivá-Boulley et al., 2021). The second (de-)motivating teaching style, characterized by high levels of directiveness and need-support is structure, which encompasses guiding and clarifying

teaching approaches (Aelterman et al., 2019). A structuring PE teacher assists students to progress by offering guidance to complete tasks in different steps and communicates expectations clearly and transparently so students can go ahead with their learning process on their own (Escriva-Boulley et al., 2021). The third (de-)motivating teaching style, characterized by high level of directiveness and need-thwarting is control, which encompasses demanding and domineering teaching approaches (Aelterman et al., 2019). A controlling PE teacher demands discipline and exerts his/her power on students by using coercive language to make it clear what they must do, does not tolerate any disagreement, and even may induce feelings of guilt, inferiority, disappointment, and shame to show his/her disagreement with students' behaviors (Escriva-Boulley et al., 2021). The fourth (de-)motivating teaching style, characterized by a low level of directiveness and a high level of need-thwarting is chaos, which encompasses abandoning and awaiting teaching approaches (Aelterman et al., 2019). A chaotic PE teacher takes no responsibility for the students at all, giving them the full initiative to act, and does not make lesson plans because he/she prefers to wait to see how things develop (Escriva-Boulley et al., 2021).

(De-)motivating teaching styles and students' outcomes in PE

SDT conceptualizes a dual-process approach in explaining human functioning by displaying a bright and dark pathway based on the distinction between the satisfaction and the frustration of the needs for autonomy, competence, and relatedness (Vansteenkiste et al., 2020). While need satisfaction contributes to one's growth and wellness (i.e., bright side), need frustration facilitates individuals' passivity and illness (i.e., dark side) (Ryan & Deci, 2017; Vansteenkiste et al., 2020). Autonomy satisfaction refers to feeling volitional in one's choices, whereas autonomy frustration involves being forced to do activities one would not choose to do. Competence satisfaction concerns the desire to express one's capacities and to feel effective in one's actions, whereas competence frustration involves feelings of failure and inferiority in activities. Finally, relatedness satisfaction refers to connectedness and a feeling of being accepted by significant others, whereas relatedness frustration involves loneliness and alienation in their surrounding environments (Vansteenkiste et al., 2020). A substantial body of SDT-based research in PE (Curran & Standage, 2017; Vasconcellos et al., 2020) has shown that (de-)motivating teaching styles (i.e., autonomy-support and structure) could catalyze the bright pathway toward more optimal adaptive outcomes by nurturing students' need

satisfaction, whereas (de-)motivating teaching styles (e.g., control and chaos) could elicit the dark pathway toward maladaptive outcomes by inducing feelings of need frustration among students.

More precisely, both autonomy-supportive and structuring styles have been positively related to students' need satisfaction (Aibar et al., 2021; Behzadnia, 2021) and adaptive outcomes such as enjoyment (Baños et al., 2020) or intention to PA in leisure time (Aibar et al., 2021; Behzadnia, 2021), whereas they have been negatively related to students' need frustration (Behzadnia et al., 2018; Haerens et al., 2015; Liu et al., 2017). Controlling style in PE, in contrast, has been negatively related to students' need satisfaction (Burgueño & Medina-Casaubón, 2021) and intention to PA (Leo et al., 2022), and especially, positively related to students' need frustration (Abós et al., 2022; Burgueño & Medina-Casaubón, 2021) and a set of maladaptive outcomes such as boredom (Behzadnia et al., 2018) or oppositional defiance (Abós et al., 2022). In comparison with the evidence about autonomy-supportive, structuring, and controlling styles, little is known about the consequences associated with a chaotic teaching style in PE. Nevertheless, with the emergence of the circumplex approach a growing number of studies has shown a positive association between students' perceptions of a chaotic style from the PE teacher and their need frustration (Burgueño et al., 2022; Burgueño & Medina-Casaubón, 2021), and a negative cross path with students' need satisfaction (Leo et al. 2022). The present study, therefore, will enable us not only to gather a broader basis of evidence about chaos and need-based experiences but also to identify the impact of this demotivating teaching style in other related students' outcomes (e.g., enjoyment, boredom, and intention to PA), which has not been explored to date.

The present study

Previous studies based on the circumplex approach in different contexts (e.g., sport, education, health, etc.) have shown how the four (de-)motivating teaching styles can trigger different (mal-)adaptive outcomes (Aelterman et al., 2019; Delrue et al., 2019; Escriva-Boulley et al., 2021). However, although recent studies have been carried out focused on providing internal validity evidence of the circumplex approach in PE teachers (Burgueño, Abós, et al., 2023; Escriva-Boulley et al., 2021) and students (Burgueño, Abós, et al., 2023), to date, no research has examined the four (de-)motivating teaching styles together in a predictive model focused on exploring the bright- and dark-sides of students' motivational process in PE. Furthermore, evidence on controlling style effects

is not totally conclusive and the number of studies that include chaotic style in PE is scarce, so this research may shed light on a more defined picture of the four (de-)motivating teaching styles which the circumplex approach encompasses. To fill this gap, this research aimed to examine the motivational process by which students' perceptions of the four (de-)motivating styles (i.e., autonomy support, structure, control, and chaos) from their PE teachers are related to their intention to PA via need-based experiences, enjoyment, and boredom in PE lessons. Consistent with previous studies based on the circumplex approach in PE and other related-contexts (Aelterman et al., 2019; Delrue et al., 2019; Escriva-Boulley et al., 2021) and SDT-based research in PE (Burgueño et al., 2022; Curran & Standage, 2017; Vasconcellos et al., 2020), we hypothesized that both the students' perceptions of autonomy-supportive and structuring styles from their PE teachers would positively predict students' intention to PA via need satisfaction and enjoyment in PE. In addition, guided by prior research in PE (Abós et al., 2022; Burgueño & Medina-Casabón, 2021), we hypothesized that students' perceptions of controlling style from their PE teachers would positively impact on students' need frustration and boredom. Finally, although the existing evidence is still scarce, based on prior research in PE (Burgueño et al., 2022; Burgueño & Medina-Casabón, 2021), we postulated that the students' perceptions of the chaotic style from their PE teachers would give rise to the dark-side of the students' motivational process via need frustration and boredom.

Methods

Participants

A convenience sample of 677 students from four secondary schools in the northeast of Spain was invited to participate in this cross-sectional study. After removing invalid data (valid response rate: 98.8%), the final sample consisted of 669 students ($M_{age}=14.65$, $SD=1.47$; 52% girls) divided in different school grade levels (i.e., Year-8=197; Year-9=161; Year-10=141; Year-11=102; Year-12=68), from four schools (i.e., school 1 = 164, school 2 = 178, school 3 = 85, and school 4 = 242 students).

Variables and Instruments

Socio-demographic variables

Gender (i.e., boy or girl), school grade level (i.e., Year-8 to Year-12), and the school in which each student was enrolled (i.e., a total of four secondary schools) were collected.

(De-)motivating teaching styles

Students' perceptions of (de-)motivating teaching styles implemented in PE were assessed using the Spanish version of the Situations in School Questionnaire in PE (SIS-PE; Burgueño et al. 2023). The SIS-PE presents 12 situations with four possible ways for the teacher to deal with them (i.e., 48 items) that commonly occur in PE lessons. Each item represents a teaching approach that can be grouped into four (de-)motivating teaching styles (i.e., autonomy support, structure, control, and chaos) following the circumplex approach (for more information about the SIS-PE questionnaire, see Burgueño et al. 2023). Students were asked to indicate the extent to which each situation reflects their PE teacher's way of teaching on a seven-point Likert scale ranging from one "does not describe my PE teacher at all" to seven "describes my PE teacher extremely well". In this research, an acceptable fit was achieved for the four-factor exploratory structural equation modelling (ESEM) model ($\chi^2(1074, n=669)=3945.46, p<.001$; CFI=.91; TLI=.90; RMSEA=.035, 90% CI=.033-.038).

Basic psychological need satisfaction

Students' perceptions of need satisfaction in PE were assessed using the Spanish version of the Basic Psychological Needs in Exercise Scale (BPNES; Moreno Murcia et al. 2008). Following the stem: "In my PE lessons ..." this scale includes 12 items (four items per basic psychological need) assessing autonomy satisfaction (e.g., "I feel that the activities I do in PE fit in with my interests"), competence satisfaction (e.g., "I feel that in PE I perform the activities effectively"), and relatedness satisfaction (e.g., "I feel that in PE lessons I can communicate openly with my classmates"). Responses were given on a five-point scale ranging from one "strongly disagree" to five "strongly agree". Consistent with previous SDT-based research in PE (e.g., Abós et al. 2021), a need satisfaction composite score was calculated by averaging mean values of autonomy, competence, and relatedness satisfaction. In this study, a good fit was reached for the single-factor CFA model ($\chi^2(54, n=669)=323.44, p<.001$; CFI=.94; TLI=.93; RMSEA=.087, 90% CI=.078-.096).

Basic psychological need frustration

Students' perceptions of need frustration in PE were assessed using the Spanish version of the Psychological Need Thwarting Scale (Sicilia et al., 2013) and adjusted to the PE context. Following the stem: "In my PE lessons ..." this scale includes 12 items

(four items per basic psychological need) assessing autonomy frustration (e.g., "I cannot make decisions in the activities I carry out in PE classes"), competence frustration (e.g., "There are some situations in which I feel unable"), and relatedness frustration (e.g., "I feel rejected by my peers in PE lessons"). Responses were given on a five-point scale ranging from one "strongly disagree" to five "strongly agree". Similarly to previous SDT studies in PE (e.g., Behzadnia 2021), a need frustration composite score was calculated by averaging mean values of autonomy, competence, and relatedness frustration. In this research, a suitable fit was reached for the single-factor CFA model ($\chi^2(27, n=669)=81.43, p<.001$; CFI=.98; TLI=.97; RMSEA=.055, 90% CI=.042–.069).

Enjoyment and boredom

Students' perceptions of enjoyment and boredom in PE were assessed using the Spanish version in PE of the Sport Satisfaction Instrument (Baena-Extremera et al., 2012). Following the stem "How do you enjoy your PE classes?", this scale includes eight items, of which five items measure enjoyment (e.g., "I usually have fun doing PE") and three items measure boredom (e.g., "I usually get bored in PE classes"). Responses were given on a five-point scale ranging from one "strongly disagree" to five "strongly agree". In the current study, a suitable fit was obtained for the two-factor CFA model ($\chi^2(19, n=669)=29.56, p<.001$; CFI=.99; TLI=.99; RMSEA=.029, 90% CI=.001–.048).

Intention to PA

Students' intention to be physically active was assessed using three items (e.g., "I intend to do active sports and/or physical activities during my leisure time in the next 5 weeks...") from the Theory of Planned Behaviour Questionnaire (Hagger & Chatzisarantis, 2009). This scale is rated on a seven-point Likert scale ranging from one "strongly agree" to seven "strongly disagree". In this study, an acceptable fit was achieved for the one-factor CFA model ($\chi^2(2, n=669)=11.25, p<.001$; CFI=.99; TLI=.99; RMSEA=.046, 90% CI=.001–.064).

Procedure

Before starting the study, the main researcher contacted the schools' boards to inform them about the objectives of the study and requested their collaboration. Next, families or legal guardians were asked to provide the informed consent form for their children to participate in the research and adolescents filled a written informed consent. Students took approximately 25 minutes to complete the questionnaires. The PE teachers

were not present while the students completed the questionnaires so as not to distort their answers. This study was approved by the Ethic Committee and followed all ethical procedures or the data collection established in the Helsinki Declaration.

Data Analysis

In preliminary analyses, descriptive statistics (means and standard deviations), composite reliability (via McDonald's omega (ω) coefficient), and latent correlations were calculated for all study variables. In the main analyses, a structural equation model (SEM) was estimated with the Maximum Likelihood Robust (MLR) method, which provides standard errors and tests of model fit that are robust to the non-normality distribution of the data. To conduct that SEM, a ESEM was followed (Alamer, 2022). Due to the nature of the circumplex model, in which some teaching approaches are very close to others, and can even sometimes overlap (see, for example, MDS in Aelterman et al. 2019 and in Burgueño et al. 2023), we started from including into the SEM the (de-)motivating teaching styles (i.e., autonomy support, structure, control, and chaos) as independent variables via ESEM factor structure, allowing the cross-loadings among items and factors in a less parsimonious way. Yet, to maintain the confirmatory application of the ESEM, a target rotation in which cross loadings are 'targeted', but not forced, to be close to zero, was used. In a next step, latent CFA factors representing the need-based experiences, enjoyment, boredom, and intention to PA, were set as outcomes of (de-)motivating teaching styles. In addition, standardized regression weights of direct and indirect effects, point estimates, and 95% bias-corrected bootstrap confidence intervals (95% CI_{BC}) were calculated and reported for each of the postulated pathways. In this analysis, relevant covariates were also controlled (i.e., gender and school grade level). The model assessment was based on the following goodness-of-fit indices: higher values of .90 and .95 for Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI) indicate good and excellent fit, respectively, whereas values of .08 and .06 or less for Root Mean Square Error of Approximation (RMSEA) indicate adequate and excellent fit (Marsh et al., 2004). Analyses were carried out using the statistical programs SPSS (version 25.00) and Mplus (version 8.0).

Results

Preliminary Analyses

Means, standard deviations, composite reliability, and latent correlations between study variables are presented in Table 1.

Table 1. Descriptive statistics, composite reliability, and latent correlations between study variables.

Variable	1	2	3	4	5	6	7	8	9
1. Autonomy support	-								
2. Structure	.47**	-							
3. Control	.38**	.25**	-						
4. Chaos	-.10*	-.37**	.04	-					
5. Need satisfaction	.50**	.47**	.20**	-.16**	-				
6. Need frustration	-.21**	-.28**	-.01	.38**	-.47**	-			
7. Enjoyment	.42**	.53**	.19**	-.21**	.77**	-.42**	-		
8. Boredom	-.13*	-.29**	.01	.32**	-.58**	.43**	-.66**	-	
9. Intention to PA	.18**	.15*	.13**	-.09	.37**	-.25**	.41**	-.26**	-
Range	1-7	1-7	1-7	1-7	1-5	1-5	1-5	1-5	1-7
<i>M (SD)</i>	4.40 (1.26)	5.19 (1.07)	4.34 (0.90)	2.59 (1.13)	3.60 (0.74)	2.28 (0.82)	4.06 (0.84)	2.45 (1.01)	5.25 (1.70)
ω	.87	.86	.71	.84	.87	.89	.84	.76	.93

Note: Correlations were significant at the level $p < .05^*$ and $p < .01^{**}$.

Importantly, a multivariate effect of gender (Wilks' Lambda= 0.91, $F(9.65)=7.07$, $p < 0.001$, $\eta^2=0.08$) and of school grade level (Wilks' Lambda=0.74, $F(36.24)=5.53$, $p < 0.001$, $\eta^2=0.07$), was found on study variables, so the two sociodemographic variables were included as covariates in the SEM model. In addition, because in this study, 677 secondary school students were nested within four secondary schools, the multilevel nature of the data was explored prior to conducting the SEM. School-level variance ($\chi^2(1)=0.47-1.19$, $p < 0.05$; $ICC > 10$) was significant for the study variables, with the exception of chaos and need frustration. Consequently, we also controlled the multilevel nature of the data at school level in the SEM.

Main analyses

The SEM model, which included indirect paths from (de-)motivating teaching styles, through the need-based experiences, toward enjoyment, boredom, and intention to PA, showed an acceptable fit with the data: $\chi^2(2152, n=669)=4113.27$, $p < .001$; CFI=.91; TLI=.90; RMSEA=.037, 90% CI=.035-.039. Additionally, direct paths from structuring style to enjoyment, controlling style to intention to PA and boredom, and from chaotic style to boredom were included in that model after observed high modification indices, showing acceptable fit with the data as well: $\chi^2(2138, n=669)=4058.34$, $p < .001$; CFI=.91; TLI=.90; RMSEA=.037, 90% CI=.035-.038. All significant and non-significant direct and indirect effects estimated are reported in Table 2.

As observed in Figure 2, autonomy support positively predicted need satisfaction ($\beta=.43, p<.05$) and negatively predicted need frustration ($\beta=-.20, p<.05$). Moreover, structure positively predicted need satisfaction ($\beta=.27, p<.05$) and enjoyment ($\beta=.20, p<.05$). Control positively predicted intention to PA ($\beta=.09, p<.05$) and boredom ($\beta=.07, p<.05$), whereas chaos positively predicted need frustration ($\beta=.33, p<.05$) and boredom ($\beta=.21, p<.05$). In addition, need satisfaction positively predicted enjoyment ($\beta=.62, p<.05$), intention to PA ($\beta=.13, p<.05$), and negatively boredom ($\beta=-.52, p<.05$). Finally, enjoyment positively predicted the intention to PA ($\beta=.34, p<.05$). With regard to indirect effects, autonomy support and structure displayed positive indirect effects on enjoyment through need satisfaction ($\beta=.27, p<.05$ and $\beta=.16, p<.05$, respectively). Besides, autonomy support and structure, through need satisfaction, showed negative indirect effects on boredom ($\beta=-.22, p<.05$ and $\beta=-.14, p<.05$, respectively). In addition, autonomy support, via need satisfaction and enjoyment, showed specific positive indirect effects on intention to PA ($\beta=.09, p<.05$), while chaos showed specific negative indirect effects on intention to PA ($\beta=-.12, p<.05$). Finally, need satisfaction showed positive indirect effects on intention to PA ($\beta=.22, p<.05$) through enjoyment

Table 2. Direct and indirect effect of (de-)motivating teaching styles on motivational outcomes.

	β	SE	p	95% CI _{BC}
<i>Direct effects on intention to PA</i>				
Autonomy support	-.064	.079	.413	(-.19, .06)
Structure	-.109	.091	.233	(-.25, .04)
Control	.095*	.042	.025	(-.02, .16)
Chaos	-.033	.018	.067	(-.06, -.01)
Enjoyment	.349**	.097	<.001	(.19, .51)
Boredom	.049	.085	.563	(-.09, .18)
Need satisfaction	.136*	.064	.034	(-.03, .24)
Need frustration	-.087	.110	.430	(-.27, .09)
<i>Direct effects on enjoyment</i>				
Autonomy support	.018	.125	.885	(-.18, .22)
Structure	.209*	.097	.031	(.04, .36)
Control	-.006	.040	.888	(-.07, .06)
Chaos	-.030	.050	.552	(-.11, .05)
Need satisfaction	.629**	.051	<.001	(.54, .71)
Need frustration	-.051	.036	.162	(-.11, .09)
<i>Direct effects on boredom</i>				
Autonomy support	.078	.072	.278	(-.04, .19)
Structure	-.014	.134	.914	(-.23, .20)
Control	.077**	.020	<.001	(.04, .11)
Chaos	.218*	.073	.003	(.09, .33)
Need satisfaction	-.520**	.113	<.001	(-.70, -.33)

Need frustration	.156	.117	.184	(-.03, .34)
<i>Direct effects on need satisfaction</i>				
Autonomy support	.435**	.090	<.001	(.28, .58)
Structure	.270*	.117	.022	(.07, .46)
Control	-.026	.030	.382	(-.07, .02)
Chaos	-.055[†]	.032	.086	(-.10, -.01)
<i>Direct effects on need frustration</i>				
Autonomy support	-.206*	.071	.004	(-.32, .08)
Structure	-.072	.139	.602	(-.30, .15)
Control	.058	.073	.429	(-.06, .17)
Chaos	.330*	.142	.020	(.09, .56)
<i>Indirect effects of autonomy support to enjoyment</i>				
Total indirect	.284**	.067	<.001	(.17, .39)
Specific indirect via need satisfaction	.273**	.062	<.001	(.17, .37)
Specific indirect via need frustration	.011	.009	.258	(-.05, .02)
<i>Indirect effects of structure to enjoyment</i>				
Total indirect	.173[†]	.090	.054	(.02, .32)
Specific indirect via need satisfaction	.169*	.083	.041	(.03, .30)
Specific indirect via need frustration	.004	.009	.668	(-.01, .01)
<i>Indirect effects of control to enjoyment</i>				
Total indirect	-.020	.022	.381	(-.04, .01)
Specific indirect via need satisfaction	-.017	.019	.390	(-.04, .01)
Specific indirect via need frustration	-.003	.005	.573	(-.02, .01)
<i>Indirect effects of chaos to enjoyment</i>				
Total indirect	-.052*	.018	.005	(-.08, .02)
Specific indirect via need satisfaction	-.035[†]	.019	.072	(-.06, -.01)
Specific indirect via need frustration	-.017	.014	.232	(-.04, .01)
<i>Indirect effects of autonomy support to boredom</i>				
Total indirect	-.258**	.049	<.001	(-.33, -.17)
Specific indirect via need satisfaction	-.226**	.054	<.001	(-.31, -.13)
Specific indirect via need frustration	-.032	.034	.337	(-.08, .02)
<i>Indirect effects of structure to boredom</i>				
Total indirect	-.151*	.073	.039	(-.27, -.03)
Specific indirect via need satisfaction	-.140*	.053	.008	(-.22, -.05)
Specific indirect via need frustration	-.011	.023	.618	(-.04, .02)
<i>Indirect effects of control to boredom</i>				
Total indirect	.023	.024	.351	(-.01, .06)
Specific indirect via need satisfaction	.014	.014	.312	(-.01, .03)
Specific indirect via need frustration	.009	.020	.510	(-.01, .03)
<i>Indirect effects of chaos to boredom</i>				
Total indirect	.080[†]	.049	.099	(.01, .16)
Specific indirect via need satisfaction	.029	.021	.161	(-.01, .06)
Specific indirect via need frustration	.051	.054	.340	(-.03, .14)
<i>Indirect effects of autonomy support on intention to PA</i>				
Total indirect	.174*	.063	.006	(.06, .27)
Specific indirect via need satisfaction	.059	.039	.125	(-.04, .12)
Specific indirect via need frustration	.018	.017	.301	(-.01, .04)
Specific indirect via enjoyment	.006	.042	.881	(-.06, .07)

