



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

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H I G H L I G H T S

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

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

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1. Introduction

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

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

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

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

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

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

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

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

1.2. Teachers' motivation and psychological functioning

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

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

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

1.3. Teachers' motivation and teaching style

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

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

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

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

1.4. Antecedents of teachers' motivation

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

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

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

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

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

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

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

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

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

1.6. The present study

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

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

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

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

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

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

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

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

2. Methods

2.1. Participants and procedures

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

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

2.2. Measures

2.2.1. Basic psychological needs satisfaction

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

2.2.2. Teacher motivation

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

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

2.2.3. Worn-out at work

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

2.2.4. Engagement at work

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

2.2.5. Interpersonal style

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

2.3. Data analysis

2.3.1. Preliminary descriptive and measurement analyses

Firstly the descriptive statistics and latent correlation analyses

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

2.3.2. Variable-centered approach

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

2.3.3. Person-centered approach

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

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

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

2.3.4. Differences in teachers' motivation antecedents and outcomes

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

3. Results

3.1. Preliminary descriptive and correlational results

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

3.2. Variable-centered approach

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

3.3. Person-centered approach

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

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

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

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

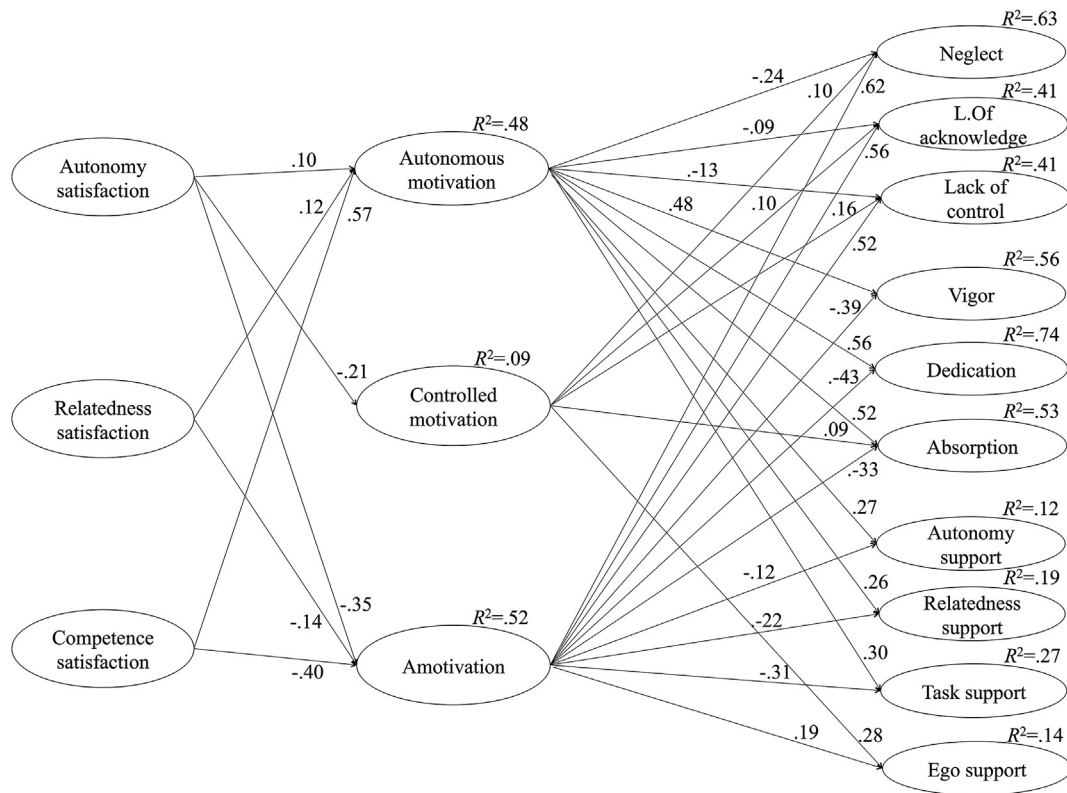


Fig. 1. Structural model of the teachers' motivation antecedents and outcomes from a variable-centered approach.
Note: $p < .05$ = values between 0.12 and -0.14 ; $p < .01$ = values greater than 0.12 and lower -0.14 ; R^2 on latent variable; For a more detailed view of the indicators loading and covariance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

