Facultad de Ciencias de la Salud

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TESIS DOCTORAL

Estilo comunicativo del profesorado de secundaria: efectos sobre el rendimiento académico y el bienestar psicológico.

Secondary teachers' engaging messages: relations with academic performance and psychological well-being.

Elisa Santana Monagas

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Tesis Doctoral presentada por Dª

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Las Palmas de Gran Canaria, a_____de_____de 2023

UNIVERSIDAD DE LAS PALMAS
DE GRAN CANARIA

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INFORMAN:

Que el trabajo de investigación titulado **"Estilo comunicativo del profesorado de secundaria: efectos sobre el rendimiento académico y el bienestar psicológico."**, ha sido realizado por **Dña. Elisa Santana Monagas**, en el Departamento de Psicología, Sociología y Trabajo Social de la Universidad de Las Palmas de Gran Canaria, bajo su dirección y asesoramiento técnico y científico, y que, una vez revisada la presente Memoria, la encuentra apta para su defensa ante tribunal.

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Table of contents

Consideraciones preliminares

Ayudas recibidas

La doctoranda, Elisa Santana Monagas, ha sido beneficiaria de un contrato predoctoral dentro del "Programa Predoctoral de Formación del Personal Investigador en Canarias". Dicho contrato contó con la financiación por parte de la Consejería de Economía, Industria, Comercio y Conocimiento y la cofinanciación del Fondo Social Europeo. El contrato fue obtenido en concurrencia competitiva (Orden de 6 de julio de 2018, de la Consejería de Economía, Industria, Comercio y Conocimiento. Boletín Oficial de Canarias nº 138).

Prólogo

Si les soy sincera, nunca estuve interesada en la investigación ni en realizar un doctorado. Durante mis años en Granada, dónde estudié psicología, siempre rehuía de los trabajos de investigación y evitaba ir al CIMCYC (*Centro de Investigación Mente, Cerebro y Comportamiento*) cuando nos animaban a participar como sujetos experimentales a cambio de modestas subidas de nota. Muchas de mis amigas, en cambio, volvían de esas experiencias con el pelo alborotado, después de haber llevado electrodos, o con fotos de su cerebro tras someterse a un TEP, mientras yo solo pensaba lo injusto que era que le subieran la nota por eso. Ahora, que por fin comprendo lo complicado que es conseguir una muestra, aplaudo ese método.

No me malinterpreten. No se trataba de que la investigación no me pareciera fundamental, y más aún, en el campo de la psicología. De hecho, disfrutaba como la que más escuchando al profesorado explicar los detalles de los estudios y cómo de estos se derivaban los distintos patrones de pensamiento. Simplemente consideraba que era un ámbito de la psicología demasiado complejo -cosa que sigo pensando- y que, por tanto, no era para mí.

Estaba tan alejado de mis planes que todavía recuerdo como si fuera ayer el drama que viví cuando me concedieron el contrato predoctoral de 4 años. Recibí la notificación mientras llegaba a casa donde me estaban esperando para comer. Cuando entré por la puerta ya estaba hecha un mar de lágrimas. Mi padre, atónito e incapaz de comprender cómo aquello podía haberse convertido en una tragedia para mí, no paraba de repetir: "¡Cualquiera en tu lugar estaría dando saltos de alegría!". Sin duda, la alegría era la última de las emociones que sentía en ese momento.

La explicación es más sencilla de lo que parece: simplemente no estaba en mis planes. Durante mis últimos años de grado comenzó a gustarme mucho la psicología de la educación, donde sacaba mis mejores notas. Por ello, perseguía cuántas optativas podía de esa rama y realicé mis prácticas en un centro de educación primaria. Para el último año ya tenía claro que quería ser orientadora. Mi plan consistía en realizar el máster de formación del profesorado, prepararme las oposiciones y aprobar a la primera ¡Qué ingenua era! Sin embargo, para cuando acabé el máster, en junio del 2018, todavía quedaban dos años para la convocatoria de las próximas oposiciones, por lo que decidí que trabajaría durante un año y estudiaría al siguiente.

Ese mismo año, en pleno verano y por pura casualidad, recibí un correo de la universidad en la que se informaba que el profesor Jaime León buscaba a un técnico para un proyecto de investigación que me pareció interesante. Era el plan perfecto: un contrato de un año a media jornada que -desde mi ingenua perspectiva- me permitía estudiar las oposiciones por las tardes. Contacté con él para una entrevista, salió bien y comenzamos a trabajar juntos. Por recomendación -y terca insistencia- de Jaime, después me matriculé en el doctorado y solicité también el contrato predoctoral para el personal investigador en formación del Gobierno de Canarias. Todo ello, en realidad, por inercia y sin expectativas de finalmente conseguirlo.

Después del almuerzo bañado en lágrimas que ya he narrado y el breve periodo de crisis existencial que lo siguió, acepté el contrato por no arrepentirme de haber dejado pasar ese tren. Sin embargo, hacer la tesis seguía sin ser mi prioridad, la consideraba más bien un mérito más que me ayudaría a obtener una plaza como orientadora. Ese fue el inicio de un largo periodo en que trabajaba por las mañanas en la tesis y estudiaba con amargura por las tardes para mis oposiciones. Mi hermano Carlos, que no ha estudiado psicología, pero conoce a la perfección la mía, fue quien me hizo caer en la cuenta de que debía optar entre una cosa o

la otra. Recuerdo esa tarde como si fuera ayer. Estaba estudiando y lo vi asomarse por la ventana. Solo le hizo falta ver mi cara para comprenderlo todo. Como bien me dijo, no se podía estar en misa y repicando. Bastaron esas palabras y la correspondiente merienda de lágrimas, para que desechara las oposiciones y me dedicara de lleno a la tesis.

Así que aquí estoy, casi cinco años después presentando este trabajo sin imaginarme otra vida distinta. Gracias a esa decisión he descubierto lo que ahora considero una vocación: la docencia. Disfruto mucho también investigando, cosa que nunca hubiese imaginado hace diez años. Incluso esos días en los que ser investigador puede llegar a ser un auténtico suplicio, cuando tus preguntas nunca tienen respuesta correcta, algunas ni siquiera respuesta, y te inunda la incertidumbre ¡Incluso esos días he aprendido a disfrutarlos!

Echo la vista hacia atrás y sólo puedo agradecer a las personas que me ayudaron a tomar esa decisión. A mi madre, que con tanto tacto y cariño me escuchó y aconsejó; a mi padre, con su firme pero realista opinión; y a mi hermano, que sin saberlo me dio el empujón que necesitaba. Por último, a Armiche, que con una paciencia infinita se sentó conmigo a hacer una lista de "*pros"* y "*contras"*, mientras me ayudaba a decidir qué hacer sin decirme nunca lo que debía hacer.

Finalmente, no puedo acabar este prólogo sin agradecer estos años y reconocer la labor de mis dos directores de tesis, Juan Luis y Jaime (mi director en la sombra). Sin ustedes formando parte de esta ecuación, probablemente mi decisión hubiese sido otra. Gracias, Jaime, por no presionarme cuando te confesé que quizás renunciaría al contrato, y por tu habilidad de hacer que las cosas en lo personal sean tan fáciles mientras conviertes lo profesional en todo un reto. Gracias, Juan Luis, por tu cálida guía, que me ha hecho sentir siempre muy bien arropada y respaldada. Con ustedes he tenido la suerte de tener "*the best of*

both worlds" para lograr el equilibrio perfecto: un poquito de orden y un poquito de caos; la cabeza en las nubes, pero con los pies en la tierra.

Les estaré eternamente agradecida a todos, por tanto.

Abstract

Schools are the place where first social and emotional experiences take place and where students spend most of their time. Thus, it may not seem surprising that many studies find consistent evidence of the influence teacher and schools have on student well-being (Eccles & Roeser, 2011; Han, 2021; Mouratidis et al., 2011; Tobia et al., 2019). In these contexts, it is common to examine student's flourishment through through indicators of well-being, among which academic performance stands out (Lerner et al., 2005; Smith & Bärker 2009). For instance, poor performance repercussions have found to extend into the future. In this sense, research shows that adults who drop out from school are at increased risk of developing health problems (Blankson & Blair, 2016; Levpušček et al., 2013).

Given that many Spanish students are performing below their potential (Veas et al., 2017), we face a major educational challenge. One possible approach to address such issue is to examine which school variables contribute to student well-being and academic performance. Among these, teachers and their teaching practices have shown to be key for adolescents' positive development (Aldrup et al., 2022; Chetty et al., 2014; Kunter et al., 2013; Leon & Liu, 2017). Within these teaching practices, researchers have begun to examine the impact the different teacher messages can have on students, with promising results (Caldarella et al., 2020; León et al., 2017; Ntoumanis et al., 2017; Putwain & Remedios, 2014). For example, according to message framing theory (Rothman & Salovey, 1997), messages that appeal to fear and this, emphasize disadvantages of not engaging in an activity (i.e., loss frame messages) have shown to trigger anxiety among students (Symes, 2011b, 2011a). Despite the evidence, the impact messages that highlight the advantages of engaging in an activity (i.e., gain-framed messages) have on students has been largely ignored. Additionally, within the framework of self-determination theory (Ryan & Deci, 2000a, 2017,

2020), teacher messages have been studied as a way of displaying informative or controlling language (e.g., "you must/should" vs. "you may/could"; Cheon et al., 2020; Haerens et al., 2015; Jang et al., 2016; Weinstein et al., 2018, 2019). However, this way of examining teacher messages does not contemplate the content of the messages. In other words, teachers may try to engage students in schoolwork by appealing to specific kinds of motivation (i.e., study for fun or study for recognition). Examining such messages solely in terms of the language that accompanies them misses the impact that appealing to certain kinds of motivations may have. Moreover, while the current research focus has been on one type of message or another, teachers can actually be incorporating different types of messages into their discourse to engage their students in school tasks.

Attending what has been just exposed, the present thesis aims to fill in these gaps in research by examining the relation between teacher engaging messages (i.e., "*If you work hard, you will learn interesting facts"* or "*If you don't work hard, you'll get into trouble"*), academic performance, and student well-being, as well as other variables that may be involved in these processes. More specifically, this work has the following general aims: 1) Assess the relation among teachers engaging messages and students' psychological functioning, academic performance, and motivational processes; 2) Examine the differential usage of messages by teachers and whether they can be grouped in different profiles based on their tendency to rely on one or another type of messages; 3) Examine antecedents of teachers' engaging messages to establish future intervention targets.

To achieve these goals, we conducted three different studies. The first study presents a newly developed scale to assess teacher engaging messages. Following a multilevel structural equation modelling (ML-SEM) approach, it assesses the relations among teacher messages, student motivations, and academic performance. Results showed that teachers engaging messages were related with students' motivation to study, and this, in turn, with their

academic performance. The second study relied on a mixed structural equation modelling (ML-SEMM) and aimed at identifying profiles of students according to their teachers' use of engaging messages and analysing the relation among these profiles and teacher-student relatedness and students' subjective vitality. Overall, at both levels of analysis, teachers' engaging messages related with teacher-student relatedness (either positively or negatively) with clear differences among profiles. Moreover, also at both levels of analysis, teacher-student relatedness related with students' subjective vitality. Finally, the last study performed a latent profile analysis to identify profiles of students based on the types of engaging messages teachers used with them. In a second step it was analysed how these profile related to students' academic performance and, in a last step, how teachers' own well-being (i.e., satisfaction/thwarting of basic psychological needs) predicted their use of engaging messages. In general, results indicated that teachers' basic psychological needs were related to their use of engaging messages, and this was related to students' performance.

To sum up, the present work highlights a new resource teachers can use to improve their students' well-being and academic performance by improving teacher-student relatedness and motivation to learn, respectively. Finally, while it is widely accepted that there is a strong connection between teaching practices and student outcomes, a fact illustrated in the third and previous research in this thesis (Collie et al., 2019), research on teachers' well-being and its impact on their own teaching practices is scarce. Therefore, the present thesis not only contributes to the literature on effective teaching practices, but also reflects the importance of teachers' own well-being in their performance as teachers.

Resumen en español

1. Introducción

A lo largo de los últimos años, con el surgimiento de la psicología positiva, el estudio del bienestar de los adolescentes se ha convertido en un campo emergente de gran relevancia en todas las disciplinas (Keyes, 2007; Mackenzie y Williams, 2018; Pollard y Lee, 2003; Wang et al., 2021; Zheng, 2022). Desde la óptica de esta nueva perspectiva, el bienestar es entendido como el óptimo funcionamiento de los seres humanos que resulta de vivir una vida plena (Deci Ryan, 2008a; Ryan et al., 2013). De esta forma, el foco deja de orbitar en torno a la idea de enfermedad. En su lugar, la investigación ha adoptado una posición más optimista, entendiendo esta etapa de desarrollo como una oportunidad para el crecimiento personal (Oberle, 2018; Taylor et al., 2017). Por consiguiente, el bienestar se entiende de manera generalizada como sinónimo de salud mental (Ruggeri et al., 2020) y se relaciona con el éxito en varios dominios de la vida. De hecho, estudios longitudinales indican que el bienestar durante las primeras etapas del desarrollo predice su presencia futura en la edad adulta (Richards y Huppert, 2011). Por tanto, resulta evidente la importancia de intervenir en esta etapa de desarrollo.

Entre los contextos más determinantes en la vida de un adolescente, la escuela juega un papel fundamental. Es el lugar donde tienen lugar las primeras experiencias sociales y emocionales, y donde los estudiantes pasan una gran cantidad de tiempo. De media, los estudiantes españoles de secundaria reciben cada año unas 1054 horas de clase. Por ello, no es de extrañar encontrar de manera consistente en numerosos estudios evidencias del impacto que los docentes y las escuelas tienen en el bienestar de los estudiantes (Eccles y Roeser, 2011; Han, 2021; King, 2015; León y Liew, 2017; Mouratidis et al., 2011; Putwain, Loderer,

et al., 2019; Tobia et al., 2019). En tales contextos, se entiende que los estudiantes prosperarán y tendrán éxito cuando alcancen un funcionamiento óptimo y holístico en su vida diaria.

De esta forma, es común que las investigaciones en el campo de la psicología de la educación examinen este desarrollo personal a través de indicadores de bienestar, entre los cuales destaca, por resultar de suma importancia, el rendimiento académico (Lerner et al., 2005; Scales et al., 2000; Smith y Barker, 2009). Así, Ferragut y Fierro (2012), encontraron que el bienestar se relacionaba positivamente con la nota media y la actitud en clase, e inversamente con el número de asignaturas suspensas. Tan notoria es la relación entre estas dos variables (Needham et al., 2004) que una disminución en el rendimiento académico se relaciona con un mayor riesgo de desarrollar síntomas y trastornos de salud mental durante la adolescencia (Kendler et al., 2016b, 2016a; MacCabe et al., 2013). De hecho, las repercusiones asociadas a un bajo rendimiento se prolongan en el futuro. Sin ir más lejos, varias investigaciones han encontrado un mayor riesgo de desarrollar problemas de salud en adultos que abandonaron la educación formal (Blankson y Blair, 2016; Levpušček et al., 2013).

Si tenemos en cuenta que muchos estudiantes españoles están rindiendo por debajo de su potencial (Veas et al., 2017), es evidente que nos encontramos ante un problema importante en el ámbito educativo. España es el país de la OCDE con la mayor proporción de estudiantes que han repetido al menos un curso en secundaria: 24.9% frente al 6.4% de media del resto de países de la OCDE (Ikeda y García, 2014). Además, la tasa de abandono escolar en el curso 2019-2020 se situó en el 28.2%, 14.4 puntos por encima de la media de la Unión Europea (Ministerio de Educación y Formación Profesional, 2022). En cuanto al bienestar, la evidencia sugiere que alrededor del 7.7% de los adolescentes están en riesgo de presentar

problemas de salud mental (Sánchez-García et al., 2018) mientras que un 15% de los adolescentes ya presentan algún síntoma emocional y conductual (Ortuño-Sierra et al., 2014). De hecho, una comisión de Lancet llegó a la conclusión de que mejorar el rendimiento académico de los estudiantes de secundaria representa la mejor inversión en salud y bienestar (Patton et al., 2016). Por lo tanto, parece ser que encontrar formas de mejorar tanto el bienestar como el rendimiento académico de los estudiantes es una prioridad, no solo en España, sino en todo el mundo (Yeager et al., 2019). Estos datos enfatizan y justifican la urgencia de encontrar soluciones y tratar de reducir las repercusiones, tanto en el ámbito de la salud como en el de la educación, que surgen del bajo rendimiento académico de los adolescentes.

Un posible enfoque para abordar tal problema es explorar el contexto escolar en busca de variables que contribuyan al bienestar y rendimiento académico de los estudiantes. Así, los docentes y sus prácticas educativas se han convertido en puntos centrales de investigación y objetivos de intervenciones educativas, ya que han demostrado ser clave para el desarrollo positivo de los adolescentes (Aldrup et al., 2022; Bieg et al., 2022; Chetty et al., 2014; Kunter et al., 2013; León y Liew, 2017). Entre estas prácticas docentes, los investigadores han comenzado a explorar el impacto que el estilo comunicativo del docente, entendido como el uso de diferentes mensajes, puede tener en los estudiantes, presentando resultados muy prometedores (Caldarella et al., 2020; León et al., 2017; Ntoumanis et al., 2017; Putwain, Nicholson, et al., 2016; Putwain y Remedios, 2014). Por ejemplo, siguiendo la teoría del *Message Framing* (Rothman y Salovey, 1997), se ha demostrado que los mensajes que apelan al miedo y resaltan los inconvenientes (i.e., *loss-framed messages*) provocan ansiedad entre los estudiantes (Putwain y Symes, 2011b, 2011a). A pesar de la evidencia, el impacto que los *gain-framed messages* o mensajes que resaltan los beneficios (es decir, aquellos que resaltan las consecuencias positivas de participar en una actividad) puede tener en los estudiantes ha

sido ampliamente ignorado. Además, atendiendo la teoría de la autodeterminación (Ryan y Deci, 2000a, 2017, 2020), los mensajes de los docentes se han explorado como una forma de mostrar un lenguaje informativo o controlador (es decir, "podrías/puedes" vs. “debes/tienes que”; (Cheon et al., 2020; Haerens et al., 2015; Jang et al., 2016; Weinstein et al., 2018, 2019). Sin embargo, este enfoque no contempla el contenido del mensaje. En otras palabras, podría ser que los docentes intentasen involucrar a sus estudiantes en las tareas escolares apelando a ciertas motivaciones. Por ejemplo, los docentes pueden decirles a los estudiantes que se esfuercen para aprender cosas interesantes (motivación intrínseca) o pueden decirles que lo hagan para tener más tiempo libre en casa (motivación extrínseca). Si examinamos dichos mensajes solo atendiendo al lenguaje que los acompaña (es decir, “podrías/puedes” vs. “debes/tienes que”), perderíamos el efecto que puede tener en los estudiantes el hacer referencia a distintas motivaciones. Asimismo, el enfoque actual de las investigaciones ha sido centrarse en uno u otro tipo de mensaje, cuando en realidad los profesores pueden realmente integran diferentes tipos de mensajes dentro de su discurso.

Atendiendo a lo expuesto, la presente tesis tiene como objetivo llenar estos vacíos y analizar la influencia de los mensajes de los docentes en el bienestar y rendimiento de los estudiantes ¿Qué tipo de mensajes usan los docentes y cómo se relacionan con los resultados de los estudiantes? ¿Cómo pueden, con sus mensajes, elevar el rendimiento académico de los estudiantes y promover su bienestar al mismo tiempo? ¿Qué otras variables pueden explicar estas relaciones? Desde un punto de vista aplicado, las respuestas a las siguientes preguntas pueden ser útiles para los docentes, ya que abordan los mensajes específicos que pueden usar en clase (“mi profesor/a me dice que, si me esfuerzo, aprenderé cosas interesantes”), en lugar de centrarse en un tipo de lenguaje, cosa que quizás resulte un poco ambigua ("mi profesor/a usa un lenguaje contundente"; Jang et al., 2016). Tal y como señalan investigaciones anteriores (Putwain y Remedios, 2014), la mayoría de los docentes no son conscientes del

tipo de mensajes que utilizan durante sus clases y pueden también no ser conscientes de los efectos que ello puede tener entre los estudiantes (Flintcroft et al., 2017). Dados los efectos negativos que pueden provocar algunos tipos de mensajes (Putwain y Symes, 2011b, 2011a), podría ser beneficioso informar a los docentes acerca de los mensajes exactos que pueden usar. Estos tipos de intervención podrían implementarse muy fácilmente en los centros educativos, ya que son simples, son económicas y no requieren mucho tiempo ni experiencia.

La Tabla 1 ejemplifica el tipo de mensajes examinados en la presente tesis, que se derivaban de la combinación de la teoría de la autodeterminación y la teoría del enfoque del mensaje (*Message framing theory*).

Tabla 1.
Ejemplos de mensajes docentes

Enfoque del mensaje	Incentivo motivacional	Ejemplo
Mensajes que resaltan los beneficios (MrB)	Intrínseco	MrB-intrínseco: *"Si te esfuerzas, aprenderás datos interesantes"*
	Identificado	MrB-identificado: *"Si te esfuerzas, estarás preparado para tus futuros estudios."*
	Introyectado	MrB-introyectado: *"Si te esfuerzas, te sentirás orgulloso de tí mismo."*
	Extrínseco	MrB-extrínseco: *"Si te esfuerzas, te daré una recompensa (p. ej., puntos positivos)."*
Mensajes que resaltan los inconvenientes (MrI)	Intrínseco	MrI-intrínseco: *"Si no te esfuerzas, perderás la oportunidad de entender temas interesantes"*
	Identificado	MrI-identificado: *"Si no te esfuerzas, solo podrás conseguir trabajos mal pagados".*
	Introyectado	MrI-introyectado: *"Si no te esfuerzas, te sentirás avergonzado".*
	Extrínseco	MrI-extrínseco *"Si no te esfuerzas, te quedarás sin recreo."*
Desmotivación		Mensajes de desmotivación: *"No importa si te esfuerzas, vas a suspender de todos modos."*

2. Objetivos de la tesis

Para abordar estas cuestiones, la presente tesis presenta tres estudios que arrojan luz sobre las relaciones entre los mensajes de los docentes, el rendimiento académico y el

bienestar de los estudiantes, así como otras variables que podrían estar interviniendo en dichos procesos. Más detalladamente, esta tesis tiene como objetivos generales:

1. Evaluar la relación entre los mensajes de los docentes y el funcionamiento psicológico, el rendimiento académico y los procesos motivacionales de los estudiantes de secundaria.

2. Examinar el uso diferencial de los mensajes por parte de los docentes y si se pueden agrupar en diferentes perfiles en función de su tendencia a usar un tipo de mensajes u otro.

3. Informar sobre posibles antecedentes al uso de los docentes de uno u otro tipo de mensaje para informar sobre posibles objetivos de futuras intervenciones.

Específicamente, cada uno de los estudios que dan forma a esta tesis tuvo los siguientes objetivos:

- Estudio 1:
  - Desarrollar una escala para medir los mensajes de los docentes (ver Anexo B - *Appendix B*) explorar cómo estos mensajes se relacionan con el rendimiento académico de los estudiantes a través de la motivación para aprender.
- Estudio 2:
  - Examinar los diferentes perfiles de estudiantes según el uso que hace su profesor/a de estos mensajes. En concreto, perfiles de estudiantes según los mensajes que utiliza su profesor/a con el/ella (nivel estudiante) y perfiles de docentes según la tendencia general del docente a usar estos mensajes con toda la clase (nivel docente).
  - Examinar la relación entre estos perfiles, la relación docente-estudiante y el bienestar de los estudiantes.

  - Finalmente, para comprender mejor el uso de los mensajes por parte de los docentes, también se examinó su uso en los distintos niveles educativos.

- Estudio 3:
  - Examinar la agrupación de docentes en perfiles en base al uso de mensajes y observar cómo las necesidades psicológicas básicas de los docentes predicen la pertenencia a uno u otro perfil.
  - Examinar la relación entre los diferentes perfiles y el rendimiento académico de los estudiantes.

3. Principales resultados

Para tratar de dar respuesta a estos objetivos, en el primero de los estudios se desarrolló un instrumento para evaluar los mensajes de los docentes y se realizó un modelo multinivel de ecuaciones estructurales (ML-SEM) para examinar las relaciones propuestas entre los mensajes del profesorado, la motivación del alumnado y su rendimiento académico. El segundo estudio siguió también un enfoque multinivel en el que se llevó a cabo un modelo mixto de ecuaciones estructurales (ML-SEMM). Esta técnica integra un enfoque centrado en las variables (es decir, modelos de ecuaciones estructurales) y un enfoque centrado en la persona (es decir, análisis de perfiles latente). Así, se consigue analizar la relación entre los mensajes del profesorado, la relación docente-estudiante y la vitalidad subjetiva de los estudiantes teniendo en cuenta el perfil de mensajes al que pertenece el docente. Finalmente, el último estudio siguió nuevamente un enfoque multinivel para realizar un análisis de perfil latente para, primero identificar los distintos perfiles de docentes de acuerdo con su uso de mensajes. Posteriormente, analizamos cómo estos perfiles se relacionaban con el rendimiento académico de los estudiantes y cómo el propio bienestar de los docentes predecía su pertenencia a un perfil u otro.

En cuanto el primero de los estudios, los resultados de los análisis acerca de la estructura factorial de la escala desarrollada para los propósitos de esta tesis y el análisis de su consistencia interna concluyeron que la escala presenta propiedades psicométricas satisfactorias. Por tanto, resultó ser un instrumento válido y fiable para evaluar los mensajes de los docentes. Por su parte, los resultados del ML-SEM, aportaron evidencias de que los mensajes de los docentes predicen indirectamente el rendimiento académico de los estudiantes a través de la motivación para aprender de estos.

Del segundo estudio se derivaron cuatro resultados principales. A nivel del alumnado, se identificaron cuatro perfiles denominados de la siguiente manera: pocos mensajes (*few messages*), mensajes de motivación autónoma (*autonomous motivational appeals*), mensajes que resaltan los inconvenientes (*loss-framed messages*) y mensajes que resaltan los beneficios (*gain-framed messages*). En cuanto a nivel docente, se identificaron dos perfiles: el perfil invariante y el perfil variante. En segundo lugar, en general, en ambos niveles de análisis, los mensajes de los docentes estaban relacionados con la relación docente-estudiante y ésta, a su vez, con la vitalidad subjetiva de los estudiantes. Un resultado interesante destacó que no todos los tipos de mensajes se relacionaban positivamente con la relación docente-estudiante y, en algunos casos, la naturaleza de la relación siendo positiva o negativa, dependía de las características del perfil al que se pertenecía. En tercer lugar, otro hallazgo mostró que, en general, al comparar ambos niveles de análisis, se encontraron relaciones más fuertes entre las variables en el nivel docente. Por último, en cuanto a la composición de los perfiles, los resultados mostraron que los docentes tienden a utilizar mensajes con más frecuencia con los estudiantes de los cursos inferiores (es decir, 3º y 4º de la ESO), mientras que, en los cursos de bachillerato, la tendencia es utilizar muy pocos mensajes.