Specific indirect via boredom	.004	.004	.390	(-.01, .01)
Specific indirect via need satisfaction and enjoyment	.096*	.030	.001	(.04, .14)
Specific indirect via need frustration and enjoyment	.004	.004	.366	(-.03, .01)
Specific indirect via need satisfaction and boredom	-.011	.017	.521	(-.04, .01)
Specific indirect via need frustration and boredom	-.002	.004	.686	(-.01, .06)
<i>Indirect effects of structure on intention to PA</i>				
Total indirect	.168†	.096	.079	(.01, .32)
Specific indirect via need satisfaction	.037	.023	.106	(-.01, .07)
Specific indirect via need frustration	.006	.017	.716	(-.02, .03)
Specific indirect via enjoyment	.073	.051	.149	(.01, .15)
Specific indirect via boredom	-.001	.007	.924	(-.01, .01)
Specific indirect via need satisfaction and enjoyment	.059	.045	.186	(-.01, .13)
Specific indirect via need frustration and enjoyment	.001	.003	.699	(-.01, .07)
Specific indirect via need satisfaction and boredom	-.007	.013	.603	(-.02, .01)
Specific indirect via need frustration and boredom	-.001	.002	.777	(-.01, .01)
<i>Indirect effects of control on intention to PA</i>				
Total indirect	-.013	.023	.583	(-.05, .02)
Specific indirect via need satisfaction	-.004	.005	.507	(-.01, .01)
Specific indirect via need frustration	-.005	.011	.649	(-.02, .01)
Specific indirect via enjoyment	-.002	.014	.891	(-.02, .02)
Specific indirect via boredom	.004	.007	.596	(-.01, .01)
Specific indirect via need satisfaction and enjoyment	-.006	.008	.446	(-.01, .01)
Specific indirect via need frustration and enjoyment	-.001	.002	.622	(-.01, .01)
Specific indirect via need satisfaction and boredom	.001	.002	.695	(-.01, .01)
Specific indirect via need frustration and boredom	.001	.001	.756	(-.01, .01)
<i>Indirect effects of chaos on intention to PA</i>				
Total indirect	-.050	.044	.256	(-.12, .02)
Specific indirect via need satisfaction	-.008	.006	.202	(-.01, .01)
Specific indirect via need frustration	-.029	.028	.307	(-.07, .01)
Specific indirect via enjoyment	-.010	.016	.505	(-.03, .01)
Specific indirect via boredom	.011	.015	.489	(-.01, .03)
Specific indirect via need satisfaction and enjoyment	-.012*	.004	.001	(-.02, -.01)
Specific indirect via need frustration and enjoyment	-.006	.006	.333	(-.01, .01)
Specific indirect via need satisfaction and boredom	.001	.002	.365	(-.01, .01)
Specific indirect via need frustration and boredom	.003	.006	.678	(-.01, .01)
<i>Indirect effects of need satisfaction on intention to PA</i>				
Total indirect	.194**	.046	<.001	(.11, .26)
Specific indirect via enjoyment	.220*	.072	.002	(.10, .33)
Specific indirect via boredom	-.026	.040	.528	(-.09, .04)
<i>Indirect effects of need frustration on intention to PA</i>				
Total indirect	-.010*	.005	.050	(-.01, .01)
Specific indirect via enjoyment	-.018	.017	.306	(-.04, .01)
Specific indirect via boredom	.008	.018	.668	(-.02, .03)

Note: β = standardized estimates; SE = standard error; 95% CI_{BC} = 95% bias-corrected bootstrap confidence interval. * $p < 0.05$, ** $p < .01$, † $p > .05$ but 95% CI_{BC} do not contain 0.

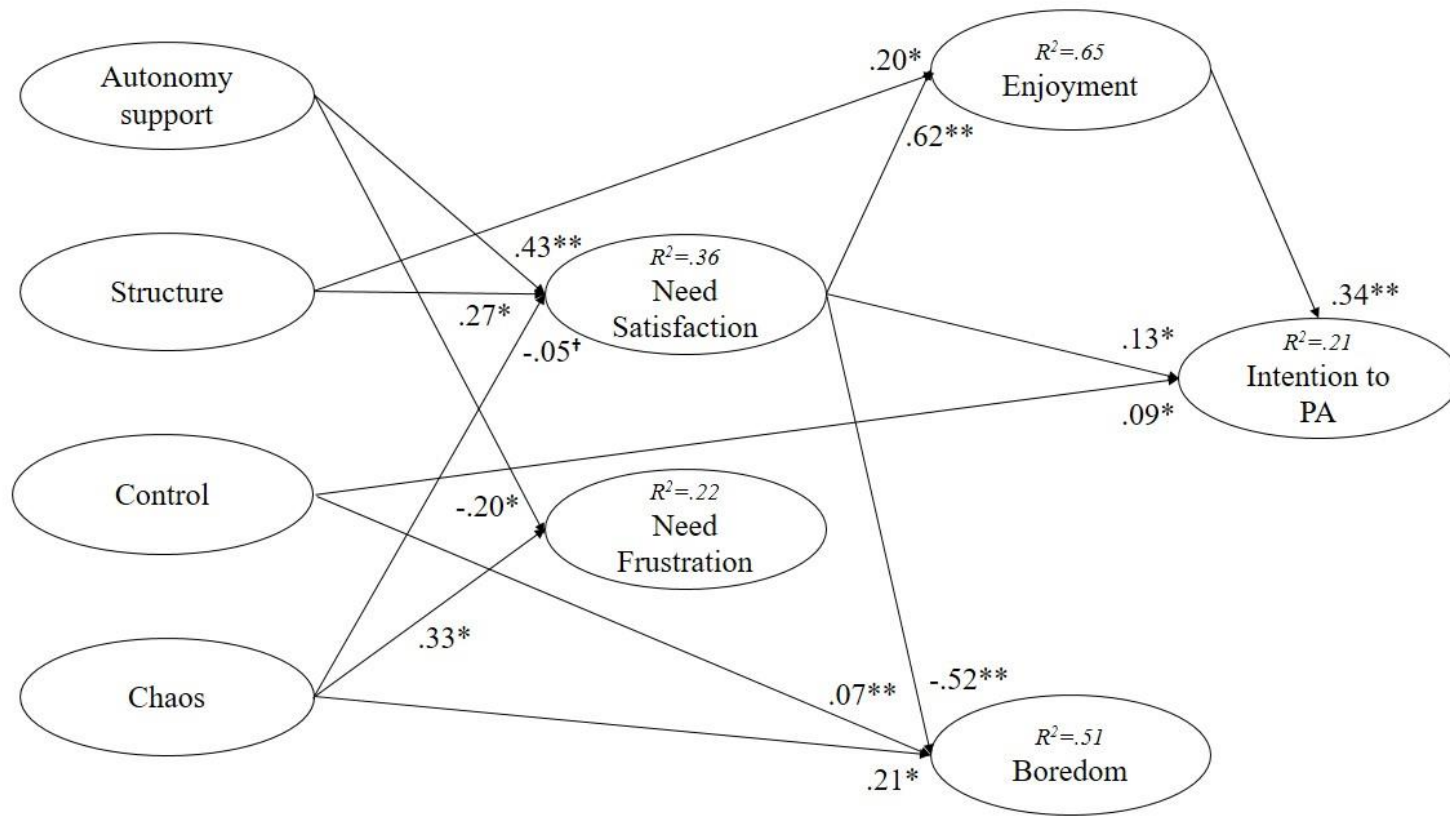


Figure 2. SEM model depicting effects between (de-)motivating teaching styles, need-based experiences, enjoyment, boredom, and intention to PA.

Note: All the relations shown in the figure were significant at the level * $p < 0.05$, ** $p < .01$, † $p > .05$ but 95% CI_{BC} do not contain 0.

Discussion

In recent years, the circumplex approach has gained recognition in varied contexts (e.g., Aelterman et al. 2019; Delrue et al. 2019; Moè, Consiglio, and Katz 2022), including the PE field (Burgueño, Abós, et al., 2023; Escriva-Boulley et al., 2021). Despite this growing body of evidence around the circumplex model, questions remain to be answered, especially with PE students where only one study has been carried out so far (Burgueño, Abós, et al., 2023). In this vein, this is the first study with PE students that encompasses the four (de-)motivating teaching styles together in a predictive model focused on exploring the bright- and dark-sides of their motivational process in PE. Overall, the main findings from our study highlight that: (a) students' bright-side motivational processes in PE are more enabled when they perceive their PE teachers as exhibiting high need-supportive styles (i.e., autonomy support and structure); (b) students' perceptions of chaos from their PE teachers, not only foster the dark-side of their motivational process, but also slightly deprives students' need satisfaction; and (c) controlling style from PE teachers, in the students' eyes, promotes boredom behaviors in PE but at the same time could foster intentions to PA in leisure time.

Consistent with our hypotheses and aligned with prior SDT-based research in PE (Behzadnia, 2021; Burgueño et al., 2022), our results strengthen that students' perceptions of autonomy-supportive style, through the need satisfaction, may facilitate adaptive outcomes in PE (i.e., enjoyment) and dampen other maladaptive ones (i.e., boredom). It seems when students feel that the PE teacher tries to identify and nurture as much as possible their preferences, so they are able to voluntarily engage in lesson learning activities, and he/she transfers to students learning responsibilities allowing to make their own decisions, one's need satisfaction experiences may be fulfilled giving rise to a more adaptive motivational process in PE (Vasconcellos et al., 2020). If these autonomy-supportive results seem remarkable, they become still more relevant if we consider the indirect association found of students' perception of autonomy-support from PE teachers and intention to PA in leisure time, via need satisfaction and enjoyment in PE. These findings reinforce the trans-contextual model evidence in PE and suggest that providing students with need satisfaction and positive motivational experiences during PE lessons via autonomy-supportive style could increase their PA intentions outside school (González-Cutre et al., 2014; Hagger & Chatzisarantis, 2016). Finally, our results showed a remarkable negative cross-path between students' perceptions of autonomy support

from PE teachers (i.e., bright-side) and need frustration (i.e., dark-side). These results further highlight the importance of teachers providing opportunities for choice, promoting initiative, and accepting the students' opinions and feelings, because these autonomy-supportive strategies would not only help to boost the students' bright side of motivation (Abós et al., 2021; Vasconcellos et al., 2020) but would also may buffer students' maladaptive need-based experiences (Liu et al., 2017).

Regarding students' perceptions of structuring style from their PE teachers, our results are in line with the hypotheses postulated and previous research in PE (Behzadnia, 2021; Burgueño et al., 2022), by displaying that this motivating teaching style fosters students' need satisfaction and enjoyment in PE. These results shed important practical implications because when students perceive that their PE teachers provide feedback, help and encouragement, as well as useful strategies for task completion and report goals and expectations for the lesson, not only directly impacting on their need fulfilment, but also in their positive experiences into the PE class. In addition, similar to the autonomy-supportive style, our results showed that a structuring style, via students' need satisfaction, not only may boost adaptive outcomes in PE (i.e., enjoyment) but also may damper maladaptive experiences (i.e., boredom). A possible explanation could be that when PE teachers are characterized by a structuring style, they are usually concerned that the level of the learning tasks is adapted to the characteristics of their students (Escriva-Boulley et al., 2021). In this vein, if the tasks result challenging enough for students, first, they could facilitate students' need satisfaction, and second, they may turn the PE lessons into an adaptive and motivating space (Curran & Standage, 2017; Vasconcellos et al., 2020).

With regard to demotivating teaching styles, we postulated that the students' perceptions of controlling style from PE teachers would positively impact on the dark-side of students' motivational process in PE. While our results did not reveal an association between students' perceptions of controlling style from PE teachers and need frustration, they did, in line with prior SDT-based research in PE (Abós et al., 2022; Behzadnia et al., 2018), with students' feelings of boredom in PE lessons. These results make it more obvious when PE teachers demand students to think, feel, and behave in a prescribed way, regardless of what the students think, students' may experience negative outcomes in the PE lessons (Bartholomew et al., 2018). In addition to these SDT-aligned results, we found an unexpected positive association between students' perceptions of

control from their PE teachers and intentions to PA in their leisure time. As the circumplex model notes, some (de-)motivating teaching styles are adjacent to others (i.e., control is near structure by the right and near chaos from the left) and, sometimes some features of these styles may even be overlapped (For a further inspection, see MDS results from Aelterman et al. 2019; Burgueño et al. 2023; Escriva-Boulley et al. 2021), which can provide a potential explanation for this result. More precisely, it is possible that some features of the demanding teaching approach, which is part of the controlling style and is characterized by high directivity and moderate need thwarting levels (e.g., the PE teacher clearly informs students about the goals of the lessons, and follows-up with them to monitor their progress), can be interpreted by students as features of a clarifying teaching approach, which is part of the structuring style and it also stands out for high directivity but together with moderate levels of need support (e.g., the PE teacher imposes students' responsibilities as to what they must do without tolerating contradictions using explicit strategies, including forceful and commanding language) (Aelterman et al., 2019; Vansteenkiste et al., 2019). Another complementary explanation is that when PE teachers use a controlling style as a response to students' performance, students may have a social acceptance for this behavior, because understand that with this attitude their PE teacher is worrying about their learning (Abós et al., 2022). Nevertheless, while this demotivating teaching style could be interpreted in the eyes of students as slightly adaptive in terms of some positive outcomes (e.g., intention to PA), great caution should be taken because the effects that it may cause by fostering students' need frustration and maladaptive outcomes in PE are still more detrimental (Abós et al., 2022; Bartholomew et al., 2018; Behzadnia et al., 2018). Therefore, more research is required to shed light on which could be the optimal amount and type of controlling style, if any, or on the contrary, it should be totally avoided by PE teachers.

Last but not least, we also hypothesized that the students' perceptions of chaotic style from PE teachers would foster the dark-side of students' motivational process in PE. Consistent with the scarce prior research in PE about chaos (Burgueño et al., 2022; Burgueño & Medina-Casaubón, 2021), we not only found that students' perceptions of chaotic style conducted to need frustration and feelings of boredom, but it also slightly deprive the experiences of need satisfaction in PE. More practically, when PE teachers make feel alone to students, making it confusing for them to know what they are supposed to do, how they should behave, and how they can develop their skills, actively facilitate

students' need frustration and boredom whereas in parallel also hamper potential need-support (Aelterman et al., 2019; Vansteenkiste et al., 2019). In the same line, our findings further support that these chaotic practices from PE teachers would have a negative indirect impact on the intention to PA through depriving students' need satisfaction and enjoyment in PE lessons. Aligned with studies based on the trans-contextual model of motivation (González-Cutre et al., 2014; Hagger & Chatzisarantis, 2016), this finding gather more evidence in favor of the importance of avoiding chaotic style from PE teachers to be able to achieve a more active and healthy society, which is a serious public health problem among youth (Tapia-Serrano et al., 2022).

Limitations and future directions

Balanced against the contributions of this research, limitations should also be noted. First, the use of convenience sample suggests interpreting the results with caution. It seems important that in future studies a representative sample of students with different educational levels, or types of school participate in the study. Second, the cross-sectional design makes it impossible to determine the causal relationships among the study variables. Further research using longitudinal and experimental design seems required to examine the direction of the relationships and the long-term effects of the four (de-)motivating teaching styles from PE teachers on students' outcomes. Finally, the four (de-)motivating teaching styles were examined exclusively through students' perceptions. Using a mixed-methods approach would contribute to further understanding the effects of the four (de-)motivating teaching styles of the circumplex approach on distinct outcomes in PE and PA settings. In addition, the use of device-measured PA levels, rather than self-reported PA intentions, would provide more robust data regarding the relationship between students' perception of teaching styles in PE and PA in leisure time.

Conclusion

This research provides empirical evidence about the effect of autonomy-supportive, structuring, controlling, and chaotic styles from PE teachers, in the eyes of students, on their need-based experiences and affective outcomes in PE, as well as on their PA intentions in leisure time. Findings strengthen previous evidence about the importance of high need-supportive teaching styles (i.e., autonomy support and structure) from PE teachers, not only to optimize the bright side of the students' motivational process in PE and PA settings, but also to buffer students' need frustration experiences in

PE lessons, whereas the opposite is triggering when students perceive their PE teachers as chaotic. Further, this research yields mixed results on the effects of controlling style from PE teachers, which demands further studies based on the circumplex model to gain more refined evidence. Overall, these findings may be useful to effectively guide initial (i.e., pre-service) and ongoing (i.e., in-service) teaching training in PE teachers, with the aim that those teachers adopt the most optimal motivating teaching styles in their PE lessons.

4.3. ESTUDIO III: A cross-cultural examination of the role of (de-)motivating teaching styles in predicting students' basic psychological needs in physical education: A circumplex approach

Abstract

Guided by self-determination theory, this research examined cross-cultural differences in associations of students' perceptions of teachers' (de-)motivating approaches on Estonian and Spanish students' need satisfaction from a circumplex model. The participants were 601 Estonian (56% girls) and 669 Spanish (52% girls) secondary students. Multi-group analysis revealed that the four motivating approaches (i.e., participative, attuning, guiding, clarifying) predicted overall the satisfaction of each basic psychological need (BPN), specifically autonomy and competence satisfaction according to the Estonian and Spanish students' perspective, domineering approach positively predicted competence satisfaction in the eyes of Estonian students, while abandoning approach predicted the satisfaction of each BPN negatively as perceived by Estonian and Spanish students in general. Results underscore the cross-cultural relevance in explaining the role of teachers' (de-)motivating approaches in the eyes of students, supporting/undermining students' need satisfaction in physical education. Hence, these findings set the scene for development of effective guidance for teaching training adapted to culture, aimed at providing teachers with the strategies they need to apply the most optimal motivating teaching styles in their PE lessons.

Keywords: circumplex model; need–supportive teaching; need–thwarting teaching; basic psychological needs.

Introduction

One of the main curricular goals for physical education (PE) is to develop physically literate students who are able to demonstrate both positive peer interactions, and autonomy and competence in a wide array of motor activities and movement patterns (SHAPE America—Society of Health and Physical Educators, 2014). A substantial basis of research on PE has evidenced that teachers take a central position in the social classroom environment to guide students in their learning process (Vasconcellos et al., 2020). Building upon self–determination theory (SDT; Ryan & Deci, 2017), Aelterman et al. (2019) forwarded a more fine–grained conceptualization of (de-)motivating teaching styles by differentiating among eight approaches that draw a circular structure

in terms of teacher directiveness and need-supportiveness. Although the circumplex model represents a meaningful advance in the study of PE teachers' (de-)motivating practices (Escriva-Boulley et al., 2021), very little is, currently, known about the influence of students' perceptions of eight (de-)motivating teaching approaches on their psychological experiences in PE. Furthermore, it is important to deem the premise that PE may vary across countries due to the cultural characteristics and their own variability (Walton-Fisette et al., 2018). Therefore, there is a need to investigate whether the cross-cultural differences influence how students' perceptions of (de)motivating approaches from the teacher might yield specific motivational outcomes. To overcome this existing cross-cultural gap and to extend evidence on the circumplex model in PE, this study aimed to test cross-cultural differences in the associations of Spanish and Estonian students' perceptions of (de-)motivating approaches from PE teachers with their satisfaction of the three basic psychological needs (BPN).

From demotivating to motivating teaching styles: the Circumplex model

(De-)motivating styles are the particular way in which the teacher interacts, relates, and communicates with students during classroom practice. Following the circumplex model (Aelterman et al., 2019; Escriva-Boulley et al., 2021), the level of directiveness (i.e., the degree in which the teacher takes the lead in student learning) and need-supportiveness (i.e., the degree to which the teacher supports or thwarts BPN) are used to interact with the students. Considering intersections among two dimensions, two motivating and two demotivating styles are differentiated (see Figure 1) (Aelterman et al., 2019).

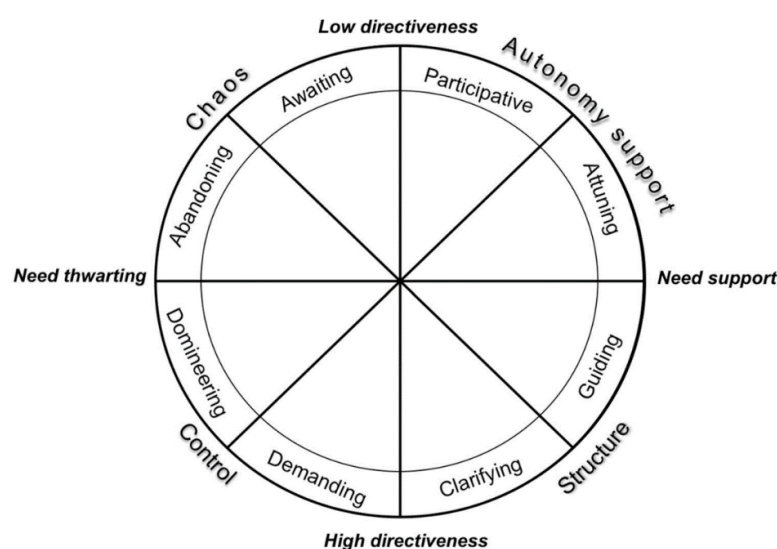


Figure 1. Graphical representation of the circumplex model (Aelterman et al., 2019).