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

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

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

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

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

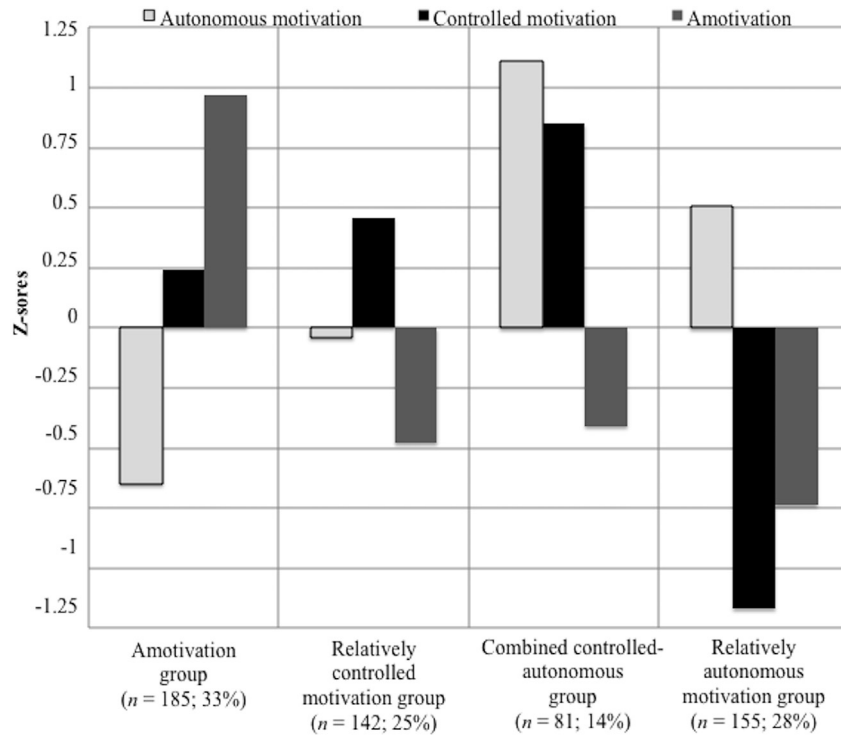


Fig. 2. Four-cluster solution based on Z-scores for autonomous motivation, controlled motivation and amotivation for secondary teachers.

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

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

4. Discussion

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

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

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

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

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

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

Variables	Cluster 1: Amotivation group <i>n</i> = 185 (33%)	Cluster 2: Relatively controlled motivation group <i>n</i> = 142 (25%)	Cluster 3: Autonomous- controlled group <i>n</i> = 81 (14%)	Cluster 4: Relatively autonomous motivation group <i>n</i> = 155 (28%)	F-value (³ ₅₉₉)	η^2_p
Autonomous motivation						
Z-scores	-.65 (.04) ^a	-.04 (.05) ^b	1.10 (.07) ^c	.51 (.05) ^d	188.35***	.50
Raw scores (1–5)	3.84 (.03) ^a	4.19 (.03) ^b	4.85 (.04) ^c	4.51 (.03) ^d		
Controlled motivation						
Z-scores	.23 (.05) ^a	.45 (.05) ^b	.84 (.07) ^c	–1.16 (.05) ^d	252.28***	.58
Raw scores (1–5)	2.78 (.03) ^a	2.92 (.03) ^b	3.19 (.04) ^c	1.83 (.03) ^d		
Amotivation						
Z-scores	.97 (.04) ^a	-.48 (.04) ^b	-.40 (.04) ^b	-.74 (.03) ^c	426.85***	.70
Raw scores (1–5)	2.06 (.02) ^a	1.19 (.02) ^b	1.24 (.03) ^b	1.04 (.02) ^c		
Teacher psychological outcomes						
Neglect (1–7)	2.85 (.05) ^a	1.93 (.06) ^b	1.67 (.08) ^{bc}	1.53 (.08) ^c	103.46***	.36
Lack of acknowledgement (1–7)	4.19 (.10) ^a	3.61 (.12) ^b	3.40 (.15) ^b	3.20 (.11) ^b	15.62***	.08
Lack of control (1–7)	4.29 (.09) ^a	3.78 (.10) ^b	3.68 (.14) ^b	3.08 (.10) ^c	26.93***	.13
Vigor (0–6)	3.33 (.08) ^a	3.96 (.06) ^b	4.58 (.09) ^c	4.43 (.06) ^c	63.77***	.25
Dedication (0–6)	3.44 (.08) ^a	4.26 (.06) ^b	4.91 (.09) ^c	4.79 (.06) ^c	91.67***	.33
Absorption (0–6)	3.33 (.09) ^a	3.87 (.06) ^b	4.52 (.09) ^c	4.12 (.07) ^b	42.43***	.18
Teacher interpersonal style						
Autonomy support (1–5)	3.06 (.05) ^a	3.14 (.06) ^{ab}	3.32 (.07) ^{bc}	3.37 (.05) ^c	7.34***	.04
Relatedness support (1–5)	3.27 (.06) ^a	3.47 (.06) ^{ab}	3.56 (.08) ^b	3.68 (.06) ^b	8.46***	.04
Task climate support (1–5)	4.41 (.03) ^a	4.56 (.03) ^b	4.73 (.04) ^c	4.66 (.03) ^{bc}	15.94***	.08
Ego climate support (1–5)	2.18 (.05) ^a	2.06 (.06) ^a	2.07 (.08) ^a	1.79 (.06) ^b	7.99***	.04
Teacher antecedents						
Autonomy satisfaction (1–6)	4.45 (.06) ^a	4.75 (.06) ^b	4.94 (.08) ^{bc}	5.07 (.06) ^c	20.21***	.10
Relatedness satisfaction (1–6)	4.32 (.06) ^a	4.59 (.07) ^b	4.80 (.09) ^b	4.84 (.07) ^b	12.00***	.06
Competence satisfaction (1–6)	4.67 (.04) ^a	5.01 (.04) ^b	5.25 (.06) ^c	5.32 (.04) ^c	48.93***	.21

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

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

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

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

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

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

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

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

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

4.2.1. Clustering of teachers according to types of motivation

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

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

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

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

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

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

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

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

4.3. Implications for practice

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

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

4.4. Limitations and future directions

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

5. Conclusion

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

Conflicts of interest

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

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Appendix

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

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

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

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