Finalmente, los resultados del tercer, y último estudio que compone esta tesis, demostró la existencia de tres perfiles a nivel del alumnado: el perfil de mensajes que resaltan los beneficios (g*ain-framed messages*), el perfil de pocos mensajes (f*ew messages*) y el perfil de todos los mensajes (a*ll messages*). A nivel docente, el análisis de perfiles latentes multinivel mostró un perfil activo y otro pasivo. Los resultados también indicaron que las necesidades psicológicas básicas de los docentes predecían el uso que hacían de un tipo de mensaje u otro, y esto estaba relacionado con el rendimiento académico de los estudiantes. En concreto, observamos que la necesidad de autonomía de los docentes estaba relacionada con una mayor probabilidad de pertenecer al perfil activo que al pasivo.

4. Conclusiones

En su conjunto, los resultados arrojados por los estudios que componen esta tesis pueden resumirse en las siguientes conclusiones:

1. Los mensajes que tratan de involucrar a los estudiantes en las tareas escolares se relacionan positivamente con la motivación de los estudiantes para aprender, lo que a su vez también se relaciona positivamente con su rendimiento académico.

2. De hecho, los docentes no usan estos mensajes de manera indiscriminada, por el contrario, tienden a basarse con una mayor frecuencia en un tipo u otro de mensajes. Así, los resultados muestran de manera consistente dos perfiles a nivel docente: uno activo (variante) y otro pasivo (invariante). A nivel de alumnado los hallazgos muestran de tres a cuatro perfiles de los cuales dos son consistentes: docentes que utilizan en mayor proporción mensajes que resaltan los beneficios de involucrarse en las actividades relativas a la escuela y docentes que apenas utilizan mensajes para tratar de involucrar al alumnado.

3. Los mensajes que resaltan los beneficios se relacionan positivamente con la vitalidad de los estudiantes a través de la mejora de la relación docente-estudiante.

4. Al comparar los distintos tipos perfiles de docentes, aquellos que recurren a todo tipo de mensajes para implicar a sus estudiantes tienen estudiantes con mejor rendimiento académico, en comparación con los que apenas usan mensajes. Por lo tanto, se puede concluir que es mejor utilizar cualquier tipo de mensaje frente a no hacerlo.

5. El valor predictivo de determinados mensajes sobre la relación docente-estudiante depende de la tendencia general del docente a usar uno u otro tipo de mensaje. En otras palabras, el uso de los mensajes es más determinante que el valor predictivo de cada tipo de mensaje por separado. Así pues, hay que tener en cuenta tanto el enfoque de los mensajes (beneficios vs. inconvenientes) y las motivaciones a las que se hace referencia.

6. Los docentes utilizan en mayor proporción los mensajes para tratar de implicar al alumnado con niveles educativos inferiores. Por tanto, se puede concluir que los docentes adaptan sus mensajes a las características de sus estudiantes.

7. Entre los distintos tipos de mensajes que pueden utilizar el profesorado, los mensajes con un enfoque en los beneficios superan al resto de mensajes en términos de valor predictivo con las variables del alumnado.

8. La satisfacción (o frustración) de las necesidades psicológicas básicas de los docentes se relaciona con el uso que hacen de los mensajes, de tal forma que cuando se satisface la autonomía de los docentes, estos utilizan en mayor medida este tipo de mensajes. Por el contrario, cuando la necesidad de autonomía de los docentes se ve frustrada, la frecuencia de uso de estos mensajes se ve significativamente reducida.

En resumen, la presente tesis destaca un nuevo recurso que pueden usar los docentes para mejorar el bienestar y el rendimiento de sus estudiantes, a través de la mejora de la relación docente-alumnado y la motivación para aprender, respectivamente. Como ponen de manifiesto los datos, si los docentes empezasen a utilizar este tipo de mensajes en clase (en lugar de no utilizar ninguno) y utilizasen con mayor frecuencia los mensajes que resaltan los beneficios, tendrían más probabilidades de observar mejoras entre sus estudiantes. Así, los estudiantes pueden tener una motivación de mayor calidad si los docentes, con sus mensajes, les ayudan a centrarse en lo que pueden obtener a cambio de su comportamiento en lugar de centrarse en evitar obtener algo malo o negativo.

Asimismo, dado que el uso de los mensajes en su conjunto es más decisivo que el uso de un tipo de mensaje por sí solo, el profesorado debe ser consciente de que también puede incidir positivamente sobre su alumnado incluso con mensajes que, a priori, puedan parecer menos adecuados. Por ejemplo, imaginemos a un docente que siempre hace hincapié en los beneficios de participar en actividades relacionadas con la escuela. Atendiendo a nuestros resultados, podría ser que cuando este tipo de profesorado recurre, de vez en cuando, a mensajes que resalten los inconvenientes, tales como "*si no te esfuerzas un poco más, no podrás estudiar lo te gusta*", podría incidir positivamente en el alumnado. Dado a que no están acostumbrados a escuchar este tipo de mensajes, puede ser que el alumnado interprete este tipo de mensajes como una llamada de atención por parte del docente, entendiendo que realmente se lo dice porque quiere lo mejor para ellos.

Finalmente, si bien está ampliamente aceptado que existe una fuerte conexión entre las prácticas docentes y los resultados de los estudiantes, hecho que se ilustra en la tercera investigación de esta tesis y en anteriores (Collie et al., 2019), la investigación sobre el bienestar de los docentes y su impacto en sus propias prácticas docentes es escasa. Por lo

tanto, la presente tesis no solo contribuye a la literatura sobre prácticas docentes efectivas, sino que también refleja la importancia del propio bienestar de los docentes en su desempeño como profesores/as. Dado que la enseñanza puede resultar mental y emocionalmente agotadora (Lauermann y König, 2016) y a la luz de los presentes resultados, si queremos mejorar las prácticas docentes, centrarnos también en el bienestar laboral de los docentes debería ser un objetivo de los investigadores.

1. Introduction

"*I gave a quiz, 20 questions. A student missed 18. I put a "+2" on his paper and a big smiley face. He said, "Ms. Pierson, is this an F?" I said, "Yes." He said, "Then why'd you put a smiley face?" I said, "Because you're on a roll. You got two right. You didn't miss them all." I said, "And when we review this, won't you do better?" He said, "Yes, ma'am, I can do better." You see, "-18" sucks all the life out of you. "+2" said, "I ain't all bad.*". (Pierson, 2020).

Extract from the 2013 TED Talk: "Rita Pierson: Every kid needs a champion."

Over the past years, with the emergence of positive psychology, research on adolescents' well-being has become a rising field of huge relevance across disciplines (Keyes, 2007; Mackenzie & Williams, 2018; Pollard & Lee, 2003; Wang et al., 2021; Zheng, 2022). From this new perspective, well-being is understood as the optimal functioning of humans that results from experiencing a fulfilling life (Deci & Ryan, 2008a; Ryan et al., 2013). Thus, the focus no longer orbits around the idea of illness. Instead, research has adopted a more optimistic position, understanding this developmental stage as an opportunity for flourishment (Oberle et al., 2018; Taylor et al., 2017). Consequently, well-being is commonly understood as synonym of mental health (Ruggeri et al., 2020). It has been linked to success in several life domains, and longitudinal studies indicate that well-being during the early stages of development predicts its future presence in adulthood (Richards & Huppert, 2011). Hence, the importance of intervening in such stage seems evident.

Among the most determinant contexts on an adolescent life, school plays a fundamental role. It is the place where first social and emotional experiences take place and where students spend a vast amount of time. On average, Spanish secondary students receive each year around 1054 hours of lectures. Accordingly, the impact that teachers and schools have on students' well-being has been consistently found across studies (Eccles & Roeser, 2011; Han, 2021; King, 2015; León & Liew, 2017; Mouratidis et al., 2011; Putwain et al., 2019; Tobia et al., 2019). In such contexts, it is understood that students would flourish and success when they reach a holistic optimal functioning in their daily lives.

For such reason, it is common for research on the field to examine such thriving through indicators of well-being, among which academic performance results of extremely importance (Lerner et al., 2005; Scales et al., 2000; L. H. Smith & Barker, 2009). For instance, Ferragut and Fierro (2012) found that well-being was positively related to grade point average and attitude in class, and inversely related to the number of failed subjects. So notorious is the relation between these two variables (Needham et al., 2004) that a decline in performance is related with a higher risk for the development of mental health symptoms and disorders during adolescence (Kendler et al., 2016a, 2016b; MacCabe et al., 2013). In fact, the repercussions of underperformance are prolonged in the future as adults who drop-out from school have a higher risk to develop health problems (Blankson & Blair, 2016; Levpušček et al., 2013).

If we take into account the fact that many Spanish students are performing below their potential(Veas et al., 2017), it's evident that we are facing a major problem in the field of education. Spain is the OCDE country with the highest proportion of students that have repeated at least one grade during secondary: 24.9% as opposed to the 6.4% mean of OCDE countries (Ikeda & García, 2014). Besides, the school drop-out rate in the school year 2019-2020 was situated on the 28.2%, 14.4 point above the mean of the European Union

(Ministerio de Educación y Formación Profesional, 2022). Regarding well-being, evidence suggests that around 7.7% of adolescents are at risk of presenting mental health problems (Sánchez-García et al., 2018) whereas 15% adolescents already present some emotional and behavioural symptoms (Ortuño-Sierra et al., 2014). Indeed, a Lancet commission reached the conclusion that improving the academic performance of secondary students represents the best inversion on health and well-being (Patton et al., 2016). Thus, it seems that finding ways in which to improve both students well-being and academic performance is a priority not only in Spain but worldwide (Yeager et al., 2019). These facts simply emphasise and justify the urgency to find solutions and aim to reduce the potential health and educational implications low performance arise.

One approach to tackle such problem is to explore the school context in search of variables that contribute to students' well-being and academic performance. In such way, teachers and their practices have become central points of research and targets within educational interventions as they have proven to be key for students' positive educational outcomes (Aldrup et al., 2022; Bieg et al., 2022; Chetty et al., 2014; Kunter et al., 2013; León & Liew, 2017). Among these behaviours researchers have started to explore the impact that different teacher messages can have on students, presenting promising results (Caldarella et al., 2020; León et al., 2017; Ntoumanis et al., 2017; Putwain, Symes, et al., 2016; Putwain & Remedios, 2014). For instance, following the message framing theory, (Rothman & Salovey, 1997) it has been proven that messages that appeal to fear and highlight negative consequences (namely, loss-framed messages) trigger anxiety among students (Putwain & Symes, 2011a). Despite the evidence, the impact that gain-framed messages, these are messages highlighting the positives consequences of engaging in an activity, can have on students have been widely ignored. Furthermore, under the umbrella of the self-determination theory (Ryan & Deci, 2000a, 2017, 2020), teacher's messages have been explored as a way

of displaying an informative or a controlling language (i.e., “you could/may” vs. “you must/have to”; Cheon et al., 2020; Haerens et al., 2015; Jang et al., 2016; Weinstein et al., 2019). However, this approach does not contemplate the content of the message. In other words, it could be that teachers try to engage students in their school tasks by appealing to certain motivations. For instance, teachers can tell students to work hard in order to learn interesting facts (intrinsic motivation) or they can tell them to do so to have more free time at home (extrinsic motivation). If we examine such messages only attending to the language accompanied (i.e., “you could/may” vs. “you must/have to”), we would miss the effect that appealing to different motivations can have on students. Moreover, the current approach on research has been to focus either on one or another type of message, when in fact teachers can be appealing to and integrating different kinds of messages.

Attending what has been just stated, the present dissertation aims to fill in these gaps and analyse the influence of teachers' messages on students' well-being and performance. What kinds of messages do teacher rely on and how do they relate with students’ outcomes? How can they raise students’ academic performance and promote their well-being at the same time? What other variables can explain these relations? From an applied point of view, the answers to the following questions can be useful for teachers as the address the specific messages they can use in class (i.e., “my teacher tells me that if I work hard, I will learn interesting facts”) rather than focusing on a type of language, which in some cases could seem too vague (i.e., “my teacher uses forceful language”; Jang et al., 2016). As previous researchers have highlighted (Putwain & Remedios, 2014) most teachers are unconcerned about the type of messages they use during their lessons and, may be unaware of the effects they might trigger among students (Flitcroft et al., 2017). Given the negative effects some kinds of messages might prompt (Putwain & Symes, 2011a), it might be advantageous to advise teachers of what exact messages they could rely on. These kinds of intervention could

be very easily implemented in schools as they are simple, inexpensive, and do not require much time or expertise.

To address these issues, the present dissertation presents three studies that shed some light on the relations among teachers engaging messages, students' academic performance and well-being, as well as other variables that could be intervening in such processes. Specifically, the first study examined how teachers engaging messages relate to students' motivation and academic performance. The second study aimed to understand the relation among teachers engaging messages, teacher-student relatedness, and students' subjective vitality. Finally, the last study had two aims: First, to identify what kinds of messages teachers' use and how these relate with students' performance; and then, to examine the factors that lead teachers to rely on one or another type of messages.

Thus, on the pages that follow, readers can find a first section dedicated to the theoretical framework of the concepts embedded within this dissertation. Followed by the three studies that compose the present dissertation. To attain the objectives of the present dissertation, first an instrument to measure teachers' engaging messages was developed. The first study thus, presented the results from testing its factorial structure and internal consistency and examines whether teachers engaging messages relate with student's performance via motivation to learn. Results from the Multilevel Structural Equation Modelling (ML-SEM) conducted suggested that, indeed, teacher engaging messages indirectly predicted student's academic performance via motivation to learn. Practical implications and suggestions for future research are further discussed.

In order to understand the usage of messages by teachers and their repercussions, the next study examined profiles of students according to the messages their teachers used both with them and with the whole class. In a second step, it was analysed how these profiles related with teacher-student relatedness and with students' well-being. Finally, to further

explore if and how teachers adapt their messages with students, in a last step, the differences in the usage of such messages across grades was examined. To achieve such objectives, a Multilevel Structural Equation Mixture Model (SEMM) approach was followed, which integrates both variable-centered (i.e., structural equation models) and person-centered approaches (i.e., latent profile analysis). Results from this study revealed four mayor results. At the student level, four profiles were identified and named as follows: Few messages, Autonomous motivational appeals, loss-framed messages, and gain-framed messages. At the teacher level, two profiles were identified named as follows: the invariant profile and the variant profile. Second, overall, at both levels of analysis, teachers' engaging messages related with teacher-student relatedness, and this, in turn, related with students' subjective vitality. An interesting result highlighted that not all kinds of messages related positively to teacher-students' relatedness, and, in some cases, the nature of the relation being positive or negative depended on the characteristics of the profile students belonged to. Third, a further finding showed that in general, when comparing both levels of analysis, stronger relations among variables were found at the teacher level. Finally, regarding the composition of profiles at the student-level, results showed that teachers tend to rely on engaging messages more frequently with lower grade students (i.e., grade 9 and 10), whereas for grades 11 and 12, the trend is to use very few messages. The study closes by discussing main findings and their practical implications.

The last of these studies aimed to analyse the relation among teachers' basic psychological needs and their use of engaging messages, and how the different profiles of engaging messages related with students' academic performance. For such reason, following a multilevel latent profile analysis approach, profiles of teachers according to their usage of messages at both levels of analysis were identified. It was then predicted how these profiles related with students' academic performance and, in a last step, estimated how the

satisfaction (or frustration) of teacher's basic psychological needs estimated their belonging to one or another profile. Results at the student-level revealed three profiles of teachers: the gain-framed messages (GFM) profile, the few-messages (FM) profile, and the all-messages (AM) profiles. At the teacher-level, multilevel profile analysis showed an active and a passive profile. Results also indicated that teachers' basic psychological needs were related to their use of engaging messages, and this was related to students' performance. Specifically, it was found that teachers' need for autonomy was linked with the use of engaging messages. Specifically, teachers who felt that their need for autonomy was fulfilled were more likely to be perceived as belonging to the active profile rather than to the passive profile. To sum up, further practical implications and directions for future practice are discussed at the end of the study.

Finally, the last section of this dissertation summarizes the main findings of all studies, presents a brief discussion of them, and outline the limitations and main conclusions to shape future research.

2. Theoretical framework

2.1. Well-being: Eudaimonia and the basic psychological needs.

Eudaimonia refers to a good and fulfilling way of live. From this perspective, well-being is understood as synonym of healthy functioning (Deci & Ryan, 2008a; Ryan et al., 2008; Ryan & Deci, 2001). Eudaimonic well-being results from feeling satisfied and fulfilled with the life being lived (Ryan & Martela, 2016). Thus, contrary to the hedonic view, eudaimonia is not understood as a state or kind of happiness; as experiencing positive affect and absence of negative affect (Kahneman et al., 1999). Instead, is this eudaimonic living which then leads to happiness and thriving. Accordingly, the common foci among eudaimonic researchers has been to explore the aspects that contribute to living in such manner (Ryan et al., 2008; Ryan & Huta, 2009). For instance, developing ones' fully potentials and engaging in activities that emphasize and line up with one's values are strong contributors of feeling fulfilled and satisfied with our life (Ryan et al., 2013). Thereby, activities that accomplish intellectual, social, and personal flourishment would be essential for our fully functioning and thriving, which would then bring us pleasure, joy and happiness (Ryan et al., 2013; Ryan & Huta, 2009).

Rooted on eudaimonia, the self-determination theory (Ryan et al., 2021; Ryan & Deci, 2000a, 2002, 2017, 2020) is a macro theory of human motivation and well-being. From its tenets, well-being has been found to be strongly linked to individuals sense of vitality (Ryan & Deci, 2008; Ryan & Frederick, 1997). This is the experience of possessing energy, feeling alive, and enthusiastic about a certain activity (Greenglass, 2006; Ryan & Frederick, 1997). It embodies energy that individuals can exploit and adjust for volitional behaviours. Basically, as Deci and Ryan (2008, p. 703) describe it, is the experience of displaying "physical and

mental energy.”. Among the many research on this concept, Huta and Ryan (2010) found that trait eudaimonia strongly predicted vitality. Moreover, it has also been linked to active and productive ways to cope with challenge and stress plus a heightened mental health (Penninx et al., 2000; Ryan & Frederick, 1997). Due to its link with numerous positive health and motivational outcomes, it has been considered an important aspect of eudaimonic well-being (Salama-Younes, 2011) and identified as its indicator of “excellence” (Vergara-Torres et al., 2020).

Given that well-being is conceived as a process of self-realisation, growth, and personal development, the school environment has been a common context under the spotlight of eudaimonic researchers. Among the educational agents within schools, teachers and their practices have been recognized as important promoters of students’ positive outcomes. Therefore, have become important points of intervention targets (Cheon & Reeve, 2015; de Carvalho et al., 2021; Quinlan et al., 2019). Features such as teachers’ fairness (Choi et al., 2019), quality teacher-student relationships (Blackwell et al., 2020; Hamre & Pianta, 2006; Ryan & Deci, 2017) and need-supportive practices (Behzadnia, 2020; Behzadnia et al., 2018; Chatzisarantis et al., 2019; Mouratidis et al., 2011) have proven key for students well-being.

In regard with this last teaching practice, and according to the self-determination theory, students have three innate needs that when satisfied contribute to thriving and well-being. These are: autonomy, competence, and relatedness (Deci & Ryan, 2000; Ryan & Deci, 2017; Vansteenkiste & Ryan, 2013). Autonomy refers to a sense of initiative and the capability to decide to take part, or not, in a certain activity. Behaviour is therefore driven by their willingness and by interest (Ryan & Deci, 2000, 2020). In this sense, students feel that their need for autonomy is satisfied when their perspectives are considered, their initiatives supported, and meaningful reasons when making a demand are provided. The need for

competence refers to effectively interacting with one's environment. Students whose competence need is satisfied, feel that they have the capability to perform their work effectively. Finally, relatedness refers to the desire to feel significantly related to and bonded with others. Students' need for relatedness would be satisfied when they feel connected with and supported by both their teachers and their peers (Behzadnia et al., 2018; Ryan & Deci, 2000a). Consequently, need-supportive practices describe a teaching style characterized by nurturing students' needs and interests.

Previous studies have shown the positive and negative effects of one's needs being either fulfilled or thwarted (Liu et al., 2017; Skinner et al., 2017). It is important to note that not meeting needs is not the same as thwarting them (Ebersold et al., 2019; Sheldon & Hilpert, 2012; Vansteenkiste & Ryan, 2013). This phenomenon is commonly referred to as the "dark" and "bright" pathways of human development (Ryan & Deci, 2000b) which outlines that a lack of satisfaction can lead to negative outcomes, but thwarting can result in ill-being and non-adaptive results (Bartholomew, Ntoumanis, Ryan, & Thøgersen-Ntoumani, 2011; Chen et al., 2015). Researchers must, therefore, examine both the thwarting and fulfilment of these needs in order to accurately illustrate the relationship between them, as has been done in many studies (Martinek et al., 2021). For instance, it has been observed that need satisfaction is related to adolescents' well-being (Jiang et al., 2020; van der Kaap-Deeder et al., 2017; Véronneau et al., 2005), indicators of school adjustment (Ahmad et al., 2013; Raižiene et al., 2017), achievement (Marshik et al., 2017), drop-out intentions (Milyavskaya et al., 2009), motivation (Haerens et al., 2015; Standage et al., 2012) and academic performance (Jang et al., 2009).

In contrast, it has been suggested that need frustration is more predictive of maladjustment, poor health, and mental disorders than need deprivation. On the contrary, need frustration compared to need deprivation has been estimated to have a greater predictive

value on maladjustment, ill-being, psychopathology or mental health disorders (van der Kaap-Deeder et al., 2021; Vansteenkiste & Ryan, 2013). Among the body of research exploring these links, several works have proven the link among need frustration and students' indicators of ill-being such as eating disorders (Boone et al., 2014), low quality sleep (Campbell et al., 2021) or depressive symptoms (Campbell et al., 2018). As expected, even some studies found need thwarting to outperform the contribution of need satisfaction (Bartholomew, Ntoumanis, Ryan, Bosch, et al., 2011). In schools, need thwarting has been related to students' lower motivation and disengagement, among others (Haerens et al., 2015; Jang et al., 2016).

Research has illustrated the significance of basic psychological needs for teachers, not only for their optimal functioning and well-being, but also for their teaching practices. When these needs are met, teachers show better teaching methods (Klaeijsen et al., 2018; Praetorius et al., 2017; Van den Berghe et al., 2014), whereas when these needs are not fulfilled, teachers tend to have more negative teaching results and less successful teaching habits (Marshik et al., 2017; Martinek, 2019; Pelletier et al., 2002).

It has been widely acknowledged that there is a relationship between "inner" aspects of teaching, such as teachers' beliefs, emotional experiences, attitudes and well-being, and their behaviour in the classroom (the "outer" side). (Bandura, 1978; Kunter et al., 2013; Shen et al., 2015). However, as Korthagen and Evelein (2016) remarked, the connection between teachers' basic psychological needs for autonomy, relatedness and competence and their teaching behaviour as perceived by students (e.g. engaging messages) remains largely under-researched. Additionally, the thwarting and fulfilment of these needs has been poorly addressed at the same time (Bartholomew et al., 2011; Cuevas et al., 2015; Ebersold et al., 2019). For instance, although Korthagen and Evelein (2016) found that when teachers' basic psychological needs were met, they displayed behaviour that was characterized by a high

level of influence and proximity. But researchers did not assess how need thwarting impacted the teachers' behaviour. Thus, it is vital for teachers to have their basic psychological needs satisfied in order to reach their full potential as professionals. Therefore, to gain a better understanding of the dynamics of teachers' engaging messages, and consequently, the outcomes of students, researchers should prioritize attending to the behavioural predictors of teachers teaching.

2.2. The process of internalization: intrinsic and extrinsic motivation

Within the self-determination theory (Ryan & Deci, 2020), researchers have identified different types of motivations that drive students to engage (or not) in certain activities and which teachers can promote. The kind of motivation along with the resultant engagement displayed is largely dependent on the extent to which students' needs are satisfied by teachers (Ryan & Deci, 2000a). This process falls along a continuum of internalization: the more internalized the motivation, the more autonomous students feel when taking part in a certain activity. Thus, motivations are commonly classified into autonomous forms of motivations (i.e., intrinsic and identified) and controlled forms of motivation (i.e., introjected and extrinsic; Howard et al., 2021; Ryan & Deci, 2008).

Autonomous kinds of motivation describe behaviours driven by willingness and choice. Adversely, controlled forms of motivations concern getting involved in certain activities due to external demands or forces (Ryan & Deci, 2017). For instance, students can engage in their homework to obtain rewards (e.g., extra points) or avoid punishments (e.g., detention) and thus would be extrinsically motivated. They can also do so driven by internal sources such as guilt or self-esteem (e.g., studying to make one's parents feel proud) and thus, would be displaying and introjected motivation. However, students can also get involved in such activities autonomously. For example, students can study for an exam because they think it is worth it and believe it's important for their future. Therefore, students would display an

identified motivation. Finally, can displayed a completely internalized motivation and engage in an activity for the mere pleasure of it and the enjoyment they experience when doing so (Ryan & Deci, 2020). Thus, students would display an intrinsic motivation.

Nevertheless, in certain circumstances students might feel none of these motivations at all but instead feel completely amotivated, this is, a lack of intention to act (Behzadnia et al., 2018). Amotivation can result from students feeling a lack of competence, lack of interest or value, or a lack of contingency between a behaviour and it's expected outcome (Deci & Ryan, 2008b). It has commonly been identified as a distinctive negative predictor of engagement, learning processes, and well-being (Ryan & Deci, 2020). Contrary to this, when students are autonomously motivated their performance is enhanced and, they feel fulfilled and content (Jang et al., 2016; León et al., 2015). For instance, in Taylor's et al. (2014) meta-analysis, results indicated that autonomous motivations (i.e., intrinsic and identified) were positively related with students' school achievement, whereas controlled motivations (i.e., introjected and external) related negatively with amotivation having the strongest negative relation with achievement. Moreover, Froiland and Worrell (2016) showed that an intrinsic motivation to learn predicted students' engagement. Thus, fostering autonomous forms of motivation (e.g., intrinsic or identified) among students would result of great importance given its substantial effect on student outcomes. Ways teachers can promote this type of motivation is through their need-supportive teaching and their instructional practices (León et al., 2017).

While both autonomous and controlled motivations can drive students' behavior, only autonomous goals are related to their thriving, need fulfilment, best performance and success. (Ryan & Martela, 2016). In such manner, students who are motivated in an autonomous way achieve self-regulated and deep learning (León et al., 2015), put in more effort, display greater knowledge, and performance (Behzadnia et al., 2018; Kusurkar et al., 2013), report

higher levels of well-being (Chirkov & Ryan, 2001; Haerens et al., 2018; Sheldon et al., 2009), and experience goals towards learning and higher engagement (Froiland & Worrell, 2016; Ryan & Deci, 2020). Conversely, those students who are motivated in a controlled manner tend to procrastinate more (Codina et al., 2018), have psychological distress (Liu et al., 2017), and experience fear of failure, contingent self-worth, and challenge avoidance (Bartholomew et al., 2018). Consequently, enriching environments that satisfy students' needs is essential for students' positive emotions, engagement, and autonomous motivations (Deci et al., 1991; Deci & Vansteenkiste, 2004; Hafen et al., 2012; Núñez & León, 2015). This is where teachers and their practices come into play.