Under the circumplex model, Aelterman et al. (2019) propose that autonomy support and structure are identified as motivating styles inasmuch as both are need-supportive and qualitatively different given that the first is low in teacher directiveness and the second is high on this dimension. Autonomy-supportive style (i.e., the teacher understands students' interests and preferences) can be expressed in participative and attuning approaches. Particularly, a participative teaching approach wants to find out students' personal interests to open a dialogue and invite them to make suggestions and comments. An attuning teaching approach tries to identify different choices for more attractive and enjoyable tasks, allowing students to work at their own pace (Aelterman et al., 2019). Structuring style (i.e., the teacher provides students with suitable assignments to their abilities level to facilitate their perceived competence in classroom) can be expressed through guiding and clarifying approaches. A guiding teaching approach assists students to progress through the provision of help when needed, the decomposition step by step for the task accomplishment, so students can continue learning on their own. A clarifying teaching approach provides an overview of the students' expectations of the lesson, as well as communicates guidelines in a clear and transparent way to guide their learning (Aelterman et al., 2019).

The other half of the circumflex stands two demotivating styles, which are need-thwarting but qualitatively different as control is high in directiveness and chaos is low on this dimension (Aelterman et al., 2019). A controlling style (i.e., the teacher obliges students to adopt his/her viewpoint to behave in classroom) can be adopted by demanding and domineering approaches. A demanding teaching approach imposes discipline on students by using coercive and commanding language to make it clear what students must do and not tolerating any disagreement. A domineering teaching approach exerts their power on students to make demands, inducing feelings of guilt and shame, if they do not follow his/her commands. It turns into a personal attack on students in some situations (Aelterman et al., 2019). Finally, a chaotic style (i.e., the teacher leaves students alone, making it confusing for them to find out without help what to do and how to behave) can be differentiated into abandoning and awaiting approaches. An abandoning teaching approach takes no responsibility for students, as well as allowing them to learn to take responsibility for their own behavior. An awaiting teaching approach gives all the initiative to students, so the teacher does not make often the lesson plans because he/she prefers to wait to see how things develop (Aelterman et al., 2019).

(De-)motivating styles and need satisfaction in physical education

SDT-based research on PE has well documented that the students' satisfaction of the BPN for autonomy (i.e., sense of initiative and choice for the task development), competence (i.e., sense of effectiveness and mastery in the ongoing task accomplishment), and relatedness (i.e., sense of belonging and connection with classmates in the PE lesson) led to a wide range of adaptive learning outcomes (Vasconcellos et al., 2020). In the PE lesson, teachers, via their (de-)motivating teaching style, have a central position within the social classroom environment which allow them either to support or thwart students' need satisfaction (Vasconcellos et al., 2020).

Previous PE research has shown the tendency that the students' perception of motivating styles (i.e., autonomy-supportive and structuring styles) were positively associated with their need satisfaction and adaptive outcomes (Vasconcellos et al., 2020). More particularly, perceived autonomy-supportive and structuring teaching styles were positively associated with the students' satisfaction of the three BPN, albeit emphasizing that autonomy-supportive style was more strongly related to autonomy satisfaction just as structuring style was more highly associated with competence satisfaction among students (Curran & Standage, 2017; Vasconcellos et al., 2020). While evidence on motivating styles is consistent in the PE setting, the small basis of research examining perceived demotivating styles (i.e., control and chaos) reported inconsistent results in PE. Concerning control, although much of the previous PE research found negative associations of perceived controlling style from the teacher with autonomy, competence and relatedness satisfaction in the eyes of students (e.g., Burgueño et al., 2022; Leo et al., 2022; Vasconcellos et al., 2020), fewer studies also revealed non-significant relationships between students' perceptions of controlling teaching style and their need satisfaction in PE (Behzadnia et al., 2018; Cronin et al., 2019; Tilga et al., 2020). Regarding chaos, little research to date found negative associations of the students' perception of chaotic teaching style with their satisfaction of the three BPNs, albeit some studies reported a non-significant relationship between both variables (Burgueño & Medina-Casabón, 2021; Leo, Mouratidis, et al., 2022). More research is, thus, needed to shed light on how the students' perception of the different (de-) motivating teaching approaches may differentially yield specific motivational processes in PE.

Cross-Cultural Research in Physical Education

Central to SDT is the fact that the three BPNs are essential for all individuals, irrespective of their cultural backgrounds (Ryan & Deci, 2017). Nevertheless, a growing body of research has called into question the cross-cultural SDT validity (Chen et al., 2015; Chirkov et al., 2005) suggesting an uniformity rather than universality of BPNs and a little more diffuse way of understanding autonomy varying between choice and independence in non-Western cultures (Chirkov et al., 2005; Chirkov & Ryan, 2001; Vlachopoulos et al., 2013). Indeed, autonomy is thought to represent a core ideal to be learnt in Western cultures where individualist values prevailed over collectivist ones (Chirkov, 2011). In contrast, autonomy is believed to have less importance in Eastern cultures and it could therefrom perform a more secondary role in Eastern people who prioritized more collectivist over individualist values (Chirkov, 2011).

Consistent with previous research in PE, there is a myriad of factors that may vary across cultures, such as including workplace, education system, curriculum, or teacher education. These cultural characteristics can somehow determine the specific way in which students perceived their teacher as interacting with them in not only directing the lesson, but also facilitating their psychological experiences in the lesson. Regarding initial PE secondary teacher education, both countries (i.e., Spain and Estonia) follow the European University System, which consists of the fulfilment of 300 ECTS (i.e., European Credit Transfer System; one credit represents a total of 25 hours of study and work for the student). In addition, these countries have a consecutive model with studies of Bachelor's Degree first and a specific Physical Education Teacher Education (PETE) programs (i.e., master's degree). However, they have some differences in analyzing the structure of this PE secondary teacher education. Spain follows a 4-year Bachelor's Degree and 1-year PETE, whereas Estonia follows a 3-year Bachelor's Degree and 2-year PETE. Overall, this structure of PE secondary teacher education might have some influence on student motivation. For this reason, it is essential to combine a well-designed teacher education programs, practical experience, and specialized knowledge, to be more likely to positively impact student motivation in PE. Concerning the amount of the proportions of pedagogy and PE teaching subjects in the Bachelor's Degree. In Estonia, the proportion of pedagogy and PE teaching subjects is 12 ECTS, out of total 180 ECTS (7%). In Spain, on the other hand, the proportion of pedagogy and PE teaching subjects is 48 ECTS, out of total 240 ECTS (20%). Also, there are some differences in the amount

of the proportion of theoretical and practical subjects in the PETE programs. In Estonia, the proportion of theoretical and practical subjects is 120 ECTS, out of which 82 ECTS (68.3%) are theoretical subjects and 38 ECTS (31.7%) are practical subjects. In Spain, however, the percentage of theoretical and practical subjects is 60 ECTS, including 50 ECTS (83%) in theoretical subjects and 10 ECTS (17%) in practical subjects. While the proportions of pedagogy and PE teaching-related subjects are meaningful, they are just one aspect of a teacher's overall preparation. The quality of instruction, the integration of theoretical knowledge into practical teaching experiences, and individual teaching styles also play critical roles in motivating secondary school students.

Concerning professional development programs, while Estonian PE teachers must complete 160 hours of continuous education in five years, Spanish PE teachers are not required to undertake continuous education. With respect to the PE curriculum, although the curricular goals for PE (e.g., PA promotion) are common in both countries (i.e., Spain and Estonia), different perspectives were adopted in content and assessment. Specifically, the Estonian curriculum takes a more sports view for PE in content development with students who are usually engaged in team sports (e.g., basketball, volleyball, and football), winter sports (e.g., cross-country skiing and skating), track and field athletics, while Spanish curriculum adopts a more varied perspective for PE with students who are typically engaged in a wide range of physical activities, including individual activities, inter-individual opposition, cooperative activities, cooperation and opposition, nature activities, and expressive activities (López-Pastor et al., 2016). It is important to consider that the curriculum is meaningful factor of the overall PE experience. Creating a supportive and inclusive learning environment that recognizes and values student interests and provides opportunities for success is crucial for enhancing motivation in PE.

The present research

Recently, research under the circumplex model has shown that different (de-) motivating approaches contributed to differentially predicting autonomy, competence and relatedness satisfaction in different domains (Delrue et al., 2019; Escriva-Boulley et al., 2021). To the best of our knowledge, no previous studies so far were found to examine the predictive associations of the students' perception of the eight (de-)motivating teaching approaches proposed in the circumplex model with their autonomy, competence, and relatedness satisfaction in PE. Furthermore, little is, currently, known about the potential role that a chaotic style (i.e., abandoning and awaiting approaches) from the

teacher may play in fostering or hampering students' motivational outcomes in the PE lesson. Besides, it is worth underscoring the great absence of cross-cultural research in PE analyzing the role that the students' perceptions of (de-)motivating behaviors from the teacher might have in their motivational outcomes. Indeed, there are no evidence to date examining the predictive associations of students' perceptions of (de-)motivating approaches from the teacher on their need satisfaction, considering the potential cross-cultural differences between students from Estonia (a more collectivist culture) and Spain (a more individualist culture). As societies are becoming increasingly multicultural, the research could be helpful for PE teachers to raise awareness of which (de-)motivating approaches may be the most and least effective in developing their students' experiences of autonomy, competence and relatedness in the PE lesson.

Building upon the circumplex model from SDT, the objective of this study was to examine to what extent are there cross-cultural differences based on students' perceptions of (de-)motivating teaching style from PE teachers. Specifically, the potential cross-cultural differences in the predictive associations of (de-)motivating approaches from the teacher with autonomy, competence, and relatedness satisfaction in the eyes of Estonian and Spanish secondary school students who participated in PE classes. According to previous literature, a theoretical model was hypothesized to analyse all these relationships (see Figure 2).

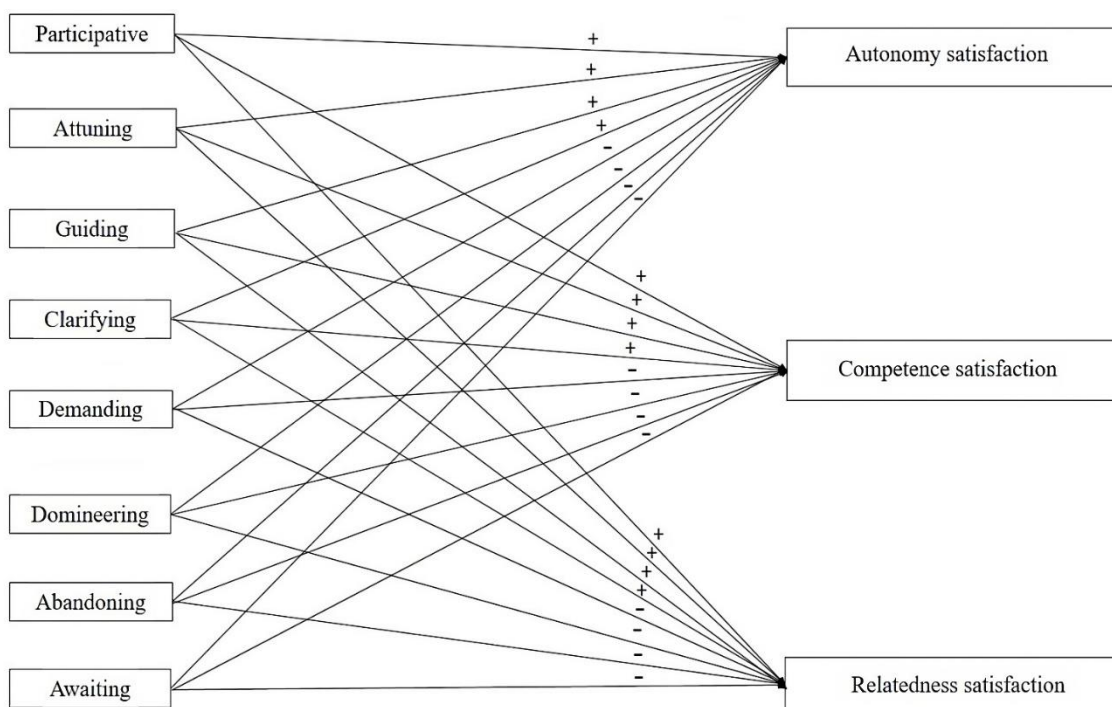


Figure 2. Theoretical hypothesized model of relationships between the study variables.

Consistent with previous SDT-based research in PE (Burgueño et al., 2022; Curran & Standage, 2017; Vasconcellos et al., 2020) and cross-cultural studies (Chirkov, 2011; Vlachopoulos et al., 2013), we hypothesized that Spanish students (as members of a more individualist culture) would obtain higher scores in the two perceived autonomy-supportive and structuring approaches, as well as lower scores in the two perceived controlling and chaotic approaches. We also expected that students' perceptions of motivating teaching approaches would positively predict autonomy, competence and relatedness satisfaction and that demotivating teaching approaches would negatively predict autonomy, competence and relatedness satisfaction.

Methods

Participants and Setting

A convenience sample of 1278 secondary school students from two secondary schools in Estonia and four secondary schools in Spain were invited to voluntarily participate in this cross-sectional study. After removing invalid data (valid response rate: 99%), the final sample consisted of 1270 secondary school students ($M_{age}=14.62$, $SD=1.68$; 54% girls) from Estonia ($n=601$, $M_{age}=14.59$, $SD=1.90$; 56% girls) and Spain ($n=669$, $M_{age}=14.65$, $SD=1.47$; 52% girls) who completed different validated questionnaires regarding PE during the period between May 2021 and February 2022. Before to fill the questionnaire, the researchers obtained parent-signed written informed consent of every student and the students themselves. A paper-and-pencil survey was administered by the researchers from each country during 25 minutes in a quiet classroom environment without the presence of the PE teacher. In Spain, students received two 50-minutes PE lessons per week, whereas Estonian students received two 45-minutes PE lessons per week. Generally, the PE teacher's annual program consists of different teaching units per year. These teaching units correspond to different types of motor content (e.g., individual sports, cooperative games, first aid, etc.) following the national curriculum of each country. Ethical approval for this study was obtained from the Ethics Committee.

Variables and Instruments

Motivating and demotivating teaching approaches

Spanish students' perceptions of (de-)motivating approaches from PE teachers was assessed using the Spanish version (Burgueño et al., 2023) of the Situations-in-

School Questionnaire (SIS-PE; Escriva-Boulley et al., 2021), while Estonian students' perceptions of (de-)motivating approaches from PE teachers was assessed using an Estonian translation of the Situations in School Questionnaire modified for the PE context (SIS; Aelterman et al., 2019). These questionnaires present some situations alongside with four different reactions (i.e., items) for each situation that commonly occur in PE class. Each presented reaction correspond to one of the four (de-)motivating teaching style (i.e., autonomy support, structure, control, and chaos), each of which, in turn, is divided into two teaching approaches (i.e., in total of eight teaching approaches; for further information, please see Aelterman et al., 2019). Students were asked to indicate the extent to which each response reflects their PE teacher's way of teaching on a 7-point Likert scale ranging from one "does not describe my PE teacher at all" to seven "describes my PE teacher extremely well". In this study, the confirmatory factor analysis (CFA) showed a good fit to the data for Spanish ($\chi^2(1074) = 3945.46$, $p < .001$; CFI = .906; TLI = .901; RMSEA = .064), and Estonian samples ($\chi^2(1074) = 6703.34$, $p < .001$; CFI = .929; TLI = .926; RMSEA = .070) as well as appropriate reliability values were obtained ($\omega_{\text{Spanish}} = .71$ to .86) and ($\omega_{\text{Estonian}} = .89$ to .92).

Basic psychological need satisfaction

Students' perceptions of autonomy, competence, and relatedness satisfaction in PE were assessed using the Spanish version of the Basic Psychological Needs in Exercise Scale (BPNES) (Moreno-Murcia et al., 2008) and the Estonian version of the Basic Psychological Need Satisfaction and Frustration Scale (BPNSFS) adapted to PE (Tilga, Hein, et al., 2020), for Spanish and Estonian students, respectively. Following the stem: "In/during my PE lessons ..." both scales includes 12 items (four items per need) assessing autonomy satisfaction (e.g., "I feel that the activities I do in PE fit in with my interests" or "I felt that the exercises reflect what I really want"), competence satisfaction (e.g., "I feel that in PE I perform the activities effectively" or "I felt capable at what I did"), and relatedness satisfaction (e.g., "I feel that in PE lessons I can communicate openly with my classmates" or "I felt that the class members I care about also cared about me"). Items were rated on a 5-point scale ranging from one ("strongly disagree") to five ("strongly agree"). In this research, the CFA showed a good fit to the data for Spanish ($\chi^2(54) = 323.44$, $p < .001$; CFI = .944; TLI = .932; RMSEA = .087) and Estonian ($\chi^2(51) = 179.97$, $p < .001$; CFI = .979; TLI = .973; RMSEA = .065) samples, as well as appropriate reliability values were obtained ($\omega_{\text{Spanish}} = .72$ to .83) and ($\omega_{\text{Estonian}} = .88$ to .93).

Data Analysis

Prior to the main analyses, descriptive statistics (means and standard deviations), composite reliability (via McDonald's omega (ω) coefficient), and Pearson's correlations were performed for all study variables in the Spanish and Estonian samples. Next, multivariate analysis of variance (MANOVA) tests were run to examine cross-cultural mean differences in all study variables. In the main analysis, a multi-group path analysis was performed to examine cross-cultural differences in relationships between students' perceptions of the eight (de-)motivating approaches from the PE teacher and students' autonomy, competence, and relatedness satisfaction. For this purpose, independent models for Spanish and Estonian samples were simultaneously specified within the same overall model. Following the Kline's (2016) methodological approach, the first step consisted of identifying non-significant structural paths in both samples, which were proposed for elimination. The second step tested cross-cultural differences in the relationships of the trimmed model, where all structural paths were freely estimated (i.e., unconstrained model) and compared to the model in which all structural paths were constrained to be equal across samples. To verify which paths were variant across countries, one at a time path was constrained to be equal across countries. Each partially constrained model was compared with an unconstrained model. Next, the χ^2 difference test was used to evaluate the difference between models. A significant χ^2 difference would indicate that the partially constrained model does not fit equally well for both countries and the magnitude of the path coefficient is significantly different across countries, indicating that country moderates this path in the model. Reversely, a non-significant χ^2 difference test would indicate that the partially constrained model fit equally well for both countries and the path coefficient did not vary significantly in magnitude across countries, indicating thus that the country does not moderate this pathway in the model.

The model's fit was assessed by taking acceptable cut-off scores above .90 in Comparative Fit Index (CFI) and Tucker-Lewis Index (TLI), and up to .08 in Root Mean Square Error of Approximation (RMSEA) (Kline, 2016). As the multivariate normality assumption was violated (a Mardia's coefficient=22.65 $p<.01$), the maximum-likelihood method and the 5000-re-sampling bootstrapping technique were conjointly used. Analyses were conducted using the statistical programs SPSS (version 28, Chicago, IL) and AMOS (version 26, IBM SPSS, Chicago, IL).

Results

Preliminary Results

Mean differences and Pearson's correlations between study variables for Spanish and Estonian students are presented in Table 1. MANOVA tests revealed a significant cross-cultural multivariate effect (Wilks' Lambda=0.64, $F(11,12)=62.56$, $p<.001$, $\eta_p^2=.35$). In detail, univariate tests showed that Estonian students significantly higher scored on perceived participative, abandoning, and awaiting approaches, whereas Spanish students significantly higher scored on perceived clarifying, demanding, and domineering approaches. On the other hand, correlations from .25 (i.e., guiding and abandoning approaches) to .86 (i.e., clarifying and attuning approaches) were found in Estonian and Spanish students. In particular, perceived participative, attuning, guiding, and clarifying approaches were positively correlated with autonomy, competence and relatedness satisfaction in Spanish and Estonian students. In Spanish students, a positive correlation was also found between perceived demanding approach and the satisfaction of each BPNs. In Estonian students, perceived demanding approach only was positively correlated with competence satisfaction, whereas perceived domineering approach was positively correlated with autonomy satisfaction. Finally, there were negative correlations of perceived abandoning approach with the satisfaction of each BPN in Estonian and Spanish students.

Cross-cultural differences in the associations of (de-)motivating approaches on students' need satisfaction

Prior to path analysis, the multilevel nature of the data was explored because the participating sample of 1270 secondary school students was nested within eight secondary schools (four schools for each country). As school-level variance ($\chi^2[df=1]=0.68-2.40$, $p>0.05$) was nonsignificant for the study variables, the multilevel nature of the data at school level was not controlled for multi-group path analysis.

Results from the multi-group path analysis indicated that paths from each perceived (de-) motivating teaching approaches to autonomy, competence and relatedness satisfaction were, overall, statistically significant among Estonian and Spanish students. The trimmed multi-group path model fitted adequately well across countries (see Table 2, Model 1). Standardized path coefficients for both countries are presented in Figure 2. Then, equality constraints were specified to all structural paths to test cross-cultural

differences in relationships between each perceived (de-)motivating approach and the satisfaction of each BPN. In consequence, a significant change in the χ^2 test was observed (see Table 2, Model 2) suggesting that at least one or more structural paths differed across countries.

A total of 13 additional models in addition to models 1 and 2 were run to examine which structural paths were variant across countries (see Table 2, Models 3 to 15) by constraining paths one at a time to be equal across the Estonian and Spanish samples. Equality constraints on paths from participative approach to autonomy satisfaction (Model 3), competence satisfaction (Model 4), and relatedness satisfaction (Model 5), from attuning approach to relatedness satisfaction (Model 8), from clarifying approach to competence satisfaction (Model 9), from domineering approach to competence satisfaction (Model 12) and from abandoning approach to autonomy satisfaction (Model 13) resulted in a significant reduction in model fit as indicated by the significant χ^2 difference test, suggesting that these paths were moderated by the country.

Table 1. Descriptive statistics, mean differences and correlations between study variables by country.