2.3. Teaching practices: teachers' engaging messages

As mentioned, following the self-determination approach, researchers have described a set of teaching practices that foster students' motivation, well-being and performance: need-supportive teaching practices (Collie et al., 2019; Haerens et al., 2015, 2018; Jang et al., 2016; Wang et al., 2021). This teaching style is characterized by a teacher that (Reeve, 2016):

1. Takes student's perspective.
2. Promotes internal motivational resources.
3. Provides a reasonable explanation for their demands, procedures, activities, or rules.
4. Acknowledges and accepts negative feelings.
5. Is patient.
6. Uses an informative, non-pressurising language.

Although research on this teaching style has originated a strong body of evidence to reflect teacher's capacity to motivate and engage students (Ryan & Deci, 2020), researchers are still highlighting the continuing decline in students' academic interest (Lazarides et al., 2019) and autonomous motivation (Scherrer & Preckel, 2019) throughout adolescence. This

fact underpins the importance to persist in conducting research on new ways teachers can foster students' motivation to learn.

According to the framework on need-supportive teaching, when advising students, teachers' ways of communication have been explored as a way of relying on words such as "you could" (e.g., informative) rather than "you must" (e.g., controlling; Cheon et al., 2020; Haerens et al., 2015; Jang et al., 2016; Weinstein et al., 2019). However, when teachers advise or recommend students what actions they could engage in, they typically remark the motives to do so and thus, appeal to different kinds of motivations. For example, imagine a teacher that appeals to an autonomous kind of motivation by telling students to pay attention during classes because they will understand better what is being explained. If we followed the previous approach, we would assess whether the teacher says, "you must pay attention in class in order to […]" or whether they say, "you could pay attention in order to […]".

If we carefully read such messages, we can see they have the exact same literal meaning but a different choice frame. Yet, the motivations appealed to by teachers when trying to engage students are not examined. It could be that what is also important is not only how messages are communicated but the kinds of messages (i.e., motivational appeals) used. For example, if we followed the previous approach, we would examine the difference among telling a student "You must pay attention to understand what is being explained" as opposed to "you may pay attention to understand what is being explained. However, it could be that appealing to an autonomous motivation (i.e., if you pay attention, you will understand what is being explained) has a different impact that appealing to a controlled motivation (i.e., if you pay attention, I'll give you extra points). The meaning of the messages is now completely different whereas its choice frame is remained constant. This new approach could help to better understand how the content of messages might impact students, independently from the language used to communicate the message.

Moreover, teachers can frame messages differently. In such way, teachers can either highlight the advantages of engaging in an activity (i.e., gain-framed messages) or the disadvantages of not doing so (i.e., loss-framed messages). Following the message framing theory (Rothman & Salovey, 1997), messages would prompt different responses depending on where this emphasis is located. Returning to our previous example, teachers could encourage students relying on gain-framed messages such as "if you pay attention, you will understand what is being explained" or by relying on loss-framed messages such as "if you don't pay attention, you won't understand what is being explained". As we can see, both messages appeal to the same kind of motivation but emphasize very different things.

These types of messages have been extensively examined in the framework of persuasive communication within the health context. Research in this field has examined the way these messages relate with people's willingness to follow medical recommendations (e.g., putting on sunscreen, flossing their tooth, exercising, reducing their alcohol consumption or increase their vegetable consumption; Gerend & Cullen, 2008; Gerend & Maner, 2011; Lithopoulos & Young, 2018; O'Keefe & Jensen, 2007; O'Keefe & Forrester, 2009). Like the studies described above and as explained, teachers can also target their messages to persuade students to engage in a particular activity. Yet, these kinds of messages have just began to be examined under educational contexts. Such studies have mainly examined the effect that loss-framed messages can have on students, providing evidence for their negative impact (Nicholson et al., 2019; Putwain, Symes, et al., 2019). For instance, loss-framed messages, namely fear appeals, have been related with students' anxiety (Putwain & Symes, 2011b), low behavioural engagement and worse performance (Putwain et al., 2017), psychological distress (Belcher et al., 2022), negative emotions such as worry and hopelessness, and avoidance behaviours (Putwain & von der Embse, 2018).

When it comes to the impact of gain-framed messages, the available research is scarce, and the results are not so clear. To the best of our knowledge, only two studies have examined the effect of gain-framed messages in educational contexts. However, they have not directly measured their used of these by teachers, but rather under artificial and hypothetical contexts showing mixed results. For instance, in Symes and Putwain (2016) study, authors asked students to imagine different scenarios where their teachers used on or another type of message. Results demonstrated that the framed of the messages did not influence student's self-efficacy or message appraisal. On another study by the same authors (Putwain & Symes, 2016) students were asked to read different vignettes of fictional students receiving a gain or loss-framed message by a teacher and imagine how they would appraise them. Results showed that gain-framed messages were related to a greater probability of disregarding the message when subjective task value and expectancy of success were high, compared to loss-framed messages. These diverse findings and the lack of evidence on naturalistic contexts regarding gain-framed messages underline the need for more research on this area.

By following both frameworks to conceptualize teachers engaging messages research on the area could step forwards on the understanding of these kinds of messages. As Busemeyer (2017) and Gigerenzer (2017) advise, it is not only essential to rely on a macro-theory when conducting research, but also to seek for the integration of different theories. This would enrich the study of human learning and behaviour serving as a ateway for researchers to gather new insight from fields that, in a first stage, may appear unconnected (Mayer & Sparrowe, 2013).

The following dissertation is grounded on both the self-determination theory and the message framing theory to examine teacher engaging messages, understood as the messages teachers rely on to engage students in school tasks. This approach enables both theories to

complement each other and counterbalance their limitations allowing us to consider what neither theory could separately. For example, the message framing theory does not consider the kinds of motivation appealed to, when in fact this can determine student outcomes. Similarly, the self-determination theory does not consider the frame of messages, although this has already proven relevant (Nicholson et al., 2019; Putwain, Loderer, et al., 2019; Putwain & Remedios, 2014). Taken together, this theory combination could lead to a better understanding of how each element of teachers engaging message (i.e., motivational appeals and the message frame) assists to its impact on students. For instance, a particular frame can restrict or enhance the effect a certain motivational appeal can have, and contrariwise.

Table 2 displays examples of the kind of messages that teachers can rely on to engage their students in school tasks.

Table 2

Examples of Teachers' Engaging Messages

Message frame	Motivational appeals	Example
Gain-frame	Intrinsic	Gain-framed intrinsic messages: *"If you work, you will learn interesting facts."*
	Identified	Gain-framed identified messages: *"If you work hard, you will be prepared for your future studies."*
	Introjected	Gain-framed introjected messages: *"If you work hard, you will feel proud of yourself."*
	Extrinsic	Gain-framed extrinsic messages: *"If you work hard, I'll give you a reward (star, sticker, etc.)."*
Loss-frame	Intrinsic	Loss-framed intrinsic messages: *"Unless you work hard, you will miss the opportunity to understand interesting issues."*
	Identified	Loss-framed identified messages: *"Unless you work hard, you will only be able to get low paid jobs.*

	Introjected	Loss-framed introjected messages: *"Unless you work hard, you will feel ashamed."*
	Extrinsic	Loss-framed extrinsic messages: *"Unless you work hard, you will miss your break."*
	Amotivation	Amotivation messages: *"It does not matter if you work hard, you will fail anyway."*

2.4. The objectives

Attending to what has just been exposed, the present dissertation aims to fill in literature gaps in both the theories by examining both gain-framed and loss-framed messages, as well as the different motivational appeals that teachers rely on. In general terms, the present dissertation aimed to understand and explain how teachers' engaging messages might relate with students' well-being and academic performance. More specifically, it aimed to:

1. Assess the relation among teachers engaging messages and students' psychological functioning, academic performance, and motivational processes.
2. Examine the differential usage of messages by teachers and whether they can be grouped in different profiles based on their tendency to rely on one or another type of messages.
3. Examine antecedents of teachers' engaging messages in order to establish future intervention targets.

Precisely, each of the studies that shape the present dissertation had the following objectives:

- Study 1:

- Develop a scale to measure teachers' engaging messages (see Appendix A) and explore how these messages related with students' academic performance via motivation to learn.

- Study 2:
  - Examine the different profiles of students according to their teacher's use of engaging messages both at the student and teacher-level, that is, profiles of students according to the engaging messages their teacher uses with them (student level) and profiles of students according to teacher's tendency to rely on engaging messages with the whole class (teacher level).
  - Examine the relation among these profiles and teacher-student relatedness and students' well-being.
  - Finally, to further understand the usage of teachers' engaging messages; difference in grade belonging among students was also examined.

- Study 3:
  - Examine profiles of teachers' engaging messages and how teachers' basic needs predicted such profiles.
  - Examine the relation among the different profiles and students' academic performance.

3. Methodology, results, and discussion

3.1. Study 1. Do teachers' engaging messages predict motivation to learn and performance?

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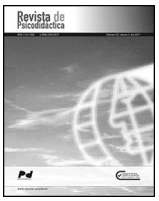

Original

Do teachers' engaging messages predict motivation to learn and performance?

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ABSTRACT

Previous studies have shown that teacher messages are related with many school-related outcomes, such as students' engagement and performance. However, it is still unknown how the combination of different elements within teacher messages relate with these outcomes. Based on the message framing theory and the self-determination theory, the present study examined how teachers' engaging messages link to student's motivation to learn and academic performance. A total of 1209 students between grades 8 and 12 drawn from 63 classes participated in the study. Participants completed self-report measures of teachers' engaging messages and motivation to learn. Academic performance was measured using students' grades obtained from school records. Multilevel structural equation models were performed (ML-SEM) to test the hypothesized relations among variables. ML-SEMs results confirmed our hypothesis and showed that teacher engaging messages indirectly predicted student's academic performance via motivation to learn. Specifically, the autonomous forms of motivation to learn positively predicted performance and the controlled forms of motivation to learn where negatively related to performance. The present findings highlight a resource teachers can rely on to motivate students and improve their academic outcomes. These results set the basis for future educational interventions targeting teaching practices.

¿Predicen los mensajes del profesorado la motivación para aprender y el rendimiento?

Palabras clave:
Calidad didáctica
Teoría de la autodeterminación
Teoría del enfoque del mensaje
Multinivel-SEM
Motivación para aprender
Rendimiento académico

RESUMEN

Estudios previos han demostrado que los mensajes del profesorado están relacionados con múltiples variables a nivel escolar, entre ellas, la implicación y el rendimiento de los estudiantes. Sin embargo, aún se desconoce cómo la combinación de los distintos elementos de estos mensajes se relaciona con estas variables. Fundamentado en la teoría del enfoque del mensaje y en la teoría de la autodeterminación, el presente estudio analiza cómo los mensajes del profesorado se relacionan con la motivación para aprender de los estudiantes y con su rendimiento académico. En total, 1209 estudiantes entre los cursos de 2° de ESO y 2° de Bachillerato, repartidos en 63 grupos, han participado en el estudio. Los estudiantes han notificado, mediante medidas de autoinforme, sobre los mensajes de su profesorado y su propia motivación para aprender, mientras que el rendimiento académico de los estudiantes se ha obtenido a través de las calificaciones oficiales de sus expedientes académicos. Para comprobar las relaciones esperadas entre las variables se han llevado a cabo varios modelos multinivel de ecuaciones estructurales (ML-SEM). Los resultados de los ML-SEM han confirmado nuestras hipótesis y han mostrado

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que los mensajes del profesorado predicen indirectamente el rendimiento académico de los estudiantes mediante la motivación para aprender. En concreto, la motivación autónoma para aprender predice positivamente el rendimiento y la motivación controlada se relaciona negativamente. Estos resultados ponen de relieve un nuevo recurso del que puede hacer uso el profesorado para motivar a sus estudiantes y mejorar sus resultados académicos, sentando las bases para futuras intervenciones educativas dirigidas a mejorar la práctica docente.

Introduction

"If you work hard you will learn interesting facts". *"Unless you work hard you will get into trouble".* These are examples of messages that teachers use to encourage engagement among their students. If these messages are read carefully, it can be noticed that they support different kinds of motivations (i.e., motivational appeals; Santana-Monagas et al., 2022), the first is intrinsic to oneself (interest) and the second is external (punishment). It can also be observed that the messages are framed differently: gain-framed messages highlighting positive consequences and loss-framed messages highlighting negative consequences. In educational contexts, different teacher messages (e.g., reprimands, praise, fear appeals, etc.) have shown to be relevant for many student outcomes such as attention capacity, motivation, performance and engagement (Caldarella et al., 2020; Putwain et al., 2017, 2019; Putwain & Remedios, 2014). However, it could be that teachers can be relying on and integrating different kinds of messages within their speech. Thus, the present work approaches the study of teachers' engaging messages as a construct derived from the combination of *message framing theory* (MFT: Rothman & Salovey, 1997), and *self-determination theory* (SDT: Ryan & Deci, 2000, 2020) and aims to examine how messages integrating motivational appeals and frames (gain vs. loss) relate to students' motivation to learn and academic performance.

Message framing theory

Teachers' engaging messages encompass both the frame and the motivational appeals within it. Regarding the frame, messages can prompt different responses depending on where the emphasis is located (Rothman & Salovey, 1997). These can highlight the benefits of engaging in an activity (gain-frame) or the cost of not doing so (loss-frame). In educational contexts, teachers can tell their students to study, work hard, and pay attention in class to obtain higher grades (gain-framed message) or they can tell them that if they don't do so, they will fail their subject (loss-framed message). Both kinds of messages use the same stimuli to promote motivation, but with a different emphasis.

Research following the MFT under educational contexts is scarce, but relevant. Studies following this theory have gathered evidence towards the negative effects that loss-framed messages can have on students (Putwain et al., 2019). For instance, it has been found that messages that focus on fear of failure, namely loss-framed messages, trigger anxiety among students (Putwain & Symes, 2011), relate to low behavioural engagement, and worse performance (Putwain et al., 2017). Thus, given the non-adaptive outcomes such messages can elicit, teachers should be aware of such phenomena. Contrastingly, the possible outcomes related to the use of gain-framed messages remain largely unexamined.

Furthermore, the few studies examining both messages together have not directly measured the use of these by teachers in natural contexts, but instead under artificial settings or under hypothetical contexts. These studies have shown mixed results. For instance, in Symes and Putwain (2016), message frame did not influence message appraisal, whereas, on another study by the same authors, gain-framed messages were related to a greater likelihood of disregarding the message when subjective task value and expectancy of success were high, compared to loss-framed messages (Putwain & Symes, 2016). These diverse results along with the lack of knowledge available regarding gain-framed messages underlines a gap in the literature aimed to be addressed with the present study.

Self-determination theory

Turning to motivational appeals, researchers following a SDT approach (Ryan & Deci, 2020) have identified four types of motivations that drive students to engage or not in certain activities. Motivational appeals can be defined as messages used by teachers that highlight students' different motivations for engaging in a task. Motivations are commonly classified into autonomous forms of motivations (i.e., intrinsic and identified) and controlled forms of motivation (i.e., introjected and extrinsic; Deci & Ryan, 2008; Howard et al., 2021). Autonomous motivation concerns acting with willingness and choice. Contrastingly, controlled forms of motivations concern acting moved by external demands or forces (Deci & Ryan, 2008). For instance, when teachers appeal to a controlled motivation, students' behaviour would be driven by rewards or punishments (e.g., doing homework to avoid detention) or by internal sources such as guilt or self-esteem (e.g., studying to make one's parents feel proud). Moreover, when teachers appeal to autonomous forms of motivation, students engage in an activity purposely and because they think it is worth it (e.g., working hard because they think it is important to obtain a job in the future) or for the enjoyment they experience when doing so (Deci & Ryan, 2016). Nevertheless, in certain circumstances students might feel none of these motivations but instead feel completely amotivated, that is, a lack of intention to act (Behzadnia et al., 2018). Amotivation can result from students feeling a lack of competence, lack of interest or value, or a lack of contingency between a behaviour and it's expected outcome (Deci & Ryan, 2008). It has commonly been identified as a distinctive negative predictor of engagement, learning processes, and well-being (Ryan & Deci, 2020).

When students are autonomously motivated their performance is enhanced and, they feel fulfilled and content (Jang et al., 2016; León et al., 2015). For instance, in Taylor et al.'s (2014) meta-analysis, results indicated that autonomous motivations (i.e., intrinsic and identified) were positively related with students' school achievement, whereas controlled motivations (i.e., introjected and external) related negatively with amotivation having the strongest negative relation with achievement. Moreover, Froiland and Worrell (2016) showed that an intrinsic motivation to learn predicted students' engagement. Thus, fostering autonomous forms of motivation (e.g., intrinsic or identified) among students would result of great importance given its substantial effect on student outcomes. Ways teachers can promote this type of motivation is through their need-supportive teaching and their instructional practices (León et al., 2017).

Regarding need-supportive teaching, SDT researchers have examined and described a different set of teaching behaviours that foster one type of motivation or another (Collie et al., 2019;

Message frame	Motivational appeals	Example
Gain-frame	Intrinsic	Gain-framed intrinsic: *"If you work hard, you will learn interesting facts."*
	Identified	Gain-framed identified: *"If you work hard, you will be prepared for your future studies."*
	Introjected	Gain-framed introjected: *"If you work hard, you will feel proud of yourself."*
	Extrinsic	Gain-framed extrinsic: *"If you work hard, I'll give you a reward (star, sticker, etc.)."*
Loss-frame	Intrinsic	Loss-framed intrinsic: *"Unless you work hard, you will miss the opportunity to understand interesting issues."*
	Identified	Loss-framed identified: *"Unless you work hard, you will only be able to get low paid jobs.*
	Introjected	Loss-framed introjected: *"Unless you work hard, you will feel ashamed."*
	Extrinsic	Loss-framed extrinsic: *"Unless you work hard, you will miss your break."*
Amotivation		Amotivation messages: *"It does not matter if you work hard, you will fail anyway."*

Figure 1. Engaging messages.

Vansteenkiste et al., 2012). Such behaviours support students' innate basic needs for autonomy (the sense of willingness to actively participate in a certain activity), relatedness (feel truly bonded and connected with others), and competence (interacting effectively with the environment; Vansteenkiste et al., 2020) which result essential for growth and optimal functioning (Ryan & Deci, 2000). Autonomy-supportive teaching practices include offering choice, providing informative feedback, and showing care and attention to students' concerns, among others (Reeve, 2009). These practices have been related with students' well-being (Behzadnia, 2020), engagement (Leo et al., 2020), motivation (Haerens et al., 2015), learning and behavior (Vansteenkiste et al., 2012). Among these behaviours, the study of teacher messages has been approached as a way of displaying an informative or controlling language (Legate et al., 2021; León et al., 2017; Reeve, 2009). However, this way of measuring teachers' communications does not differentiate between different types of motivation that could be communicated in a more or less forceful way. Thus, examining teachers' engaging messages from the present study perspective, as an approach to motivate students, might help to better understand teaching practices. From a practical point of view, this approach might be beneficial for teachers as it examines the exact messages they can rely on (i.e., *"If you work hard, you will learn interesting facts"*) instead of referring to a certain language which could seem vague (i.e., *"my teacher uses forceful language"*; Jang et al., 2016).

Although research under the SDT has originated a strong body of evidence to reflect teacher's capacity to motivate and engage students (Ryan & Deci, 2020), researchers are still highlighting the continuing decline in students' academic interest (Lazarides et al., 2019) and intrinsic motivation (Scherrer & Preckel, 2019) throughout adolescence. This fact underpins the importance of the need to persist conducting research on new ways teachers can foster students' motivation to learn. Teachers, as key agents for students' learning (León et al., 2015; Ruiz-Alfonso & León, 2017), must be aware of the power they have to motivate students and raise their academic interest. A teacher capable to do so would not only be essential for students' engagement and academic performance, but it would also have many other beneficial implications, such as need satisfaction, enhanced experiences of well-being (Behzadnia et al., 2018; Liu et al., 2017) and less maladaptive behavior (Oostdam et al., 2019).

Self-determination theory and message framing theory

Following Busemeyer's (2017) and Gigerenzer's (2017) recommendations, it is essential to not just rely on one macro-theory but also to rely on distinctive theories to accomplish a more accurate approximation to the study of human learning and behaviour. This approach may serve as a pathway for researchers to advance and gather new insight (Mayer & Sparrowe, 2013) on fields that, a priori, may seem unrelated. The following work relies on both the SDT and the MFT to enhance the study of teachers' engaging messages as both theories could complement each other as well as counteract their weaknesses. In other words, following both of these theories would allow us to consider what neither theory could separately. For instance, MFT does not examine the types of motivation contained within the message focussing only on its frame, when in fact the motivation could determine students' outcomes. Likewise, the SDT does not consider the frame of the message when teachers appeal to a certain motivation, despite its implication on student outcomes, as proven previously by researchers (Nicholson et al., 2019; Putwain et al., 2019; Putwain & Remedios, 2014). Together, this synthesis would lead to a better understanding of how each element of teacher messages (i.e., motivational appeals or message frame) contributes to its effect on students. It could help us acknowledge whether a certain frame can diminish or reinforce the effect of a certain motivational appeal and viceversa. Figure 1 displays examples of the different messages that result when relying on both theories.

Multilevel approach

Teachers could use the same, or similar, engaging messages with the whole class (e.g., items could ask "My teacher tells *the class* that unless *we* work hard, *we* will miss our break"). Alternatively, they could direct, or adapt, engaging messages to specific students (e.g., items could ask "My teacher tells *me* that unless *I* work hard, *I* will miss my break). The present study used the latter approach to ask students about the teacher messages directed towards them specifically and not the whole class. Our rationale for adopting this approach is that teachers have reported adapting messages to specific students (Flitcroft et al., 2017). For example, a teacher might tend to rely mostly on intrinsic motivational appeals to encourage their students to work hard. However, this same teacher might notice that a certain student works harder when rewarded and hence might rely more on external motivational appeals. In this case, we can obtain two indicators with different meanings: the message the teacher uses with each student and the teacher's tendency towards a particular message. That is, the most common messages the teacher uses with students in the same class. Thus, we can find data located at different levels, Level 1 data (L1 or student-level) refers to messages directed to specific students and Level 2 data (L2 or teacher-level) refers to the teacher's tendency (Stapleton et al., 2016). When considering the multilevel nature of the data, researchers can approach a more thorough understanding of the effect these messages have on students.

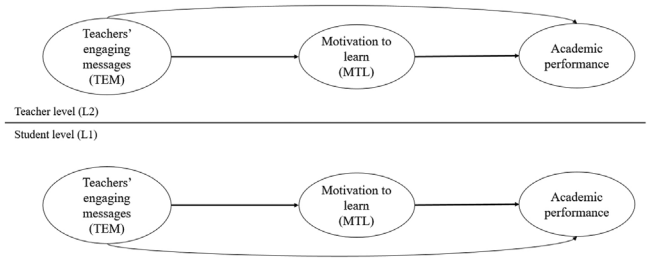

Figure 2. Proposed ML-SEM.

The present study

The aim of the present study was to examine, relying on the SDT and the MFT, how teacher engaging messages relate with students' motivation to learn and academic performance. Based on the aforementioned studies showing that negative outcomes related to loss-framed messages and positive outcomes related to autonomous forms of motivation (Froiland & Worrell, 2016; Nicholson et al., 2019; Putwain et al., 2019; Taylor et al., 2014), the following hypothesis were reached: students' perceptions of teacher's engaging messages characterized by a gain-frame and by autonomous motivational appeals will relate positively with students' autonomous motivation to learn, whereas students' perceptions of teacher's amotivation messages will relate positively with amotivation among students (H1). Autonomous motivation to learn among students would positively relate with their academic performance, whereas amotivation will negatively relate with their academic performance (H2). Finally, it is expected that students' perceptions of teacher's engaging messages relate indirectly with students' academic performance via motivation to learn (H3) (see Figure 2).

Method

Participants

The sample of the present study comprised 1209 students (600 females, 591 males, and 18 not reported; *Mean age* = 15.86, *SD* = 1.45) between grades 8-12. In total 49 teachers were evaluated (29 females, 19 males; *Mean age* = 46.38, *SD* = 8.07) by their corresponding students that were drawn from 63 classes from ten different secondary schools on the island of Gran Canaria (Spain) from both rural and urban environments. Students came mostly from middle-class families. The sampled schools presented no potential ethnic differences as most of the students were from the Canary Islands.

Measures

Teachers' engaging messages

In the absence of an existing instrument, new items were developed to measure teachers' engaging messages. This new instrument is based on the *Teachers Use of Fear Appeals Questionnaire* (TUFAQ: Putwain et al., 2019) and incorporates new items framed by SDT and MFT to examine a wider variety of teacher messages. The instrument is composed of a total of 36 items preceded by the stem "My teacher tells me that. . .". Items were grouped into nine factors. Eight of the factors corresponded to the four types of self-determined motivation (*intrinsic, identified, introjected*, and *external*) and its frame (*gain* vs. *loss*). The ninth factor was *amotivation* which was not classified by frame as it completely lacked one. Example items are displayed in Figure 1. Factors showed a high internal consistency with only gain-framed external showing a moderate reliability (see Table 1). Different multilevel confirmatory factor analyses (CFAs) were run to compare the hypothesized model against plausible alternates. The hypothesized model displayed better fit indices than the plausible alternates considering the frame and motivational appeals independently (see supplementary material). Items were rated according to a seven-point Likert scale (1 = does not correspond at all to me to 7 = fully corresponds to me). Model fit indices for the CFA were as follows: $\chi^2(1143) = 1873.427$, $p < .001$, RMSEA = .028, CFI = .971, TLI = 968, $SRMR_{-W} = .049$, $SRMR_{-B} = .138$.

Motivation to learn

Motivation to learn was measured using five of the seven subscales of the Spanish version of the *Échelle de Motivation en Éducation* (Núñez et al., 2005). Each subscale was composed of 4 items preceded by the stem "Why do you study?". The subscales used were: *amotivation*, *external motivation*, *introjected motivation*, *identified motivation* and the subscale of *intrinsic motivation* (see supplementary material for example items). Similar to prior studies (León et al., 2015), factors displayed a high internal consistency (see Table 1). Items were rated according to a seven-point Likert scale (1 = does not correspond at all to me to 7 = fully corresponds to me). Model fit indices for the CFA were as follows: $\chi^2(120) = 12195.584$, $p < .001$, RMSEA = .056, CFI = .900, TLI = .881, $SRMR_{-W} = .056$, $SRMR_{-B} = .409$.

Academic performance

Students' academic performance was measured using teacher-estimated grades in maths, obtained from official school records. Grades ranged between 0-10, being 10 the highest possible mark. In the Spanish education system grades are assigned by teachers according to different rubrics provided by the government. These grades are of great importance as they define the universities and degrees students can have access to.

Procedure

We first contacted the different schools and requested their collaboration. Questionnaires were administered individually by researchers during a teaching period where participants' assessed teacher was not present. Items were made specific to one compulsory subject, namely mathematics. For engaging messages, students were asked to think about their current mathematics teacher. The objectives of the research were explained to participants, emphasizing the voluntary and confidential nature of their participation. All participants provided informed consent to participate. The study was conducted in accordance with the ethical guidelines of the Declaration of Helsinki and was approved by the University Human Research Ethics Committee.

Data analysis

As mentioned, when following a multilevel approach, students' ratings can be aggregated to serve as a measure of teachers' tendency. Similar answers among students would indicate that what is been measure is, in fact, teacher's messages and not students' impressions (Marsh et al., 2012). Researchers can rely on ICC statistic, which represents the proportion of variance in the data attributable to the class level, to inform about the similarity observed across students' ratings in a same class (Lüdtke et al., 2009; Marsh et al., 2012). For variables in which students rate a characteristic of the teacher, these values are found typically between .10 and .30, whereas for variables that are specific to each student these values are larger (Marsh et al., 2008). Then, to examine if teacher's engaging messages predict students' motivation to learn and performance, nine multilevel structural equation models

Table 1
Descriptive statistics, Intraclass correlations and internal consistency indices for teacher's engaging messages, motivation to learn and academic performance

	M	*SD*	Skewness	Kurtosis	ICC1	ω	α	CR	AVE
TEM: G-Intrinsic	4.03	2.21	-.19	-.67	.18	.81	.81	.84	.56
TEM: L-Intrinsic	3.54	1.52	.16	-.78	.07	.81	.77	.82	.53
TEM: G-Identified	4.96	1.52	-.79	-.08	.10	.85	.84	.87	.62
TEM: L-Identified	2.75	1.58	.76	-.47	.10	.89	.85	.90	.69
TEM: G-Introjected	4.14	1.57	-.27	-.93	.12	.88	.86	.90	.68
TEM: L-Introjected	2.33	1.67	1.23	.60	.06	.92	.88	.92	.75
TEM: G-Extrinsic	4.32	1.70	-.34	-.60	.14	.68	.69	.72	.40
TEM: L-Extrinsic	2.43	1.57	1.02	.18	.10	.83	.78	.85	.59
TEM: Amotivation	1.34	1.50	3.70	14.79	.07	.97	.92	.97	.90
MTL: Intrinsic	4.80	.96	-.52	-.46	.06	.90	.87	.90	.69
MTL: Identified	6.02	1.56	-1.55	2.47	.02	.87	.78	.87	.62
MTL: Introjected	4.76	1.13	-.50	-.62	.06	.85	.81	.86	.60
MTL: Extrinsic	5.61	1.63	-.90	.46	.07	.78	.67	.81	.55
MTL: Amotivation	1.85	1.27	1.88	3.21	.06	.91	.82	.91	.71
Academic performance	5.24	1.45	-.01	-.70	.19	–	–	–	–

Note. TEM = teacher's engaging messages; MTL = Motivation to learn; ω = McDonald's Omega; α = Cronbach's alpha; G = Gain-framed; L = Loss-framed.

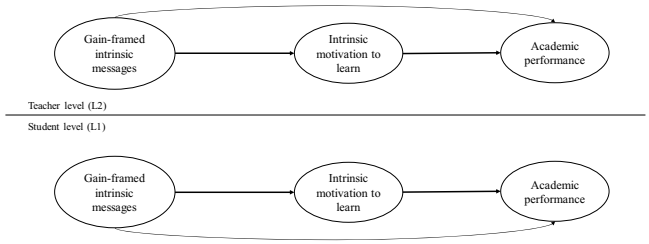

Figure 3. Example of one of the nine ML-SEM.

(ML-SEMs; one for each kind of engaging message) were estimated. This approach allows to identify the total effect that a single message has on a student, instead of freely estimating all possible correlations among all constructs (Arens & Morin, 2016). The fit indices used to compare the models and the CFA of the instruments were the following: the root mean square error of approximation (RMSEA), standardized root mean square residual (SRMR), comparative fit index (CFI) and the Tucker–Lewis index (TLI). To the best of our knowledge, there are no current guidelines to interpret multilevel models, therefore, Hu and Bentler's (1999) guidelines for single level models were followed. Models show a good fit when they meet the following criteria: RMSEA < .05, SRMR < .08, and CFI and TLI > .95. However, when working with naturalistic data these indices should be interpreted with some flexibility (Heene et al., 2011). To analyse internal consistency, McDonald's ω, Cronbach's α, the averaged variance extracted, and the composite reliability of all factors were estimated for each of the nine factors proposed (see Table 1). Values ≥ .7 are indicators of good reliability (Gu et al., 2017). Messages were modelled with the matching motivation to learn (see Figure 3 for an example). Separate models for engaging messages were run to keep models as parsimonious as possible (Hox & McNeish, 2020). Including all messages in a single model would add unnecessary complexity resulting in possible non-convergence and requiring a larger sample size and number of clusters (Lüdtke et al., 2008, 2009; Marsh et al., 2009). Moreover, factor loadings were also made constant across levels (Morin et al., 2014). L2 variables were built from the class aggregation of student responses and L1 variables were class-mean centred (Marsh et al., 2012; Morin et al., 2014).

To test whether teacher's engaging messages had a direct or indirect relation with student performance, fully and partially indirect ML-SEMs were tested and compared. For the fully indirect model, relations between variables followed the paths shown in Figure 2, whereas the partially indirect model included an additional direct path between teacher's engaging messages and students' academic performance. To estimate the standard errors of the indirect paths, the delta method was followed (MacKinnon et al., 2002). This method divides the difference between the simple and the partial correlation by the estimated standard errors and contrasts the result with the standard normal distribution to examine whether there is any interceding variable effect. 95% confidence intervals (CIs) were estimated around the point estimate of the standardised indirect path coefficient. CIs that do not cross zero are statistically significant at $p < .05$.

The weighted least square mean adjusted estimator (WLSM) was used as the estimation method due to the categorical nature of the variables and its higher accuracy over the maximum likelihood method especially in cases when categorical variables are not normally distributed (Schmitt, 2011; see Table 1). All data analysis was performed with M*plus* 8.4 (Muthen & Muthén, 2021). Missing data were handled with the full information maximum likelihood approach.

Results

Descriptive statistics

Descriptive analyses, intra-class correlations, McDonald's ω, Cronbach's α, the averaged variance extracted, and the composite reliability are displayed in Table 1. ICC values show that a moderate proportion of the variability observed was attributed to the differences between classrooms (ICCs .021 to .189).

Bivariate correlations

Bivariate correlations are displayed in Table 2. Gain and loss-framed messages were positively inter-correlated. Gain-framed messages showed negative correlations with *amotivation* messages and loss-framed messages positive correlations. Broadly, at L1, gain-framed messages and loss-framed messages correlated positively with motivation. *Gain-framed intrinsic* messages were positively correlated with grades, as well as *intrinsic* and *identified motivation*. Finally, at L1, *amotivation* messages and *amotivation* were negatively correlated with grades.

Multilevel structural equation models

Fully indirect ML-SEMs showed model fit indices that were either comparable to, or superior to the partially indirect models (see Table 3). Given the greater parsimony of the fully indirect ML-SEMs and that, for the partially indirect ML-SEMs direct relations from teacher engaging messages and performance only reached statistical significance ($p < .05$) once (at L2 in the loss-framed iden-

Table 2
Bivariate correlations among variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. TEM: G-Intrinsic	–	.86	.90	.84	.72	.25	.39	.25	-.11	.54	.20	.40	.23	.13	.10
2. TEM: G-Identified	.58	–	.81	.73	.82	.35	.44	.25	-.09	.41	.28	.22	.14	.06	-.03
3. TEM: G-Introjected	.67	.62	–	.93	.68	.49	.63	.47	.16	.43	.19	.65	.43	.29	-.20
4. TEM: G-Extrinsic	.59	.53	.68	–	.61	.60	.69	.59	.12	.43	.32	.73	.54	.28	.03
5. TEM: L-Intrinsic	.39	.35	.33	.33	–	.20	.25	.17	-.10	.33	.25	.12	-.07	-.03	.11
6. TEM: L-Identified	.20	.29	.27	.26	.54	–	.94	.81	.66	-.10	.09	.66	.82	.62	-.38
7. TEM: L-Introjected	.27	.24	.34	.30	.59	.78	–	.88	.67	.11	.06	.76	.72	.59	-.42
8. TEM: L-Extrinsic	.15	.17	.24	.25	.49	.68	.75	–	.62	-.06	-.20	.61	.52	.64	-.22
9. TEM: Amotivation	-.04	-.09	-.02	-.04	.03	.15	.16	.12	–	-.16	-.30	.53	.55	.76	-.53
10. MTL: Intrinsic	.40	.28	.29	.23	.23	.10	.16	.05	-.06	–	.57	.42	-.01	-.28	.37
11. MTL: Identified	.27	.32	.24	.22	.17	.12	.12	.05	-.15	.52	–	.27	.14	-.57	.35
12. MTL: Introjected	.29	.26	.36	.28	.19	.21	.24	.16	.01	.46	.48	–	.77	.45	-.24
13. MTL: Extrinsic	.14	.18	.17	.19	.14	.18	.13	.14	-.05	.17	.54	.40	–	.64	-.33
14. MTL: Amotivation	-.09	-.09	-.02	-.03	.03	.14	.11	.14	.29	-.20	-.38	-.05	-.14	–	-.39
15. Academic performance	.11	.05	-.01	-.01	.01	-.03	-.02	-.06	-.08	.18	.18	.03	.02	-.19	–

Note. $N = 1209$ (below diagonal), $N = 63$ (above diagonal); TEM = Teachers' engaging messages; MTL = Motivation to learn; G = Gain-framed; L = Loss-framed.

Table 3
Model fit indices for the ML-SEM models

Model	χ^2	RMSEA	CFI	TLI	SRMR-w	SRMR-b
G-Intrinsic	163.626 (1208, 62)	.037	.994	.993	.034	.072
L-Intrinsic	169.319 (1202, 62)	.038	.993	.992	.036	.114
G-Identified	101.668 (1208,62)	.023	.993	.992	.039	.311
L-Identified	83.510 (1202, 62)	.017	.998	.998	.035	.471
G-Introjected	406.851 (1208, 62)	.068	.980	.977	.049	.143
L-Introjected	697.683 (1208, 62)	.092	.950	.942	.085	.205
G-Extrinsic	193.288 (1208,62)	.042	.980	.977	.048	.244
L-Extrinsic	238.915 (1202, 62)	.049	.979	976	.060	.218
Amotivation	108.988 (1208, 62)	.025	.998	.998	.040	.105

Note. G = Gain-framed; L = Loss-framed; χ^2 of all models was $p < .05$.

tified model; $p = .033$), fully indirect models were retained (fit indices for the partially models can be found in the supplementary material).

Direct relations

Table 4 shows the direct relations in the ML-SEMs (unstandardized parameters can be found in the supplementary material). Concerning path 1, mostly all engaging messages related significantly with their matching motivation to learn at both levels of analysis. Exceptions include *gain* and *loss-framed identified*; and *loss-framed intrinsic* messages at L2. When comparing the effects among the different teacher messages, it can be appreciated that among the messages that appealed to autonomous motivations (i.e., intrinsic and identified), stronger relations with motivation to learn where found among gain-framed messages.

Regarding relations on path 2, overall, autonomous motivations to learn positively predicted academic performance at both levels of analysis, whereas controlled motivations to learn (i.e., introjected and extrinsic) negatively predicted academic performance at L2. At L1 *extrinsic motivation* to learn had a very small positive effect on performance. Finally, *amotivation* messages positively predicted *amotivation* to learn, and this in turn, negatively predicted academic performance at both levels of analysis.

Indirect relations

Table 5 shows the indirect relations in the ML-SEMs. Overall, the autonomous motivations predicted academic performance at both levels of analysis except for *loss-framed identified* messages, which negatively predicted performance at L2. Indirect relations between introjected messages and performance were never statistically significant at both levels of analysis ($p > .05$). At L2, extrinsic messages (gain and loss-framed) negatively predicted performance, whereas at L1 its relation with performance was positive, although this effect was small. Lastly, negative indirect relations at L1 and L2 were shown for *amotivation* messages and performance.

Discussion

Following a multilevel approach, the present study relies on the SDT and MFT to examine how engaging messages from teachers predict students' motivation to learn and academic performance. Overall, teacher's messages predict students' motivation to learn, and this, in turn, predicts students' performance. Major findings are discussed below.

Regarding H1, as expected, gain-framed messages and autonomous motivational appeals are associated with students' autonomous motivation to learn, whereas amotivation messages predict students' amotivation to study. These findings are consistent with previous studies which have shown how teacher's motivational approach is related to students' motivation and engagement (Collie et al., 2019; Vansteenkiste et al., 2012). Moreover, they also add to this well-established relationship (Deci & Ryan, 2016; Jang et al., 2016; León et al., 2018) by not addressing teacher's motivational approach as a mixture of many different teaching practices (Collie et al., 2019; Reeve & Cheon, 2016) but instead focuses on a specific one (i.e. teachers' engaging messages) to precisely measure its unique effect on students. In such way, the present results strengthen the idea of the power teachers have to motivate students, and engage them in school tasks, but also the ability they have to demotivate them. In this sense, students whose teacher relies on gain-framed messages and autonomous motivational appeals might feel more supported, believing their teacher really wants the best for them. This might make students feel autonomous motivated, which would move them to engage in school-related tasks.

Table 4
Standardized direct effects from the ML-SEMs

Model	Level	Path 1			Path 2		
		TEM MTL			MTL Academic performance		
		ß	*SE*	95% CI	ß	*SE*	95% CI
G-Intrinsic	L2	.54	.10	.37, .71	.32	.16	.05, .58
	L1	.50	.03	.45, .54	.21	.03	.15, .26
L-Intrinsic	L2	.20	.17	-.07, .48	.40	.15	.15, .66
	L1	.29	.03	.25, .34	.18	.03	.12, .24
G-Identified	L2	.98	3.36	-4.54, 6.50	-.17	.57	-1.10, .76
	L1	.45	.02	.41, .49	.17	.04	.11, .24
L-Identified	L2	.96	3.13	-4.18, 6.11	-.57	1.89	-3.68, 2.53
	L1	.09	.03	.04, .15	.18	.05	.10, .25
G-Introjected	L2	.66	.13	.45, .87	-.32	.22	-.70, .04
	L1	.48	.02	.44, .51	.04	.05	-.03, .11
L-Introjected	L2	.98	.12	.78, 1.17	-.41	.21	-.80, -.06
	L1	.38	.03	.33, .42	.04	.04	-.03, .11
G-Extrinsic	L2	.55	.17	.26, .83	-.30	.20	-.64, .03
	L1	.27	.03	.22, .32	.07	.04	.02, .13
L-Extrinsic	L2	.64	.22	.28, 1.00	-.57	.23	-.95, -.20
	L1	.09	.03	.04, .15	.07	.04	.02, .13
Amotivation	L2	.86	.09	.71, 1.01	-.70	.13	-.92, -.48
	L1	.48	.03	.43, .53	-.23	.04	-.29, -.17

Note. TEM = Teachers' engaging messages; MTL = Motivation to learn; G = Gain-framed; L = Loss-framed; L2 = Teacher level; L1 = Student level.

Table 5
Indirect effects from the ML-SEMs

Model	Level	TEM academic performance (via MTL)		
		ß	*SE*	95% CI
G-Intrinsic	L2	.14	.09	-.01, .28
	L1	.09	.02	.06, .11
L-Intrinsic	L2	.13	.11	-.05, .31
	L1	.05	.01	.04, .07
G-Identified	L2	-.19	.24	-.59, .20
	L1	.06	.02	.04, .09
L-Identified	L2	-.64	.25	-.1.05, -.23
	L1	.01	.01	.00, .02
G-Introjected	L2	-.23	.17	-.51, .05
	L1	.02	.02	-.01, .04
L-Introjected	L2	-.55	.34	-1.11, .00
	L1	.01	.01	-.01, .03
G-Extrinsic	L2	-.27	.20	-.60, .06
	L1	.03	.02	.01, .05
L-Extrinsic	L2	-.43	.22	-.72, -.06
	L1	.01	.00	.00, .01
Amotivation	L2	-.25	.07	-.37, -.13
	L1	-.04	.01	-.05, -.03

Note. TEM = Teachers' engaging messages; MTL = Motivation to learn; G = Gain-framed; L = Loss-framed; L2 = Teacher level; L1 = Student level.

An additional finding shows that, at a student level, when comparing both frames, gain-framed messages show stronger relations with student motivation (βs = .269 to .496) compared to those of loss-framed messages (βs = .091 to .377; see Table 5). This implies that highlighting the benefits of a certain activity stimulates students more than emphasizing and appealing to loss. As teachers' engaging messages encompass both the frame and the motivation appeals, this finding suggests that self-determined motivational appeals are more effective when they are accompanied by a gain-frame. These results are the first to highlight the differences between the effect the message frame can have on students and complements the findings of previous works which have shown how loss-framed messages are associated with controlled motivations and lower engagement (Putwain et al., 2019; Putwain & Remedios, 2014). In this sense, results suggest that students might feel more motivated to focus on the positive outcomes they can obtain if they work hard than to focus on the threat or the possibility of losing something they might not even value or that they already have.

Regarding H2, findings show that autonomous forms of motivation (i.e., intrinsic and identified) are positively associated with students' academic performance, and that as expected, amotivation inversely predicts students' academic performance. These results align with the assumptions of the SDT (Deci & Ryan, 2016; Ryan & Deci, 2000) and with previous studies that have identified the relation between autonomous motivation and positive academic outcomes (León et al., 2015; Ruiz-Alfonso & León, 2017). Students who are autonomous motivated will engage in school-related tasks because they enjoy and value them. Their engagement would in turn, influence positively their grades. Instead, amotivated students would have no reason to engage in a certain activity at all, resulting in poor performance (Cheon & Reeve, 2015).

Finally, our results further confirm that teachers' engaging messages are indirectly related to students' academic performance (H3). This finding is key to understanding how teacher messages relate with students' motivation and academic performance as fundamentally different interpretations can derive from paths being direct or indirect. If teacher's engaging messages had a direct effect

on performance, then these would be directly responsible for students' performance. In contrast, results indicate that the messages relate indirectly with student performance via motivation to learn. This knowledge has practical implications for teachers as it articulates a new resource they can rely on to motivate their students and that result in a better academic performance. If teachers could simply rely more on gain-framed messages and those appealing to autonomous forms of motivation, it is likely for them to observe improvements among their students' motivation and performance. Given the novelty of this result, this finding cannot be compared with others.

Limitations and future directions

Teachers' engaging messages are addressed by self-reports. To overcome possible sources of unreliability future research should complement the data obtained with the scale with teacher self-reports and observational techniques. Second, our study is cross-sectional. Therefore, no casual relations can be drawn from the present study. Future research should endeavour to conduct longitudinal studies to establish directionality between the present study variables. Third, although teacher grades are better predictors than test scores (Galla et al., 2019) and despite their great relevance to predict several outcomes, such as standardized test scores (Duckworth et al., 2012); and lifetime educational attainment (French et al., 2015); these could seem subjective (Cross & Frary, 1999). Thus, future research could rely on test scores to obtain a more objective measure. Moreover, the present study conducted nine ML-SEM models given their greater parsimony with the available sample. Future research should explore the relations on the present study conducting one ML-SEM. To do so, larger samples are required. Additionally, as previous research has highlighted the effect that the tone of voice might have on students' motivation (Weinstein et al., 2018, 2019), future research could examine how the tone of voice influences the effect teacher engaging messages might have. Furthermore, future studies replicating the present one are needed to examine the reliability and factor loading of certain items and dimensions. To conclude, it could be interesting for future research to examine the predictive value that grades can have on students' motivational experiences, as these could result from the actual fact of grading students (Krijgsman et al., 2017). Similar to previous studies (Liu et al., 2017), it would be of interest to further examine both positive (i.e., well-being) and negative (i.e., ill-being) student outcomes in regard with teachers' engaging messages to further expand on how this teaching practice relate with student's functioning.

Practical implications

Considering the impact that teacher engaging messages can have on student's outcomes, the above results may be of relevance for school staff, such as teachers and school psychologists, to tackle one of the main challenges they face: students lack of interest and engagement (Lazarides et al., 2019). As previous researchers have highlighted (Putwain & Remedios, 2014) most teachers are unconcerned about the type of messages they use during their lessons and, may be unaware of the effects they might trigger among students (Flitcroft et al., 2017). A way to tackle this problem could be setting up school-based interventions to instruct teachers about the different engaging messages and their effect. To start, the scale developed for the present study could be used to help teachers recognize their engaging messages and, if it proceeds, show them how they could improve it. Given the negative effects some kinds of messages might prompt (Putwain & Symes, 2011), it might be advantageous to advise teachers of what exact messages they could rely on. For example, based on the current study findings, a way math teachers can enhance autonomous forms of motivation and reduce controlled forms of motivations and amotivation among students, is relying on gain-framed messages such as *"It's all about playing with algebra, if you play applying the logical rules, everything flows and works out fine"*. This kind of intervention could be very easily implemented in schools as it is simple, inexpensive, and does not require much time.

Conclusions

The present study conceptualizes a new resource that teachers can rely on to face amotivation among students. A major conclusion can derive from the present results: teachers' engaging messages predict students' motivation to learn and this, in turn, predicts their academic performance. Specifically, gain-framed and autonomous motivational appeals messages predicted students' autonomous motivation, and this, in turn, positively predicted performance. Contrastingly, amotivation messages predicted students' amotivation to study, and these where negatively related to performance. Therefore, both the frame and the motivational appeals should be taken into account when trying to encourage students to participate in school-related activities. Given the ability teachers have to motivate students and the great influence they exert on them (Caldarella et al., 2020; Jang et al., 2016) these findings could help teachers find new ways to keep doing so.

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Appendix A. Supplementary data

Supplementary material related to this article can be found, in the online version, at doi:https://doi.org/10.1016/j.psicoe.2021.11.001.

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3.2. Study 2. What makes a student feel vital? Links between teacher - student relatedness and teachers' engaging messages.

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What makes a student feel vital? Links between teacher-student relatedness and teachers' engaging messages

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Abstract
Recent studies suggest that teacher messages can affect students' well-being. Using a multilevel, variable, and person-centred approach, this study aimed to identify profiles of students according to their teachers' use of engaging messages and analyse the relation among these profiles and teacher-student relatedness and students' subjective vitality. A total of 1209 students participated in the study. At the student-level, profile analysis indicated the existence of four different profiles: the *few messages* profile, the *autonomous motivational appeals* profile, the *loss-framed messages* profile, and the *gain-framed messages* profile. At the teacher level, profile analysis indicated the existence of two profiles: the *variant* and the *invariant* profiles. Results showed that overall, at both levels of analysis, teachers' engaging messages related with teacher-student relatedness (either positively or negatively) with clear differences among profiles. Moreover, also at both levels of analysis, teacher-student relatedness related with students' subjective vitality. Main findings and implications for practice are discussed.

Keywords Subjective vitality · Mixture structural equation model · Message framing · Self-determination · Well-being · Teacher-student relatedness

Introduction

On average, secondary students spend 905 h per year in the classrooms with their teachers (OECD, 2014); thus, it may seem unsurprising to state that teachers are one of the most relevant social agents regarding students' vitality and well-being (Eccles & Roeser, 2011; Furrer et al., 2014; King, 2015; León & Liew, 2017; Liu et al., 2017; Mouratidis et al., 2011). Among the main promoters of students' vitality and well-being, extensive research has highlighted the importance of teacher-student relationships (Bakadorova & Raufelder, 2018; Behzadnia, 2020; Chatzisarantis et al., 2019; Chirkov & Ryan, 2001; Khalkhali &

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Golestaneh, 2011; King, 2015; Manzano, 2022; Wang et al., 2021; Zheng, 2022). However, most research rarely focus on the antecedents of such relation and the mechanisms underlying such link (Froiland et al., 2019; Zee et al., 2013). Instead, the common approach among researchers has been to add knowledge on how teacher-student relationships affect diverse outcomes. In other words, new ways in which teachers can develop and build such positive relationships have not been explored.

A recent promising line of research has started to explore the impact teacher messages can have on students which, although relevant, has mainly explore their link with learning-related outcomes (Caldarella et al., 2020; León et al., 2017; Putwain & Remedios, 2014; Putwain et al., 2017; Santana-Monagas et al., 2022a, b) with very little known about their impact on students' well-being. Therefore, the present study sought to provide new insights into how teachers' messages, specifically, the advice messages teachers use to engage students in school-related tasks (Santana-Monagas et al., 2022a, b), relates with teacher-student relatedness and students' well-being.

Teacher's engaging messages

When approaching students, teachers rely on numerous strategies to promote students' engagement (Felicetti & Cabrera, 2022). Among these strategies, teachers typically advise students on what actions they could take to achieve certain outcomes. These kinds of messages have been defined as teachers' engaging messages (Santana-Monagas et al., 2022a, b). In such messages, teachers highlight the possible consequences of getting involved (or not) in a certain activity and the motives to do so.

In this sense, teachers can either highlight the favourable outcomes related to an activity or the unfavourable outcomes to not engaging in such activity (Rothman & Salovey, 1997). For instance, teachers can encourage their students by telling them that if they work hard, they will obtain good grades (gain-framed messages) or that, if they do not, they will fail the subject (loss-framed messages). Both messages use grades as a motive to engage in school tasks; however, they are framed differently.

With respect to the motives to engage in a certain activity (referred to as motivational appeals), teachers can appeal to different kinds of motivations to engage students. For example, teachers can tell their students that if they pay attention during class, they will learn interesting facts, or they can tell them that if they pay attention during class, they will receive a house-point. Whereas the first message appeals to an autonomous motive, that is, interest, the second message relies on a controlled motive such as a reward (Ryan & Deci, 2017, 2020).

Under educational contexts, the study of teacher messages is scarce but promising. Such studies have focused mainly on exploring loss-framed messages, providing evidence on the negative impact these can have on student. Specifically, they have been commonly related to students' negative emotions such as anxiety, distress, worry, and hopelessness following avoidance behaviours such as disengagement, strategic withdrawal of effort, and procrastination (Belcher et al., 2021; Nicholson et al., 2019; Putwain & Remedios, 2014; Putwain et al., 2017, 2019, 2021). Contrastingly, the impact of gain-framed messages remains largely understudied, with only a few studies examining such messages in relation with student's learning outcomes (Santana-Monagas et al., 2022a, b; Symes & Putwain, 2016) that do not examine the influence of gain-framed messages on students' well-being.

Regarding motivational appeals, research on controlled and autonomous motivations have revealed that although they both can initiate students' behaviour, they do not

contribute equally to students' wellness, vitality, and thriving. Research has shown that when students feel autonomously motivated, they report higher levels of well-being (Chirkov & Ryan, 2001; Haerens et al., 2018; Sheldon et al., 2009). Contrastingly, when moved by controlling forces, students can experience fear of failure and contingent self-worth and are more likely to encounter psychological ill-being and maladaptive behaviour (Bartholomew et al., 2018; Liu et al., 2017; Oostdam et al., 2019). Given the evidence stated, we could expect that relying on one or another motive might have an impact on students' well-being. In other words, it could be that relying on certain motivations within teacher messages relate with students' well-being, both in a positive and in a negative way. In this sense, teacher-student relatedness (from now on: TS-relatedness) could have an influence.