	Estonian students (n=601)	Spanish students (n=669)	$F_{(11,258)}$	η_p^2	1	2	3	4	5	6	7	8	9	10	11
	$M (SD)$	$M (SD)$													
1. Participative approach	4.40(1.24)	4.01(1.50)	47.84**	.019	-	.81**	.75**	.49**	.20**	.01	-.07	.08*	.66**	.52**	.50**
2. Attuning approach	4.49(1.22)	4.60(1.26)	3.50	.002	.73**	-	.86**	.51**	.15**	-.01	-.17**	.04	.70**	.56**	.54**
3. Guiding approach	5.06(1.18)	5.18(1.22)	4.11	.002	.61**	.77**	-	.70**	.13**	-.06	-.25**	-.02	.67**	.55**	.51**
4. Clarifying approach	4.96(1.02)	5.22(1.08)	21.84**	.015	.52**	.70**	.51**	-	.05	-.08*	-.22**	-.09*	.44**	.36**	.35**
5. Demanding approach	3.85(1.15)	4.75(0.97)	254.55**	.150	.42**	.51**	.55**	.59**	-	.79**	.63**	.39**	.07	.17**	.06
6. Domineering approach	3.51(1.35)	3.77(1.19)	21.26**	.010	.21**	.18**	.12**	.22**	.44**	-	.74**	.42**	-.07	.06	-.05
7. Abandoning approach	3.14(1.26)	2.56(1.24)	104.50**	.050	-.06	-.24**	-.33**	-.22**	-.01	.43**	-	.60**	-.22**	-.10**	-.15**
8. Awaiting approach	3.25(1.22)	2.63(1.29)	121.73**	.057	.01	-.07	-.16**	-.11**	.04	.27**	.57**	-	.01	.01	-.04
9. Autonomy satisfaction	3.37(1.01)	3.26(0.86)	3.93*	.004	.50**	.56**	.50**	.39**	.35**	.10**	-.09*	.00	-	.71**	.60**
10. Competence satisfaction	3.49(1.09)	3.76(0.92)	22.88**	.017	.26**	.34**	.31**	.21**	.19**	.05	-.16**	-.04	.53**	-	.56**
11. Relatedness satisfaction	3.47(1.13)	3.77(0.91)	28.02**	.021	.22**	.31**	.29**	.26**	.16**	.06	-.16**	-.05	.44**	.58**	-

Note: Correlations for Estonian are shown above the diagonal and correlations for Spanish are shown below the diagonal. Correlations were significant at the level * $p < .05$, ** $p < .01$.

Table 2. Invariance test across countries.

	Parameters constrained	χ^2	Df	CFI	TLI	RMSEA (90% CI)	$\Delta\chi^2$	Δdf	Δp
Model 1	None	41.146	22	.998	.988	.026 (.013-.038)	-	-	-
Model 2	All paths	160.518	35	.984	.951	.053 (.045-.062)	119.372	13	.000
Model 3	Participative → Autonomy satisfaction	46.596	23	.997	.986	.028 (.016-.040)	5.411	1	.020
Model 4	Participative → Competence satisfaction	45.903	23	.997	.986	.028 (.016-.040)	4.757	1	.029
Model 5	Participative → Relatedness satisfaction	48.168	23	.997	.985	.029 (.018-.041)	7.022	1	.008
Model 6	Attuning → Autonomy satisfaction	41.607	23	.998	.989	.025 (.012-.037)	0.461	1	.497
Model 7	Attuning → Competence satisfaction	41.257	23	.998	.989	.025 (.012-.037)	0.112	1	.738
Model 8	Attuning → Relatedness satisfaction	45.876	23	.997	.986	.028 (.016-.040)	4.730	1	.030
Model 9	Guiding → Autonomy satisfaction	41.606	23	.998	.989	.025 (.012-.037)	0.460	1	.497
Model 10	Guiding → Competence satisfaction	43.738	23	.997	.988	.027 (.014-.039)	2.592	1	.107
Model 11	Clarifying → Competence satisfaction	47.528	23	.997	.985	.029 (.017-.041)	6.383	1	.012
Model 12	Domineering → Competence satisfaction	47.200	23	.997	.986	.029 (.017-.041)	6.055	1	.014
Model 13	Abandoning → Autonomy satisfaction	53.885	23	.996	.982	.033 (.021-.044)	12.739	1	.000
Model 14	Abandoning → Competence satisfaction	41.602	23	.998	.989	.025 (.012-.037)	0.457	1	.499
Model 15	Abandoning → Relatedness satisfaction	41.174	23	.998	.989	.025 (.012-.037)	0.028	1	.867

Note: Models highlighted in bold had significant change in χ^2 difference test in relation to the unconstrained model (i.e., Model 1).

Figure 3 shows that Estonian students' perceptions of participative approach positively predicted autonomy, competence, and relatedness satisfaction, while only autonomy satisfaction was positively predicted by participative approach in Spanish students. More specifically, these predictive effects were significantly higher in the eyes of Estonian than Spanish students. Results also display that attuning approach positively predicted the satisfaction of each BPN as perceived by Estonian and Spanish students. However, only the prediction from attuning approach to relatedness satisfaction was significantly greater in the eyes of Estonian than Spanish students. Regarding the two structuring approaches, guiding approach positively predicted autonomy satisfaction both as perceived by Estonian and Spanish students, while it only predicted competence satisfaction in Estonian students. Clarifying approach only predicted competence satisfaction negatively in Spanish students' perspective, while nonsignificant prediction was found in Estonian students' perspective. Concerning the two controlling approaches, while demanding approach had nonsignificant effects on need satisfaction among students, domineering approach only predicted competence satisfaction positively in Estonian students' perception. About the two chaotic approaches, abandoning approach negatively predicted competence and relatedness satisfaction both in the eyes of Estonian and Spanish students, whereas it predicted negatively only autonomy satisfaction in Estonian students' perspective. Awaiting approach did not predict the satisfaction of any BPN in students from both cultures.

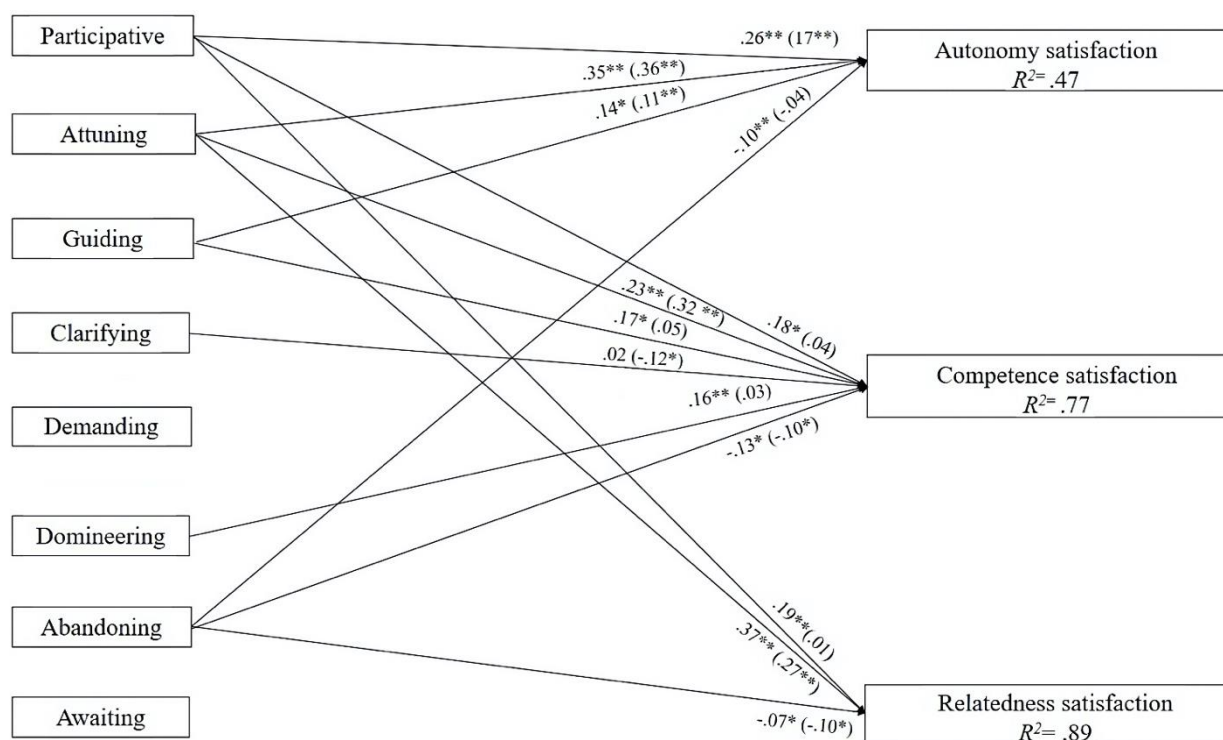


Figure 3. Multi-group path analysis depicting relationships between perceived teachers' (de-)motivating approaches and need satisfaction between Estonian and Spanish students.

Note: Standardized estimates for Estonians are shown outside parentheses and estimates for Spanish are shown within parentheses. * $p < .05$, ** $p < .01$.

Discussion

Grounded on the circumplex model from SDT, the main objective of this study was to examine the potential cross-cultural differences in the predictive associations of the Estonian and Spanish students' perception of (de-)motivating approaches from the teacher with autonomy, competence, and relatedness satisfaction in PE. The main results revealed that: a) the four perceived motivating approaches (i.e., participative, attuning, guiding, clarifying) predicted the satisfaction of each BPN in general, and autonomy and competence satisfaction in the eyes of Estonian and Spanish students in particular; b) domineering approach positively predicted competence satisfaction in Estonian students' perceptions; and c) abandoning approach overall predicted the satisfaction of each BPN negatively as perceived by Estonian and Spanish students.

The results from the two autonomy-supportive approaches showed that perceived participative approach predicted positively and significantly autonomy satisfaction in both Spanish and Estonian students, whereas predicting positively and significantly competence and relatedness satisfaction only in Estonian students. Aligned with SDT-

based research in PE (Vasconcellos et al., 2020), these results suggest that providing students with opportunities for choice, asks them for their opinions, and welcomes their suggestions (i.e., participative approach) may facilitate autonomy satisfaction in particular, but also competence and relatedness satisfaction. Concerning attuning approach, it is positively predicted autonomy, competence, and relatedness satisfaction in both Estonian and Spanish students. This would mean that when students can choose both the most-liked variant and the most-loved classmates to do it (i.e., attuning approach), they would tend to satisfy their autonomy, competence, and relatedness.

In line with our research hypotheses, both participative and attuning approaches positively predicted autonomy, competence, and relatedness satisfaction. Contrasted with our expectations, the predictive effect was significantly higher in Estonian than Spanish students' perceptions. A possible explanation would rest on the differences in the education context, where students from individualistic or collectivist countries could experience autonomy support differently (Awang-Hashim et al., 2017). These results obtained in the two autonomy-supportive approaches contrasted both with Chirkov and Ryan's (2001) study reporting students from collectivist cultures perceived lower values of PE teachers' autonomy support, and the Vasconcellos et al. (2020) systematic review showing the absence of cross-cultural differences in perceived autonomy support. These findings may be due to the changing nature of young people's cultural orientations in Eastern European countries. Previous research has suggested that socio-political evolution and modernization in these countries may change the balance between individualistic and cultural values (Allik & Realo, 2004). In particular, Realo (2003) stated that Estonian people tended to self-stereotype themselves as individualists whereas the scientific literature tends to conceptualize Estonia as a collectivist culture.

The results of the two structuring approaches showed that perceived guiding approach predicted positively autonomy satisfaction in both Estonian and Spanish students, whereas predicting positively competence satisfaction only in Estonians. Perceived clarifying approach negatively predicted competence satisfaction only in Spanish students, instead. Consistent with SDT assumptions and the circumplex model (Vansteenkiste et al., 2019), these results indicated that perceived guiding approach could predict autonomy and competence satisfaction because it supports the students' progress by providing them with help and assistance when needed. This would imply that when students can decompose the target activity into different steps to complete it, receiving

useful feedback to guide them in their improvement of the teaching-learning process (i.e., guiding approach), they are prone to satisfy their autonomy and competence. Moreover, perceived clarifying approach characterized by strategies for teachers to communicate their expectations to their students in a clear and transparent way and offering an overview of the learning to be achieved could not satisfy the three BPN by moving away from SDT (Ryan & Deci, 2017) in Spanish students. The negative association of perceived clarifying approach with competence satisfaction could be explained because the two structuring approaches are highly directive and could, therefore, be mistaken with a controlling style (Aelterman et al., 2019). Therefore, further research should be conducted on how this teaching approach, which combines high directiveness and high need-support, may facilitate or hinder the students' motivational process in PE.

The results from perceived guiding and clarifying approaches are partially consistent with our hypotheses, such that they positively predicted autonomy and competence satisfaction, but not relatedness satisfaction. In addition, the predictive effect was overall higher in Estonian than Spanish students' perceptions, although this difference was only significant between clarifying approach and competence satisfaction across countries. These results may be explained by the change in the Estonian young people's mentality from collectivist to individualist values which may show less cross-cultural variability in the psychological variables than expected (Realo, 2003).

In line with SDT-based PE research (Behzadnia et al., 2018; Cronin et al., 2019) and following the circumplex model (Aelterman et al., 2019; Escrivá-Boulley et al., 2021), the results of the two controlling approaches showed that perceived demanding approach did not predict significantly the satisfaction of any BPN. These results suggested that when a PE teacher imposes their lessons agenda on students with direct and overt strategies (e.g., excessively coercive commands or contingent use of rewards and punishment), they were not prone to perceive their BPNs as neither satisfied nor actively undermined both in Estonia and Spain. According to Aelterman et al. (2019), it is possible that students seen perceived demanding approach as a need-depriving approach, namely, this controlling approach failures to actively undermine need satisfaction in the lessons, but instead it could generate the conditions whereby students do not have opportunities to support their need satisfaction. Perceived domineering approach positively and significantly predicted competence satisfaction only in Estonian students. Unlike the SDT assumptions (Ryan & Deci, 2017), these results suggest that

when a PE teacher pressures their students to complete the task in question according to his/her requests using intrusive and manipulative tactics (domineering approach), they would be able to successfully accomplish it (competence satisfaction). It could somehow point out that domineering approach from the PE teacher might be interpreted by students as an effective way to direct their efforts to the task accomplishment. Although this teaching approach could be effective in guiding student short-term learning, great caution should be taken about long-term effects (Ryan & Deci, 2017). It is plausible to think that, as controlling and structuring practices are high in teacher directiveness, specific controlling practices might be understood by students as structuring strategies and, in consequence, feel their competence as satisfied (Aelterman et al., 2019). Hence, more research is required to shed light on which may be the optimal level of perceived control to contribute to adaptive outcomes in the PE lesson, since it broadly yields maladaptive outcomes in the long-term (Vasconcellos et al., 2020). In addition, it would be beneficial to examine the effects of the combination of structure and control, to explore if there is a need to study profiles where it can be seen if there are combinations of both teaching styles that would have positive effects.

Furthermore, and in contrast to our hypothesis, non-significant cross-cultural differences were found for perceived demanding approach, while perceived domineering approach had a higher prediction on competence satisfaction in Estonian than Spanish students. A possible explanation would rest on the fact that Estonian and Spanish students would differentially interpret controlling approaches from their teacher. This is, Estonian students could largely normalize controlling approaches in the instructional practice and understand that they are the specific manner the teacher have to be interest in how they complete the task and, in turn, guide their learning (Cheng et al., 2016; Zhou et al., 2012).

The results of the two chaotic approaches revealed that perceived abandoning approach negatively predicted competence and relatedness satisfaction in students from both cultures, whereas negatively predicting autonomy satisfaction only in Estonian students. Consistent with SDT assumptions (Ryan & Deci, 2017), our findings suggest that when a PE teacher gives up and leave students to their fate in the lessons, they would tend to actively undermine need satisfaction by not knowing what they have to do, how they should act and how they are able to develop their skills. Following with our hypotheses, it was expected a negative prediction from perceived awaiting approach to BPN satisfaction. However, the results of this teaching approach did not significantly

predict the satisfaction of any BPN. According to Aelterman et al. (2019), these findings would raise that awaiting approach does not actively undermine need satisfaction, but rather it might create the conditions for which students might deprive the opportunities to support their need satisfaction in the PE lesson.

In contrast to our hypothesis, the results displayed that, while non-significant cross-cultural differences were found for perceived awaiting approach, there were greater predictions of perceived abandoning approach on the satisfaction of each BPN, except relatedness satisfaction, in the eyes of Estonian than Spanish students. A plausible rationale would lie in the change in the Estonian young people's mentality to denominate themselves as individualists against the scientific literature to date tending to identify them as a collectivist culture (Realo, 2003). Our results also contrasted with previous research (Chirkov & Ryan, 2001), in the sense that students from collectivist cultures reported lower perceptions of less directive behaviors, including chaotic teaching style.

Limitations and Future Directions

Although this research meaningfully contributed to the PE existing literature and practice, various limitations should be considered. Firstly, although the same SDT-based variables were assessed in the two target samples, slightly different questionnaire versions were used to measure such variables, which might entail some distinctiveness in analyzing cross-cultural differences. Future studies should consider the use of the same questionnaire form to obtain a more rigorous insight into students' motivational processes in different countries. Secondly, the adoption of a cross-sectional design does not allow us to estimate causal effects between study variables. Additional longitudinal research is needed to further examine the direction of the relationships and to shed light on the effects of (de-)motivating teaching approaches on students' need satisfaction in PE. Thirdly, in the present study, only need satisfaction was included. More research should expand the evidence on the associations of the eight (de-)motivating approaches with other adaptive and maladaptive outcomes such as need frustration or the quality of motivation in PE. This would allow us to gain a better understanding of the beneficial and detrimental effects of (de-)motivating approaches from teachers in instructional practice. Fourthly, the eight (de-)motivating approaches were assessed by self-reported measures in eyes of students. Further studies could complement these self-reported measures both with observational instruments and teachers' perceptions of their own (de-)motivating approaches for an effective data triangulation.

Conclusions

The present study underscores cross-cultural differences in the associations of students' perceptions of (de-)motivating approaches on their need satisfaction, as well as it strengthens the SDT assumptions regarding cross-cultural validity. Our results highlight the cross-cultural variability in the determinant role played by the Estonian and Spanish students' perception of (de-)motivating approaches from the teacher in the satisfaction of their autonomy, competence and relatedness. Firstly, autonomy support through perceived participative and attuning approaches may be relevant for students to satisfy their BPN. Secondly, structure through perceived guiding approach is associated with autonomy and competence satisfaction, whereas perceived clarifying approach is negatively related to competence satisfaction. Moreover, control, and in special, perceived domineering approach was positively related to competence satisfaction, which make us suggest the need for further research to expound on the relationship between this type of demotivating approach and competence satisfaction in students. Finally, chaos and, more particularly, perceived abandoning approach was negatively associated with need satisfaction, which could trigger maladaptive outcomes over time in PE. Thus, these results underline the need to include a specific education in initial and continuous teacher education programs, in which PE teachers are trained not only to maximize motivating styles (i.e., autonomy support and structure), but also to minimize demotivating styles (i.e., control and chaos) as much as possible in their lessons practice.

4.4. ESTUDIO IV: Exploring (de-)motivating teaching profiles from a fine-grained directiveness approach in Physical Education: Differences in students' need-based experiences

Abstract

A more integrative and fine-grained circumplex model has been recently proposed to explain teachers' (de) motivating teaching style based on four styles (autonomy support, structure, control, and chaos). However, to date, no study has examined the extent to which PE teachers might combine these styles in their classes. Adopting a person-centered approach, this study aimed to identify different combinations of students' perceptions of (de)motivating teaching approaches from their PE teachers, and to examine the extent to which the results of identified (de)motivating teaching approach profiles were optimal in terms of students' need-based experiences. A sample of 1132 secondary school students (52% girls) participated in the study. Two sets of latent profile analyses (LPA) to identify respectively different combinations of high (i.e., Participative, attuning, guiding, and clarifying) and low (i.e., demanding, domineering, abandoning, and awaiting) directive approaches were performed. After that, chi-square means equality tests to know the extent to which the retained profiles were similar in terms of need-based experiences were conducted. With regard to the high directiveness approaches, four profiles were retained: "high structure–moderate control", very high structure–high control", moderate structure–control", and "low structure–control". Whereas the "very high structure–high control" profile showed the most optimal results in terms of students' need-based experiences, the opposite was true for the "low structure-control" profile. Regarding the low directiveness approaches, four profiles emerged: "high autonomy support-low chaos", "low autonomy support-high chaos", "high autonomy support-very high chaos, and "moderate autonomy-support–chaos". While the "high autonomy support-low chaos" profile reported the most adaptive results in terms of students' need-based experiences, the contrary was true for the "low autonomy support-high chaos". PE teachers, in the eyes of their students, may especially combine traits of structure and control, as well as autonomy support and chaos. Thus, it seems important not only that future training programs focus on encouraging autonomy support and structure, but also on reducing chaos and control for PE teachers.

Keywords: high teacher directiveness, low teacher directiveness, teaching styles, physical education.

Introduction

One of the main curricular goals for Physical Education (PE) is to develop students' autonomy, competence and social interactions in a wide array of motor skills, contributing to maintaining health-improving levels of physical activity throughout their lifetime (SHAPE America—Society of Health and Physical Educators, 2014). In PE, how students perceive their teacher as leading them in the lesson is thought to be a key determinant of their autonomy, competence and relatedness (Curran & Standage, 2017; Vasconcellos et al., 2020). Self-Determination Theory (SDT; Ryan & Deci, 2017) is a highly-valuable theoretical perspective for examining how students' perceptions of teacher behavior PE lesson influence their experiences of autonomy, competence, and relatedness through the concept of (de-)motivating teaching style.

Grounded in SDT, Aelterman et al. (2019) recently developed a circumplex approach to (de-)motivating teaching styles that has been adapted to the specific context of PE (Burgueño, Abós, et al., 2023; Escriva-Boulley et al., 2021). This integrative and fine-grained conceptualization relies on the intersection of teacher directiveness (y-axis) with need-supportiveness (x-axis) introducing the teachers' styles of autonomy support (i.e., understanding and flexibility attitudes toward students' learning), structure (i.e., guidance attitudes toward students' skill development), control (i.e., pressure attitudes toward students' learning) and chaos (i.e., laissez-faire attitudes toward students' progress) within a circular structure. Through variable- and person-centered approaches, much of the PE research to date analyzed teachers' styles from a black-white fashion (i.e., need-supportive *versus* need-thwarting), reporting students' perceptions of predominantly need-supportive teaching (i.e., autonomy support and structure) was positively associated with the satisfaction of their need for autonomy, competence and relatedness, while a perceived mainly need-thwarting teaching (i.e., control and chaos) was positively associated with their need frustration (Burgueño et al., 2022; Haerens et al., 2018; Vasconcellos et al., 2020). Although all such studies meaningfully contributed to the PE field, they ignored the teacher-directiveness axis in examining teachers' (de-)motivating styles in PE. From the premise that perceived (de-)motivating styles can be simultaneously used by PE teachers for optimal lesson management, it is important to explore different combinations of autonomy support and chaos from PE teachers when transferring room for students to take initiative, and distinct configurations of teachers' structure and control when they take the leadership in the lesson. This will help PE

teachers to use maximized autonomy-supportive practices being chaotic as little as possible when students lead the lesson, as well as implement effective structuring rather than controlling practices when teachers direct the lesson. Therefore, the present research adopted a person-centered approach to shed light on how students' perceptions of different combinations of low teacher directiveness (i.e., autonomy-supportive and chaotic approaches) and of high teacher directiveness (i.e., structuring and controlling approaches) differ in their experiences of autonomy, competence and relatedness in the PE lesson.

A circumplex view for (de-)motivating styles from the PE teacher

Building upon SDT, the circumplex model (or teaching wheel) operationalizes the PE teachers' styles of autonomy-support, structure, control and chaos in terms of directiveness (i.e., the degree to which teacher takes the initiative or transfers room for students to lead learning interactions) and need-supportiveness (i.e., the degree to which teacher supports or thwarts students' needs) providing a more integrative and fine-grained vision (Aelterman et al., 2019; Escriva-Boulley et al., 2021). This more fine-grained view implies a refinement of each (de-)motivating style into two more specific teaching approaches (Aelterman et al., 2019; Escriva-Boulley et al., 2021). While the more integrative perspective entails a more progressive distinction among styles with each representing high relative to low directiveness and need-supportive relative to need-thwarting practices (Aelterman et al., 2019; Escriva-Boulley et al., 2021).

Focusing on teacher directiveness, PE teachers can take the lead in learning interactions (high directiveness) using structuring and controlling styles, with the structure being need-supportive and control being need-thwarting in nature (Burgueño, Abós, et al., 2023; Escriva-Boulley et al., 2021). When being structuring, a PE teacher provides students with adjusting instructions to their ability levels, positive informative feedback and assistance when needed for task accomplishment (i.e., guiding approach), as well as (s)he clearly communicates learning expectations and goals to them and consistently monitors their progress (i.e., clarifying approach). When being controlling, a PE teacher, instead, exerts pressure on students to strictly follow his/her classroom agenda using explicit and behavior-centered strategies based on coercive language, powerful commands, threats of contingent punishment and rewards (i.e., demanding approach), and using intrusive and power-assertive practices based on guilt-induction, intimidation, personal attacks, and public shame (i.e., domineering approach).

When PE teachers give opportunities for students to take the initiative in learning interactions (low directiveness), they can do it using autonomy-supportive and chaotic styles (Burgueño, Abós, et al., 2023; Escriva-Boulley et al., 2021). Although both are low in directiveness, autonomy support is need-supportive and chaos is need-thwarting in nature (Burgueño, Abós, et al., 2023; Escriva-Boulley et al., 2021). When being autonomy-supportive, a PE teacher provides students with opportunities for choice, invitations for suggestions and decision power to get involved in the learning process (i.e., participative approach), as well as (s)he offers meaningful rationales for tasks to them and validates their preferences and interests (i.e., attuning approach). When being chaotic, a PE teacher fails to intervene when indications are required and leaves students to their own (i.e., abandoning approach), as well as (s)he awaits to see how the lesson evolves and if students can take the lead themselves (i.e., awaiting approach).

(De-)motivating teaching styles and students' need-based experiences in PE

SDT recognizes autonomy, competence and relatedness as the three basic psychological needs for growth, integrity and adjustment (Vansteenkiste et al., 2020). SDT makes a clear distinction between the satisfaction and frustration of the need for autonomy, competence and relatedness, such that need satisfaction contributes to wellness, proactivity and integration (i.e., the bright side of functioning), and need frustration is prone to illness, passivity and defensiveness (i.e., the dark side of functioning) (Vansteenkiste et al., 2020). Autonomy satisfaction refers to a sense of initiative and ownership in behaviors, whereas autonomy frustration involves perceptions of being forced to act in predetermined ways. Competence satisfaction refers to a sense of ability, mastery and efficacy for expected goals, whereas competence frustration involves perceived inefficacy and inability toward desired challenges. Relatedness satisfaction refers to a sense of meaningful connections with valued people, whereas relatedness frustration involves perceptions of loneliness and social exclusion by significant others (Vansteenkiste et al., 2020).

The students' perception of how the PE teacher leads the lesson has been identified as a key determinant of their need-based experiences in PE lessons (Vasconcellos et al., 2020; Curran & Standage, 2017). Previous PE research has demonstrated that, despite being highly directive styles, the students' perception of PE teachers' structure was positively associated with their need satisfaction, just as perceived control from their teacher was positively related to their need frustration (Vanconcellos et al., 2020; Curran

& Standage, 2017). Further, negative relationships (or cross-path) were consistently found between perceived PE teachers' structure and need frustration (Behzadnia et al., 2018; Burgueño & Medina-Casabón, 2021; Curran & Standage, 2017), while the relationship between perceived PE teachers' control and need satisfaction requires to be clarified for consistent results (Burgueño et al., 2022; García-González et al., 2023; Leo, Behzadnia, et al., 2022).

On the other hand, previous studies showed that, although both are common in low directiveness, the students' perception of autonomy support from the PE teacher was positively associated with their need satisfaction (Vanconcellos et al., 2020; Curran & Standage, 2017), and perceived chaos from their teacher was positively related to their need frustration (Burgueño & Medina-Casabón, 2021; Leo, Behzadnia, et al., 2022; Van Doren et al., 2023). While inconclusive associations were observed between perceived PE teachers' autonomy support and need frustration (Behzadnia et al., 2018; Haerens et al., 2015; Van Doren et al., 2023), perceived chaos from the teacher was unrelated to need satisfaction among students in PE lessons (Burgueño & Medina-Casabón, 2021; Leo, Behzadnia, et al., 2022; Van Doren et al., 2023). These variable-centered studies meaningfully contributed to the study of the interplay between PE teachers' (de-)motivating styles with need-based experiences in the eyes of students. However, variable-centered analyses fail to ascertain whether students can simultaneously perceive their PE teacher as using autonomy-supportive and chaotic styles when (s)he offers room to them to lead learning interactions, and when (s)he engages with structuring and controlling styles to take the initiative in the practice time. Further, variable-centered approaches do not allow one to explore how distinct configurations of autonomy-support and chaos (low directiveness), and of structure and control (high directiveness) yield specific need-based experiences in students.

The merits of person-centered approaches to study (de-)motivating teaching styles

In an effort to overcome the limitations of variable-centered analyses, person-centered approaches allow for the identification of qualitatively distinct subgroups within populations (i.e., profile) sharing certain outward features (Weller et al., 2020). Hence, person-centered approaches are of great practical usefulness to analyse how different combinations of PE teachers' autonomy support and chaos, and structure and control yield specific need-based experiences among students in PE lessons.

A small body of person-centered research to date has focused almost exclusively on PE teachers' need-supportiveness to examine combinations of perceived (de-)motivating teaching styles in PE (Burgueño et al., 2022; Haerens et al., 2018; Leo, Pulido, et al., 2022). The results indicated two common profiles, one characterized by high need-support and low need-thwarting with more adaptive patterns of students' outcomes, and another with low need-support and high need-thwarting reporting more maladaptive patterns of outcomes. The remaining identified profiles were characterized by varying levels of need-support and need-thwarting being more adaptive inasmuch as more need-support contained every profile (Burgueño et al., 2022; Haerens et al., 2018; Leo, Pulido, et al., 2022). So far, there was a single person-centered study analyzing configurations of PE teachers' (de-)motivating styles putting the spotlight on teacher directiveness with structure (or competence-support) and control in PE (García-González et al., 2023). Four distinct profiles (i.e., high competence-support–low control, moderate competence-support and control, moderate competence-support–high control, and low competence-support–high control) were identified differing over need-based experiences. The high competence-support–low control profile was highest on need satisfaction and lowest on need frustration, while the low competence-support–high control scored lowest on need satisfaction and highest on need frustration. The moderate competence-support–control profile was more adaptive than the moderate competence-support–high control profile. Albeit, García-González et al. (2023) study laid the first stone of teacher directiveness in PE indicating that the manner the PE teacher provides students with directions matters, it was away from the SDT-based circumplex model and ignored autonomy-support and chaos as less directive styles in studying teacher directiveness in the PE lesson.

To the best of our knowledge, little attention has been received the question of how students' perceptions of the specific way the teacher leads the practice time may influence their experiences of autonomy, competence and relatedness in the PE lesson. Indeed, many PE teachers fear that providing high autonomy support might lead to chaos when transferring control to students in the learning process (Aelterman, Vansteenkiste, Van Keer, et al., 2016). This is because some students may perceive the freedom given to them as being too open, thereby contributing to confusion and uncertainty, while other students may understand it as an opportunity for self-realization and active lesson participation. On the other hand, when PE teachers decide to assume the leadership as an optimal lesson management strategy, they wonder how to avoid confusing structure with

control in the instructional practice, since if teachers intervene with clear and transparent instructions for successful task completion, these may be perceived by certain students as coercive and strict commands, whereas others may interpret them as helpful and accomplishment-oriented guidelines. Under the more gradual lens of SDT-based circumplex model discerning among eight teaching approaches in terms of high relative low directiveness and need-supportive relative to need-thwarting practices, there is a need to obtain a deeper understanding of how PE teachers can optimally direct the practice time in order for students to become more autonomous, competent and socially well-interact in PE, irrespective of who takes the leadership in the lesson. This will help PE teachers to improve their capacity of calibration in selecting the combination of motivating approaches that best fits with students' characteristics and situational learning circumstances.

The present study

Guided by the SDT-based circumplex model (Aelterman et al., 2019; Burgueño, Abós, et al., 2023; Escriva-Boulley et al., 2021), the objective of this research was twofold. The first objective was to separately identify the optimal number of profiles with varying levels both of high teacher directiveness (i.e., guiding, clarifying, demanding and domineering approaches) and low teacher directiveness (i.e., participative, attuning, abandoning and awaiting approaches) perceived by students in PE. Considering previous SDT-based research in PE (Burgueño et al., 2022; García-González et al., 2023; Haerens et al., 2018; Leo, Pulido, et al., 2022), we expected to identify up to four different profiles based on varying levels of high teacher directiveness. The first profile would be characterized by high levels of guiding and clarifying approaches in conjunction with low levels of demanding and domineering approaches, and the second one by opposite scores. The third and fourth profiles would simultaneously show low-to-high levels of the four more directive approaches. For low directiveness, we also hypothesized four profiles with one characterized by high levels of participative and attuning approaches paired with low abandoning and awaiting approaches, and another obtaining opposite scores. The remaining two profiles would concurrently display low-to-high scores for the four less directive approaches.

The second objective was to examine the differences in students' satisfaction and frustration of the need for autonomy, competence and relatedness across the previously retained profiles based both on the four more directive approaches and on the four less

directive approaches. Consistent with previous SDT-based studies in PE (Burgueño et al., 2022; García-González et al., 2023; Haerens et al., 2018; Leo, Pulido, et al., 2022), we hypothesized that both the profile characterized by high guiding and clarifying and low demanding and domineering approaches and the profile with high participative and attuning and low abandoning and awaiting approaches would report the highest levels on need satisfaction and the lowest on need frustration. The exactly opposite profiles were expected to be the lowest scores on need satisfaction and the highest on need frustration. No hypotheses were formulated about the differences in need-based experiences over the remaining retained profiles.

Methods

Participants and procedures

A non-probabilistic convenience sample of 1132 students from eight secondary schools in a small-sized city in the northeast of Spain participated in this cross-sectional study. After removing invalid data (valid response rate: 99.3%), the final sample consisted of 1124 secondary school students ($M_{age}=14.60$, $SD=1.51$; 52% girls) distributed into five different school grades (i.e., Year-8 $n=299$; Year-9 $n=236$; Year-10 $n=257$; Year-11 $n=195$; Year-12 $n=137$). Students' responses were taught by 15 different PE teachers ($M_{age}=36.81$, $SD=6.79$; 20% woman; divided in three schools with three teachers and five schools with one teacher).

To collect the data, the researchers obtained all permissions and authorizations from the schools' boards and PE teachers of the participating secondary school and written informed consent from parents or guardians of every student and the students themselves. Participants were informed that the data were confidential and anonymous and would only be used for research purposes. The paper-and-pencil questionnaires were completed at the end of the lesson in approximately 25 minutes in a quiet classroom in the absence of their PE teacher so as not to influence their responses. The questionnaires were distributed in May of 2021 and 2022, giving students enough time to get to know their PE teacher's motivating teaching style, as the school year starts in September. In the participating schools, PE lessons were two compulsory 60-minute lessons per week. The study was approved by the Ethics Committee.

Variables and instruments

(De-)motivating teaching approaches

Students' perceptions of (de-)motivating teaching approaches from their PE teacher were assessed using the Spanish version (Burgueño, Abós, et al., 2023) of the Situations-in-School in Physical Education Questionnaire (SIS-PE; Escriva-Boulley et al., 2021). The SIS-PE outlines 12 classroom situations followed by the description of four items describing potential behaviors corresponding to one of the four autonomy-supportive, structuring, controlling and chaotic styles (i.e., in total 48 items). Five items are classified as clarifying, seven as guiding, seven as demanding, and five as domineering teaching approaches, which are the high teacher directiveness. Meanwhile, four items are categorized as participative, eight as attuning, eight as abandoning, and four as awaiting teaching approaches, which are considered to be low teacher directiveness. Students were asked to indicate the extent to which each item reflects their PE teacher's way of teaching in a specific situation on a 7-point Likert scale ranging from 1 (does not describe my PE teacher at all) to 7 (describes my PE teacher extremely well). In the present study, confirmatory factor analysis (CFA) showed a good fit to the observed data for the four-factor correlated models specified in terms of highly-directive approaches ($\chi^2/df=6.13$, $p<.001$; CFI=.91; TLI=.90; RMSEA=.068; 90% CI=.064–.071) and less-directive approaches ($\chi^2/df=4.12$, $p<.001$; CFI=.95; TLI=.95; RMSEA=.053, 90% CI=.049–.056).

Need satisfaction

Students' perceptions of autonomy, competence, and relatedness satisfaction in PE were assessed by the Spanish PE version (Moreno-Murcia et al., 2008) of the Basic Psychological Needs in Exercise Scale (Vlachopoulos & Michailidou, 2006). Following the stem: "In my PE lessons ...", this scale includes 12 items (four items per factor) assessing autonomy satisfaction (e.g., "I feel that the activities I do in PE fit in with my interests"), competence satisfaction (e.g., "I feel I can successfully complete difficult tasks"), and relatedness satisfaction (e.g., "I feel very comfortable when participating in activities with my classmates"). Items are rated on a 5-point scale from 1 (strongly disagree) to 5 (strongly agree). In this study, a higher-order CFA model obtained an acceptable fit: $\chi^2/df=9.87$, $p<.001$; CFI=.92; TLI=.90; RMSEA=.089 90% CI=.082–.096).

Need frustration

Students' perceptions of autonomy, competence, and relatedness frustration in PE were assessed by the Spanish PE version (Sicilia et al., 2013) of the Psychological Need Thwarting Scale (Bartholomew et al., 2011) following the stem: "In my PE lessons ...", this scale includes 12 items (four items per factor) assessing autonomy frustration (e.g., "I feel pressured to behave in certain way"), competence frustration (e.g., "There are some situations in which I feel unable"), and relatedness frustration (e.g., "I feel that other people do not like me"). Items are rated on a 5-point scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). In this research, a higher-order CFA model obtained an acceptable fit: $\chi^2/df=5.41$, $p<.001$; CFI=.96; TLI=.95; RMSEA=.063, 90%CI=.056–.070).

Data Analysis

Descriptive statistics, McDonald's omega (ω) reliability coefficients and Pearson's correlations were estimated for all study variables using SPSS version 28.00. For person-centered approaches, standardized scores for each perceived teaching approach were previously computed. Next, we performed two sets of latent profile analyses (LPA) using MPlus v8.4 (Muthén & Muthén, 2017) to identify different combinations of high teacher directiveness (latent variables: guiding, clarifying, demanding and domineering approaches; covariates: participative, attuning, abandoning, and awaiting approaches) and distinct configurations of low teacher directiveness (latent variables: participative, attuning, abandoning and awaiting approaches; covariates: guiding, clarifying, demanding, and domineering approaches) (see supplementary materials, Table 6 and 7). Additionally, as perceived teacher behavior and motivational process could depend on students' gender and academic year and the teacher who conducts the PE lessons, these variables were also introduced as covariates (Vasconcellos et al., 2020). LPAs were run using a robust maximum-likelihood method estimator (MLR) with 5000 random start values, 1000 iterations, and 200 final optimizations to guarantee convergence on a true maximum likelihood (Muthén & Muthén, 1998-2017). Starting with a two-profile model, additional profiles were iteratively added up to $k=6$ (Weller et al., 2020). Best-fitting profile-model selection was taken based on substantial meaningfulness, theoretical congruity and recommended statistical practices (Weller et al., 2020). At the statistical level, various information criterion indexes, namely, Akaike information criterion (AIC), Bayesian information criterion (BIC) and sample-size

adjusted BIC (SSA-BIC) were firstly considered by pointing out that lower scores express a better model fit (Weller et al., 2020). Secondly, a significant p-value from Lo-Mendell-Rubin likelihood ratio (LRT) test indicates a better model fit compared to the model with one fewer profile (Weller et al., 2020). Thirdly, entropy with value scores above .80 reports a good profile separation (Weller et al., 2020). Fourthly, a profile size of at least 5% of the participating sample is required to avoid a potential over-extraction (Weller et al., 2020).

To examine the extent to which the retained profiles are similar (versus different) in terms of need-based experiences (i.e. autonomy, competence, and relatedness satisfaction and frustration), chi-square mean equality tests based on the Bolck-Croon-Hagenaars (BCH) method were conducted in Mplus v8.4 (Muthén & Muthén, 2017). This approach additionally involves conducting post-hoc pairwise comparisons of profile means on the target need-based experiences. These comparisons are carried out using Wald chi-square tests to identify the specific profiles that exhibit significant differences between them (Muthén & Muthén, 1998-2017). The statistical significance level was $p < .05$.

Results

Descriptive statistics, reliability coefficients, and correlations among variables

Table 1 reports descriptive, reliability and correlational statistics of the study variables. Mean scores are above the midpoint of the measurement scale for the two autonomy-supportive (i.e., participative and attuning), structuring (i.e., guiding and clarifying), and controlling (demanding and domineering) approaches, and the satisfaction of the three needs. The two chaotic approaches (i.e., abandoning and awaiting) and the frustration of each need scored less than the midpoint of the measurement scale. The two structuring and controlling approaches were positively correlated with autonomy, competence and relatedness satisfaction. In contrast, negative correlations were found between the two structuring approaches with autonomy, competence and relatedness frustration. Concerning controlling approaches, demanding were negatively correlated with autonomy and competence frustration, whereas domineering approach were positively correlated with the frustration of each need. On the other side, the two autonomy-supportive approaches were positively correlated with autonomy, competence, and relatedness satisfaction, whereas abandoning approach negatively correlated with each need satisfaction and awaiting only negatively with

relatedness satisfaction. In contrast, negative correlations were found between the two autonomy-supportive approaches with the frustration of each need (i.e., except for participative approach with relatedness frustration) and the two chaotic approaches were positively correlated with the autonomy, competence and relatedness frustration.

Table 1. Descriptives, composite reliability, and correlations among study variables.

Variables	M(SD)	ω	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Highly directive approaches																
1.Guiding	5.11(1.26)	.83	-	.70**	.51**	.11**	.66**	.80**	-.41**	-.23**	.53**	.35**	.33**	-.39**	-.20**	-.13**
2.Clarifying	5.12(1.10)	.84		-	.58**	.23**	.53**	.72**	-.29**	-.20**	.44**	.27**	.27**	-.30**	-.12**	-.07**
3.Demanding	4.75(0.94)	.59			-	.46**	.41**	.49**	-.02	.01	.30**	.22**	.18**	-.15**	-.11**	-.03
4.Domineering	3.88(1.16)	.57				-	.20**	.16**	.38**	.24**	.08**	.08**	.07**	.14**	.10**	.14**
Less directive approaches																
5.Participative	4.01(1.52)	.72					-	.75**	-.17**	-.03	.53**	.29**	.25**	-.30**	-.14**	-.02
6.Attuning	4.51(1.30)	.83						-	-.33**	-.14**	.60**	.38**	.32**	-.37**	-.18**	-.07*
7.Abandoning	2.70(1.25)	.82							-	.57**	-.21**	-.21**	-.18**	.37**	.29**	.27**
8.Awaiting	2.85(1.34)	.67								-	-.05	-.05	-.06*	.21*	.14**	.17**
Need-based experiences																
9.Autonomy Satisfaction	3.17(0.91)	.78									-	.55**	.44**	-.44**	-.24**	-.08**
10. Competence Satisfaction	3.77(0.93)	.84										-	.56**	-.34**	-.44**	-.22**
11.Relatedness Satisfaction	3.82(0.92)	.82											-	-.30**	-.25**	-.40**
12.Autonomy Frustration	2.50(1.03)	.84												-	.61**	.49**
13.Competence Frustration	2.40(0.98)	.81													-	.63**
14.Relatedness Frustration	1.98(0.93)	.81														-

Note: Correlations were significant at the level $p < .05^*$ and $p < .01^{**}$.