The power of teacher-student relationships

Relatedness has been examined across a wide variety of perspectives and theories, all agreeing that it comprises the establishment of meaningful, caring, warming, and respectful relationships. Teachers who build such relationships with their students actively demonstrated their interest in students' well-being and academic achievement (Martin & Dowson, 2009). From the self-determination approach (Ryan & Deci, 2020), relatedness has been identified as a basic need for student's optimal functioning. It implies feeling bonded to, supported, and accepted by others (Behzadnia, 2020; Lavigne et al., 2011; Ryan & Deci, 2020). It has been proven to be so fundamentally important that a simple threat of disapproval from others elicit similar neural reactions to those who face during real physical pain (MacDonald & Leary, 2005).

Specially among adolescents, this need plays an important role when it comes to adapting to new social situations (La Guardia & Ryan, 2002), such as those faced during the transition to secondary school. Previous research has already stablished the many positive implications that positive teacher-student relationships bring on students in terms of engagement, motivation, self-regulation, and well-being (Furrer & Skinner, 2003; García-Moya et al., 2015; King, 2015; Liu et al., 2015; Poulou & Norwich, 2020; Raufelder et al., 2015; Wubbels, 2017). However, there is little scientific evidence on how teachers' messages may affect both TS-relatedness and student's well-being. In other words, the mechanisms and predictors among the link between TS-relatedness and student's well-being have not been explored in depth (Froiland et al., 2019; Zee et al., 2013). In this sense, it could be possible that teachers' who demonstrate concern and care towards their students by relying on messages that try to engage them in school-task and advise them on what actions they could take to succeed might fulfil student's need of relatedness with the teacher as they might feel supported by them. Considering the link among TS-relatedness and student's well-being, it might also be expected that such messages affect students' well-being through this enhance feeling of relatedness. So far, some approaches have gathered evidence towards the effect that teacher's feedback messages can have on students' well-being (Mouratidis et al., 2010; Schwab et al., 2022). However, less emphasis has been placed in the role teacher engaging messages can have and in the mediating role of teacher-student relatedness. Moreover, such studies have been conducted in the primary education and sport settings, despite to the fact that TS-relatedness declines drastically as student's advance in the education system and enter the secondary education (Anderman, 2003; Baker, 2006; Neel & Fuligni, 2013; Spilt et al., 2012).

Subjective vitality

The concept of subjective vitality is rooted in the self-determination theory (Ryan & Deci, 2008). It refers to the conscious experience of possessing energy, feeling alive, and enthusiastic about a certain activity (Greenglass, 2006; Ryan & Frederick, 1997). Due to its link with numerous positive outcomes, it has been considered an important aspect of eudaimonic well-being (Salama-Younes, 2011). From this perspective, well-being is conceived as a process of self-realisation, growth, and personal development, concepts closely linked to the formal educational process undertaken in schools. Unlike its hedonic perspective, it is not understood as a state of happiness, but it rather refers to feeling satisfied with the kind of live people are actually living (Ryan & Martela, 2016). Given subjective vitality's functionality as an indicator of health and motivation outcomes, it has been identified as the indicator for "excellence" of eudaimonic well-being (Vergara-Torres et al., 2020).

Existing research recognises the critical role teachers have on students' well-being. For instance, aspects such as teachers' fairness (Choi et al., 2019), their autonomy-supportive practices (Behzadnia, 2020; Chatzisarantis et al., 2019), and quality teacher-student interactions have proven to impact students' well-being and vitality (Blackwell et al., 2020; DuBois & Silverthorn, 2005; Hamre & Pianta, 2006; Ryan & Deci, 2017). Moreover, research has also highlighted the importance that teacher messages can have on triggering emotions on students (Belcher et al., 2021; Putwain et al., 2021; Schwab et al., 2022). Given the important repercussions messages and teachers can have on students, paying attention to this aspect of teaching could offer some important understanding on how teachers could influence students' well-being. Although this promising line of research has gathered some interesting evidence (Santana-Monagas et al., 2022a, b), research to date has not yet determined how teacher engaging messages could affect students optimal functioning, subjective vitality, and well-being.

The present study

The present study follows a multilevel Structural Equation Mixture Model (SEMM) approach. This method integrates both variable-centred (i.e. structural equation models (SEM)) and person-centred (i.e. latent profile analysis (LPA)) approaches. Variable-centred approaches group variables, whereas person-centred approaches group persons (Lubke & Muthén, 2005). When complementing both approaches, researchers can obtain "the best of both worlds" and identify variable effects on a set of persons (Berlin et al., 2014; Morin et al., 2017).

Moreover, variables measured in educational contexts are often located at two levels of analysis: student-level variables that have a unique value for each student (i.e. student's vitality) and teacher-level variables that have the same value for all students in a same class (i.e. class-average students' vitality) and that are built from the aggregation of students' responses (Marsh et al., 2012). Given that teachers have found to adapt their messages when approaching students (Flintcroft et al., 2017), we can find data located at two levels. In one hand, messages the teacher deliver to a specific student and, in the other hand, teachers' overall tendency to rely on certain messages when approaching the whole class (Morin et al., 2014; Santana-Monagas et al., 2022a, b; Stapleton et al., 2016). These types of design, where the multilevel nature of data is considered, allow researchers to

acknowledge how teacher variables can explain student outcomes beyond what their own individual characteristics indicate (Marsh et al., 2012; Morin et al., 2014; Stapleton et al., 2016).

Thus, the present study aims to: (a) examine the different profiles of students according to their teacher's use of engaging messages both at the student and teacher-level, that is, profiles of students according to the engaging messages their teacher uses with them (student level) and profiles of students according to teacher's tendency to rely on engaging messages with the whole class (teacher level); (b) examine how such profiles relate with TS-relatedness and students' well-being; and (c) further understand the usage of teachers' engaging messages; difference in grade belonging among students was also examined. Thus, we hypothesise the following: (H1) Based on previous works examining profiles of students according to their perceptions of their teachers' engaging messages (Santana-Monagas et al., 2022a, b), we expect to find at least three profiles at the student level and 2 at the teacher level; (H2) in regard with our second aim, similar to previous studies (Mouratidis et al., 2011; Schwab et al., 2022), we expect to find relations among teacher engaging messages and students' subjective vitality through TS-relatedness. The nature of such relation (positive or negative) will depend on the nature of the different profiles; and (H3) finally, we also expect to find different patterns of message usage across the different grades as it has already been reported that teachers adapt their messages to specific students (Flintcroft et al., 2017); thus, we might expect they do so to specific age ranges.

Method

Participants

Data were collected from a total of 954 students (464 females, 43 not reported; mean age = 16.63, *SD* = 1.22) from ten secondary schools of the island of Gran Canaria, Spain. They were drawn from 64 classes between 9 and 12th grade. Schools belonged to both rural and urban environments, and students came mostly from middle class backgrounds. The sampled schools presented no potential ethnic differences as most of the students were from the Canary Islands, Spain.

Procedure

First, schools were contacted by phone and asked for their collaboration in the study. Therefore, the sample corresponds to those schools and teachers that were willing to participate. During the data collection, which took place during the academic year 2018–2019, we explained the objectives of the research to students, emphasising the voluntary and confidential nature of their participation. Participants were told that returning filled questionnaires would imply their acceptance to participate, whereas returned blank questionnaires were interpreted as a withdrawal from the study. Instruments were administered in classrooms by researchers during a teaching period when the assessed teacher was not present. For engaging messages, students were asked to rate their current teacher so that the students in a class rated the same teacher. To diminish potential bias, all students were studying the same subject (i.e. mathematics) and, thus, attended an equal number of hours of classes per week.

Instruments

To analyse reliability, McDonald's omega values were estimated because of its higher accuracy over Cronbach's alpha (McNeish, 2018). Items were rated following a seven-point Likert scale (1 = does not correspond; 7 = fully corresponds). All items were made specific to the compulsory subject of mathematics.

Teachers' engaging messages

To evaluate teachers' engaging messages, students completed 32 items of the scale developed by Santana-Monagas et al. (2022b). Items were preceded by the phrase *My teacher tells me that* and divided into 4 factors: gain-framed autonomous messages (e.g. *If I work hard I will enjoy this subject*), loss-framed autonomous messages (e.g. *Unless I work hard I will miss the opportunity to learn interesting facts*), gain-framed controlled messages (e.g. *If I work hard I will feel important*), and loss-framed controlled messages (e.g. *Unless I work hard I will feel sad*). This scale has proved reliable and valid in previous studies (Santana-Monagas et al., 2022a, b).

Teacher-student relatedness

To assess students' relatedness with teachers, students completed a subscale from the Spanish version of the *Échelle de Satisfacción des Besoins Psychologiques* validated to the educational context (León et al., 2011). The subscale consisted in a total of five items preceded by the phrase In Maths class (e.g. *I feel comfortable with my teacher*). Previous works have provided evidence of reliability and validity of the scale (Moreno-Murcia et al., 2018).

Subjective vitality

Students completed the Spanish version of the subjective vitality scale (Castillo et al., 2017). Items were preceded by the phrase *In Math class* (e.g. *I feel very energetic*). This scale has proved reliable and valid in previous studies (Mouratidis et al., 2011).

Data analyses

All analyses were conducted with *M*plus 8.7 (Muthen & Muthén, 1998–2022). To estimate the variable scores and to overcome possible measurement errors, instead of using the mean of the items, factor scores were used. To interpret these scores, we standardised them with a mean of 0 and a SD of 1 (Collie et al., 2020; Justice et al., 2011); if data are above 0 and with a low *p*, we can observe that the value is different from the mean. The robust maximum likelihood (MLR) estimator was used for estimating the models using at least 250 random start values, each allowing 50 initial stage iterations. Missing data was handled with the full information maximum likelihood approach.

Multilevel Mixture SEM

To analyse the relations among variables, a Multilevel Structural Equation Mixture Model (ML-SEMM) analysis was performed. When relying on ML-SEMM, researchers can examine the estimation of model parameters as well as the classification of individuals into

clusters based on the posterior class membership (Vermunt & Magidson, 2005), at both levels of analysis (i.e. at the student level and at the teacher level).

To inform about the similarity observed among students' ratings in a same class, that is, their agreement when assessing a construct related to their class experience (i.e. teachers' use of engaging messages when approaching the whole class (Lüdtke et al. (2009)), ICC values are calculated. This step is key as high ICC values inform about the reliability of the teacher-level variable in relation to sampling error, that is, the reliability to estimate teachers' overall tendency to rely on certain engaging messages. In multilevel studies, these values oscillate between 0.10 and 0.30 (Marsh et al., 2008). Nonetheless, when working with naturalistic data, ICC values should be interpreted with flexibleness (Heene et al., 2011).

Latent profile analysis

Latent profile analysis was performed to estimate and decide the number of profiles. This approach does not rely on random values (e.g. a standard deviation above the mean) but on the fit of models with a different number of profiles. To decide the number of profiles, we attended both the statistics criteria and the theoretical grounding of results (Collie et al., 2020). The following fit indices were used to decide the number of profiles: Log-Likelihood (LL), Akaike Information Criteria (AIC), Sample Size Adjusted Bayesian Information Criteria (SSA-BIC), and Likelihood Ratio Test (LRT). The lower the value of the first three indices, the better the fit, while the level of significance of LRT informed us whether the fit of a model with k cluster was better than the fit of a model with k-1 profile. A low p value indicated that the solution with k groups fits better than a model with k-1 groups (Lo et al., 2001). Following Collie et al. (2020), elbow plots were built to visualise the flattening of the indices. These plots show an appropriate solution at the point where a clear elbow is visible (Morin et al., 2016). In addition, because solutions with small numbers of participants (e.g. 1 to 5% of total sample) may not represent a unique latent subgroup (Marsh et al., 2009), we also analysed the percentage of cases in the smallest latent subgroup of each model.

To identify the number of profiles at both levels of analysis and following Collie et al. (2020) and Mäkikangas et al.'s (2018) recommendations, a two-step procedure was followed. First, we estimated the number of clusters at the single student-level conforming to a single level profile analysis. At this level of analysis, 1 to 7 solutions were tested. Then, to explore the profiles of classes at the teacher level, we carried out a multilevel latent profile. At this level, profiles at the teacher level (i.e. students at the student level and aggregates of students' responses at the teacher level) are estimated and arranged with the frequency of profiles at the student level. In other words, these profiles are estimated based on the proportion of student-level profiles on the teacher-level profiles (Collie et al., 2020). At the teacher level, a range of 1 to 4 profile solutions were tested.

To examine whether there were any differences among clusters regarding the predictive value of teachers' engaging messages on teacher-student relatedness and of teacher-student relatedness on students' vitality, two mixture SEMs were carried out, one at each level of analysis. Teacher-level variables were constructed from the aggregation of students' responses, and student-level variables were modelled using class-mean-centred data (Marsh et al., 2012; Morin et al., 2014). The 95% confidence intervals around the point estimate of the standardised coefficient were estimated. When confidence intervals do not cross zero, these are significant at $p < 0.05$. To compare the composition of the profiles

based on students' educational grade at the student-level, we employed the *M*plus AUXILIARY option.

Results

Preliminary analyses

The mean, standard deviation, ICC values, and correlations among variables are shown in Table 1. ICC values show that a considerable proportion of the variability observed among classroom variables was attributed to the differences between classrooms.

Student level

Table 2 presents fit indexes for the latent profile analysis at the student level. Models between six to seven profiles were characterised by a group with a very low percentage of subjects. LRT value discarded the five-profile solution. Finally, the model with four profiles showed lower LL, AIC, and SS-BIC values than the model with three and two profiles. Elbow plots (Fig. 1) showed a steady flattening of the slope after the 4-profile solution. Therefore, a 4-profile solution was retained as it represented the data the finest. Theoretically, the 4-profile solution was also maintained as it best described the differential use of teachers' messages. A 3-profile solution described three profiles with opposite experiences: a profile of students that described a high use of all messages, a profile of students whose teacher barely relied on messages, and a profile describing all messages in the mean. Furthermore, a 5-profile solution did not add further information on the messages teachers used with their students' as it described two very similar profiles. Therefore, following both statistical and theoretical reasoning, the 4-profile solution was retained.

The following profiles were found: profile 1, *few-messages* (FM) included 468 students who informed about their teacher using very few messages of all kinds (49%); profile 2, *autonomous motivational appeals* (AMA) was composed of 222 students whose teacher relied mostly on autonomous motivational appeals, both gain and loss-framed, but with a higher proportion of these last ones (23.3%); profile 3, *loss-framed messages* (LFM) consisted of 142 students whose teacher relied on loss-framed messages, both autonomous and controlled motivational appeals, with a higher proportion of these last ones (14.9%); and profile 4, *gain-framed messages* (GFM) included 122 students whose teacher relied mostly on gain-framed messages with higher proportion of the controlled motivational appeals (12.8%). Student-level profile analysis results are displayed in Fig. 2.

Regarding relations among profiles, results for path 1 (teachers' engaging messages → TS-relatedness) showed that through all the profiles, the kind of messages that had the strongest positive predictive value on teacher-student relatedness was gain-controlled messages (see Table 3). Gain-autonomous messages only reached statistically significance once for the FM profile. When comparing the predictive value of loss-framed messages across profiles, we can observe that the relation being either positive or negative depended on the characteristics of the profile students belonged to. For instance, for the profiles FM and AMA, loss-autonomous messages related negative with teacher-student relatedness, whereas for the profile LFM, this relation was positive. The same was the case of loss-controlled messages. These messages related positively with teacher-student relatedness in the case of the profile FM, whereas this relation was positive in the case of

Table 1 Means, standard deviations, and correlations among variables

	Mean	SD_w	SD_b	ω	ICC	1	2	3	4	5	6
1. Gain-autonomous messages	3.99	1.30	0.78	0.91	0.27	–	0.84*	0.86*	0.47*	0.64*	0.85*
2. Loss-autonomous messages	2.95	1.28	0.49	0.91	0.13	0.45*	–	0.77*	0.70*	0.37*	0.54*
3. Gain-controlled messages	3.60	1.41	0.70	0.89	0.20	0.73*	0.42*	–	0.71*	0.68*	0.78*
4. Loss-controlled messages	2.13	1.19	0.42	0.92	0.11	0.27*	0.71*	0.34*	–	0.35*	0.41*
5. Relatedness with teachers	4.24	1.57	0.85	0.94	0.23	0.41*	0.14*	0.34*	0.03	–	0.77*
6. Subjective vitality	2.99	1.54	0.49	0.95	0.09	0.43*	0.19*	0.40*	0.11*	0.50*	–

*$p < 0.05$, $N = 954$ (below diagonal), $N = 64$ (above diagonal), SD_w = standard deviation within (student-level), SD_b = standard deviation between (teacher-level), ICC = intra-class correlation, ω = Mc Donalds' omega

Table 2 Goodness of fit for each model of the student-level profile analysis

Profiles	Parameters	LL	AIC	SSA-BIC	LRT *p*	% Smallest group
1	9	− 2448.256	4914.512	4929.675	-	-
2	35	− 7496.334	15,062.669	15,121.634	0	11
3	47	− 7419.799	14,933.599	15,012.78	0	13
4	59	− 7349.34	14,816.68	14,916.078	0.04	12
5	71	− 7333.569	14,809.139	14,928.753	0.33	11
6	83	− 7237.283	14,640.567	14,780.397	0.20	5
7	95	− 7226.021	14,642.042	14,802.089	0.79	5

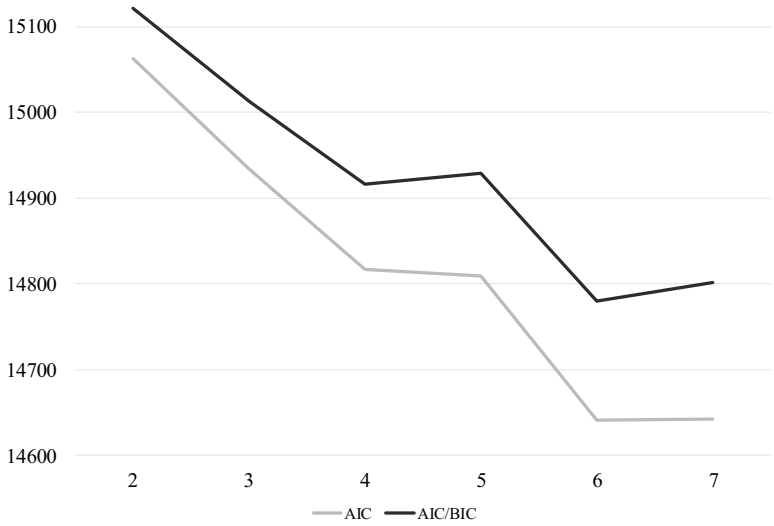

Fig. 1 Elbow plot for single level latent profile analysis

the profile GFM. Regarding path 2 (TS-relatedness → subjective vitality), for all profiles, teacher-student relatedness positively predicted students' vitality, being this relation the highest for the LFM profile followed by the GFM profile, the FM, and lastly, by the AMA profile.

Concerning the proportion of message profiles across students' educational grade belonging (see Table 4), results showed that teachers of grade 9 students tend to rely mostly on gain-framed messages. However, as students' progress through grades, this trend starts to change. In such a way, teachers from grade 10 students tend to rely on all kinds of messages, whereas for the higher levels (grades 11 and 12), teachers start to barely rely on such messages.

Teacher level

Table 5 displays the fit indices of the profiles at the teacher-level latent profile analysis. Results showed that the four-profile solution was characterised by a group with a very low percentage of subjects. The three-profile solution showed a better fit, a higher percentage of smallest group, and the elbow plot illustrated a modest flattening of the slope after the two-profile solution (see Fig. 3), indicating that this solution was the best from a statistical point of view. However, when it came to the theoretical grounding of results, a three-profile described two remarkably similar profiles, not adding further distinct information of the differential use of

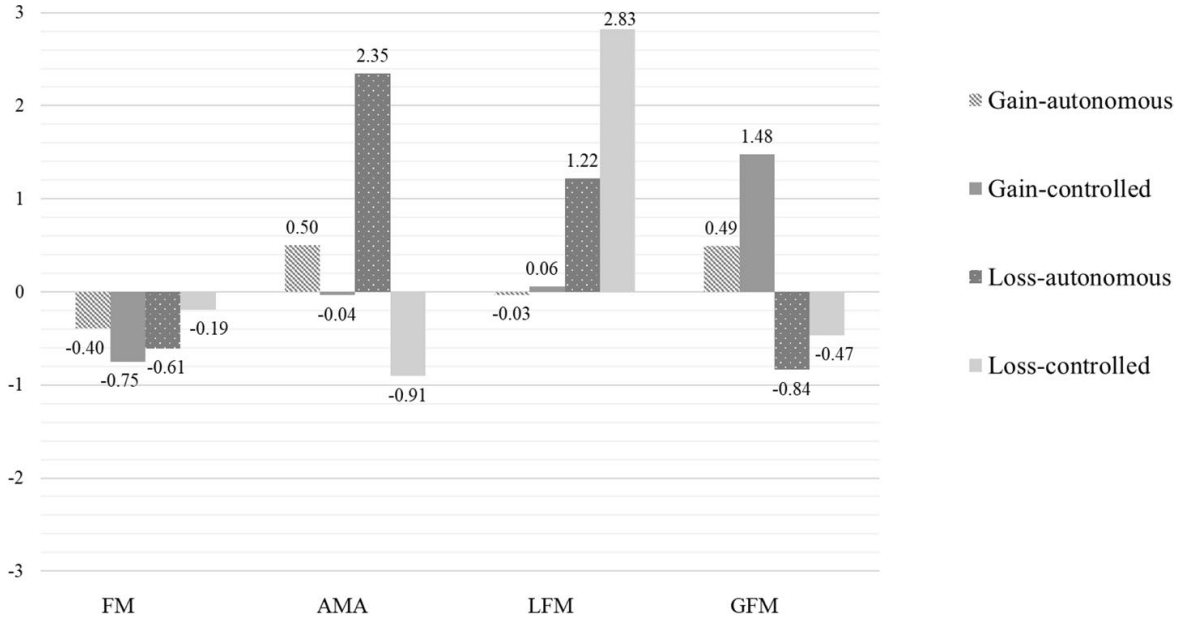

Fig. 2 Student-level profile analysis results. *Note*. FM = Few messages; AMA = Autonomous motivational appeals; LFM = Loss-framed messages; GFM = Gain-framed messages

teacher messages. Therefore, the three-profile solution was discarded, and a two-profile solution was retained.

The two-profile solution is illustrated in Fig. 2. The *invariant* profile represented 34.6% of the sample and described a group of teachers using very few messages (66.7%) followed by another group of teachers relying mostly on gain-framed messages (24.9%). Finally, it also described a very small proportion of teachers relying on loss-framed messages (2.4%) and autonomous motivational appeals (6.1%). The *variant* profile (65.4%) described a set of teachers relying on all kinds of messages, mostly gain-framed messages (42.2%) and few messages (22.8%), followed by a similar percentage of teachers that relied on autonomous motivational appeals (20.4%) and loss-framed messages (14.7%). Results of the teacher-level latent profile analysis are displayed in Fig. 4.

Regarding relations among profiles (see Table 6), results for path 1 showed different patterns across profiles for certain messages. In profile *invariant*, gain-autonomous messages showed the strongest relation with TS-relatedness, whereas for the profile *variant*, this relation did not reach statistical significance. Loss-controlled messages had a very similar predictive value across the two profiles. Contrastingly, loss-autonomous messages and gain-controlled messages showed opposite trends among profiles. In this respect, gain-controlled messages related negatively with TS-relatedness in the *invariant* profile, whereas it related positively in the *variant* profile. As regards to loss-autonomous messages, these related positively with TS-relatedness in the *invariant* profile, whereas it related negatively in the AM profile. Regarding path 2, only for the profile *invariant*, TS-relatedness predicted student subjective vitality. Overall, when comparing results at both levels, it could be observed stronger relations at path 1 among variables at the teacher level.

Discussion

The present study aimed to: (a) examine the different profiles of students according to their perceptions of their teacher's use of engaging messages with students and with the class as a whole, (b) examine how such student profiles relate with TS-relatedness

Table 3 Mixture SEM results for the student level

		Profiles											
		FM			AMA			LFM			GFM		
		β	*SE*	95% CI	*β*	*SE*	95% CI	*β*	*SE*	95% CI	*β*	*SE*	95% CI
Path 1: TEM➔ TS-relatedness	Gain-autonomous	0.20	0.06	0.08/0.30	0.21	0.15	-0.03/0.45	-0.03	0.13	-0.29/0.19	0.15	0.10	-0.05/0.35
	Loss-autonomous	-0.31	0.07	-0.45/-0.20	-0.21	0.11	-0.39/-0.03	0.15	0.06	0.03/0.25	0.03	0.09	-0.12/0.19
	Gain-controlled	0.25	0.07	0.10/0.37	0.20	0.10	0.04/0.37	0.40	0.12	0.17/0.60	0.34	0.12	0.14/0.54
	Loss-controlled	0.13	0.06	0.01/0.24	-0.08	0.11	-0.27/0.10	0.09	0.07	-0.06/0.21	-0.16	0.07	-0.26/-0.05
Path 2: TS-relatedness ➔ subjective vitality		0.46	0.04	0.39/0.52	0.33	0.11	0.15/0.51	0.63	0.05	0.54/0.70	0.59	0.07	0.48/0.70

TEM = teachers' engaging messages, TS-relatedness = teacher-student relatedness, FM = few messages, AMA = autonomous motivational appeals, LFM = loss-framed messages, GFM = gain-framed messages

Table 4 Profile composition regarding grade belonging

	Proportion across grades (%)			
	Grade 9	Grade 10	Grade 11	Grade 12
FM	14.5	32.5	23.5	29.1
AMA	32.5	39.6	13.3	14.6
LFM	34.7	38.7	17.1	9.6
GFM	50	39.9	4.4	5.6

FM = few messages, AMA = autonomous motivational appeals, LFM = loss-framed messages, GFM = gain-framed messages

Table 5 Goodness of fit for each model of the teacher-level profile analysis

Profiles	Parameters	LL	AIC	SSA-BIC	% Smallest group
1	62	− 7629.841	15,383.682	15,488.134	-
2	79	− 7550.627	15,259.254	15,392.345	0.80
3	96	− 7477.895	15,147.79	15,309.521	1.57
4	113	− 7421.034	15,068.068	15,258.439	0.30

and well-being, and (c) to examine differences in the usage of such messages across grades. Four main findings can be drawn from the present work. Regarding H1, results confirmed our hypothesis as, at the student level, four profiles were identified (i.e. FM, AMA, LFM, and GFM). At the teacher level, two profiles were identified: the *invariant* profile and the *variant* profile. Second, overall, at both levels of analysis, teachers' engaging messages related with TS-relatedness, and this, in turn, related with students' subjective vitality, further confirming our H2. An interesting result highlighted that not all kinds of messages related positively to teacher-students' relatedness, and, in some cases, the nature of the relation being positive or negative depended on the characteristics of the profile students belonged to. Third, a further finding which was not hypothesised showed that in general, when comparing both levels of analysis, stronger relations among variables were found at the teacher level. Finally, regarding the composition of profiles at the student-level and confirming H3, results demonstrated that teachers tend to rely on engaging messages more frequently with lower grade students (i.e. grade 9 and 10), whereas for grades 11 and 12, the trend is to use very few messages. Altogether, the present findings address several gaps in the literature: First, it examines an understudied teaching practice (i.e. teachers' engaging messages) as an antecedent of TS-relatedness and as a promoter of students' well-being (Froiland et al., 2019; Zee et al., 2013) adding knowledge to research that has not been comprehensive in this way; second, it examines in more depth the predictive value that gain-framed messages can have on students' well-being (Putwain & Symes, 2016; Santana-Monagas et al., 2022a, b; Symes & Putwain, 2016) which until now has been barely examined; and finally, it follows a person and variable-centred approach to complement previous studies on teachers' engaging messages that have follow either one or another approach but not (Santana-Monagas et al., 2022a, b) which help us identify variable effects on a set of persons (Berlin et al., 2014; Morin et al., 2017). Main findings and practical implications are discussed below.