Identification and interpretation of latent profiles with high and low directiveness in PE

Table 2 shows fit statistics for the profile models based, respectively, on high teacher directiveness and low teacher directiveness. Regarding high teacher directiveness, the four-profile model was considered the most appropriate one given that it did not significantly differ from the five-profile model and, in turn, was lower than two-profile and three-profile models on values of AIC, BIC and SSA-BIC. Further, the four-profile model obtained a good value in entropy.

Concerning low teacher directiveness, the four-profile and five-profile models seemed to represent good choices for the data. The two profile models did not significantly differ from the six-profile solution, while they were significantly different from the two-profile and three-profile ones and scored lower on AIC, BIC, and SS-BIC. Considering the interpretability of both profile models, the addition of a new profile (i.e., five-profile model) did not suppose a theoretically meaningful contribution compared to the four-profile model when examining the dynamic interplay between autonomy-supportive and chaotic teaching approaches in the eyes of students. Thus, the four-profile model was interpreted to represent the most theoretically meaningful and parsimonious solution.

Table 2. Fit indexes, entropy, and model comparisons for models from highly and less teacher directiveness latent profile analysis.

Highly teacher directiveness							
Model	AIC	BIC	SSA-BIC	LMRT(p)	Entropy	Participants for profile	Np<5%
2 profiles	11140.80	11241.29	11177.77	<.001	0.842	391; 733	0
3 profiles	10475.84	10636.63	10534.99	.010	0.851	532; 139; 453	0
4 profiles	10027.35	10348.44	10208.68	.001	0.841	86; 295; 457; 286	0
5 profiles	9932.32	10213.74	10035.87	.098	0.804	87; 295; 263; 227; 252	0
6 profiles	9745.88	10087.56	9871.57	.002	0.814	256; 87; 306; 173; 169; 133	0
Less teacher directiveness							
Model	AIC	BIC	SSA-BIC	LMRT(p)	Entropy	Participants for profile	Np<5%
2 profiles	11276.19	11376.68	11313.16	<.001	0.827	529; 595	0
3 profiles	10647.33	10808.12	10706.48	<.001	0.868	469; 523; 132	0
4 profiles	10091.80	10312.88	10173.13	.001	0.871	389; 471; 158; 106	0
5 profiles	9825.19	10106.57	9928.70	.009	0.854	332; 92; 209; 378; 113	0
6 profiles	9591.37	9933.04	9717.06	.578	0.835	209; 326; 114; 191; 205; 79	0

AIC: Akaike information criterion; BIC: Bayesian information criterion; SSA-BIC: sample-size adjusted BIC; LMRT: Lo–Mendell–Rubin likelihood test; Np < 5%: number of profiles with <5% of participants. Analyses controlled for gender, academic year, and teacher for both latent profiles. Analyses controlled for participative, attuning, abandoning, and awaiting approaches in highly directiveness, whereas guiding, clarifying, demanding, and domineering approaches in less directiveness.

As hypothesized, at least four profiles were found in the high teacher directiveness (Figure 1 and Table 3). However, we did not find a group of students who rated their teacher as “high structure-low control” and “low structure-high control” as expected at the beginning. More specifically, the four clusters were labelled based on their raw scores as follows: Profile 1 (n=457, 40.65%) was labelled as “high structure–moderate control” as students in this Profile were scoring 5.50 and 5.31 out of 7 in guiding and clarifying approaches (i.e., high structure), and 4.78 and 3.66 out of 7 in demanding and domineering approaches (i.e., moderate control). Profile 2 (n=286, 25.44%) was denominated “very high structure-high control” as it obtained raw scores of 6.46 and 6.25 out of 7 in guiding and clarifying approaches (i.e., very high structure), and of 5.58 and 4.44 out of 7 in demanding and domineering approaches (i.e., high control). Profile 3 (n=295, 26.25%) was labelled as “moderate structure and control” as students in this Profile scored 4.02 and 4.32 out of 7 in guiding and clarifying approaches (i.e., moderate structure), and 4.27 and 3.77 out of 7 in demanding and domineering approaches (i.e., moderate control). Profile 4 (n=86, 7.66%) was denominated “low structure and control” as it had raw scores of 2.32 and 2.97 out of 7 in guiding and clarifying approaches (i.e., low structure), and 3.48 out of 7 in demanding and domineering approaches (i.e., low control).

As hypothesized, at least four profiles were found in the low teacher directiveness (Figure 2 and Table 4). We found students who rated their teacher as highly participative and attuning and lowly abandoning and awaiting, and vice-versa in accordance with our established hypotheses. More precisely, the four clusters were labelled based on their raw scores as follows: Profile 1 (n=389, 34.60%) was named “high autonomy support–low chaos” by scoring 5.28 and 5.78 out of 7 in participative and attuning approaches (i.e., high autonomy support), and 1.73 and 2.05 out of 7 in abandoning and awaiting approaches (i.e., low chaos). Profile 2 (n=158, 14.05%) was labelled as “high autonomy support-very high chaos” since it had raw scores of 5.40 and 5.50 out of 7 in participative and attuning approaches (i.e., high autonomy support), and of 4.78 and 5.09 out of 7 in abandoning and awaiting approaches (i.e., very high chaos). Profile 3 (n=471, 41.91%) was named “moderate autonomy support and chaos” by scoring 3.37 and 4.01 out of 7 in participative and attuning approaches (i.e., moderate autonomy support), and 2.66 and 2.79 out of 7 in abandoning and awaiting approaches (i.e., moderate chaos). Profile 4 (n=106, 9.44%) was denominated “low autonomy support–high chaos” as it was

characterized by raw scores of 1.87 and 2.26 out of 7 in participative and attuning approaches (i.e., low autonomy support), and of 3.74 and 3.45 out of 7 in abandoning and awaiting approaches (i.e., high chaos).

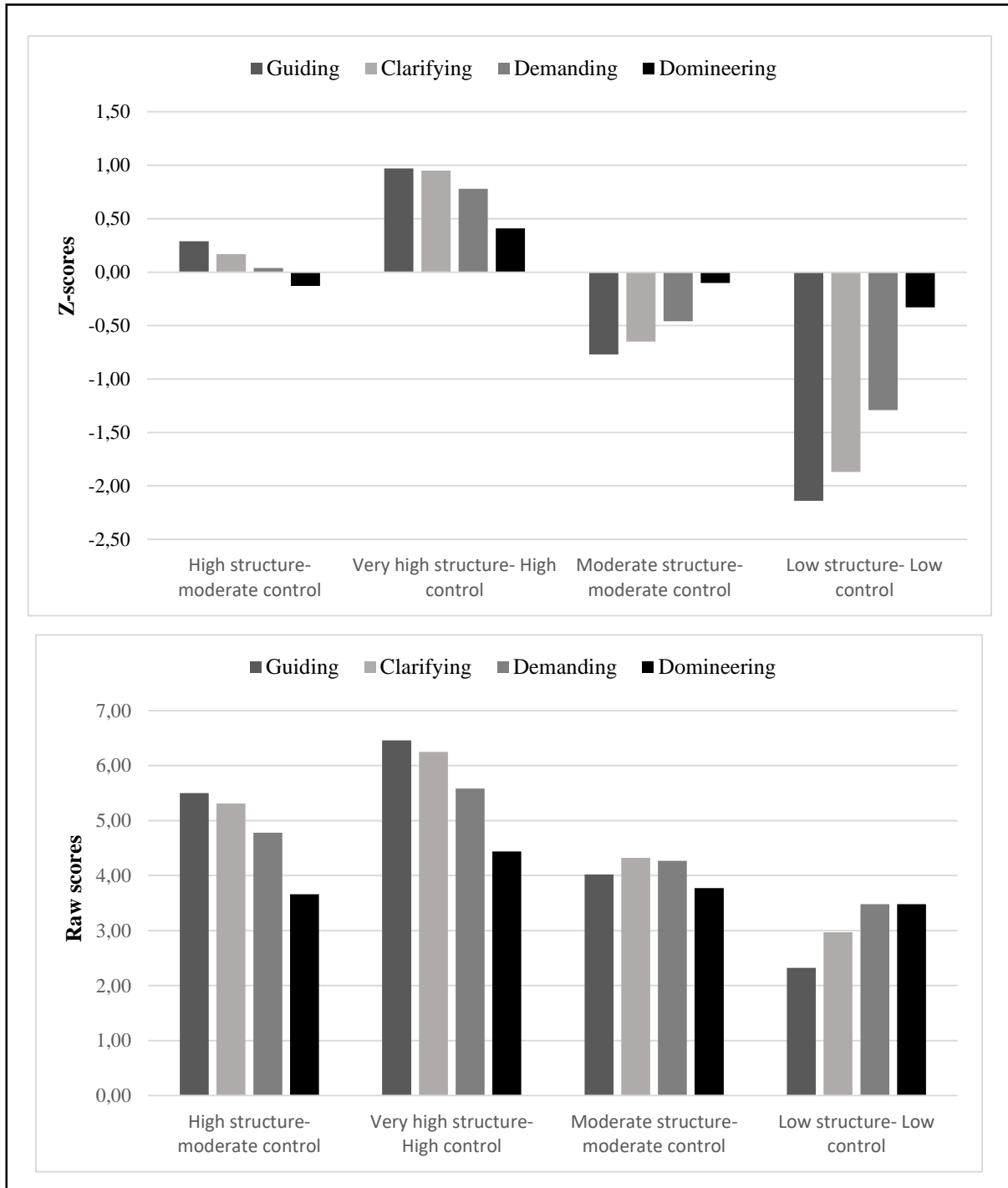


Figure 1. Description of the four guiding, clarifying, demanding, and domineering approaches latent profiles based on standardized (upper side) and raw (lower side) scores.

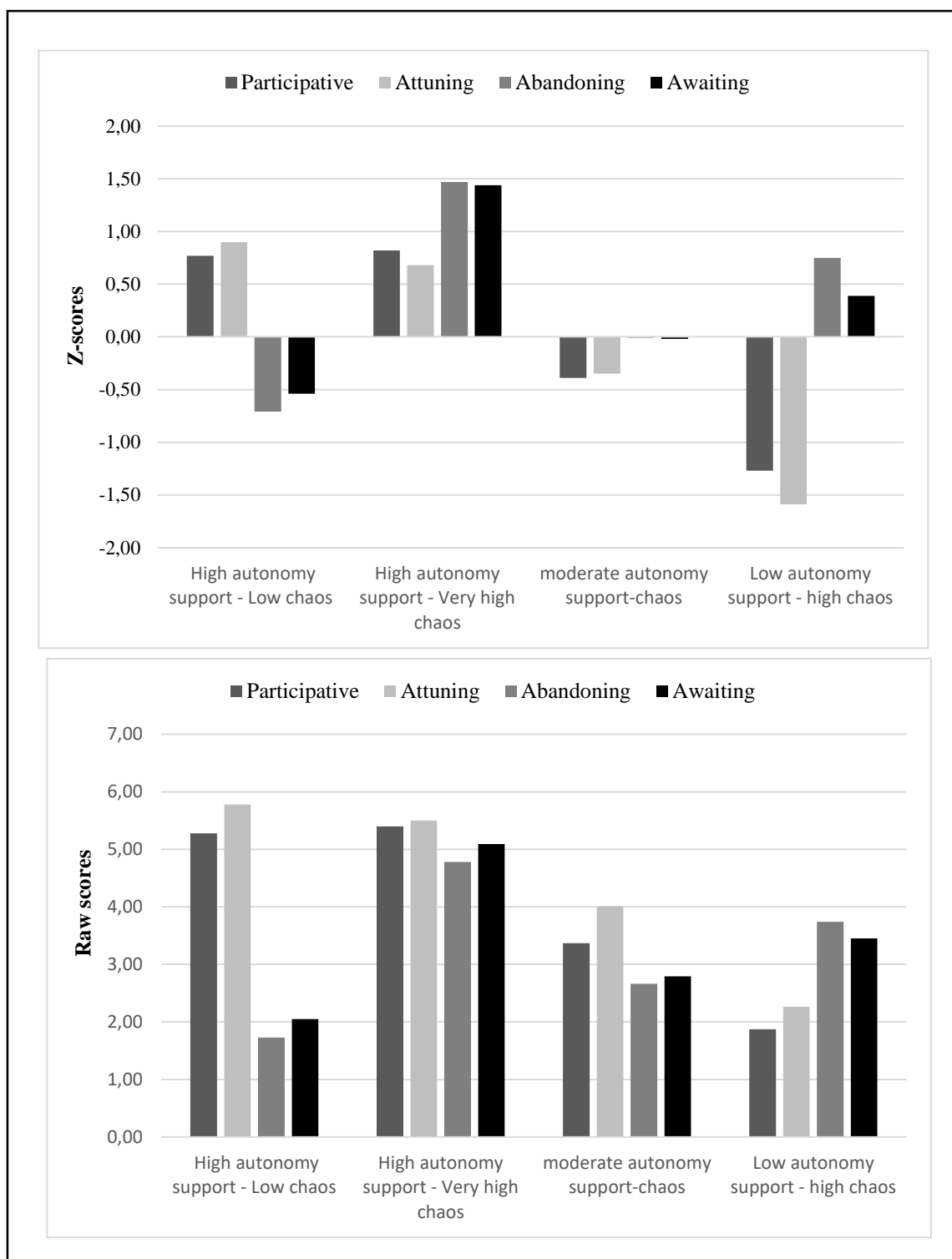


Figure 2. Description of the four participative, attuning, abandoning, and awaiting approaches latent profiles based on standardized (upper side) and raw (lower side) scores.

Differences in students' need-based experiences across high and low directiveness profiles in PE

Mean-level differences in students' need-based experiences across the identified profiles are shown in Tables 3 and 4. Prior to analyses, distribution by gender, academic course and teachers across the retained profiles was inspected by mean equality tests. Students were heterogeneously distributed by gender ($\chi^2=20.88$, $p<.001$), academic years ($\chi^2=70.56$, $p<.001$) and teacher ($\chi^2=12.09$, $p=.007$) for both four-profile solutions (see supplementary materials, Table 5), so that each was, respectively, introduced as a covariate in both sets of LPAs.

BCH χ^2 mean equality tests found significant mean-level differences across the four highly-directive profiles (see Table 3) for autonomy satisfaction ($\chi^2=492.74$, $p<.001$), competence satisfaction ($\chi^2=135.35$, $p<.001$), relatedness satisfaction ($\chi^2=110.88$, $p<.001$), as well as for autonomy frustration ($\chi^2=161.48$, $p<.001$), and competence frustration ($\chi^2=29.03$, $p<.001$). While for relatedness frustration, there were non-significant differences across the four highly-directive profiles ($\chi^2=5.89$, $p=.117$). For the high teacher directiveness, it was not possible to test the hypotheses previously established because the expected profiles (i.e., high structure–low control and low high structure–high control) were not found. The *post-hoc* pairwise comparisons reported that Profile 2 (i.e., very high structure–high control) scored highest on autonomy, competence, and relatedness satisfaction, followed by Profile 1 (i.e., high structure-moderate control) scoring significantly higher on each need satisfaction than Profile 3 (i.e. moderate structure-control) and Profile 4 (i.e., low structure-control) with the latter having the lowest levels of autonomy, competence, and relatedness satisfaction. Concerning need frustration, Profile 2 (i.e., very high structure–high control) scored lowest on autonomy frustration, followed by Profile 1 (i.e., high structure-moderate control) scoring significantly lower on autonomy and competence frustration than Profile 3 (i.e. moderate structure-control,) and Profile 4 (i.e., low structure-control) that scored highest on autonomy, competence, and relatedness frustration. For competence frustration, Profiles 1 (i.e., high structure-moderate control) and 2 (i.e., very high structure–high control) scored significantly lower than Profiles 3 (i.e. moderate structure-control) and 4 (i.e., low structure-control). For relatedness frustration, few significant differences were found between the Profiles, except between Profile 2 (i.e., very high structure–high control) and 4 (i.e., low structure-control).

Table 3. Mean differences in students' outcomes in PE between profiles based on the two structuring and controlling approaches.

	Profile 1(n=457) (40.65%) High structure - moderate control	Profile 2 (n=286) (25.44%) Very high structure -high control	Profile 3 (n=295) (26.25%) Moderate structure - control	Profile 4 (n=86) (7.66%) Low structure - low control
Highly directive approaches				
Guiding approach				
Raw scores (1-7)	5.50(0.03) ^{2a,3a,4a}	6.46(0.09) ^{1a,3a,4a}	4.02(0.04) ^{1a,2a,4a}	2.32(0.08) ^{1a,2a,3a}
Z-scores	0.29(0.08) ^{2a,3a,4a}	0.97(0.05) ^{1a,3a,4a}	-0.77(0.07) ^{1a,2a,4a}	-2.14(0.08) ^{1a,2a,3a}
Clarifying approach				
Raw scores (1-7)	5.31(0.03) ^{2a,3a,4a}	6.25(0.03) ^{1a,3a,4a}	4.32(0.47) ^{1a,2a,4a}	2.97(0.18) ^{1a,2a,3a}
Z-scores	0.17(0.08) ^{2a,3a,4a}	0.95(0.05) ^{1a,3a,4a}	-0.65(0.07) ^{1a,2a,4a}	-1.87(0.10) ^{1a,2a,3a}
Demanding approach				
Raw scores (1-7)	4.78(0.04) ^{2a,3a,4a}	5.58(0.04) ^{1a,3a,4a}	4.27(0.04) ^{1a,2a,4a}	3.48(0.09) ^{1a,2a,3a}
Z-scores	0.04(0.07) ^{2a,3a,4a}	0.78(0.08) ^{1a,3a,4a}	-0.46(0.06) ^{1a,2a,4a}	-1.29(0.10) ^{1a,2a,3a}
Domineering approach				
Raw scores (1-7)	3.66(0.05) ^{2a}	4.44(0.08) ^{1a,3a,4a}	3.77(0.06) ^{2a}	3.48(0.13) ^{2a}
Z-scores	-0.13(0.07) ^{2a}	0.41(0.06) ^{1a,3a,4a}	-0.10(0.06) ^{2a}	-0.33(0.11) ^{2a}
Outcomes				
Autonomy satisfaction (1-5)	3.22(0.05) ^{2a,3a,4a}	3.87(0.06) ^{1a,3a,4a}	2.74(0.05) ^{1a,2a,4a}	2.01(0.08) ^{1a,2a,3a}
Competence satisfaction (1-5)	3.81(0.04) ^{2a,3a,4a}	4.23(0.05) ^{1a,3a,4a}	3.48(0.06) ^{1a,2a,4b}	3.04(0.12) ^{1a,2a,3b}
Relatedness satisfaction (1-5)	3.86(0.04) ^{2c,3a,4a}	4.23(0.05) ^{1c,3a,4a}	3.54(0.05) ^{1a,2a,4a}	3.17(0.12) ^{1a,2a,3a}
Autonomy frustration (1-5)	2.37(0.05) ^{2a,3a,4b}	2.12(0.06) ^{1a,3a,4b}	2.89(0.05) ^{1a,2a,4a}	3.51(0.12) ^{1a,2a,3a}
Competence frustration (1-5)	2.34(0.07) ^{3a,4a}	2.20(0.06) ^{3b,4b}	2.55(0.05) ^{1a,2b}	2.81(0.12) ^{1a,2b}
Relatedness frustration (1-5)	1.97(0.04)	1.89(0.06) ^{4c}	2.04(0.05)	2.16(0.11) ^{2c}

Note: Numbers in superscript indicate significant group differences. ^a $p < .001$, ^b $p < .010$, ^c $p < .050$.

In relation to the four low-directive profiles (see Table 4), mean-level differences were found significant using BCH χ^2 mean equality tests for autonomy satisfaction ($\chi^2=576.47$, $p < .001$), competence satisfaction ($\chi^2=134.97$, $p < .001$), relatedness satisfaction ($\chi^2=98.76$, $p < .001$), as well as for autonomy frustration ($\chi^2=273.73$, $p < .001$), competence frustration ($\chi^2=70.27$, $p < .001$), relatedness frustration ($\chi^2=63.88$, $p < .001$). For the low-directive profiles, *post-hoc* pairwise comparisons revealed that Profile 1 (i.e., high autonomy support-low chaos) scored highest on competence and relatedness satisfaction in line with our hypotheses, followed by Profile 2 (i.e., high autonomy-support-very high chaos) scoring significantly higher on each need satisfaction than Profile 3 (i.e., moderate autonomy support-chaos) and Profile 4 (i.e., low autonomy support-high chaos) with the latter having the lowest levels of autonomy, competence, and relatedness satisfaction in line with our hypothesis. Concerning need frustration, Profile 1 (i.e., high autonomy support low chaos) scored lowest on autonomy, competence and relatedness frustration in line with our hypothesis, followed by Profile 3 (i.e., moderate autonomy support-chaos) scoring significantly lower on autonomy frustration than Profile 4 (i.e., low autonomy support-high chaos) with the latter having the lowest

levels of autonomy frustration in line with our hypothesis. For competence frustration, Profile 3 (i.e., moderate autonomy support–chaos) scores significantly lower than Profiles 2 (i.e., high autonomy support–very high chaos) and 4 (i.e., low autonomy support–high chaos). For relatedness frustration, Profile 2 (i.e., high autonomy support–very high chaos) scored highest on relatedness frustration contrary to our expectations.