Table 6 Mixture SEM results for the teacher level

		Profiles					
		Invariant			Variant		
		β	*SE*	CI	*β*	*SE*	95% CI
Path 1: TEM➔ TS-relatedness	Gain-autonomous messages	0.86	0.13	0.65/1.06	0.08	0.26	−0.35/0.50
	Loss-autonomous messages	0.49	0.11	0.32/0.67	−0.42	0.13	−0.62/−0.21
	Gain-controlled messages	−0.63	0.13	-0.84/-0.42	0.48	0.20	0.16/0.80
	Loss-controlled messages	0.23	0.05	0.15/0.32	0.31	0.07	0.19/0.42
Path 2: TS-relatedness ➔ vitality		0.69	0.09	0.54/0.84	0.33	0.28	−0.13/0.79

TEM = teachers' engaging messages, TS-relatedness = teacher-student relatedness, FG = few gain-framed messages, AM = all messages

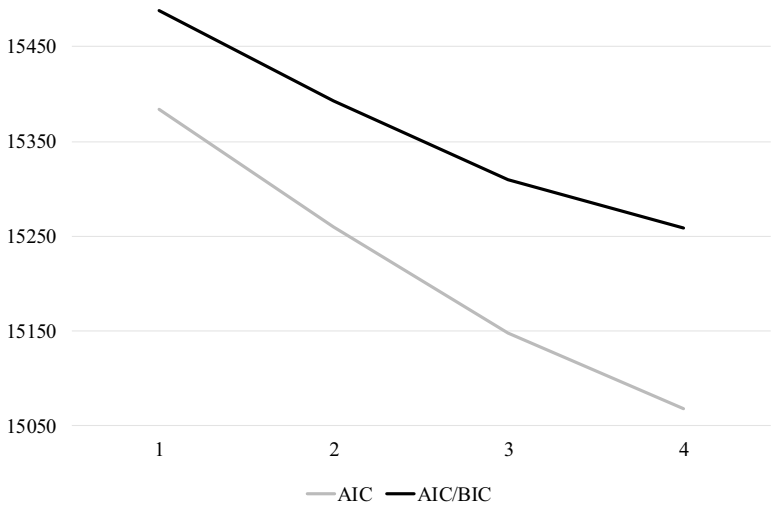

Fig. 3 Elbow plot for multilevel latent profile analysis

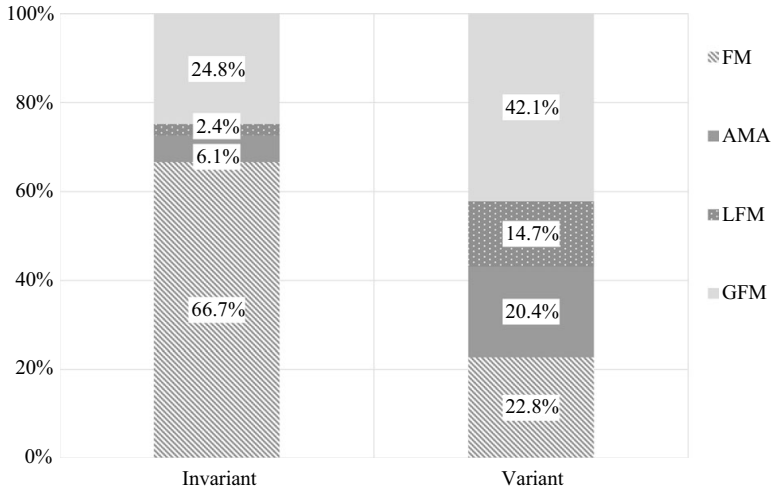

Fig. 4 Teacher-level profile analysis results. *Note*. FM = Few messages; AMA = Autonomous motivational appeals; LFM = Loss-framed messages; GFM = Gain-framed messages

Student level

The present findings provided evidence of the existence of four distinct profiles and thus confirm our hypothesis. Three similar profiles emerged, characterised by teachers usage of two distinct messages: The AMA profile was characterised by students who reported their teacher relying on gain-framed autonomous messages but specially on loss-autonomous messages; the LFM profile where most students reported their teacher to rely on loss-autonomous messages and, in a bigger proportion, on loss-controlled messages; and lastly, the GFM profile, which described students who reported their teacher as relying on gain-framed autonomous and controlled motivational appeals. The last profile was characterised by teachers with a usage of all messages below average and represented almost have of the sample (49%). These results are consistent with Santana-Monagas et al. (2022a) findings, as they also identified two of the profiles found in the present study (i.e. FM and GFM), providing evidence of the stability of such profiles.

Regarding relations among variables, substantial differences can be observed among profiles. For the FM profile, all messages had similar predictive value on TS-relatedness, with gain-framed messages (both autonomous and controlled) displaying stronger relations in this and the rest of the profiles. This finding lines up with previous research examining the higher effect that focusing on the positive has compared to

that of negative (Martínez-Zelaya et al., 2022). In this sense, positive words are better evaluated and maintain for longer in the memory (Unkelbach et al., 2008); thus, it could be that gain-framed teacher messages are further recalled after they have been sent, reinforcing the feelings of relatedness with the teacher. An unexpected result showed that loss-controlled messages had a positive predictive value, although rather low, with TS-relatedness, whereas loss-autonomous messages were negatively related with relatedness. As previous research has highlighted, the higher the frequency of loss-framed messages, the stronger impact these can have on students (Putwain et al., 2021). In this sense, it could be that, for teachers that rely less-frequently on these kind of messages, when they do so and rely on loss-controlled messages such as "*If you don't study, you'll make your parents feel angry*" could be interpreted by students as a sense of concern from the teacher towards them, as there are not used to such messages, and thus, making them think their teacher really desires the best for them (Connell & Wellborn, 1991; Taylor & Ntoumanis, 2007). Contrastingly, when loss-framed messages are accompanied by an autonomous motivational appeal, relying on messages such as "If you don't pay attention, you won't study what you want" even with a low frequency might instead be interpreted by students' as an attack towards them, as a critic or intrusion (MacGeorge et al., 2008) and, thus, in line with previous studies (Belcher et al., 2021; Putwain & Remedios, 2014), negatively predicting TS-relatedness.

In respect with the rest of the profiles (i.e. AMA, LFM, GFM), gain-controlled messages such as "If you work hard, you will feel proud" displayed the highest predictive value on TS-relatedness with strongest relations for the profile LFM. This result lines up with previous research demonstrating the positive relation among gain-framed messages and student outcomes (Santana-Monagas et al., 2022a, b) and among positive information in general (Martínez-Zelaya et al., 2022; Unkelbach et al., 2008). Moreover, like profile FM results, loss-autonomous messages had a negative relation with TS-relatedness for the profile AMA. For this profile, the frequency of such messages was approximately 2.5 points above average, indicating a high frequency which could be responsible for the nature of such relation (Putwain et al., 2021). However, for profile LFM, this relation was positive. Such result could be explained attending the features of such profile, where loss-controlled messages are situated almost 3 points above average and doubles those of loss-autonomous messages. In this sense, it could be that for students' whose teachers rely mostly on loss-controlled messages, when they do so on a loss-autonomous message, these could be interpreted as a sign of the teacher being supportive and caring as their normal trend is not to be so. Finally, unlike results for the FM but in consistency with previous results on loss-framed messages and teachers' motivational approach (Bartholomew et al., 2018; Codina et al., 2018; Putwain & Symes, 2011; Putwain et al., 2017), loss-controlled messages for the GFM profile related negatively with TS-relatedness. Given that teacher's general trend in profile GFM is to rely mostly on gain-framed messages (both controlled and autonomous), it could be that loss-controlled messages are perceived by students more harshly as they are not used to hear such messages from their teacher. Therefore, the present findings highlight the fact that messages can have different predictive values on TS-relatedness based on the overall usage of messages from teachers. Thus, when approaching the study of teacher messages, it is important to examine the usage of all messages together, as the frequency to which certain messages are reported may affect the predictive value of other messages.

In respect to path 2 and like previous studies (García-Moya et al., 2015; León et al., 2015), across all profiles and specially for those characterised by a strong message frame (LFM and GFM), TS-relatedness had a positive predictive value with student's vitality. In

this line, Furrer et al. (2014) and Furrer and Skinner (2003) found that positive relationships among teachers and students have an energising function as they fulfil student's need for relatedness (Ryan & Deci, 2017). Proving once again that, students who feel that their teacher really cares about them and who feel supported by them report higher levels of well-being.

Finally, regarding the distribution of messages across grades, results highlight how teachers tend to rely more often on gain-framed messages with the lower grade students (i.e. grade 9) and all kinds of messages with grade 10 students, whereas for grades 11 and 12, teachers' trend is to barely rely on engaging messages. In line with previous studies (Flintcroft et al., 2017), research has provided evidence that teachers adapt their messages to students. For instance, teachers have been reported to rely more frequently on loss-framed messages and controlling strategies in classes with low engagement (see Putwain et al., 2021). Grades 11 and 12 are not part of the compulsory curriculum, and thus, students in such grades have willingly decided to enrol in such courses. It could be that those students display high levels of engagement and, thus, teachers might perceive that there is no need to rely on engaging messages. In a similar line, it could be that teachers of lower grade students perceive them as less engaged and needier of guidance and, thus, rely more often on such messages. It could also be that they rely more often on gain-framed messages with grade 9 students as teachers are less constraint and pressured by time or final stage exams.

Teacher level

Analysis at the teacher level revealed two different profiles of students. The *Invariant* profile represented the 34.6% of the sample and is described students that reported their teacher's as tending to barely rely on messages. The *variant* profile represented the 65.4% of the sample and describes a group of students who reported their teachers' as having an overall tendency to rely on all kinds of messages, both controlled and autonomous and both gain and loss-framed. Like results at the student level, this finding lines up with previous works examining profiles of teachers in respect to their message usage (Santana-Monagas et al., 2022a, b), which also found two profiles of teachers with similar characteristics to that of the present, proving the stability of such profiles. Regarding relations among teachers' engaging messages and TS-relatedness, again important differences could be observed among the predictive value the different messages had across profiles.

For the *invariant* profile, like previous studies highlighting the importance of focusing on more autonomous goals for optimal functioning (Ryan & Martela, 2016), autonomous messages had the strongest predictive value on the class overall TS-relatedness, followed by loss-controlled messages. More specifically, this result suggests that engaging messages that rely on autonomous motivational appeals have a strong predictive value on a class of students when teachers' overall tendency is to barely rely on such messages. It could be that this low tendency of relying on engaging message affects the value students grant to the actual messages they receive. Students could perceive such messages as something unusual from teachers, worth paying attention to and thus, as a sign that the teacher really cares about them. An unexpected result from this profile revealed that gain-controlled messages had a strong negative predictive value with TS-relatedness. Given the novelty of the present findings, we cannot compare these results to previous studies to help us explain this result. However, considering the strong predictive value that autonomous motivational appeals have on TS-relatedness for teacher profiles that barely rely on engaging messages, it could be that gain-controlled

messages such as "If you all work hard, I'll give you free time" negatively affects TS-relatedness as these do not involve any sense of connectedness, warmth, or security but rather imply simple classroom control strategies. Another possible explanation could be that this profile represents a group of teachers that have been arranged with a "good" group of students in terms of performance, motivation, and engagement. Thus, it could be that for such students, gain-controlled messages have opposite effect to that of the intended as these are two far away from students' internalisation process and, thus, quality motivation. Previous studies have gathered some evidence towards this effect, where highly autonomous students feel unrelated to teachers as they, by their own, are able to meet their own needs (Zee et al., 2013). However, given the limited research available regarding teachers' engaging messages, we recommend readers to interpret these results with caution.

In regard with profile *variant*, results revealed that the highest predictive values were observed among controlled messages, both gain and loss-framed. In this sense, teachers' tendency to rely on all kinds of messages indistinctively with the whole class could be interpreted as a lack of credibility or ability, given that they try to engage their students with all their possible resources but without a clear tendency. Students might feel disconnected with the teacher as they could think that they do not really know them to properly engage them. In such cases, students might feel motivated in a more controlled manner and, thus, controlled messages appealing to rewards or punishments might influence positively TS-relatedness. Moreover, similar to results at the student-level, relying more often than not on loss-autonomous messages with the whole class such as "If you don't work hard, you won't be able to get the job you want" could be perceived by students as an "attack" to them, as a critic or intrusion (MacGeorge et al., 2008), especially if, as explained, teachers are perceived as having a low ability and, thus, negatively predicting TS-relatedness.

Finally, regarding path 2, when comparing both profiles, only for the *invariant* profile did TS-relatedness predictive positively students' vitality. These could be due to the big variability observed in profile *variant*. Additionally, when comparing both levels of analysis, results revealed that relations among teachers' engaging messages and TS-relatedness were higher at the teacher-level than to that of the student-level analysis. This suggests that teachers' engaging messages have a strongest predictive value on TS-relatedness when they are used towards the whole class, instead of directing them towards a specific student. In fact, previous studies have found that positive relationships increase student's sense of belongingness to school (Connell & Wellborn, 1991; Furrer & Skinner, 2003; Hughes et al., 2008). It could be that teachers' engaging messages used with the whole class promote a stronger sense of belonging to a group led by the teacher. In this sense, trying to engage students collectively might make them feel part of team with shared experiences about interests, objectives, and difficulties for which the teacher will support them and thus might foster more strongly their TS-relatedness.

Limitations and future perspectives

Although making an interesting contribution to the field, the present study faces some limitations. First, data was cross-sectional, and thus, causal relations cannot be reached. Future research may expand these results by conducting longitudinal research to establish whether changes in teachers' engaging messages lead to changes in students' outcomes. Second, it would be interesting to examine the relationship between teachers' engaging messages and students' outcomes at different educational levels and grounded in different subjects to observe if the same profiles emerge and whether they relate similarly to TS-relatedness and student's subjective vitality. Finally, even though mixed structural equation models

represent a good approach to detect the influences among variables and help to reach a clearer understanding of variable influences (Berlin et al., 2014; Morin et al., 2017), information could be lost when categorising into clusters continuous variables. Besides, like exploratory factor analysis, when conducting mixed structural equation models, researchers must choose the number of clusters that best represent the data, which could increase subjectivity and, thus, altering the margin of error (Marsh et al., 2009).

Conclusion

The present findings are of relevance, since they highlight a new resource teachers can rely on to improve both students' sense of relatedness and well-being, adding evidence on the relevance teacher messages have. One of the main conclusions that can be drawn from the present findings is the fact that teachers' engaging messages predict students' well-being through their enhancement of TS-relatedness and that, among the different messages, gain-framed messages outperformed the rest in terms of their predictive strength with TS-relatedness. Moreover, it can also be concluded that the predictive value of certain messages can depend on teachers' overall tendency to rely on one or another message. In other words, the usage of messages as a whole is more determinant than the predictive value of each type of message separately. This finding has important repercussions to teaching practice as it enriches the knowledge on teachers' engaging messages, proving not only the importance that certain messages can have but also how these are used in combination with others. Thus, a message that a priori might have proven to be beneficial for students might not be so beneficial when it is combined with others. Accordingly, when examining the predictive value that certain teacher messages can have on student outcomes, it is important for researchers to not only explore their effect independently, but also in conjunction. This knowledge could serve to better design and explore the effectiveness of interventions targeting teacher engaging messages.

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Declarations

Conflict of interest The authors declare no competing interests.

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Most relevant publications in the field of Psychology of Education:

Santana-Monagas, E., Núñez, J. L., Loro, J. F., Huéscar, E., & León, J. (2022a). Teachers' engaging messages: The role of perceived autonomy, competence and relatedness. *Teaching and Teacher Education, 109*, 103556. https://doi.org/10.1016/j.tate.2021.103556

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Moreno-Murcia, J. A., Silveira, Y., y Belando, N. (2015). Questionnaire evaluating teachingcompetencies in the university environment. Evaluation of teaching competencies in the university. *New Approaches in Educational Research, 4*(1), 54-61.

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3.3. Study 3. Teachers' engaging messages: The role of perceived autonomy, competence, and relatedness.

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Research paper

Teachers' engaging messages: The role of perceived autonomy, competence and relatedness

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HIGHLIGHTS

- Teachers can be classified according to their communicative style.
- Most teachers use gain-framed messages and self-determined motivational appeals.
- Teachers' basic needs is related with teachers' communicative style.
- Teachers' communicative style is related with students' academic performance.
- Data adds to the insight of the link among teacher inner and outer side.

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ABSTRACT

"If you work hard you will learn interesting facts".*"Unless you work hard you will get into trouble"*. These are examples of engaging messages teachers use to encourage engagement among their students. These kind of messages have been recently addressed by researchers, yet the reason why teachers use certain messages remains unexplored. This study aimed to identify profiles of teachers' engaging messages and how these relate to their basic needs and students' performance. The sample comprised 48 teachers and 1150 students. At the student-level, latent profile analysis showed three profiles: the gain-framed messages (GFM), the few-messages (FM), and the all-messages (AM) profiles. At the teacher-level, multilevel profile analysis showed an active and a passive profile. Results also indicated that teachers' basic psychological needs were related to their use of engaging messages and this was related to students' performance.

Teachers play an essential role in students' learning, motivation, academic performance, and well-being (Bartholomew et al., 2018; Blazar & Kraft, 2017; Collie & Martin, 2017; Hill et al., 2019; Lazarides et al., 2019; León et al., 2017; Sevil et al., 2017). Amongst the strongest promoters of students' positive outcomes, teachers and their behaviours have become focal points of research and educational policies (Chetty et al., 2014; Kunter et al., 2013; León et al., 2017; León et al., 2018). Recently, researchers have drawn attention towards teachers' behaviours, such as their use of messages, presenting promising results (León et al., 2017). Particularly, previous studies have shown that teachers' messages have an impact on students' psychological well-being, on-task behaviour, and academic performance (Caldarella et al., 2020; Ntoumanis et al., 2017; Putwain et al., 2017; Putwain & Roberts, 2009; Santana et al., 2019). Despite the progress made in the area, more evidence is needed to understand why teachers rely on certain messages (Santana et al., 2019) and how that might relate to certain student outcomes such as academic performance. For instance, Korthagen and Evelein (2016) studied how the "inner side" of teachers (e.g., feelings, emotions, thoughts, etc.) affected their "outer side" (e.g., teaching quality, teaching behaviour, etc.). Specifically, these authors offered evidence of significant relations between teachers' basic needs and their teaching behaviour. Considering teachers' engaging messages as a verbal teaching behaviour, it might be expected that teacher's basic needs have an

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influence on the engaging messages they rely on. Therefore, the following research question was investigated: Are teacher's basic needs related to their use of engaging messages? More precisely, the present study aimed to: 1) test if the fulfilment or the thwarting of teachers' basic psychological needs is related to their use of engaging messages; and 2) examine if student outcomes, such as academic performance, are related to the engaging messages teachers' rely on.

1. Engaging messages

Teachers' engaging messages have been defined as the different messages teachers rely on to engage students in school tasks (Santana et al., 2019). These messages are characterized by focusing on the consequences associated to certain outcomes, which can either be favorable (referred to as *gain-framed messages*) or unfavorable (referred to as *loss-framed messages*). These messages are also characterized by supporting a certain type of motivation (external, introjected, identified or intrinsic), referred to as *motivational appeals* (Santana et al., 2019). Researchers, who have approached the study and measurement of teachers' engaging messages via student perceptions, have conceptualised it following two theories: The message framing theory (Rothman & Salovey, 1997) and the self-determination theory (Deci & Ryan, 2016; Ryan & Deci, 2000, 2017, 2020).

1.1. Message framing theory

Teachers' engaging messages refer to both the frame and the motivational appeals within a given message. Attending to the frame, messages can generate different outcomes depending on whether they are gain or loss-framed (Rothman & Salovey, 1997). Gain-framed messages emphasise the benefits of engaging in a specific activity, whereas loss-framed messages highlight the expenses of not doing so. When applied to educational contexts, teachers can engage students in school-tasks either by telling them that, if they do so, they could choose what to study once they finish school (i.e., gain-framed message), or by telling them that, if they do not do so, they would have to pursue a less demanded degree (i.e., loss-framed message). Clearly, both messages use the same stimulus as a reference (i.e., choice of future studies) but the message is framed differently. Thus, the focus here is the frame of the message and not the stimuli or the motive appealed to.

Few researchers have followed this approach, but those who have, have provided evidence of the negative consequences that loss-framed messages can have on students (Putwain & Remedios, 2014; Putwain & Symes, 2016). For instance, Putwain and Roberts (2009) reported that loss-framed messages could be perceived by students as threatening, thereby increasing anxiety levels. However, the effects of gain-framed messages remain largely unexplored. For instance, only two studies have examined both loss and gain-framed messages simultaneously (Putwain & Symes, 2016; Symes & Putwain, 2016). Moreover, in these studies, the messages were not investigated by directly measuring teachers' behaviour, but instead were measured under hypothetical settings resulting in mixed findings. This gap in research highlights the need for more studies examining the effects that gain-framed messages can have on students.

1.2. Self-determination theory

Attending to motivational appeals, researchers (Deci & Ryan, 2016; Ryan & Deci, 2000, 2017, 2020) have identified four different types of motivations that drive behaviour. These four types of motivations can be categorised as autonomous (i.e, identified and intrinsic) or controlled (i.e., external and introjected). In such way, teachers can use their messages to engage their students in school related tasks by appealing to one type of motivation or another. For instance, when teachers appeal to controlled motivations, student's behaviour is driven by external sources such as rewards or punishments (i.e., extrinsic motivation), or by internal sources, such as guilt or self-esteem (i.e., introjected motivation). In contrast, when teachers appeal to autonomous motivations student's behaviour is controlled either by the value attributed to a certain activity (i.e., identified motivation), or by the pleasure and enjoyment of the activity itself (i.e., intrinsic motivation). Each type of motivation would have a different degree of self-determination, ranging from the least self-determined motivation to the most in the following order: Extrinsic, introjected, identified, and intrinsic (Behzadnia et al., 2018; Ryan & Deci, 2020). Despite the different types of motivations, sometimes teachers may not appeal to a motivation at all. Such messages highlight that there is no existing relation between student's behaviour and the outcomes related to such behaviour. In such situations, students might feel amotivated and experience a lack of control (Núñez & León, 2015). Previous research has shown that when students are autonomous motivated, they perform better, achieve conceptual and self-regulated learning, engage in school tasks, and experience higher satisfaction and enjoyment through their engagement in specific activities (Froiland & Worrell, 2016; Jang et al., 2016; León et al., 2015; Ryan & Deci, 2020).

Under the self-determination framework, researchers have identified a series of teaching practices that support students' needs, foster their motivation, and relate with their outcomes, known as need-supportive teaching (Collie et al., 2019; Haerens et al., 2015, 2018; Vansteenkiste et al., 2012). A need-supportive teaching style is characterized by nurturing students' needs and interests. It has also been linked to students' motivation, learning strategies, and behaviours (Haerens et al., 2015; Vansteenkiste et al., 2012). In contrast a controlling teaching style is characterized by pressuring students to behave in a certain way and has shown to predict students' disengagement and lower their academic achievement (Collie et al., 2019). Amidst these practices, teacher messages have been assessed as a way of relying on an inviting (i.e., "*you could*") or a controlling language (i.e., "*you must*"; Haerens et al., 2015; Núñez & León, 2015; Reeve, 2009; Vansteenkiste et al., 2012). Nevertheless, this way of approaching the study of teacher messages does not consider the different types of motivation that could be communicated in a more or less controlling way. Attending both the message framing theory and the self-determination theory might help to better understand how teaching practices impact student outcomes. As a practical implication, teachers may benefit more from this theoretical approach as it addresses the specific messages they can use in class (i.e., "*my teacher tells me that if I work hard, I will learn interesting facts*") rather than focusing on a type of language, which in some cases could seem too vague (i.e.,"*my teacher uses forceful language*"; Jang et al., 2016). Finally, it could be also helpful for the design of future interventions and teacher training programs, as asking teachers to rely on a certain message and avoid others is low-cost, easy to implement, and does not require much time.

1.3. Integrating the theories

The present study aimed to integrate the message framing theory and self-determination theory in order to provide a more comprehensive view of teachers' engaging messages. It also aims to fill in the literature gaps in both the theories by examining gain-framed and loss-framed messages, as well as the different motivational appeals that teachers rely upon. As Busemeyer (2017) and

Gigerenzer (2017) recommend, it is important not only to rely on a meta-theory but also to aim for the integration of different theories to improve the study of human learning and behaviour. Combining these theories would greatly enrich the study of teachers' engaging messages as they can both complement and overcome each other's weaknesses (see Table 1 for examples of the different messages teachers can rely on resulting from the theory integration). For instance, the message framing theory does not consider the motives appealed within a message, instead, it only examines the message frame, when in fact motivational appeals could contribute to students' outcomes. Similarly, the self-determination theory does not take into account the frame of the message when teachers appeal to a certain kind of motivation. Nonetheless, Putwain and Roberts (2009) have demonstrated that loss-framed messages can have negative effects on students.

Recently, in a preliminary study, Santana et al. (2019) combined both the theories to offer a deeper understanding of teachers' engaging messages. Their findings acknowledged that teachers' engaging messages have an impact on students' psychological well-being. Furthermore, they also identified three profiles of teachers according to students' perceptions: teachers who used few messages, teachers who used all kind of messages, and teachers who relied mostly on gain-framed messages and on more self-determine motivational appeals (i.e., autonomous motivations such as intrinsic and identified). Students who reported having a teacher in this last profile reported higher levels of psychological well-being. Nevertheless, there is still a need to explore the predictors of teachers' engaging messages in order to successfully design future interventions.

2. Teachers' basic needs as a predictor of their engaging messages

In the school context, the basic psychological needs mini-theory suggests that teachers have three innate basic needs: autonomy, competence, and relatedness (Ryan & Deci, 2017). The need for autonomy refers to a sense of initiative and the capability to decide to take part, or not, in a certain activity. Teacher's behaviour is therefore driven by their willingness and by interest (Deci & Ryan, 2000; Ryan & Deci, 2020). In this sense, teachers feel that their need for autonomy is satisfied when the head teacher considers their perspective, supports their initiatives, and provides meaningful reasons when making a demand. The need for competence refers to effectively interacting with one's environment. Teachers whose competence need is satisfied, feel that they have the capability to perform their job effectively (Lee & Nie, 2014). Finally, relatedness refers to the desire to feel significantly related to and bonded with others. Teachers' need for relatedness would be satisfied when they feel connected with and supported by both their students and their colleagues (Behzadnia et al., 2018; Deci & Ryan, 2000; Ryan & Deci, 2000).

In educational contexts, the fulfilment of these needs in teachers would not only be essential for their optimal functioning and well-being (Deci & Ryan, 2008), but it would also affect their teaching behaviours (Klaeijsen et al., 2018; Praetorius et al., 2017; Van den Berghe et al., 2014), whereas the thwarting of these needs would lead to negative teaching outcomes and less effective teaching behaviours (Marshik et al., 2017; Martinek, 2019; Pelletier et al., 2002). It is important to note that need thwarting is not the same as the absence of need fulfilment (Ebersold et al., 2019). When a need is poorly satisfied individuals' growth attenuates, but when a need is thwarted individuals are more vulnerable to ill-being (Bartholomew et al., 2011; Chen et al., 2015; Vansteenkiste & Ryan, 2013). This implies that when teachers' needs for autonomy, competence, and relatedness are thwarted, they feel controlled and pressured, their sense of self-efficacy declines, and feel excluded and lonely, respectively (Chen et al., 2015).

The relation between "inner" aspects of teaching, such as teachers' beliefs, emotional experiences, attitudes or well-being, and their actual behaviour in the classroom (i.e., "the outer side") has been widely addressed among researchers over time, providing sufficient empirical evidence on their relation (Bandura, 1978; Kunter et al., 2013; Shen et al., 2015). However, as Korthagen and Evelein (2016) remarked, among these inner aspects of teaching, teachers' basic psychological needs (i.e., autonomy, relatedness, and compentence) and its link with teaching behaviour as observed by students (e.g., engaging messages) remains understudied. Likewise, the thwarting and fulfilment of these needs has been poorly addressed simultaneously (Bartholomew et al., 2011; Cuevas et al., 2015; Ebersold et al., 2019). For instance, although Korthagen and Evelein (2016) found that when teachers' basic psychological needs (inner side of teaching) were satisfied, they displayed a behaviour characterized by a high level of influence and proximity (outer side of teaching); researchers did not measure how need thwarting influenced the teachers' behaviour.

The present study fills this gap in research and expands previous works by taking a wider perspective based on the three basic psychological needs, both their thwarting and fulfilment, and by connecting the inner side of teaching with its outer side. In other words, this study attempts to relate teachers' need fulfilment or thwarting with their use of engaging messages. This wider perspective allows us to examine more complex relations between teachers' personal aspects and their behaviours, while considering both teachers' and students' perspectives. Thus, in order to acquire a better understanding of the dynamics underlying teachers'

Table 1
Teachers' engaging messages.

Message frame	Motivational appeals	Example
Gain-frame	Intrinsic	Gain-framed intrinsic messages: *"If you work hard, you will learn interesting facts."*
	Identified	Gain-framed identified messages: *"If you work hard, you will be prepared for your future studies."*
	Introjected	Gain-framed Introjected messages: *"If you work hard, you will feel proud of yourself."*
	Extrinsic	Gain-framed extrinsic messages: *"If you work hard, I'll give you a reward (star, sticker, etc.)."*
Loss-frame	Intrinsic	Loss-framed intrinsic messages: *"Unless you work hard, you will miss the opportunity to understand interesting issues."*
	Identified	Loss-framed identified messages: *"Unless you work hard, you will only be able to get low paid jobs."*
	Introjected	Loss-framed introjected messages: *"Unless you work hard, you will feel ashamed."*
	Extrinsic	Loss-framed extrinsic messages: *"Unless you work hard, you will miss your break."*
Amotivation		Amotivation messages: *"It does not matter if you work hard, you will fail anyway."*

engaging messages, and in turn, students' academic performance, attending to the teachers' behavioural predictors should be a priority for researchers.

3. Teachers' engaging messages: A person-centered and multilevel approach

3.1. Person-centered approach

For this study, taking a person-centered approach would help in examining the profiles of teachers with a similar use of engaging messages (e.g., teachers that rely on gain-framed and autonomous messages). Unlike variable-centered approaches, person-centered approaches allow researchers to examine the existence of possible subpopulations of teachers that share characteristics within a unique sample, such as their engaging messages (Collie et al., 2020). In contrast, a variable-centered approach informs about the existent relations between variables in the same population. As a practical implication, person-centered approaches could be helpful in guiding future interventions based on the necessities displayed by each profile identified within a sample of teachers, whereas variable-centered approaches would only give us information about the variables that may be the subject of a wider intervention (Lanza & Rhoades, 2013). For instance, interventions following a variable-center approach would target teachers equally, this is to say that all teachers would be told the kind of messages they should rely on. Contrastingly, interventions following a person-center approach would adapt the intervention towards the profile displayed by teachers. For example, teachers identified as relying on all kinds of messages could be told to stop relying on loss-framed messages, given the inconvenience associated with them (Putwain & Symes, 2016).

3.2. Multilevel approach

In the educational context, researchers usually deal with variables located at different levels. In our study we deal with two levels: Level 1 (L1 or student-level) and Level 2 (L2 or teacher-level). Two kinds of Level 2 variables are frequently used: (1) variables that have the same value for all the students of a teacher (e.g., teachers' basic needs), and (2) variables based on the aggregate of students' responses (e.g., teachers' engaging messages). When combining latent profile analysis with a multilevel approach we can obtain different profiles for each level of analysis. At Level 1, we can identify profiles of students according to the engaging messages their teacher uses with them, whereas at a Level 2, we can identify profiles of teachers according to the proportion of Level 1 profiles.

These kind of designs, in which the nature of the data is taken into account, allow us to approach a more thorough understanding of the effect these messages have on students. In this research, personalised messages directed towards an individual student (analysis at L1), are differentiate from teacher's overall tendency to use a message with the whole class (analysis at L2; Marsh et al., 2012; Morin et al., 2014).

3.3. The present study

In the present study, profiles of teachers' engaging messages were examined along with their relation to the teachers' basic needs (L2) and students' academic performance (L1 and L2). In the first stage, profiles of students were identified according to the engaging messages that the teacher used with them and examined how these profiles were related to students' academic performance. In the second stage, profiles of teachers were examined according to the engaging messages they used in class with their students and how these profiles were related to their basic needs and the students' academic performance.

Based on the recent evidence about the outcomes related to certain teaching behaviours (Putwain & Symes, 2016; Ryan & Deci, 2020) and the impact that teachers' basic needs have on their own behaviour (Korthagen & Evelein, 2016), it was expected to find that specific profiles would relate to teachers' basic needs. It was also expected to find differences in students' academic performance based on their teachers' use of engaging messages. Specifically, it was expected that profiles characterized by the use of gain-framed messages and self-determined appeals would be related to teachers' basic needs fulfilment and students' optimal academic performance.

4. Method

4.1. Participants

A total of 48 teachers (60.4 % female; age range = 26–58; mean age = 46.38, *SD* = 8.07) and their 1150 students (50.4 % women; Mean age = 15.15, *SD* = 1.46) from grades 8th to 12th participated in the study (Mean students per classroom = 18.69, *SD* = 6.64, range = 7–34). The participants belonged to ten public secondary schools of the island of Gran Canaria, Spain, belonging to both rural and urban environments. To diminish potential bias all students were studying the same subject and attended an equal number of hours of classes per week. The questions were specific to one subject, mathematics, and therefore referred to students' mathematics teacher.

4.2. Procedure

Data collection took place during the first trimester of the 2018–2019 academic year. The objectives of the study were explained to the students and teachers, emphasizing the voluntary and confidential nature of their participation. The teachers filled in the Basic Psychological Need Satisfaction and Frustration Scale (Chen et al., 2015), while students assessed the engaging messages of their teacher through the instrument developed by León et al. (2019). Both instruments were administered in the classroom during a teaching period.

4.3. Instruments

Items for both instruments were rated according to a Likert scale of seven points from 1 (*absolutely not true*) to 7 (*absolutely true*). To examine reliability of the used instruments, McDonald"s Omega was used instead of Cronbach's alpha, because the latter assumes that the factor loadings are the same for all (Hancock & An, 2020) and McDonald's Omega has shown evidence of better accuracy than Cronbach's alpha (McNeish, 2018). McDonald's Omega were estimated using factor loadings from a congeneric CFA for each variable.

4.3.1. Teachers' engaging messages

Teachers' engaging messages were assessed by students using the instrument developed by León et al. (2019). The scale comprises a total of 36 items preceded by the phrase, "*My teacher tells me that …*". Items are grouped by four into nine factors, one for each degree of self-determination and its frame: gain-frame intrinsic (e.g., "*If I work hard I will enjoy this subject*"), loss-frame intrinsic (e.g., "*Unless I work hard I will miss the beauty of this subject*"), gain-frame identified (e.g., "*If I work hard I will be able to choose what to study*"), loss-frame identified (e.g., "*Unless I work hard I will have a hard life*"), gain-frame introyected introjected (e.g., "*If I work hard I*

will feel important"), loss-frame introjected (e.g., "*Unless I work hard I will feel sad*"), gain-frame extrinsic (e.g., "*If I work hard I will receive compliments*"), loss-frame extrinsic (e.g., "*Unless I work hard I will get into trouble*"), and amotivation messages (e.g., "*It does not matter if I work hard, I will fail anyway*"). Model fit indices for the CFA were as follows: χ^2 (558) = 1851.053, p < .001, RMSEA = 0.045, CFI = 0.922. The reliability and validity of this scale has been previously established displaying values of McDonald's Omega above 0.81 for each factor (Santana et al., 2019). In the present study, McDonald's omega for each of the nine factors was above 0.85.

4.3.2. Basic psychological needs

To evaluate perceived thwarting and fulfilment of teachers' basic psychological needs, teachers completed the spanish version for adults of the Basic Psychological Need Satisfaction and Frustration Scale (Chen et al., 2015). The instrument is comprised of 24 items preceded by the phrase "*In my workplace*". The items are divided into six factors of four items each, one for each need frustrated and satisfied: autonomy satisfaction (e.g., "*I feel my choices express who I really am*"), autonomy frustration (e.g., "*I feel pressured to do too many things*"), relatedness satisfaction (e.g., "*I fell that the people I care about also care about me*"), relatedness frustration (e.g., "*I feel excluded from the group I belong to*"), competence satisfaction (e.g., "*I feel confident that I can do things well*"), and competence frustration (e.g., "*I feel disappointed with many of my performances*"). Previous research has provided evidence of reliability and validity of the scale (Liga et al., 2018). In the present study, McDonald's omega for need fulfilment factors was above .84, whereas for need thwarting factors was above 0.75.

4.3.3. Academic performance

Students' academic performance was measured by their grades in mathematics retrieved from the schools' official records. In the spanish education system grades are granted by students' teachers, following rubrics implemented by the government. These rubrics cover students' knowledge and ability in a given subject as well as their work done during classes and homework. Similar to standardized test results, teacher reported grades are very important for students' future as they determine the universities and courses that students can have access to. The grades ranged from 1 to 10, 10 being the highest possible grade (León et al., 2017).

4.4. Data analyses

All data analyses were conducted with M*plus* 8.6 (Muthén & Muthén, 2021). Students were clustered within classrooms in the single level models using the "type = complex" command in M*plus*. The robust maximum likelihood (MLR) estimator was used in all models. These were estimated using at least 5000 random start values, each allowing 100 initial stage iterations, and 100 final stage optimizations. There was no missing data for teacher variables whereas for variables reported by students, missing data accounted for 1–14 %. Missing data were handled with the full information maximum likelihood approach. To test the different models, an invariant modeling approach was followed where variances were made constant. In addition, to ease interpretation, all variables were standardized to mean 0 and standard deviation of 1 (Collie et al., 2020). This approach allows to easily interpret means in the latent profile results: if data are above 0 and with a low *p*, we can observe that the value is above the mean.

4.4.1. Single level latent profileanalysis

Latent profile analysis is used to explain the variability within a population using the fewest number of latent profiles possible (Korpipää et al., 2019). This procedure classifies participants based on the probability of belonging to a certain profile and relies on fit indices to decide the number of profiles, unlike traditional cluster analysis (Morin & Marsh, 2015; Stanley et al., 2017). Specifically, the following indices were used to decide the number of latent profiles: Log-Likelihood (LL), Akaike Information Criteria (AIC), Sample Size Adjusted Bayesian Information Criteria (SSA-BIC), and Likelihood Ratio Test (LRT). Lower values of LL, AIC, and SSA-BIC are indicators of better fit than higher values. LRT informs if the fit of a model with k latent profile is better than the fit of a model with k-1 profile. A low *p*-value indicates that a model with k groups fits better than a model with k-1 groups (Lo et al., 2001). Because one disadvantage of latent profile analysis is that a solution with a small number of participants may not represent a unique latent profile (Marsh et al., 2009), the percentage of cases in the smallest latent subgroup of each model (e.g., 1 % or 5 % of the total sample) was also analysed. To show the flattening of these indices an elbow plot was created. A clear elbow is an indicator of a suitable solution (Morin et al., 2016).

Following Mäkikangas et al. (2018) and Collie et al. (2020) recommendations, a two-step procedure was followed. In a first step, single latent profile analysis were estimated to decide the number of clusters at L1 or student-level. At this level, 1 to 8 solutions were tested. To estimate the variable scores, factor scores were used to diminish the effect of measurement errors (Justice et al., 2011). Factor scores were saved from the 9-factor measurement model and standardized (M = 0 and SD = 1). Model fit indices and examples for each factor of this single level latent model are provided in the instruments section. To analyse differences in the academic performance of students between the different profiles, the Bolck-Croon-Hagenaars (BCH; Bolck, Croon, & Hagenaar, 2004) method was used (Asparouhov & Muthén, 2014b). Unlike the classic ANOVA this method considers the probability of belonging to each profile instead of assuming subjects belong just to one profile (Asparouhov & Muthén, 2014a).

4.4.2. Multilevel latent profile analysis

In a second step, multilevel latent profile analysis were performed. The multilevel version of this analytic approach is used to explore the profiles at a higher level (i.e., students at Level 1 and teachers at Level 2), for example, based on the proportion of Level 1 profiles on the Level 2 profiles (Collie et al., 2020). Thus, based on the results of step 1 regarding teachers' use of messages, a multilevel latent profile analysis was performed to explore teachers' profiles with different percentages of L1 profiles. At Level 2, a range of 1–3 profile solutions were tested.

Data on teachers' basic psychological needs were modelled using mean scores given that the teacher sample size was not big enough in order to rely on factor scores. To test if the likelihood of belonging to a multilevel latent profile depends on teacher's autonomy, competence, and relatedness, a logistic regression analysis was performed. The correct interpretation of a logistic regression implies the understanding of the difference between probability, odds ratio, and logit. A probability informs about how likely is something to happen, an odds ratio informs of the probability of one group compared to another group, and is the ratio of two probabilities. For example, when comparing the probability of studying a STEM degree among men and women, an odd ratio of 1.5 would mean that men are 50 % more likely to study a STEM degree than women. Finally, the logit provides the same information of the odds ratio but in another scale, and is the *b* regression coefficient. The logit is the logarithm of the odds ratio, in our example it would be Log (1.5) = 0.18 (Wooldridge, 2020).

In the above example the predictor (gender) is a categorical variable, however, in our study the predictor (autonomy, competence, and relatedness) is a continuous variable, thus, the interpretation for odds ratio is different. In our study, the interpretation

would be: For every unit (i.e., standard deviation) increase in the predictor, the likelihood of pertaining to one group when compared to the other group increases or decreases an X percentage.

At level 2, similar to Collie et al. (2020), academic performance was compared between the different profiles using the delta method under the M*plus* MODEL CONSTRAINT option. To aggregate academic performance to these models the mean academic performance per class was calculated relying on the raw student data.

5. Results

5.1. Preliminary analyses

The descriptive statistics (mean and *SD*) and correlations for student and teacher variables are shown in Tables 2 and 3.

5.2. Single level latent profile analysis

Table 4 displays the fit indices for the latent profile analysis conducted at the student-level. Findings show that six to eight profile models hold groups with very low percentages of subjects. Given that solutions with a small number of participants may not represent a unique latent profile (Marsh et al., 2009) six to eight profiles were rejected. Four and five profile models were rejected by LRT values (high *p* values). A three-profile model was assumed due to the lower values of LL, AIC, and SS-BIC in comparison with a two-profile model, a satitstically significant LRT value, a reasonable percentage of subjects in the smallest group and the slope flattening depicted in the elbow plot in Fig. 1. Furthermore, following our theoretical approach, a three-profile solution was also retained because it best described the differential use of messages by teachers. More profiles did not add further information on the messages that teachers were using.

The characteristics and names of the profiles were as follows: Profile 1 as *gain-framed messages* (GFM) with a total of 549 students (48 % of the sample). Students in this profile classified their teacher as relying on gain-framed messages that highlighted the benefits of studying, and on motivational appeals with the highest levels of self-determination (i.e., intrinsic and identified); Profile 2, as *all messages* (AM) with a total of 278 students (24 % of the sample) that classified their teacher as using all kinds of messages, both gain-framed and loss-framed, including motivational appeals with all degrees of self-determination; and Profile 3, as *few messages* (FM) with a total of 323 students (28 % of the sample) who reported their teacher as barely relying on the messages assesed. Single-level profile analysis results are displayed in Fig. 2.

Regarding the differences between the profiles at the student-level in academic performance, students in the GFM profile had higher academic performance. When comparing the three profiles together, the GFM profile demonstrated a significantly higher mean ($p < .05$; $M_{GFM} = 5.39$, $M_{FM} = 4.93$) than the FM profile, whereas no significant differences were found between the rest of the profiles (FM vs. AM: $p = .89$; GFM vs. AM: $p = .07$; $M_{AM} = 5.03$).

Table 3
Means, standard deviations, correlations among teacher variables.

	Mean	SD	2	3	4	5	6
1. Satisfied autonomy	5.51	.95	.70[c]	.37[a]	-.46[b]	-.65[c]	-.37[a]
2. Satisfied relatedness	5.82	1.09	–	.60[c]	-.37[a]	-.80[c]	-.50[c]
3. Satisfied competence	6.05	.73	–	–	-.27	-.40[b]	-.42[b]
4. Frustrated autonomy	3.04	1.22	–	–	–	.45[b]	.45[b]
5. Frustrated relatedness	1.59	.71	–	–	–	–	.50[c]
6. Frustrated competence	1.88	1.07	–	–	–	–	–

Note.
[a] $p < .05$.
[b] $p < .01$.
[c] $p < .001$.

5.3. Multilevel latent profile analysis

Table 5 displays the fit indices to decide the number of profiles in the multilevel latent profile analysis. Findings indicate that the three-profile solution showed a similar fit to the two-profile solution, which showed a better fit than the one-profile solution. Given that the elbow plot displayed a clear change in the slope after the two-profile (see Fig. 3), this solution was retained. Furthermore, theoretically a two profile solution demonstrated to be better than the one or three solution given that it was the only one to add new information on the differential use of messages by teachers. One profile described just one group of teachers relying on the same kind of messages found at L1, and the three profile solution reported two very similar groups. Precisely, it described a group of teachers that barely used these messages and two groups of teachers that relied mainly on gain-framed messages. Thus, a two profile solution was retained.

A representation of the results for the multilevel latent profile analysis at the teacher-level is illustrated in Fig. 4. Results showed two teacher profiles: An active profile representing the 77 % of the sample and a passive profile representing the remaining 23 % of the sample. The active profile was characterized by teachers whose tendency was to rely on gain-framed messages and motivational appeals with the highest self-determination (i.e., intrinsic and identified; 53.6 % of the teachers) including a relatively small proportion of teachers whose tendency was to rely on all kinds of messages (25.6 %) and few messages (20.8 %). Contrastingly, the

Table 2
Means, standard deviations and correlations among student variables.

	Mean	SD	2	3	4	5	6	7	8	9	10
1. Gain-framed intrinsic	4.07	1.50	.60[c]	.69[c]	.62[c]	.41[c]	.18[c]	.26[c]	.15[c]	-.06[a]	.16[c]
2. Gain-framed identified	5.00	1.55	–	.63[c]	.54[c]	.38[c]	.28[c]	.25[c]	.18[c]	-.08[b]	.08[a]
3. Gain-framed introjected	4.17	1.69	–	–	.71[c]	.35[c]	.29[c]	.35[c]	.25[c]	-.02	.00
4. Gain-framed extrinsic	4.34	1.52	–	–	–	.34[c]	.29[c]	.33[c]	.30[c]	-.04	.03
5. Loss-framed intrinsic	3.57	1.57	–	–	–	–	.49[c]	.55[c]	.45[c]	.01	.04
6. Loss-framed identified	2.75	1.67	–	–	–	–	–	.79[c]	.70[c]	.18[c]	-.08[a]
7. Loss-framed introjected	2.32	1.57	–	–	–	–	–	–	.76[c]	.18[c]	-.07
8. Loss-framed extrinsic	2.41	1.49	–	–	–	–	–	–	–	.15[c]	-.11[b]
9. Amotivation	1.30	.91	–	–	–	–	–	–	–	–	-.11[b]
10. Academic performance	5.22	2.18	–	–	–	–	–	–	–	–	–

Note.
[a] $p < .05$.
[b] $p < .01$.
[c] $p < .001$.

Table 4
Fit indices for each model of the single level latent profile analysis.

Profiles	Parameters	LL	AIC	SSA-BIC	LRT *p*	% Smallest Group
1	18	−14686.014	29408.028	29441.709	–	–
2	28	−12589.988	25235.976	25288.369	.0002	28
3	38	−11257.858	22591.716	22662.822	.0118	24
4	48	−10531.483	21158.967	21248.785	.0682	12
5	58	−10090.603	20297.206	20405.736	.6080	11
6	68	−9716.327	19568.654	19695.895	.3561	5
7	78	−9437.517	19031.034	19176.988	.7130	6
8	88	−9145.930	18467.859	18632.525	.2118	5

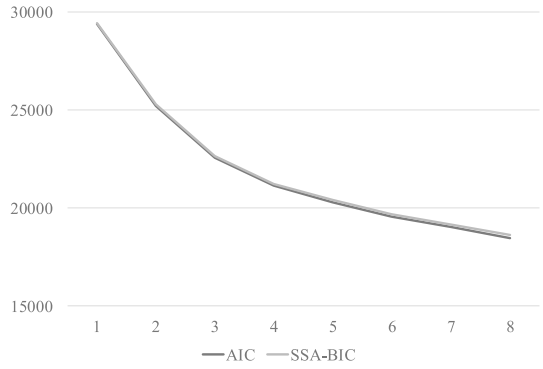

Fig. 1. Elbow plots for single level latent profile analysis.

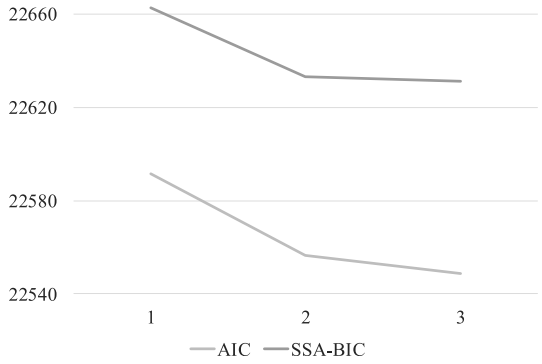

Fig. 3. Elbow plots for multilevel latent profile analysis.

passive profile was characterized by teachers with a tendency to rely on very few messages (51.3 %), with a moderate proportion of teachers belonging to the GFM profile (29.6 %), followed by teachers whose tendency was to use all kinds of messages (19.1 %).

Analysis of the relation between the profiles of teachers' engaging messages and the fulfilment or thwarting of their needs at a teacher-level yielded significant results for the need for autonomy (see Table 6). In such a way that when the need for autonomy was fulfilled, the likelihood of pertaining to the active profile was four times greater than that of the passive profile. In contrast, when this need was thwarted the likelihood of pertaining to the passive profile was three times greater than the likelihood of pertaining to the active profile.

Finally, regarding differences in students' academic performance at the teacher-level between the different profiles, students who perceived their teacher as relying on the messages of the active profile showed higher academic performance ($p < .001$; $M_{active} = 6.32$, $M_{passive} = 4.61$).

6. Discussion

The present study follows a person-centered approach to

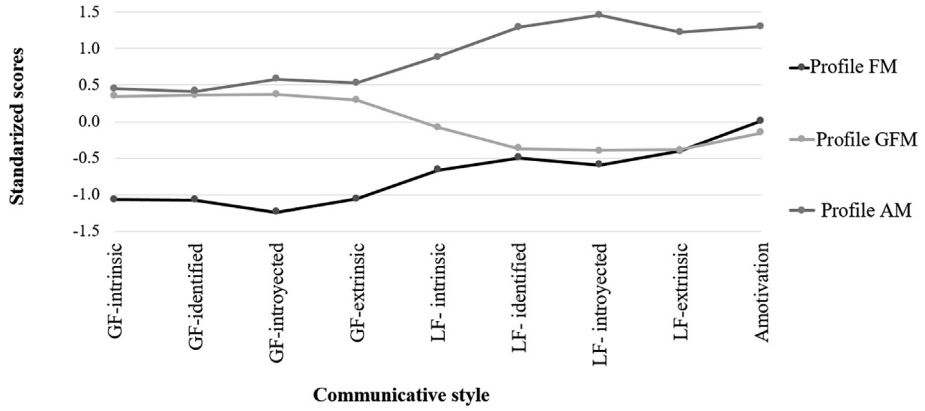

Fig. 2. Single level profile analysis results. *Note.* GF= Gain-framed; LF=Loss-framed

Table 5
Fit indices for each model of the multilevel latent profile analysis.

Profiles	Parameters	LL	AIC	SSA-BIC	% Smallest Group
1	38	−11257.859	22591.717	22662.823	24
2	41	−11237.169	22556.338	22633.058	4
3	44	−11230.376	22548.752	22631.085	2

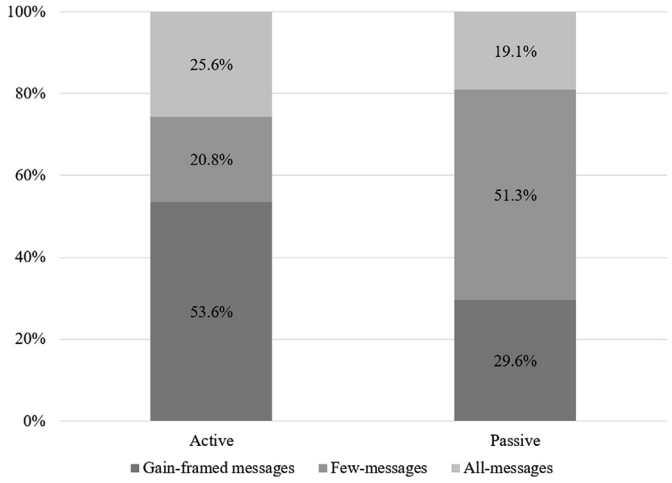

Fig. 4. Multilevel profile analysis results.

identify profiles of teachers' engaging messages and its relation to the teachers' basic needs and students' academic performance. At the student-level, three different profiles are identified: The gain-framed messages profile (GFM), the few-messages profile (FM), and the all-messages profile (AM). Results show that, indeed, the different profiles relate differently to students' academic performance. At the teacher-level, evidence indicates the existence of two profiles: A passive profile of teachers who pertain mostly to the FM profile and an active profile of teachers who pertain mostly to the GFM profile. Results show that the need for autonomy is related to teachers' use of engaging messages and that those students whose teacher pertains to the active profile have a higher academic performance.

6.1. Single-level latent profile analysis

As expected, different profiles are found at the student-level. Specifically, three profiles can be observed. The gain-framed messages (GFM) profile represents 48 % of the sample. This profile comprise students who describe their teacher as mainly relying on gain-framed messages during their classes, and within this frame, they also report their teacher relying on a greater proportion on self-determined appeals (i.e., intrinsic and identified). The second profile, labelled the all-messages (AM) profile, represents 24 % of the sample. This profile comprises students who recalled their teacher as using both gain- and loss-framed messages but also relying more on extrinsic and introjected motivational appeals. Finally, the few-messsages (FM) profile represents 28 % of the sample. This profile is characterized by students who report having a teacher that barely rely on any of the messages addressed.

These findings help to understand the classification of teachers' messages according to the messages they use to engage their students in school tasks. More specifically, owing to this classification, almost half of the teachers are described as using messages that highlight the positive outcomes of engaging in school tasks (e.g., freedom to choose the degree after finishing the school). Despite these optimistic results, one in four teachers are classified as relying on messages that highlight the negative outcomes of not complying with school duties. Putwain and colleagues (Putwain & Remedios, 2014; Putwain & Roberts, 2009; Putwain & Symes, 2016) have demonstrated that these kind of messages lead to non-adaptive outcomes in students (e.g., anxiety and low performance). On the other extreme, one in five teachers were described by their students as barely relying on any kind of messages that tried to encourage them to engage in school tasks.

In this sense, results show that the students whose teacher rely on gain-framed messages, and assign their teacher to the GFM profile, have a higher academic performance as compared to the other two profiles, whose academic performance is below the mean. These results are similar to those of Putwain et al. (2017), who found that loss-framed messages predicted worse student academic performance. In the Spanish education system grades are an indicator of students' performance and are assigned by teachers following rubrics implemented by the government. Students depend on these grades to choose universities and degrees; thus, they are key for their future career (León, 2017; Sánchez-Pérez et al., 2015).

6.2. Multilevel latent profile analysis

With regard to the teacher-level, two profiles can be observed, named active and passive. The active profile represents the 77 % of the sample and is characterized by teachers whose tendency is to use messages to engage their students in school duties. The passive profile represents 23 % of the sample and is characterized by teachers whose tendency is to barely use any message. It is important to highlight the differences between profiles at the student-level and at the teacher-level. The former is an indicator of the engaging messages that a single student perceived on their teacher, while the latter is an indicator of the tendency of the teacher to use certain messages, derived from the aggregation of profiles at the student-level. The findings indicate that, in the active profile more than half of the teachers belong to the GFM profile, and in the passive profile more than half of the teachers belong to the FM profile.

Regarding the relation between the teachers' needs and the two profiles, results show that the need for autonomy is linked with the teachers' use of engaging messages. Specifically, teachers who feel that their need for autonomy is fulfilled are more likely to be perceived as belonging to the active profile rather than to the passive profile. Similarly, when teachers feel their need for autonomy is thwarted, students are more likely to perceive their teacher to rely on the engaging messages illustrated by the passive profile rather than those of the active profile. These findings add significantly to the existing evidence on the relation between the inner and outer sides of teachers. Precisely, that teachers' needs are related to their teaching behaviour (i.e., engaging messages).

Following the self-determination theory (Deci & Ryan, 2008; Ryan & Deci, 2020), the fulfilment of the basic psychological needs is essential for an optimal functioning. Among these needs, the

Table 6
Odd ratios of the association between basic psychological needs and engaging messages at L2.

Basic Psychological Need	Fulfilment				Thwarting			
	OR	*b*	*SE*	*P value*	OR	*b*	*SE*	*P value*
Autonomy	4.129	1.418	.619	.022	.322	−1.132	.449	.012
Relatedness	.441	-.819	.821	.318	.568	-.566	.837	.499
Competence	1.303	.265	.557	.634	1.302	.264	.324	.416

Note. OR = odd ratio; *b* = logistic regression coefficient; SE = standard error.

authors of the theory postulate that autonomy plays the most important role (Deci & Ryan, 2000). Thus, the present findings line up with the theory as they highlight that when teachers feel their perspectives are considered and their initiatives supported, they are more likely to use messages to involve students in school duties. Following these assumptions, teachers whose need for autonomy is satisfied would find themselves in a professional state of balance and comfort at their workplace. Those teachers are perceived by their students as relying on messages that try to engage them in school tasks and among these messages, relying mostly on gain-framed self-determined appeals. We could argue that fulfilled autonomy promotes teachers to take care for their students and their learning, desiring the best for them and, in turn, making them rely on adequate engaging messages.

On the other hand, when teachers need for autonomy is thwarted, students perceived their teachers as barely relying on messages that try to encourage them to actively participate in the learning process. When teachers' need for autonomy is thwarted it is more likely for them to not feel supported by head teachers, to feel their perpectives are not being taking into consideration and might also feel pressured to comply with meaningless demands. This would translate into teachers not paying heed to their messages, and thus, not relying on any kind of message.

Turning to students' academic performance, results show that teachers in the active profile have students with higher academic performance. In this sense, providing messages that highlight the benefits of engaging in school duties is better for student's academic performance than not relying on this kind of messages. When teachers are communicationally active, namely relying on messages that try to promote engagement, students might feel cared for by their teacher. This feeling could encourage students to think that their teachers sincerely want the best for them, and thus, to engage in their school duties and perform better. Contrastingly, when teachers do not rely on these messages, students could feel unsupported by their teachers which would translate into a lower academic performance.

Together, our findings suggest that when teachers' need for autonomy is satisfied, it is more likely for them to rely on messages that encourage engagement among students, and this kind of messages would be related to higher academic performance. Similarly, when the need for autonomy is thwarted, there is a lower likelihood of teachers relying on this type of engaging style, which would be less beneficial for students' academic performance. In conclusion, teachers' needs relate to their use of engaging messages, and their use of engaging messages relates to students' academic performance.

6.3. Limitations and future perspectives

Although the present study makes a significant contribution, some limitations need to be addressed. First, the data collected was cross-sectional, which means that it was collected at a unique period of time. Therefore, it would be worthwhile to conduct longitudinal studies in the future in order to observe if changes in teachers BPNs fulfilment predict changes in their use of engaging messages. Second, part of our data is self-reported (via student and teacher reports) which indicates that variables represent students' and teachers' perceptions. Whereas, teacher self-reports might be an appropriate approach to collect this information, as it is the teacher's own perception what builds their need fulfilment or thwarting, students' self-reports about their teacher's engaging messages may lead to possible bias due to their indirect nature. Consequently, future studies could incorporate a more objective variable such as direct observations inside the classroom to measure teachers' engaging messages. Thirdly, both teachers and students who participated in this study belonged to the secondary education stage. It would be interesting to carry out a similar study at different educational levels, in order to examine whether the observed trend is replicated. Further research is also needed in order to explore what other variables might influence teachers to rely on certain engaging messages over others. Fourth, some authors consider that, similar to intelligence, basic needs share a global factor (Sánchez-Oliva et al., 2017). To explore how much each need explains above and beyond the other needs and the global factor, it is recommended to test it via a bi-factor ESEM (Gillet et al., 2019). Fifth, future studies could also explore the reasons why some teachers do not rely or rely very little on any kind of message (i.e., teachers are not concern about the students' future or they believe that their teaching behaviour is not related to the students' outcomes). Exploring this key line of research may be instrumental in designing future interventions tailored for this specific profile of teachers.

Finally, it would also be interesting to explore whether interventions based on the present study yield positive results. To improve teaching behaviours it is essential to work with variables amenable to intervention (Hill et al., 2019; Kunter et al., 2013). In this sense, researchers have underlined certain strategies to improve both basic psychological needs (Cheon et al., 2020) and teachers' engaging messages (Santana et al., 2019), which could be implemented as intervention programs. For instance, these interventions could target academic school staff, including teachers, head teachers and department coordinators to teach them what basic psychological needs are and the importance of their fulfilment.

Regarding teachers' engaging messages, there is also a need to explore whether a teacher intervention targeting this teaching behaviour is effective in improving student outcomes. To this end, school-based teaching programs could also be implemented in order to help teachers understand the importance of relying on gain-framed self-determined appeals. The formation could include the different types of messages that can be used by teachers and the different effects they have on students' well-being and academic performance. This would help them understand what engaging messages they should be relying on and why.

7. Conclusion

Teaching is a profession that requires a high level of involvement that sometimes results in a great cognitive and emotional strain (Lauermann & König, 2016). The present study helps us understand the influence of teachers' basic psychological needs on their teaching behaviors and adds to our understanding of the relation between teaching behaviors and student outcomes. In contrast with previous studies, the present work contributes to the understanding of the relation between student outcomes and teacher behaviors not only by exploring this relation directly, but also, by exploring the possible reasons for certain teaching behaviors. It is well known that teacher behaviors have a solid link with student outcomes, as demonstrated by previous research and the current one (Collie et al., 2019). However, whilst this relation is strongly supported, teachers' basic psychological needs and their influence on their own teaching behaviour has been poorly addressed (Klassen et al., 2012; Korthagen & Evelein, 2016). In other words, connecting teachers' inner side with their outer side of teaching has not been a focus of interest among researchers until recently.

The present findings highlight the impact of teachers' need fulfilment and thwarting on their engaging messages, and the impact of their engaging messages on students' academic performance, both at the student-level and teacher-level. Furthermore, it

also helps us understand how we can classify teachers according to their use of the different engaging messages. Given these relations, in order to improve teaching behaviors and student outcomes, attending to the teachers' inner side should be a priority. Schools that provide a context where the three basic psychological needs are satisfied have proven to positively influence teaching behaviour and teachers' well-being (Lee & Nie, 2014). In contrast, school contexts that undermine these needs prevent highly motivated and skilled teachers from performing effective teaching behaviors (Leithwood & Jantzi, 2006). Therefore, taking into consideration the difficult and slow pace that changes at political levels have, actions can and should be taken effectively at the school level, as proven previously (Ebersold et al., 2019).

Authors contributions

Elisa Santana-Monagas: Investigation, Data curation, Project administration, Writing – original draft, Writing – review & editing; Juan L. Núñez: Writing – review & editing, Supervision; Juan F. Loro: Writing – review & editing, Supervision; Elisa Huéscar: Writing – review & editing; Jaime León: Conceptualization, Methodology, Formal analysis, Project administration, Funding acquisition, Writing – review & editing.

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Declaration of competing interest

None.

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4. Summary of results and discussion

The main aim of the present dissertation was to understand and explain how teachers' engaging messages might relate with students' well-being and academic performance. With such objective in mind, three specific aims were stablished: first, to assess the relation among teachers engaging messages and students' psychological functioning, academic performance, and motivational processes; second, to examine the differential usage of messages by teachers and whether they can be grouped in different profiles based on their tendency to rely on one or another type of messages; and finally, to examine antecedents of teachers' engaging messages in order to establish future intervention targets.

In the pursuit of these objectives, the first of the studies that shape the present dissertation developed a scale to measure teachers' engaging messages and examined how these types of messages related with students' academic performance via motivation to learn. The psychometric properties of the Teachers' Engaging Messages Scale demonstrated its internal consistency to accurately measure teachers' engaging messages. Overall, teachers engaging messages related with students' motivation to learn and this, in turn, related with their performance. When comparing the different kinds of messages, results also demonstrated that gain-framed messages related stronger with students' motivation to learn at a student level. Finally, results from this study further confirmed that teachers engaging messages relate with students' academic performance indirectly via motivation to learn.

The following study aimed at examining the grouping of students based on the kinds of messages teachers used with them and with the whole class, how these profiles predicted teacher-student relatedness and students' well-being (using the indicator of subjective vitality) and, in a last step, understand how teachers used the different messages across grades. Four profiles were found at the student level and two at the teacher level. Overall, results showed four different profiles at the student level and two profiles at the teacher level.

At both levels of analysis, teachers' engaging messages related with teacher-student relatedness and, in turn, this related with student's subjective vitality. Interestingly, results showed that the predictive value the different messages had, depended to a large extend on teachers' overall tendency to rely on one or another kind of messages. Finally, results further indicated that teachers relied on engaging messages more frequently with lower grade students compared to higher level students.

Finally, the last of the studies examined profiles of teachers engaging messages and how teachers' basic psychological needs predicted the belonging of teachers to such profiles. It also aimed at examining the relation among the different profiles and students' academic performance. Like the previous study, three profiles were found at the student level and two at the teacher level. Overall teachers' need for autonomy was related to the kind of messages they relied on. Moreover, results further showed that students had a higher academic performance when teachers actively relied to these messages, as compared to teachers that barely relied on them.

4.1. Practical and theoretical implications

Teachers and their practices are one of the strongest supporters of students positive outcomes (Lazarides et al., 2019; Moè et al., 2022; Smith et al., 2022). Indeed, as research highlights, teachers have an enormous capacity to motivate their students, exert a positive influence on them and help them flourish (Caldarella et al., 2020; Jang et al., 2016). The findings from the present dissertation could help teachers to find new ways to keep doing so. This subsection explores the main contributions the present dissertation makes, both theoretical and practical, that help teachers and researchers advance on the research body of effective teaching practices. The contributions made describe in a simple way how actions can be effectively taken at a school and individual level.

The scale developed to measure teachers engaging messages is a good example of a theoretical contribution to the field. For instance, the scale could be used by teachers to identify the kind of messages they are using in class and be conscious of them. If we take into consideration that most teachers are unaware about the messages they use in class and the effects this may have (Flintcroft et al., 2017; Putwain & Remedios, 2014), the instrument could be a good starting point to tackle such issue. It could also be used by researchers to continue advancing in the field and set up starting points for possible interventions.

Another theoretical implication derived from the present dissertation is the proof that the integration of different theories enriches the study of teaching practices. If we had only focused on one or another of the theories, we would have missed some interesting findings. For instance, study three conclusions would have never been reached if we hadn't used both frames. We now know that some frames and some motivational appeals might relate differently with students' outcomes depending on how they are combined and how often they are used. Thus, research such take this into account an analyse all messages in conjunction instead of the effect each message has separately.

Moreover, the first of our studies provides an important theoretical contribution to the understanding of teachers engaging messages. The study showed how messages where indirectly related with student's performance via motivation to learn. Thus, it shows a new resource teachers could rely on to impact both students' motivation to learn and performance with one simple practice. If on the contrary, teachers' messages had a direct effect on students' performance, then there would have been no chance on them enhancing students' motivation.

A practical implication from the present dissertation is the fact that the evidence gathered could serve to develop future teacher interventions. On the one hand, study 3 places

the focus on teachers' well-being and emphasis its' importance and reflection on their own teaching practices. Thus, interventions could target teachers' basic psychological needs as a way of improving their communicative style, in terms of engaging messages. For instance, these interventions can target academic school staff such as teachers, principals, and departmental coordinators to teach them what their basic psychological needs are and the importance of meeting them. Furthermore, school-based interventions could also target directly teachers engaging messages. For instance, the interventions could inform teachers about the different types of engaging messages they could be relying on, help them acknowledge the importance of relying on gain-framed messages and autonomous motivational appeals as well as the importance of their overall usage in general. These types of interventions could be very implemented in schools very easily as they are simple, inexpensive, do not require much time or expertise. These interventions could also serve for future lines of research. For example, they could be used to explore the reasons why teachers do no rely or rely very little on certain kinds of messages (i.e., teachers could see no relation on their messages and student out comes or they might not be really concerned about their students' future). Moreover, identifying the different profiles of teachers according to their usage of messages could be instrumental in shaping the kinds of interventions that are more appropriate for certain profiles of teachers.

4.2. Limitations and recommendations for future research

While the present dissertation rises some interesting contributions, it is important to recognize that, like any research, presents some limitations. This section will discuss some of the limitations that are present across the three studies conducted. Moreover, it also seems necessary to provide recommendations for how to address and overcome these limitations in future research.

First, except for students' academic performance, all variables were addressed via student and teacher self-reports. Whereas in some cases these may seem a suitable approach (i.e., teacher self-reports might be an appropriate approach to collect information on their needs, as it is the teacher's own perception what builds their need fulfilment or thwarting) in other cases it may lead to possible bias due to their indirect nature. For instance, asking students about the messages the teachers use with them might not recall the exact messages teachers uses but instead does that the student recalls. Therefore, it would be interesting for future research to complement self-report measures with more objective measures such as observational techniques. For instance, researchers could record teachers' voices and observe the exact messages being used in class and with students.

Second, our data was cross-sectional, in other words, it was collected in a given and unique period of time. These means that no casual relations can be reached with the present data. Researchers planning on conducting future research on this topic could complement the present findings with longitudinal studies. This could help researcher to establish whether changes in teachers engaging messages leads to changes in student's outcomes or whether changes in teachers' basic need fulfilment leads to changes in their usage of certain messages.

Finally, results from the present dissertation relied on data on both students and teachers belonging to the secondary educational stage. This limits the generalization of the present findings. Thus, future research could carry out their studies on this topic on different educational levels. This could explain whether teachers have a stable pattern of message usage or whether they adapt them to the type of students being taught. Moreover, to diminish potential bias, the present study relied on data from the subject of mathematics. Further research could examine whether these findings replicate or whether there is a different trend due to the nature of the subject.

Future lines of research could also explore other contextual o social variables that might influence teachers to rely on certain engaging messages over others. Additionally, other aspects of these messages could also be examined apart from their content. For instance, previous research have highlighted the effect that the tone of voice could have on how messages are interpreted (Weinstein et al., 2018, 2019). Finally, and in relation with the main practical implication drawn from this dissertation, it would also be interesting to explore whether interventions based on the present dissertation yields positive results.

5. General conclusions

Following the main findings from the present dissertation and the three general objectives, the following conclusions can be reached:

1. Teachers engaging messages relate positively with students' motivation to learn, which in turn also relates positively with their academic performance.
2. Indeed, teachers tend to rely on certain messages showing two consistent profiles at a class level: an active(variant) and a passive (invariant). At a student-level findings show three to four profiles of which two are consistent: teachers that use in a higher proportion gain-framed messages and teachers that do not rely at all on these kinds of messages.
3. Teachers engaging messages positively relate with students' vitality through the enhancement of teacher-student relatedness.
4. When comparing teachers, those who rely on all kinds of messages to engage their students in comparison with those who do not rely at all on these messages have students with better academic performance. Thus, it is best to rely on any kind of message as opposed to none.
5. The predictive value of certain messages on teacher-student relatedness depends on the teachers' overall tendency to rely on one or another message. In other words, the usage of messages is more determinant than the predictive value of each type of message separately. Thus, both the frame and the motivational appeals used should be taken into consideration.
6. Teachers use more engaging messages with students at lower grades. Thus, they adapt their messages to the characteristics of their students.
7. Among the different kinds of messages teachers can use, gain-framed messages outperform the rest in terms of predictive value with student outcomes.

8. Teachers' satisfaction (or thwarting) of their basic psychological needs relates with their message usage in such way that when teachers' autonomy is satisfied, they are perceived as relying more on engaging messages. On the contrary, when teachers need for autonomy is thwarted, they do not rely that much on engaging messages. Thus, to improve teaching practices, teachers' basic psychological needs should also be taken into consideration.

To sum up, the present dissertation highlights a new resource teachers can rely on to improve their students' well-being and performance, through the enhancement of students' relatedness with their teacher and motivation to learn, respectively: engaging messages. As the evidence highlights, if teachers could simply start relying on engaging messages (as opposed to none) and more often on gain-framed messages, it is more likely for them to observe improvements among their students. In such way, students may have a higher quality motivation if teachers, with their messages, help them focus on what they can obtain in return for their behavior instead of focusing on avoiding something unpleasant.

Moreover, given than the usage of messages as a whole is more decisive than a message on its own, teachers should be aware that they can also prompt positive outcomes from their students even with messages that a priori may seem less suitable. For example, imagine a teacher who always emphasises the benefits of engaging in school-related activities. Following our results, it could be that when this type of teacher relies in a less frequently manner on loss-framed messages such as "*if you don't work hard, you won't be able to study what you really like"* could impact positively students. It could be that students, who are not used to hear such kinds of messages, interpret them as a wake-up call understanding that the teacher still wants the best for them.

Finally, while it is widely accepted that there is a strong connection between teaching practices and student outcomes, which is illustrated by the present research and previous ones

(Collie et al., 2019), research on teacher well-being and its impact on their own teaching practices is scarce. Thus, the present thesis not only contributes to the literature on effective teaching practices and related student outcomes, but also reflects the importance of teachers' own well-being on their practice. Given that teaching can be mentally and emotionally taxing (Lauermann & König, 2016) and in light of the present results, if we want to improve their teaching practices, focusing on their work related well-being should also be a target of researchers.

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Appendix A

Teachers' engaging messages scale (TEMS) – English version

Please, indicate the answer that best corresponds to your reality using the following scale:

1 Does not correspond at all	2 Does not correspond	3 Somewhat does not correspond	4 Moderately corresponds	5 Somewhat corresponds	6 Correspond	7 Fully corresponds

My teacher tells me that IF I work hard (pay attention, do my homework, study, etc.)	1.	I will enjoy this subject
	2.	I will be able to choose what to study
	3.	I will feel important
	4.	I will have more free time
	5.	Appreciate new discoveries
	6.	I will be prepared for high qualified jobs
	7.	I will feel proud of myself
	8.	I will receive a reward (star, house point, extra mark, etc.)
	9.	I will learn interesting facts
	10.	I will be able to choose a job that I like
	11.	I will feel proud of myself
	12.	When I finish my work, I'll be able to choose what to do next
	13.	I will have fun
	14.	I will be prepared for my future studies
	15.	I will feel appreciated
	16.	I will receive compliments

My teacher tells me that IF I DON'T work hard (pay attention, do my homework, study, etc.)	17.	I will miss the opportunity to understand interesting issues
	18.	I won't get anywhere in life
	19.	I will feel like a failure
	20.	I will get into trouble
	21.	I will miss the beauty of this subject
	22.	I will only be able to get low paid jobs
	23.	I will feel disappointed
	24.	I will be punished
	25.	I will miss the joy of finishing my work
	26.	I will have a tough life
	27.	I will feel sad
	28.	I will miss my break
	29.	I will miss the chance of improving my knowledge
	30.	I will have to study the less demanded degrees
	31	I will feel ashamed
	32.	I will make my family angry

My teacher tells me that it does not matter if:	33.	I work hard; I will fail anyway
	34.	I attend classes; I will fail anyway
	35.	I do my homework; I will fail anyway
	36.	I pay attention in class; I will fail anyway

Factors/subscales:

Gain-framed intrinsic messages: 1, 5, 9, 13
Gain-framed identified messages: 2, 6, 10, 14
Gain-framed introjected messages: 3, 7, 11, 15
Gain-framed extrinsic messages: 4, 8, 12, 16
Loss-framed intrinsic messages:17, 21, 25, 29
Loss-framed identified messages: 18, 22, 26, 30
Loss-framed introjected messages: 19, 23, 27, 31
Loss-framed extrinsic messages: 20, 24, 28, 32
Amotivation messages: 33, 34, 35, 36

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Appendix B

Teachers' engaging messages scale (TEMS) – versión Española.

A continuación, indica la respuesta que más se corresponda con tu realidad siguiendo la siguiente escala:

1 Absolutamente en desacuerdo	2 Muy poco de acuerdo	3 Un poco de acuerdo	4 Moderadamente de acuerdo	5 Bastante de acuerdo	6 Muy de acuerdo	7 Totalmente de acuerdo

Mi PROFESOR/A me dice que, sí me esfuerzo (atiendo en clase, hago los deberes, estudio, etc.)	1.	Disfrutaré de esta asignatura
	2.	Podré elegir lo que estudiar
	3.	Me sentiré importante
	4.	Tendré tiempo libre
	5.	Apreciaré los nuevos descubrimientos
	6.	Estaré preparado para trabajos altamente cualificados
	7.	Me sentiré orgulloso de mí mismo
	8.	Recibiré una recompensa (puntos positivos, etc.)
	9.	Aprenderé datos interesantes
	10.	Podré trabajar en aquello que me guste
	11.	Me sentiré satisfecho
	12.	Cuando acabe la tarea de Matemáticas podré hacer otra cosa
	13.	Me divertiré haciendo las tareas de clase
	14.	Estaré preparado para mis estudios futuros
	15.	Me sentiré apreciado
	16.	Recibiré felicitaciones

Mi PROFESOR/A me dice que, SÍ NO me esfuerzo (atiendo en clase, hago los deberes, estudio, etc.)	17.	Me perderé la oportunidad de entender cuestiones interesantes
	18.	No llegaré a ninguna parte en la vida
	19.	Me sentiré un fracasado/a
	20.	Me meteré en problemas
	21.	Me perderé la belleza de esta asignatura
	22.	Únicamente seré capaz de conseguir trabajos mal pagados
	23.	Me sentiré decepcionado/a
	24.	Seré castigado/a
	25.	Me perderé la alegría de terminar los ejercicios
	26.	Tendré una vida dura
	27.	Me sentiré triste
	28.	Me perderé el recreo
	29.	Me perderé la oportunidad de incrementar mi conocimiento
	30.	Tendré que estudiar las titulaciones menos demandadas
	31	Me sentiré avergonzado/a
	32.	Haré que mi familia se enfade

Mi PROFESOR/A me dice que, aunque:	33.	Me esfuerce, suspenderé igualmente
	34.	Vaya a clase, suspenderé igualmente
	35.	Haga los deberes, suspenderé igualmente
	36.	Preste atención en clase, suspenderé igualmente

Factores/subescalas:

MrB intrínsecos: 1, 5, 9, 13
MrB identificados: 2, 6, 10, 14
MrB introyectados: 3, 7, 11, 15
MrB externos: 4, 8, 12, 16
MrI intrínsecos:17, 21, 25, 29
MrI identificados:18, 22, 26, 30
MrI introyectados:19, 23, 27, 31
MrI externos: 20, 24, 28, 32
Desmotivación: 33, 34, 35, 36

Leyenda:

MrB: Mensajes que resaltan los beneficios; MrI: Mensajes que resaltan los inconvenientes.