Table 4. Mean differences in students' outcomes in PE between profiles based on the two autonomy supportive and chaotic approaches.

	Profile 1(n=389) (34.60%) High autonomy support - low chaos	Profile 2(n=158) (14.05%) High autonomy support - very high chaos	Profile 3(n=471) (41.91%) Moderate autonomy support - chaos	Profile 4(n=106) (9.44%) Low autonomy support - high chaos
Less directive approaches				
Participative approach				
Raw scores (1-7)	5.28(0.05) ^{3a,4a}	5.40(0.10) ^{3a,4a}	3.37(0.05) ^{1a,2a,4c}	1.87(0.06) ^{1a,2a,3c}
Z-scores	0.77(0.05) ^{3a,4a}	0.82(0.11) ^{3a,4a}	-0.39(0.07) ^{1a,2a,4c}	-1.27(0.08) ^{1ba,2a,3c}
Attuning approach				
Raw scores (1-7)	5.78(0.03) ^{2a,3a,4a}	5.50(0.06) ^{1a,3a,4a}	4.01(0.03) ^{1a,2a,4a}	2.26(0.06) ^{1a,2a,3a}
Z-scores	0.90(0.04) ^{2a,3a,4a}	0.68(0.12) ^{1a,3a,4a}	-0.35(0.08) ^{1a,2a,4a}	-1.59(0.11) ^{1a,2a,3a}
Abandoning approach				
Raw scores (1-7)	1.73(0.03) ^{2a,3a,4a}	4.78(0.10) ^{1a,3a,4a}	2.66(0.05) ^{1a,2a,4a}	3.74(0.09) ^{1a,2a,3a}
Z-scores	-0.71(0.03) ^{2a,3a,4a}	1.47(0.13) ^{1a,3a,4a}	-0.01(0.07) ^{1a,2a,4a}	0.75(0.18) ^{1a,2a,3a}
Awaiting approach				
Raw scores (1-7)	2.05(0.05) ^{2a,3a,4a}	5.09(0.11) ^{1a,3a,4a}	2.79(0.05) ^{1a,2a,4a}	3.45(0.11) ^{1a,2a,3a}
Z-scores	-0.54(0.04) ^{2a,3a,4a}	1.44(0.12) ^{1a,3a,4a}	-0.02(0.07) ^{1a,2a,4a}	0.39(0.1) ^{1a,2a,3a}
Outcomes				
Autonomy satisfaction (1-5)	3.72(0.04) ^{3a,4a}	3.81(0.07) ^{3a,4a}	2.91(0.04) ^{1a,2a,4a}	2.17(0.07) ^{1a,2a,3a}
Competence satisfaction (1-5)	4.13(0.04) ^{2b,3a,4a}	4.07(0.07) ^{1b,3b,4a}	3.62(0.05) ^{1a,2b,4a}	3.16(0.11) ^{1a,2a,3a}
Relatedness satisfaction (1-5)	4.18(0.05) ^{2a,3a,4a}	3.98(0.08) ^{1a,3c,4a}	3.64(0.05) ^{1a,2c,4b}	3.34(0.10) ^{1a,2a,3b}
Autonomy frustration (1-5)	1.96(0.05) ^{2a,3a,4a}	2.84(0.09) ^{1a,4a}	2.65(0.05) ^{1a,4a}	3.44(0.10) ^{1a,2a,3a}
Competence frustration (1-5)	2.06(0.05) ^{2a,3a,4a}	2.76(0.09) ^{1a,3a}	2.48(0.05) ^{1a,2c,4b}	2.71(0.10) ^{1a,3b}
Relatedness frustration (1-5)	1.71(0.05) ^{2a,3a,4a}	2.59(0.10) ^{1a,3a,4b}	2.04(0.05) ^{1a,2a}	2.05(0.09) ^{1a,2b}

Note: Numbers in superscript indicate significant group differences. ^a $p < .001$, ^b $p < .010$, ^c $p < .050$.

Discussion

Extensive research based on variable-centered SDT has explored the interplay between PE teachers' (de-)motivating styles with need-based experiences in the eyes of students. However, students can simultaneously perceive their PE teacher as employing both autonomy-supportive and chaotic styles when providing them with opportunities to lead learning interactions, and when guiding them with structured and controlling styles during practice time. Although, a small body of research to date has focused on this perspective (Burgueño et al., 2022; García-González et al., 2023; Haerens et al., 2018; Leo, Pulido, et al., 2022), there has been no detailed investigation of how students' perceptions of the specific way the teacher leads the practice time may influence their experiences of autonomy, competence and relatedness in the PE lesson. To overcome this

gap, the present study aimed to shed light on how students' perceptions of different combinations of low teacher directiveness (i.e., autonomy-supportive and chaotic approaches) and of high teacher directiveness (i.e., structuring and controlling approaches) differ in their experiences of autonomy, competence and relatedness in the PE lesson.

The results for the first aim indicated that PE teachers' (de-)motivating teaching style was best fit with a four-profile solution based on varying levels of high and low teacher directiveness. Contrasted with our hypotheses, we did not find a group of students who perceived their PE teachers as "high structure-low control" and "low structure-high control". Then, we obtained four teaching profiles characterized by showing simultaneously high, moderate or low levels both of perceived structure and control. These profiles are partially in line with the research of García-González et al. (2023), based on combinations of structure (or competence-support) and control in PE. Unlike the study by García-González et al. (2023), this study has identified three new profiles characterized by high structure-moderate control, very high structure-high control, and low structure and control. The disparities observed in these profiles between the two studies could be attributed to variations in the contextual characteristics of each sample. The most remarkable finding in high teacher directiveness is that these four profiles suggest that students perceive structure and control from their PE teacher equally (e.g., Moderate structure-control or High structure-moderate control). The explanation could be that the correlation results showed that guiding and clarifying approaches were positively related to demanding and domineering approaches ($r = .11$ to $.51$, $p < .01$). In addition to this correlation, a theoretical explanation could be rooted in the concept of a "tunnel-perspective" which is often associated with control (Vansteenkiste et al., 2019). This occurs when the teacher initiates an interaction with instructions that gradually evolve into strict commands, all in an effort to prioritize their class agenda. These findings suggest that structure and control tended to go hand in hand in all groups, especially for demanding approach defining control. Consequently, PE teachers have the potential to blend a style that incorporates both structuring and controlling strategies, adapting it according to the students' characteristics and situational class circumstances.

Regarding low teacher directiveness, two profiles were identified, showing high levels of autonomy support and low levels of chaos, and vice-versa, aligning with our hypotheses. Both profiles are in line with previous SDT-based research in PE, which

explores combinations of need-supportive and need-thwarting styles (Burgueño et al., 2022; Haerens et al., 2018; Leo, Pulido, et al., 2022). However, none of the preceding research has specifically addressed low teacher directiveness. Therefore, this study stands as the first to investigate potential combinations of autonomy support and chaos among PE teachers when facilitating opportunities for students to take initiative. These two profiles suggest that students tend to perceive an autonomy-supportive style less frequently when they perceive a lower adoption of a chaotic style, and vice-versa. Nonetheless, both profiles represent slightly less than half of the students participating in this study (44.04%). Unlike previous research on PE (Haerens et al., 2018; Leo, Pulido, et al., 2022), we also identified a profile characterized by “high autonomy support-very high chaos”. This entails that this specific group of students (14.05% of the sample) perceived their PE teacher as fostering an environment where they had an overwhelming amount of responsibility. This perception could be interpreted as a potential indication that these students perceived their teachers as being somewhat indifferent towards their learning. Like in the research of Haerens et al., (2022), the most notable discovery regarding lower directiveness is that, despite the average negative relationship between perceived autonomy support and chaos (see Table 1), the largest percentage of students (41.91%) perceived their PE teachers as displaying moderate levels of both autonomy support and chaos. These findings suggest that there may be some dependency between autonomy-supportive and chaotic style but to a lesser extent compared to high teacher directiveness. This relationship could stem from their basis in autonomy, while in high teacher directiveness, the styles revolve around student competence. As a result, when styles are centered on autonomy, students might more easily discern moments of dialogue opportunity (i.e., autonomy support) from instances of feeling adrift in class (i.e., chaos).

Regarding our second hypothesis related to the second objective which focused on high teacher directiveness, we were unable to test the hypotheses that were previously established. This was because the expected profiles were not found within the high teacher directiveness. The results displayed that students who perceived teachers as being very high structuring, and who frequently used controlling practices reported the highest levels of autonomy, competence, and relatedness satisfaction, as well as the lowest scores on the frustration of three needs. In contrast to the unique research to study high teacher directiveness in PE, emphasizing how PE teachers provide directions to students becomes crucial (García-González et al., 2023), these results suggest that students achieved the

greatest motivational benefits and the lowest maladaptive outcomes when their PE teachers provided highly need-supportive guidance as frequently offer feedback, assistance and encouragement (i.e., guiding), along with providing helpful strategies for accomplishing tasks and communicating lesson goals and expectations (i.e., clarifying), becoming demanding or domineering. This might be attributed to certain lesson scenarios where enforcing discipline and displaying a firm demeanor are essential to manage disruptive students effectively, thereby creating a conducive environment for other students to engage in lesson activities (Vansteenkiste et al., 2019).

Also, the “high structure–moderate control” profile had lower levels of satisfaction of three needs and higher levels of frustration of each need when compared to the “very high structure–high control” profile. These results highlight that the presence of high to very high structure decreases competence frustration, whereas the presence of moderate control to high control unexpectedly decreases autonomy frustration. These results could be explained due to supplementary analyses of the study (Table 6), as in “Profile 2”, we found significantly higher values of autonomy-supportive style compared to “Profile 1”. Therefore, although we controlled for participative and attuning approaches, it is possible that in this Profile of "high structure-high control," the weight of the need-supportive styles (i.e., structure and autonomy support) is greater than the need-thwarting styles (i.e., control and chaos). In addition, a possible theoretical rationale for interpreting these findings could be that high teacher directiveness theoretically focuses on the need for competence. This is because clear instructions provide students with information about what exactly they have to do. Lastly, in accordance with prior research based-SDT (Haerens et al., 2018; Leo, Pulido, et al., 2022), students in a “low structure–low control” Profile reported the lowest scores in each need satisfaction and the highest in the frustration of three needs. It appears that the overall perception of the absence of any form of guidance from PE teachers, whether it is in terms of structuring or controlling, somewhat negatively impacts the need-based experiences of this particular group of students. In addition, if we compare this group of students with the group who perceived their PE teacher as “moderate structure-moderate control”, they generally had a more maladaptive profile. Therefore, the qualitative manner in which the PE teacher leads the group becomes crucial when (s)he decides to assume the lesson leadership. It may be more beneficial for the PE teacher to adopt a teaching style that combines higher

levels of directiveness, encompassing both structuring and controlling styles, rather than providing minimal directions or guidance

Regarding low teacher directiveness, the results of the current study support the hypothesis expected that those students who perceive their PE teachers as high on autonomy support and low on chaos display the most optimal pattern of need-based experiences. They experience generally the highest levels of the three needs satisfaction and the lowest levels of each need frustration. These results are consistent with a previous person-centered study in PE (Burgueño et al., 2022; Haerens et al., 2018; Leo, Pulido, et al., 2022) because it is not autonomy support on its own, but autonomy support in the absence of chaos that yields the most motivational outcomes. These findings suggest that when students take the initiative in the lesson they have a space that fits with their motor and knowledge levels which means that they don't feel lost in the lesson. Within this space adapted to students, they have also been given limits and rules of how the task or the class goes (i.e., attuning approach). In contrast, the group that perceived their PE teachers as exhibiting high levels of chaos and low levels of autonomy support showed an opposite pattern. These results are consistent with previous studies in PE (Burgueño et al., 2022; Haerens et al., 2018; Leo, Pulido, et al., 2022) and our hypothesis, yielded the least optimal pattern of outcomes. These results indicate that the opposite pattern, when that space that is left to the student makes him get lost in class (i.e., chaotic style) is because the student feels that (s)he is alone (i.e., abandoning approach) and feels that the teacher is expecting something from him/her but does not know what and how. Consequently, when PE teachers primarily employ behaviors that hinder students' needs, even if accompanied by occasional supportive strategies, it results in students feeling compelled to perform instructional activities in a restrictive manner (autonomy frustration), along with sense of inadequacy and lack of accomplishment, (competence frustration), and a feeling of disconnect and alienation from their teacher (relatedness frustration).

The group who perceived their PE teachers as “high autonomy support - very high chaos” showed higher scores in the satisfaction and frustration of the three needs than the profile when compared to the “moderate autonomy support - chaos”. These findings potentially indicate the activation of two distinct pathways within this Profile. The first pathway leads to positive outcomes, including increased satisfaction in autonomy, competence, and relatedness, which can be attributed to the presence of autonomy support. Conversely, the second pathway leads to negative outcomes, such as the

frustration of needs, stemming from the presence of chaos (Haerens et al., 2022). It should also be pointed out that profiles with higher levels of chaos have a higher frustration of competence. This means that PE teachers who predominantly use strategies such as giving excessive responsibility to their students (i.e., abandoning) and not planning to much the task of the lessons (i.e., awaiting) may influence students' feelings of inefficacy and the inability to realize desired goals (i.e., competence frustration). Also, the group who perceived their PE teachers as moderately autonomy-supportive and chaotic reported moderated levels of each need frustration, while their feelings of need satisfaction were to some degree safeguarded. This would imply that certain students might perceive that a combination of moderate to low levels of both need-supportive and need-thwarting behaviors is justifiable, as they believe the teacher's underlying intentions are aimed at improving their academic learning or addressing the misbehavior of specific students (Cothran & Kulinna, 2020). For this particular group of students, this combination appears to be the most effective means of avoiding negative motivational experiences, even though it may result in a lower level of satisfaction for the three needs. Overall, It is crucial to reinforce the idea that the way in which the PE teacher transfer room for students to take initiative in the lesson is important due to that experiences of need frustration could fluctuate in alignment with students' perceptions of PE teachers' chaotic style (Haerens et al., 2022).

Limitations and future directions

The current study has its own limitations. First, we based on a cross-sectional design that, despite providing a snapshot of different combinations of PE teachers' more and less directive approaches, does not enable us to establish causal relationships between teaching profiles and need-based experiences. Consequently, longitudinal research is required to explore the dynamic interplays of PE teachers' more or less directive approaches with students' learning-related outcomes in PE lessons. Second, we relied on self-reported data from students that can be influenced by self-reported bias and social desirability. Thus, future studies are needed to complement the self-reports with additional tools (i.e., observations by external researchers, and teachers' perceptions of their own teaching approaches) for optimizing data triangulation. Third, we used a purposive sampling method for the participants' recruitment and selection processes, suggesting that the obtained results should be interpreted with caution. Further studies should consider samples of PE students with more heterogeneous characteristics based

on their school level (i.e., primary school), type of school (i.e., private) or social, economic and cultural background. Fourth, we only deemed need-based experiences as outcome variables. There is a need for additional research to examine the relationships between different teaching profiles in terms of high and low teacher directiveness with a myriad of students' learning-related outcomes in the PE lesson.

Conclusions

There were four different profiles both in high and low teacher directiveness, thereby highlighting the relevance of researching multiple need-supportive and need-thwarting styles simultaneously as different styles can co-occur. Regardless of how the class is managed, the teacher should know how to intervene when (s)he takes the lead or when the students take the initiative in order to promote students' need satisfaction and minimize students' need frustration. In order to achieve this purpose, when the teacher decides to assume leadership in the lesson, it is recommended that (s)he intervene with clear and transparent expectations and positive informative feedback, while avoiding the use of internal or external control strategies. On the other hand, when the teacher decides to transfer room for students to take the initiative, it is recommended that (s)he intervene to provide opportunities for choice and offer meaningful rationales for tasks while avoiding leaving excessive responsibility to students without a clear goal. This will provide PE teachers to improve their capacity to calibrate their (de-)motivating teaching style that best fits with the individual characteristics of their students and the specific learning situations.

Supplementary Files of study IV

Table 5. Covariate analysis results for the highly and less directiveness four-profile (Chi-square values).

Profile	Gender	Academic year	Teacher
Profile 1 vs 2	4.64*	18.30**	2.45
Profile 1 vs 3	11.64*	22.94*	0.23
Profile 1 vs 4	11.85*	33.78**	4.58*
Profile 2 vs 3	4.05*	25.71**	7.36*
Profile 2 vs 4	5.99*	23.76**	1.61
Profile 3 vs 4	1.40	7.82	7.59*

Note: $p < .05^*$ and $p < .01^{**}$.

Table 6. Covariate analysis results for the highly directiveness four-profile (mean values).

	Profile 1	Profile 2	Profile 3	Profile 4
Participative	3.01 ^{2a,3a,4a}	5.66 ^{1a,3a,4a}	1.90 ^{1a,2a,4a}	4.14 ^{1a,2a,3a}
Attuning	3.50 ^{2a,3a,4a}	5.93 ^{1a,3a,4a}	2.05 ^{1a,2a,4a}	4.64 ^{1a,2a,3a}
Abandoning	3.08 ^{3a,4a}	2.92 ^{3a,4a}	3.72 ^{1a,2a,4a}	1.69 ^{1a,2a,3a}
Awaiting	3.12 ^{3c,4a}	3.17 ^{3c,4a}	3.50 ^{1c,2c,4a}	1.91 ^{1a,2a,3a}

Note: Numbers in superscript indicate significant group differences. ^a $p < .001$,
^b $p < .010$, ^c $p < .050$

Table 7. Covariate analysis results for the less directiveness four-profile (mean values).

	Profile 1	Profile 2	Profile 3	Profile 4
Guiding	6.18 ^{2,3,4}	2.98 ^{1a,3a,4a}	5.59 ^{1a,2a,4a}	4.78 ^{1a,2a,3a}
Clarifying	5.90 ^{2,3,4}	3.47 ^{1a,3a,4a}	5.60 ^{1a,2a,4a}	4.83 ^{1a,2a,3a}
Demanding	5.16 ^{2,3,4}	3.91 ^{1a,3a,4a}	5.43 ^{1a,2a,4a}	4.54 ^{1a,2a,3a}
Domineering	3.80 ^{3a,4c}	3.80 ^{3a}	4.98 ^{1a,4a}	3.62 ^{1c,3a}

Note: Numbers in superscript indicate significant group differences. ^a $p < .001$,
^b $p < .010$, ^c $p < .050$

5. LIMITACIONES Y PROSPECTIVAS

5. Limitaciones y Prospectivas

A pesar de que cada uno de los cuatro estudios introducidos en el anterior apartado tienen explicadas sus respectivas limitaciones y prospectivas, en este epígrafe se detallan una serie de limitaciones transversales y de carácter general que deben tenerse en cuenta en esta Tesis Doctoral. Asimismo, es necesario reflexionar sobre las diferentes prospectivas que habría que tener en cuenta en diferentes diseños de investigación futuros para sobreponerse a las limitaciones presentadas anteriormente.

En primer lugar, en los cuatro estudios realizados se ha implementado un diseño transversal, lo que implica que no se pueda inferir causalidad de las relaciones estudiadas, limitando la generalización de los resultados obtenidos. Futuros estudios de investigación deberían implementar diseños longitudinales y cuasi-experimentales que reporten diferentes medidas a lo largo del tiempo para obtener una mayor validez externa de los resultados.

En segundo lugar, es necesario señalar que el tipo de muestreo utilizado en los cuatro estudios ha sido no probabilístico. Principalmente, el motivo de esta decisión fue las restricciones de acceso del personal externo a los centros educativos que existieron durante la pandemia originada por el Coronavirus (SARS-CoV-2). Destacar al mismo tiempo que el tamaño de la muestra es suficiente para abordar los objetivos propuestos y aportar solidez a los resultados obtenidos, pero sí que podría llegar a afectar a la generalización de los mismos. Por lo tanto, es recomendable que futuros estudios utilicen muestreos probabilísticos con el fin de obtener una muestra más representativa y con resultados de mayor generalizabilidad.

En tercer lugar, se han utilizado cuestionarios auto-reportados para medir todas las variables del presente proyecto, excepto las sociodemográficas. Esta acción puede afectar a las respuestas recogidas debido a la autopercepción de cada participante sobre su docente de EF a la hora de rellenar de los cuestionarios. En futuras investigaciones se podría valorar la inclusión de metodología cualitativa u observacional para conocer de forma más objetiva como los diferentes estilos y conductas docentes del modelo circular afectan al proceso motivacional del alumnado (Van Doren et al., 2023). Esto permitiría triangular los datos y examinar el grado de concordancia entre lo que percibe el alumnado, el profesorado siente que hace y lo que el profesorado realmente hace durante sus clases.

En cuarto lugar, algunas variables como las experiencias y el aprendizaje en las clases de EF fueron evaluadas utilizando cuestionarios de un solo ítem. En consecuencia, la fiabilidad de estas variables no puede ser calculada y dichos resultados deben interpretarse con cautela. A pesar de que hay autores que defiende la validez y fiabilidad de las medidas de un solo ítem (Allen et al., 2022; Matthews et al., 2022), futuros estudios deberían refinar estas medidas, consiguiendo una mayor validez en los resultados obtenidos.

Finalmente, el modelo teórico empleado a lo largo de toda la Tesis Doctoral (i.e., modelo circular) proporciona un enfoque más integrador y detallado de los estilos motivacionales docente. Sin embargo, dicho modelo no incluye respuestas relativas al apoyo o amenaza de la relación social, ni entre el alumnado, ni entre el docente-alumnado, el cual constituye otro estilo motivacional docente (Ryan y Deci, 2017). Futuros estudios podrían ampliar las contribuciones de esta Tesis Doctoral, añadiendo además el apoyo y amenaza a la relación social. De esta manera, se conseguiría una imagen un poco más amplia de cómo afecta el estilo motivacional docente al proceso motivacional del alumnado en EF.

6. CONCLUSIONES GENERALES

6. Conclusiones

Considerando los objetivos de la presente Tesis Doctoral y los resultados observados, a continuación, se exponen las principales conclusiones obtenidas con relación a cada uno de los estudios que la componen. Las conclusiones serán presentadas en español primero y posteriormente, en inglés.

Estudio 1: Este estudio reafirma las investigaciones existentes acerca de cómo el género y el curso del alumnado influyen en su percepción sobre los estilos y conductas motivacionales del profesorado de EF. Concretamente, los chicos y los estudiantes de los primeros cursos de Secundaria (i.e., 1º y 2º de ESO), en comparación con las chicas y con el alumnado de cursos superiores, perciben mayores niveles de conductas dominadoras, abandonadas y a la espera. En relación a las consecuencias, aquellos estudiantes que perciben experiencias mejores, mayor aprendizaje y tienen más intención de ser activos, tienden a percibir niveles más altos de conductas participativas, adaptativas, orientadoras, clarificadoras y demandantes, mientras que perciben niveles más bajos de conductas dominadoras, abandonadas y a la espera. De este modo, es preciso destacar la relevancia de los factores sociodemográficos del alumnado a la hora de examinar las conductas motivacionales de los docentes.

Estudio 2: Este estudio refuerza la evidencia previa de la importancia de los estilos motivacionales docentes de apoyo a la autonomía y estructura, no solo para facilitar el lado claro del proceso motivacional del alumnado, sino también para amortiguar la activación del lado oscuro de dicho proceso. Además, este estudio expande la literatura previa mostrando cómo el estilo caótico puede no solo frustrar las NPB del alumnado, si no también dificultar la satisfacción de las mismas. Sin embargo, los resultados del estudio acerca del estilo controlador son contradictorios debido a que facilitan la intención de práctica de AF en el tiempo libre del alumnado mientras que al mismo tiempo desencadena aburrimiento en las clases de EF. Por lo tanto, se requiere más estudios basados en el modelo circular para obtener evidencias más precisas.

Estudio 3: Este estudio subraya las diferencias culturales en la percepción del estilo motivacional docente en EF entre estudiantes españoles y estonios, así como en las asociaciones entre el estilo motivacional docente y la satisfacción de sus NPB. Mientras los estudiantes estonios perciben en mayor medida aquellas conductas menos directivas (i.e., participativas, abandonadas y a la espera), los estudiantes españoles perciben mayores niveles de conductas más directivas (i.e., clarificadoras, demandantes y

dominadoras). Además, los resultados del modelo revelan como las conductas participativas, adaptativas y orientadoras predicen positivamente la satisfacción de la autonomía en estudiantes estonios y españoles. Respecto a la satisfacción de competencia, las conductas participativas, adaptativas, orientadoras y dominadoras la predicen positivamente en los estudiantes estonios, pero solo las conductas adaptativas y orientadoras la predicen positivamente en los estudiantes españoles. En cuanto a la satisfacción de la relación social, las conductas adaptativas la predicen positivamente en ambos países, en cambio, las conductas participativas solo la predicen positivamente en los estudiantes estonios. Finalmente, las conductas abandonadas predicen negativamente la satisfacción de la autonomía, competencia y relación social tanto en los estudiantes estonios como en los españoles. En consecuencia, resulta importante subrayar la importancia de los aspectos culturales al examinar las conductas motivacionales de los docentes y como pueden influir en el proceso motivacional del alumnado en las clases de EF

Estudio 4: El presente estudio muestra como las conductas de alta directividad (i.e., orientadoras, clarificadoras, demandantes y dominadoras) por un lado, y las de baja directividad (i.e., participativas, adaptativas, abandonadas y a la espera) por otro, pueden coexistir, a ojos de los estudiantes, en las clases de EF. En relación con las conductas de alta directividad, aquellos docentes que combinan muy altos niveles de estructura y altos niveles de control muestran los resultados más óptimos en relación a la satisfacción y frustración de las NPB del alumnado. Es posible, que la adición de estructura tenga un gran efecto positivo en adolescentes y que pueda amortiguar esos valores de control cuando se dan conjuntamente. Respecto a las conductas de baja directividad, aquellos docentes con un estilo más puro de apoyo a la autonomía muestran los resultados más adaptativos. Además, es interesante señalar que puede resultar más adaptativo combinar niveles moderados de apoyo a la autonomía y caos, que niveles altos, dado que cualquier adición de caos, independientemente del nivel de apoyo a la autonomía facilita el desarrollo de un proceso motivacional desadaptativo en los estudiantes.

6. Conclusions

According to the aims of this Doctoral Thesis and the results found, the main conclusions obtained in relation to each of the studies that compose it are presented in the following paragraphs.

Study 1: This study strengthens previous research on how students' gender and academic year influence their perceptions of the (de-)motivating teaching styles and approaches of PE teachers. Specifically, boys and students in lower grades of Secondary School (i.e., Year-8 and -9), compared to girls and students in higher grades, perceive higher levels of domineering, abandoning, and awaiting approaches. In relation to outcomes, those students who perceive better experiences, more learning, and more intention to be active, perceive higher levels of participative, attuning, guiding, clarifying, and demanding approaches, while they perceive lower levels of domineering, abandoning, and awaiting approaches. In this way, the relevance of student socio-demographic factors should be highlighted when examining teachers' (de-)motivating teaching approaches.

Study 2: This study enhances previous findings on the importance of autonomy-supportive and structuring styles in not only enabling the bright side of the students' motivational process but also dampening the activation of the dark side of the motivational process. Furthermore, this study also expands previous research by showing how the chaotic style can not only frustrate students' BPN but also hinder the satisfaction of these BPN. However, the results of the study about the controlling style are contradictory because it facilitates students' intention to practice PA in their leisure time while at the same time fostering boredom in PE lessons. Therefore, further studies based on the circumplex model are required to obtain more precise evidence.

Study 3: This study highlights cultural differences in the perception of (de-)motivating teaching style in PE between Spanish and Estonian students, as well as in the associations between (de-)motivating teaching style and their BPN satisfaction. While Estonian students perceive less directiveness approaches (i.e., participative, abandoning, and awaiting) to a greater extent, Spanish students perceive higher levels of more directiveness approaches (i.e., clarifying, demanding, and domineering). Furthermore, the results of the model indicate that participative, attuning, and guiding approaches positively predict autonomy satisfaction in Estonian and Spanish students. Regarding competence satisfaction, participative, attuning, guiding, and domineering approaches

predict it positively in Estonian students, but only attuning and guiding approaches predict it positively in Spanish students. In relation to relatedness satisfaction, it is positively predicted by attuning approach in both countries, whereas participative approach only positively predict it in Estonian students. Finally, abandoning approach negatively predict autonomy, competence and relationship satisfaction in both Estonian and Spanish students. Therefore, it is important to highlight the importance of cultural aspects when examining teachers' (de-)motivating approaches and how they may influence the students' motivational process in PE lessons.

Study 4: The present study shows how high directiveness approaches (i.e., guiding, clarifying, demanding, and domineering) on the one hand, and low directiveness approaches (i.e., participative, attuning, abandoning, and awaiting) on the other hand, can coexist, in the eyes of students, in PE lessons. In relation to high directiveness approaches, those teachers who combine very high levels of structure and high levels of control show the most optimal results in relation to students' BPN satisfaction and frustration. Therefore, it does not seem to be better to have a profile of moderate structure and control rather than high structure and control, since the addition of control does not affect the students' motivational process as negatively. It is possible that the addition of structure has a great positive effect on adolescents and that it may dampen these control values when they occur together.

7. APORTACIONES PRINCIPALES

7. Aportaciones Principales

En esta sección se presentan las principales contribuciones teóricas y prácticas que esta Tesis Doctoral aporta al estudio del estilo motivacional docente del profesorado de EF, bajo el modelo circular, y a los efectos que puede tener sobre el proceso motivacional del alumnado.

En primer lugar, en el estudio 1, se deriva una relevante aplicación práctica relacionada con las variables sociodemográficas que pueden afectar al proceso motivacional del alumnado. Dicho estudio remarca la necesidad de valorar que estilo motivacional docente se está implementando, en función del género y curso académico del alumnado. Específicamente, se requiere prestar más atención cuando se está interactuando con chicos y con los estudiantes de cursos más bajos ya que tienden a percibir en mayor medida aquellas conductas controladoras y caóticas que pueden repercutir negativamente en su proceso motivacional. Por lo tanto, los programas de intervención con profesorado de EF deberían tener en cuenta cómo desarrolla su estilo motivacional docente en estos grupos específicos y en función de los chicos y chicas de cada clase.

En segundo lugar, como contribución teórica, el estudio 2 muestra el primer modelo predictivo, hasta la fecha, que aporta cómo los cuatro estilos motivacionales docentes del modelo circular pueden impactar sobre el lado claro y oscuro del proceso motivacional del alumnado en las clases de EF. En este sentido, si bien los efectos de los estilos de apoyo a la autonomía y estructura habían sido más estudiados en investigaciones previas, el presente modelo además añade los estilos de control y caos, tradicionalmente olvidados en la agenda de los investigadores. Los resultados del modelo ponen de manifiesto la importancia que tiene apoyar la autonomía y la estructura en las clases de EF, así como evitar el caos. En relación con el control, los resultados observados no ofrecen una conclusión clara por los resultados mixtos que se han obtenido en los diferentes estudios. Siguiendo esta misma línea, los resultados globales de la presente Tesis Doctoral muestran como el estilo controlador presenta un elevado número de resultados negativos asociado a su implementación en el aula. Sin embargo, en la disección de este estilo se puede observar como las conductas dominadoras son las principales causantes de este tipo de consecuencias, debido a que las conductas demandantes, al tener un nivel más bajo de directividad, incluso podrían favorecer a corto plazo el proceso motivacional del alumnado. No obstante, valorando el global de los

resultados obtenidos en los cuatro estudios de la presente Tesis Doctoral, como contribución teórica y práctica, parece importante que el profesorado siempre que pueda se aleje de estilos/conductas controladores/as, porque a medio o largo plazo, van a tener un impacto negativo sobre el proceso motivacional de los estudiantes. Los resultados de este estudio pueden ser útiles para orientar eficazmente la formación inicial y continua del profesorado de EF, con el fin de que adopten los estilos de enseñanza más óptimos en sus clases para desencadenar un proceso motivacional positivo en su alumnado.

En tercer lugar, en el estudio 3 la principal contribución teórica es que el país y la cultura pueden tener un efecto en cómo los estudiantes perciben el estilo motivacional docente del profesorado de EF. Otra contribución teórica importante es que, este es el primer estudio que despliega en un modelo predictivo como las ocho conductas que engloba el modelo circular (i.e., participativas, adaptativas, orientadoras, clarificadoras, demandantes, dominadoras, abandonadas y a la espera) se relacionan con la satisfacción de las NPB, tanto de estudiantes estonios como españoles. Los resultados del modelo destacan como las conductas participativas, adaptativas y orientadoras predicen la satisfacción de la autonomía, competencia y relación social, mientras las conductas abandonadas las predicen negativamente. Como contribución práctica, estos hallazgos subrayan la necesidad de adaptar la formación del profesorado de EF en función de los aspectos culturales específicos del país, ya que pueden partir de elementos diferentes en función de la cultura, o los efectos de los estilos y conductas pueden ser diferentes.

En cuarto lugar, esta Tesis Doctoral, y concretamente el estudio 4, es la primera investigación en demostrar que el profesorado de EF puede combinar, por un lado, conductas de estructura y control (i.e., alta directividad) y por otro, conductas de apoyo a la autonomía y caos (i.e., baja directividad). Por tanto, dicho estudio, de forma pormenorizada, contribuye a ampliar las evidencias teóricas previas que mostraban que el profesorado utilizaba al mismo tiempo diferentes estilos motivacionales durante su práctica. Como contribución práctica, este estudio demuestra que si bien cualquier adición de caos, es negativa, no pasa lo mismo con el control. Es decir, es mejor ser moderado en autonomía y caos, que alto en autonomía y caos, dado que la adición de caos, aunque también la autonomía sea más alta, supone una mayor frustración de NPB. Sin embargo, no parece ser mejor tener un perfil de estructura y control moderados que uno de estructura y control elevados, debido a que dicha dosis de control combinada con valores muy altos de estructura no afecta tan negativamente al proceso motivacional del

alumnado. Por lo tanto, con el objetivo de obtener los resultados más adaptativos posibles en las clases de EF, se anima al profesorado a familiarizarse con las preferencias del alumnado y a crear entornos de aprendizaje estructurados, evitando al mismo tiempo aplicar prácticas controladoras y caóticas a la hora de guiar a los alumnos en su proceso de aprendizaje.

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ANEXOS

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ANEXOS

ANEXO 1: Aprobación del Comité Ético



**Informe Dictamen Favorable
Trabajos académicos**

C.I. PI22/363

7 de septiembre de 2022

Dña. María González Hinjos, Secretaria del CEIC Aragón (CEICA)

CERTIFICA

1º. Que el CEIC Aragón (CEICA) en su reunión del día 07/09/2022, Acta Nº 15/2022 ha evaluado la propuesta del Trabajo:

Título: Evaluación y mejora de las conductas docentes en educación física: implicaciones en la motivación y la práctica de actividad física de jóvenes aragoneses

Alumno: Sergio Diloy Peña

Tutor: Luis García González

Versión protocolo: 11/08/2022 (v2)

Versión documento de información y consentimiento: Versión 02, de fecha 10/08/2022(alumnos y padres)

2º. Considera que

- El proyecto se plantea siguiendo los requisitos de la Ley 14/2007, de 3 de julio, de Investigación Biomédica y los principios éticos aplicables.
- El Tutor/Director garantiza la confidencialidad de la información, la obtención de los permisos necesarios para el acceso a los datos y el adecuado tratamiento de los datos, en cumplimiento de la legislación vigente y la correcta utilización de los recursos materiales necesarios para su realización.

3º. Por lo que este CEIC emite **DICTAMEN FAVORABLE a la realización del proyecto**, siempre que obtenga la autorización expresa de cada uno de los centros donde se va a realiza.

Lo que firmo en Zaragoza

GONZALEZ
HINJOS MARIA -
DNI 03857456B
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por GONZALEZ HINJOS
MARIA - DNI 03857456B
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María González Hinjos
Secretaria del CEIC Aragón (CEICA)

ANEXO 2: Documento de Información para el Participante

DOCUMENTO DE INFORMACIÓN PARA EL PARTICIPANTE (Perfil padres/tutores)

Título de la investigación: Evaluación y mejora de las conductas docentes en educación física: implicaciones en la motivación y la práctica de actividad física de jóvenes aragoneses

Investigador Principal: Luis García González

Teléfono: 658946828

mail: lgarciag@unizar.es

Centro Universidad de Zaragoza

1. Introducción:

Nos dirigimos a usted para solicitar la participación de su hijo en un proyecto de investigación que estamos realizando en la Universidad de Zaragoza. La participación es voluntaria, pero es importante para obtener el conocimiento que necesitamos. Este proyecto ha sido aprobado por el Comité de Ética, pero antes de tomar una decisión es necesario que:

- lea este documento entero
- entienda la información que contiene el documento
- haga todas las preguntas que considere necesarias
- tome una decisión meditada
- firme el consentimiento informado, si finalmente desea participar.

Si decide participar se le entregará una copia de esta hoja y del documento de consentimiento firmado. Por favor, consérvelo por si lo necesitara en un futuro.

2. ¿Por qué se le pide participar?

Se solicita la colaboración de su hijo para participar en este proyecto que pretende recoger las percepciones sobre las conductas docentes del profesorado de Educación Física, desde la perspectiva del alumnado.

En total en el estudio participarán alrededor de 700 estudiantes de la Comunidad Autónoma de Aragón de estas características.

3. ¿Cuál es el objeto de este estudio?

El objetivo del estudio es conocer mejor qué es lo que sucede en las clases de EF en Educación Secundaria y qué efectos pueden tener las metodologías de enseñanza del docente sobre otras variables motivacionales del alumnado, así como la propia práctica deportiva. Se espera poder aportar a la comunidad científica herramientas e instrumentos específicos para el área de Educación Física, además de favorecer la formación de futuros docentes en torno a los procesos motivacionales

4. ¿Qué tengo que hacer si decido participar?

Si se decide participar en el estudio, como alumno de Educación Física en Educación Secundaria, su hijo deberá cumplimentar una serie de encuestas sobre la labor habitual del profesorado de Educación Física, que consiste en cumplimentar una serie de cuestionarios durante un máximo de 25 minutos.

5. ¿Qué riesgos o molestias supone?

No se espera ningún tipo de riesgo por la participación en este estudio.

6. ¿Obtendré algún beneficio por mi participación?

Al tratarse de un estudio de investigación orientado a generar conocimiento no es probable que se obtenga ningún beneficio por la participación si bien contribuirá al avance científico y al beneficio social.

No se recibirá ninguna compensación económica por la participación.

7. ¿Cómo se van a tratar mis datos personales?

Este proyecto cumple con la Legislación relacionada con la protección de datos, en particular el Reglamento General de Protección de Datos de la Unión Europea (Reglamento UE 2016/679, de 27 de abril) y la Ley Orgánica 3/2018, de 5 de diciembre, de Protección de Datos Personales y Garantías de los Derechos Digitales. También con toda la normativa de ética en la investigación y, si es el caso, del tratamiento de datos de la investigación en salud e investigación biomédica. El proyecto está autorizado por la Universidad de Zaragoza. A continuación, le indicamos brevemente cómo trataremos sus datos personales:

Información básica sobre protección de datos.

Responsable del tratamiento: Universidad de Zaragoza

Responsable interno: Luis García González

Encargado interno: Sergio Diloy Peña

Finalidad: Sus datos personales serán tratados exclusivamente para el estudio al que hace referencia este documento. El tratamiento de sus datos personales se realizará utilizando técnicas para mantener su anonimato mediante el uso de códigos aleatorios, con el fin de que su identidad personal quede completamente oculta durante el proceso de investigación.

Legitimación: El tratamiento de los datos de este estudio queda legitimado por su consentimiento a participar.

Destinatarios: No se cederán datos a terceros salvo obligación legal.

Duración: Los datos personales serán destruidos una vez se haya cumplido con la finalidad para la que se recabaron y para las posibles revisiones o determinación de responsabilidades. Los resultados objeto de explotación, ya completamente anonimizados y sin datos personales, podrán ser conservados para su posible reutilización en otros trabajos de investigación. A partir de los resultados de la investigación, se podrán elaborar comunicaciones científicas para ser presentadas en congresos o revistas científicas, pero se harán siempre con datos agrupados y nunca se divulgará nada que le pueda identificar.

Derechos: Podrá ejercer sus derechos de acceso, rectificación, supresión y portabilidad de sus datos, de limitación y oposición a su tratamiento, de conformidad con lo dispuesto en el Reglamento General de Protección de Datos (RGPD) ante el/la Responsable interno de este estudio, cuyos datos de contacto figuran en el encabezamiento de este documento, o dirigiendo un correo electrónico al Delegado/a de Protección de Datos de la Universidad de Zaragoza (dpd@unizar.es). Si no viera atendida su petición podrá dirigirse en reclamación a la Agencia Española de Protección de Datos (<https://www.aepd.es>). Podrá consultar información adicional y detallada de este tratamiento de datos en el Inventario de Actividades de Tratamiento de la Universidad de Zaragoza, accesible en: <https://protecciondatos.unizar.es/registro-actividades-de-tratamiento>

9. ¿Quién financia el estudio?

Este proyecto se financia con fondos procedentes del Gobierno de Aragón.

10. ¿Se me informará de los resultados del estudio?

Usted tiene derecho a conocer los resultados del presente estudio, tanto los resultados generales como los derivados de sus datos específicos. También tiene derecho a no conocer dichos resultados si así lo desea. Por este motivo en el documento de consentimiento informado le preguntaremos qué opción prefiere. En caso de que desee conocer los resultados, el investigador le hará llegar los resultados.

¿Puedo cambiar de opinión?

La participación es totalmente voluntaria, puede decidir no participar o retirarse del estudio en cualquier momento sin tener que dar explicaciones. Basta con que le manifieste su intención al investigador principal del estudio.

¿Qué pasa si me surge alguna duda durante mi participación?

En la primera página de este documento está recogido el nombre y el teléfono de contacto del investigador responsable del estudio. Puede dirigirse a él en caso de que le surja cualquier duda sobre su participación.

Muchas gracias por su atención, si finalmente se desea participar le rogamos que firme el documento de consentimiento que se adjunta.

ANEXO 3: Consentimiento Informado de los Participantes

DOCUMENTO DE CONSENTIMIENTO INFORMADO

Título del PROYECTO: Evaluación y mejora de las conductas docentes en educación física: implicaciones en la motivación y la práctica de actividad física de jóvenes aragoneses

Yo, (nombre y apellidos del participante),
como madre/padre/tutor legal de.....

He leído la hoja de información que se me ha entregado.

He podido hacer preguntas sobre el estudio y he recibido suficiente información sobre el mismo.

He hablado con:(nombre del investigador)

Comprendo que la participación es voluntaria.

Comprendo que se puede retirar del estudio:

- 1) cuando se quiera
- 2) sin tener que dar explicaciones
- 3) sin que esto repercuta en mis cuidados médicos

He recibido una copia firmada de este Consentimiento Informado.

Firma del padre/madre/tutor

legal:

.....

Fecha:

.....

He explicado la naturaleza y el propósito del estudio al paciente mencionado

Firma del Investigador:

.....

Fecha:

