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10 **Teachers' motivation in relation to their psychological functioning and**  
11 **interpersonal style: a variable- and person-centered approach**

12  
13 **Abstract**

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

23 **Key words:** teacher motivation; need satisfaction; teaching style; engagement; burnout.

## 1 **1. Introduction**

2           Recently many studies have collected evidence about the high prevalence of  
3 burnout among teachers (Aloe, Shisler, Norris, Nickerson, & Rinker, 2014). Many  
4 educational practitioners and policy-makers are concerned about these prevalence rates  
5 since burnout yields maladaptive outcomes (Cordes & Dougherty, 1993) such as  
6 diminished physical health (Hakanen, Bakker, & Schaufeli, 2006), lower emotional well-  
7 being (Skaalvik & Skaalvik, 2011), and lower work commitment (Hakanen et al., 2006).  
8 In contrast to burnout, teachers' engagement is considered a positive indicator of their  
9 physical health, well-being and commitment at work (Parker, Martin, Colmar, & Liem,  
10 2012). Teachers, who have high energy levels and resilience (i.e., vigor), teach with great  
11 enthusiasm (i.e., dedication) and experience flow while working (i.e., absorption), are  
12 said to be highly engaged in teaching (Schaufeli, Salanova, González-Romá, & Bakker,  
13 2002). Given the manifold negative outcomes related to burnout and the positive aspects  
14 of teachers' engagement, the question of which factors are reducing the prevalence of  
15 burnout, while positively affecting teachers' engagement at work, arises. Until today,  
16 most research has focused on organizational (e.g., work overload) and interpersonal  
17 correlates (e.g., students' reactions toward the teacher or school principal's leadership),  
18 while personal factors such as teachers' motivation at work have received less attention  
19 (Fernet, Guay, Senecal, & Austin, 2012; Roth, 2014). As such, the current study focuses  
20 on relationships between teachers' motivation and two indicators of their well-being at  
21 work, that is, burnout and engagement at work.

22           Teachers' motivation is not only relevant for their own psychological functioning,  
23 but it may also affect the way they interact with their students (Roth, Assor, Kanat-  
24 Maymon, & Kaplan, 2007). The present study therefore relies on two prominent and well-

1 validated theoretical frameworks (i.e., Self-Determination Theory and Achievement Goal  
2 Theory), to also examine how teachers' motivation relates to their interpersonal style in  
3 the classroom. Finally, if teachers' motivation is indeed predictive of their well-being,  
4 and the quality of their interpersonal interactions with students, it is crucial to also  
5 understand the roots of teachers' motivation. Therefore, the current study also  
6 investigates how teachers' experienced need satisfaction at work relates to teachers'  
7 motivation.

### 8 *1.1. Self-determination theory (SDT) and teachers' quality of motivation*

9       Teacher motivation can be understood as the underlying reasons driving teachers'  
10 involvement in teaching (Collie & Martin, 2017), which can qualitatively differ in the  
11 degree to which they are self-determined (Deci & Ryan, 2000). Autonomous motivation,  
12 the most self-determined form of motivation, is typified by a sense of volition and  
13 approbation towards specific activities and consists of two types of regulation; intrinsic  
14 motivation (i.e., the inherent pleasure and interest derived from the activity) and identified  
15 regulation (i.e., the recognition of the values and importance of a behavior) (Deci & Ryan,  
16 2000). Teachers who get involved in their work for personal satisfaction, and the inherent  
17 pleasure of teaching is intrinsically motivated, while teachers who believe their teaching  
18 is relevant for their personal and professional development or who value being able to  
19 teach young people are driven by identified regulation.

20       Controlled motivation, situated between autonomous motivation and amotivation,  
21 is characterized by feelings of pressure to participate in certain activities, and involves  
22 introjected regulation (i.e., internal pressure such as a desire to avoid feelings of guilt and  
23 feeling better about oneself) and external regulation (i.e., external pressure such as a  
24 desire to obtain rewards or to avoid criticism) (Ryan & Deci, 2017). For instance, teachers

1 who prepare their lessons well to avoid feeling bad about themselves constitute an  
2 example of introjected regulation, whereas teachers who put effort into their teaching  
3 because they get longer holidays are driven by external regulation.

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

### 9 *1.2. Teachers' motivation and psychological functioning*

10 Furthermore, SDT makes concrete predictions about how different motivational  
11 regulations affect the quality of human behavior (Deci & Ryan, 1985). According to SDT,  
12 people seek out opportunities for personal growth, development and choice, and organize  
13 their actions based on personal goals and interests when they are autonomously motivated  
14 (Deci, 1980). In this sense, autonomous motivation is related to enhanced psychological  
15 functioning (Deci, 1980). In contrast, when people display higher levels of controlled  
16 motivation, they organize their actions based on pressurizing reasons such as deadlines  
17 or surveillance. Although controlled motivated teachers may not necessarily put less  
18 energy into their jobs, the feelings of pressure they experience may come with an  
19 emotional and psychological cost (Deci & Ryan, 1985), as indexed by higher burnout.  
20 When people are high on amotivation, they have the feeling that the outcome of their  
21 behaviors is beyond their own control. Amotivation thus finds its roots in a lack of  
22 competence, resulting in negative psychological outcomes such as burnout and  
23 depression, and would generally go hand in hand with very low levels of engagement  
24 (Deci & Ryan, 1985).

1           Manifold studies have confirmed these theoretical premises. In particular, past  
2 studies have shown that teachers who are more autonomously motivated, report fewer  
3 symptoms of burnout (Eyal & Roth 2011; Roth et al., 2007), and higher engagement  
4 (Cheon, Reeve, Yu, & Jang, 2014; Jansen in de Wal, den Brok, Hooijer, Martens, & van  
5 den Beemt, 2014). Teachers who are more controlled motivated report more feelings of  
6 burnout (Author, 2001; Fernet, Senécal, Guay, Marsh, & Dowson, 2008), yet  
7 relationships with engagement have been inconsistent so far (Fernet, Austin, & Vallerand,  
8 2012; Jansen in de Wal et al., 2014). While teachers who are highly controlled motivated  
9 may not necessarily invest less in their job, this would not be the case for teachers high  
10 on amotivation. Highly amotivated teachers have a higher risk of burnout (Fernet et al.,  
11 2008), and their engagement in their jobs is very low (Nie, Chua, Yeung, Ryan, & Chan,  
12 2015).

### 13 *1.3. Teachers' motivation and teaching style*

14           Teachers and students interact with each other on a regular basis, and the quality  
15 of their interactions can vary considerably. According to the tenets of SDT, teachers'  
16 interpersonal styles can differ in the degree to which they are supportive of students' basic  
17 psychological needs (BPN) for autonomy, relatedness and competence (Ryan & Deci,  
18 2017). Autonomy refers to people's needs to feel they are the causal agents of their actions  
19 (Deci & Ryan, 2000). Relatedness refers to experienced social inclusion and warm  
20 interpersonal relationships (Deci & Ryan, 2000). And competence refers to the perceived  
21 ability when faced with a situation that threatens an important goal (White, 1959). The  
22 provision of choices, following students' pace of progress, and explaining the relevance  
23 of the task are practices that are characteristic of an autonomy-supportive teaching style  
24 (McLachlan & Hagger, 2010). Teachers who display sincere concern, facilitate

1 cooperation, and work closely with their students, exemplify a relatedness-supportive  
2 style (Leenknecht, Wijnia, Loyens, & Rikers, 2017). And finally, teachers who provide  
3 guidance by using positive and interrogative feedback, who focus on students' progress  
4 and create clarity on expectations and rules, typify a structuring style (Jang, Reeve, &  
5 Deci, 2010). In this sense, some parts of a structuring style (i.e., the progress-oriented  
6 focus) align with the main ideas of a task-oriented climate as defined within Achievement  
7 Goal Theory (AGT) (Butler, 2014; Nicholls, 1989). Teachers develop a task climate  
8 among their students when they emphasize learning, effort and individual progress rather  
9 than performance and inter-individual comparison, which would be typical for an ego  
10 climate. For instance, when reporting on the results of an assessment task, in a task-  
11 oriented climate the teacher would emphasize the progression a student has made, while  
12 in an ego climate the teacher would focus on the final results and how well a student has  
13 done in relation to other students (Butler, 2014). Past studies have shown that a need-  
14 supportive (Author, 2001) and task-oriented teaching style is related to more adaptive  
15 student outcomes, in contrast to an ego climate, which relates more strongly to  
16 maladaptive student outcomes (Meece, Anderman, & Anderman, 2006).

17 SDT further posits that the quality of teacher-student interactions may depend on  
18 teachers' motivation (Deci & Ryan, 1985). Specifically, teachers who are more  
19 autonomously motivated have more available energy, and are more likely to display an,  
20 curious and responsive attitude, thus allowing them to interpret the learning environment  
21 including students' efforts, suggestions, (mis-)behaviors or complaints as informational  
22 rather than as threatening (Deci & Ryan, 1985; Weinstein, Hodgins, & Ryan, 2010). As  
23 such, it is assumed that autonomously motivated teachers are more likely to adopt an  
24 autonomy-supportive style (e.g., listen to students' voices and preferences), and create a

1 warm (e.g., being caring towards the students) and task-oriented learning environment  
2 (e.g., focusing on learning) (Cheon, Reeve, Lee, & Lee, 2018). Teachers who have high  
3 controlled motivation are more concerned with demonstrating their abilities (or avoidance  
4 of failure) to maintain their self-worth as a teacher (i.e., ego involvement; deCharms,  
5 1968; Nicholls, 1984; Ryan, 1982). Perhaps their own ego-involvement will also transfer  
6 into their way of interacting with their students, such that controlled motivated teachers  
7 may be more likely to create an ego-oriented climate in which they use inter-individual  
8 comparisons rather than a process-oriented focus (i.e., task-climate) to motivate their  
9 students (Roth, 2014). Because controlled motivated teachers experience more pressure  
10 to teach, they may have a less open view, and less available energy to acknowledge the  
11 students' perspectives (i.e., low on autonomy support), or to show warmth and concern  
12 (i.e., low on relatedness support) (Retelsdorf & Günter, 2011). Finally, teachers who are  
13 highly amotivated, are assumed to just go through their teaching tasks in an automatic  
14 manner, while lacking the energy to invest in high-quality interactions with their students,  
15 mainly because they do not expect positive outcomes from their efforts. As such, they are  
16 assumed to rely on those strategies that require the least energy from them.

17 The few studies that have investigated how teachers' own motivation relates to  
18 their teaching style, indeed pointed to a positive relationship between autonomous  
19 motivation and the provision of autonomy support, relatedness support and structure  
20 (Author, 2001; Cheon et al., 2014; Taylor, Ntoumanis, & Standage, 2008), and the  
21 establishment of a task climate (Parker et al., 2012). Controlled motivation was unrelated  
22 to the provision of autonomy support, relatedness support and structure (Author, 2001),  
23 yet studies relating controlled motivation to the provision of task- or ego-climates are

1 non-existent, and research investigating teachers' amotivation in relation to the provision  
2 of need support, or task- or ego-oriented climates is fairly scarce.

### 3 *1.4. Antecedents of teachers' motivation*

4 If teachers' quality of motivation is related to their psychological and interpersonal  
5 functioning, it is crucial to investigate the roots of teachers' motivation. According to  
6 SDT, teachers will be more likely to be autonomously motivated if their own BPNs are  
7 fulfilled (Deci & Ryan, 2000; Roth, 2014). While teachers can be controlled motivated  
8 when they feel connected to their supervisors, colleagues and students (i.e., relatedness  
9 satisfaction), or when they have sufficient resources to successfully cope with their job  
10 (i.e., competence satisfaction), to fully internalize their behaviors it is crucial that all three  
11 needs, and particularly the need for autonomy (i.e., experiencing a sense of psychological  
12 freedom and meaningfulness) are satisfied (Deci & Ryan, 2000). Autonomous motivation  
13 will thus be fostered if teachers grasp the meaning of teaching and connect it to their  
14 personal goals and values (Deci & Ryan, 2000). Amotivation, on the other hand, is  
15 suggested to result from not valuing an activity (i.e., low autonomy) or not feeling  
16 competent to do it (i.e., low competence) (Deci & Ryan, 2000).

17 Past studies have consistently confirmed that autonomy satisfaction is the strongest  
18 correlate of autonomous motivation (Author, 2001; Collie, Shapka, Perry, & Martin,  
19 2016). Yet, in these studies, competence and relatedness have also shown strong and  
20 positive relationships with autonomous motivation. Regarding controlled motivation,  
21 empirical evidence is not so clear-cut. Some researchers have found negative  
22 relationships between autonomy and competence satisfaction and teacher controlled  
23 motivation (Jansen in de Wal et al., 2014), while other researchers have found null  
24 relationships (Collie et al., 2016), and even positive relationships (Author, 2001; Carson



1 & Chase, 2009). Relatedness satisfaction was found to be weakly positively related to  
2 controlled motivation in some studies, (Carson & Chase, 2009; Jansen in de Wall et al.,  
3 2014), whereas it was unrelated in others (Author, 2001). As for amotivation, we are  
4 aware of only one study among teachers (Carson & Chase, 2009) showing that autonomy  
5 and competence satisfaction were moderately and negatively related to teachers'  
6 amotivation, whereas relatedness was unrelated.

7 *1.5. The merits of a person-centered approach in addition to a variable-centered*  
8 *approach*

9 Most of the previously cited studies adopted a more traditional variable-centered  
10 approach. Although these studies provide valuable insights, they typically study  
11 autonomous motivation, controlled motivation and amotivation as separate dimensions,  
12 hereby ignoring the dynamic interplay between them. This is unfortunate as recent studies  
13 are increasingly arguing that teachers can combine different reasons for putting effort into  
14 their teaching (Author, 2001; Author, 2001; Jansen in de Wal et al., 2014). To illustrate,  
15 while some teachers fulfill their tasks because they really enjoy doing it and at the same  
16 time feel pressurized to do so, other teachers might have purely autonomous reasons to  
17 engage in their jobs.

18 Grounded in SDT, only three studies, to date, have examined teachers' motivation  
19 adopting a person-centered approach based on cluster analyses and none of the three  
20 studies included a measure of amotivation (Author, 2001; Author, 2001; Jansen in de Wal  
21 et al., 2014). In the three studies, three similar groups could consistently be retained. A  
22 first group primarily put effort into teaching for autonomous reasons and less so for  
23 controlled reasons, a second group characterized by relatively high scores on both  
24 autonomous and controlled motivation, and finally, a third group primarily put effort into

1 teaching for controlled reasons and less so for autonomous reasons. In addition to these  
2 three consistently returning profiles, some studies have also identified a fourth profile.  
3 However, this profile was less stable across these studies. For instance, Author (2001)  
4 and Author (2001) found a group of teachers scoring low on both autonomous and  
5 controlled motivation, whereas Jansen in de Wal et al. (2014), found a group of teachers  
6 who scored moderately on both types of motivation. Importantly, two recent studies  
7 conducted with higher education students (Author, 2001) and employees (Howard,  
8 Gagné, Morin, & Van den Broeck, 2016) that also included amotivation scores, identified  
9 a fifth profile characterized by low autonomous motivation, moderate controlled  
10 motivation and very high amotivation scores.

11 The advantage of a person-centered analysis not only lies in the possibility of  
12 identifying these naturally occurring combinations of reasons to teach, but it also allows  
13 examining whether these groups differ in terms of antecedents and outcomes of teachers'  
14 motivation. According to SDT's qualitative view on motivation, more motivation is not  
15 necessarily better if this motivation is less self-determined (Deci & Ryan, 2000).  
16 Accordingly, the group characterized by high levels of autonomous motivation and lower  
17 levels of controlled motivation or amotivation would display the most adaptive pattern of  
18 outcomes. Indeed, studies have shown that this group reports the highest levels of  
19 engagement (Jansen in de Wal et al., 2014) and the least feelings of burnout, better quality  
20 of teacher-student interactions and greater experienced autonomy and competence  
21 satisfaction (Author, 2001). The opposite can be expected for teachers who are relatively  
22 high on amotivation or controlled motivation, who would display the least optimal pattern  
23 of outcomes. Yet, teachers who are controlled motivated would still have some available  
24 energy (Deci & Ryan, 1985), while teachers who are high on amotivation would have a

1 greater risk of burnout and a lack of energy. Because few studies have included teacher  
2 amotivation, evidence supporting this assumption from a person-oriented perspective is  
3 currently lacking.

4 SDT further suggests that it would be better to display low levels of autonomous  
5 and controlled motivation, as opposed to being predominantly controlled motivated.  
6 Indeed, Author (2001) and Author (2001) showed that the low autonomous-controlled  
7 motivation group reports significantly less burnout, and higher relatedness support than  
8 the controlled motivation group. Yet, no differences were found with respect to autonomy  
9 and competence support (Author, 2001; Author, 2001; Jansen in de Wal et al., 2014).  
10 Finally, according to SDT, it would be better to combine high levels of autonomous  
11 motivation with lower levels of controlled motivation, than to be high on both. This is  
12 because, although controlled motivation may generate engagement at work (i.e., due to  
13 external pressures), it can come with an emotional cost as indexed by feelings of burnout.  
14 However, no differences between the purely autonomously motivated group and the  
15 combined autonomous-controlled group were noted in previous research (Author, 2001),  
16 whereas this would be expected based on theoretical grounds (Deci & Ryan, 1985).

#### 17 *1.6. The present study*

18 The purposes of the present study are threefold. Firstly, we investigate the  
19 associations between teachers' motivation, and their burnout and engagement at work.  
20 While most studies with teachers have used the Maslach Burnout Inventory (MBI;  
21 Maslach, Schaufeli, & Leiter, 2001) to measure burnout, in the current study we rely on  
22 Farbers' definition of worn-out (Farber, 1991, 2000). The MBI describes burnout as a  
23 result of chronic work-related stress, characterized by emotional exhaustion, cynicism  
24 and inefficacy (Maslach et al., 2001), and the worn-out type (Farber, 2000) presents

1 strong relationships with each of these three dimensions (Montero-Marín & García-  
2 Campayo, 2010). Worn-out teachers cope with stress by performing their tasks at school  
3 in a perfunctory manner (i.e., neglect). In addition, worn-out teachers do not feel they are  
4 professionally appreciated or recognized by the administration or principals (i.e., lack of  
5 acknowledgement), and they feel they do not have enough resources to solve teaching  
6 problems (i.e., lack of control). Based on the tenets of SDT and past studies (Author,  
7 2001; Cheon et al., 2014; Eyal & Roth, 2011) we expect teachers' autonomous motivation  
8 to be negatively related to worn-out and positive related to engagement at work. As for  
9 controlled motivation, we expect positive relationships with worn-out, yet, based on  
10 theory (Deci & Ryan, 1985) and previous research (Fernet, Austin, et al., 2012; Jansen in  
11 de Wal et al., 2014), insignificant or slightly negative relationships with engagement at  
12 work are expected, as teachers who are controlled motivated might still put some energy  
13 into their jobs. For amotivation, we hypothesize finding the strongest positive  
14 relationships with worn-out and a strong negative relationship with teachers' engagement.

15 We will also investigate relationships with the quality of teacher-student  
16 relationships. In line with SDT and past studies (Author, 2001; Cheon et al., 2014;  
17 Pelletier, Séguin-Lévesque, & Legault, 2002), we postulate that autonomous motivation  
18 will positively relate to autonomy support, relatedness support and task climate support,  
19 and negatively to ego climate. As for controlled motivation, we hypothesize finding  
20 strong positive relationships with ego climate and we are open to finding possible  
21 negative relationships with autonomy-, relatedness- and task support. Regarding  
22 amotivation, we expect negative relationships with autonomy-, relatedness- and task  
23 support, as amotivated teachers will lack the energy to invest in the quality of the teacher-  
24 student relationship. With regard to relationships between teachers' amotivation and an

1 ego-oriented climate, we expect to find null- or positive relationships, because we assume  
2 that the establishment of an ego climate constitutes the path of least effort.

3 Finally, we expect all three BPNs to be significantly positively related to teachers'  
4 autonomous motivation (Author, 2001; Collie et al., 2016; Janke, Nitsche, & Dickhäuser,  
5 2015). It is hypothesized that null or positive relationships between relatedness or  
6 competence satisfaction and controlled motivation will be found, while we expect  
7 negative or null relationships with autonomy satisfaction (Author, 2001; Deci & Ryan,  
8 2000). We further expect that, in particular, autonomy and competence satisfaction will  
9 negatively relate to teachers' amotivation (Carson & Chase, 2009; Deci & Ryan, 2000)<sup>1</sup>.

10 Adopting a person-centered approach, the second purpose is to determine  
11 teachers' motivational profiles on the basis of their scores for autonomous motivation,  
12 controlled motivation and amotivation. Analogous to previous studies (Author, 2001;  
13 Author, 2001; Jansen in de Wal et al., 2014), we expect to find at least three profiles: a  
14 controlled motivation group, an autonomous-controlled group and an autonomous  
15 motivation group. Moreover, in line with studies that have included amotivation in other  
16 contexts (Author, 2001; Howard et al., 2016), we expect to find a fourth amotivation  
17 group. Because previous results are less clear-cut, we are open to the possibility of a fifth  
18 low autonomous-controlled motivation group being identified (Author et al., 2001;  
19 Author et al., 2001).

20 Finally, based on the tenets of SDT and past studies (Author, 2001; Author, 2001;  
21 Jansen in de Wal et al., 2014), we hypothesize that the group characterized by high levels

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<sup>1</sup> 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.

1 of autonomous motivation and lower levels of controlled motivation or amotivation will  
2 display the most adaptive pattern of outcomes, particularly when compared to the group  
3 that is high on amotivation or controlled motivation, alone. While the latter group may  
4 still invest some energy in their job, and experience some competence or relatedness  
5 satisfaction, they are hypothesized to be higher on burnout, ego-climate support, and to  
6 be especially lower on autonomy satisfaction when compared to the purely autonomously  
7 motivated group. For this reason, it is also hypothesized that it would be better to display  
8 low levels of autonomous motivation and controlled motivation, as opposed to being  
9 predominantly controlled motivated. A final hypothesis is that the group characterized by  
10 high levels of autonomous motivation and lower levels of controlled motivation, would  
11 display a more optimal profile when compared to a group that is high on both autonomous  
12 and controlled motivation.

## 13 **2. Methods**

### 14 *2.1. Participants and procedures*

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

22 Approval for this study was obtained from the University's research ethics  
23 committee. Participants were recruited through e-mail and Web-based surveys.  
24 Specifically, an e-mail was sent to all 7418 secondary teachers from the Aragon region

1 (Spain), who were employed during the 2014/2015 academic year. This e-mail included  
2 a brief explanation of the study purposes, a weblink providing access to the online  
3 questionnaire and the contact data of the main researcher. The response rate was 8%.  
4 Teachers had 30 days to submit the questionnaire. Participation was voluntary, and  
5 anonymity was guaranteed.

## 6 2.2. Measures

### 7 2.2.1. Basic psychological needs satisfaction

8 Needs satisfaction of teachers was measured using the Spanish version of the  
9 [details removed for peer review] (Author, 2001). This scale includes 12 items (four items  
10 per factor) and taps into autonomy satisfaction (e.g., “I can take on responsibilities at my  
11 job”), competence satisfaction (e.g., “I am able to solve problems at work”), and  
12 relatedness satisfaction (e.g., “When I’m with the people from my work environment, I  
13 feel I can trust them”). Responses were registered on a 6-point Likert scale ranging from  
14 1 (“strongly disagree”) to 6 (“strongly agree”). This scale has shown adequate reliability  
15 and validity in prior research (Boudrias et al., 2014). In the present study, the Cronbach  
16 alphas for autonomy, relatedness and competence satisfaction were .84, .84, and .90  
17 respectively.

### 18 2.2.2. Teacher motivation

19 Teacher motivation was measured using the [details removed for peer review]  
20 (Author, 2001). This scale starts with the stem “I get involved in teaching because...”  
21 followed by 19 items assessing teachers’ intrinsic motivation (four items; e.g., “I am very  
22 interested in teaching”) identified regulation (four items; e.g., “I think it is very valuable  
23 for me as a person”), introjected regulation (four items; e.g., “I want others to think I’m a  
24 good teacher”), external regulation (four items; e.g., “Others pressurize me to do this”)

1 and amotivation (three items, e.g., “I don't know, I feel like I'm wasting time when I  
2 teach”). Responses were provided on a 5-point Likert scale ranging from 1 (“strongly  
3 disagree”) to 5 (“strongly agree”). In the current study, a confirmatory factor analysis  
4 (CFA) was performed showing adequate goodness-of-fit ( $\chi^2/df=5.48$ ,  $p<.001$ ;  
5 RMSEA=.080; CFI=.960; TLI=.951;). Similarly to previous studies with teachers  
6 (Author, 2001), analyses were performed on the basis of the composite scores for  
7 autonomous and controlled motivation rather than on the separate types of regulation for  
8 parsimony reasons. Based on the expected cross-validation index (ECVI), for which  
9 lower values indicate better fit, the three-factor model (ECVI = 1.329) displayed a better  
10 fit than the five-factor model (ECVI = 1.688). The Cronbach alphas for autonomous  
11 motivation, controlled motivation, and amotivation were .85, .77, and .88 in the current  
12 study, respectively.

### 13 2.2.3. *Worn-out at work*

14 Worn-out at work was measured using a subscale of the Spanish version of the  
15 Burnout Clinical Subtype Questionnaire (Montero-Marín & García-Campayo, 2010). The  
16 scale consists of 12 items (four items per factor) assessing respondents' neglect (e.g., “I  
17 give up in response to difficulties in my work”), lack of acknowledgement (e.g., “I think  
18 my dedication to my work is not acknowledged”) and lack of control (e.g., “I feel the  
19 results of my work are beyond my control”). The items were rated on a 7-point Likert  
20 scale, ranging from 1 (“totally disagree”) to 7 (“totally agree”). The scale was found to  
21 be valid and reliable in prior research with university employees (Montero-Marín et al.,  
22 2012). In the current study, the internal consistencies, as indexed by Cronbach alphas,  
23 were .89, .84, and .82 for neglect, lack of acknowledgement, and lack of control,  
24 respectively.



1 2.2.4. *Engagement at work*

2 Engagement at work was measured using the Spanish version of the Utrecht Work  
3 Engagement Scale (UWES, Schaufeli, Martínez, Marques-Pinto, Salanova, & Bakker,  
4 2002). This scale consists of 17 items assessing respondents' vigor (six items; e.g., "When  
5 I get up in the morning, I feel like going to work"), dedication (five items; e.g., "My job  
6 inspires me") and absorption (six items; e.g., "I feel happy when I am working  
7 intensely"). The items were rated on a 7-point Likert scale, ranging from 0 ("never") to 6  
8 ("always"). This scale has shown adequate reliability and validity in prior research  
9 (Høigaard, Giske, & Sundsli, 2012; Klassen, Yerdelen, & Durksen, 2013). In the current  
10 study, the Cronbach alphas for vigor, dedication, and absorption were .89, .80, and .79  
11 respectively.

12 2.2.5. *Interpersonal style*

13 Teachers' interpersonal style was measured with the [details removed for peer  
14 review] that was adapted to the teacher context (Author, 2001). This scale consists of 15  
15 items, preceded by the stem "In my classes...". The questionnaire taps into autonomy  
16 support (four items; e.g., "I give students the opportunity to select activities according to  
17 their own interests"), relatedness support (three items; e.g., "I try to get my students to  
18 "work together" as a team"), task climate support (5 items; e.g., "For me, it is important  
19 for students to try their best") and ego climate support (three items; e.g., "For me, it is  
20 important for students to show that they are better than others"). Teachers were asked to  
21 rate each item on a 5-point Likert scale ranging from 1 ("strongly disagree"), to 5  
22 ("strongly agree"). In the present study, a CFA was performed showing adequate  
23 goodness-of-fit ( $\chi^2/df=2.67$ ,  $p<.001$ ; RMSEA=.051; CFI=.941; TLI=.927), and the

1 Cronbach alphas for autonomy support, relatedness support, task climate and ego climate  
2 support were .73, .74, .79 and .72 respectively.

### 3 *2.3. Data analysis*

#### 4 *2.3.1. Preliminary descriptive and measurement analyses*

5 Firstly the descriptive statistics and latent correlation analyses (via CFA) were  
6 computed. Analyses were performed using SPSS 20.0 and Mplus 7.3 software.

#### 7 *2.3.2. Variable-centered approach*

8 The first purpose of the study was examined by means of SEM-analyses,  
9 investigating relationships between experienced need satisfaction, teachers' motivation,  
10 worn-out at work, engagement at work and interpersonal teaching style. To run SEM-  
11 analyses the weighted least squares mean and variance adjusted estimator (WLSMV) was  
12 chosen, because it is more suited for data with Likert scales taking into account non-  
13 normal data (Lei, 2009). The assessment of the models was based on the root mean square  
14 error of approximation (RMSEA) with values equal to or less than .08 considered  
15 acceptable, and the comparative fit index (CFI) and Tucker-Lewis index (TLI) with  
16 values greater than .90 considered acceptable (Marsh, Hau, & Wen, 2004). We controlled  
17 covariance between the independent variables. There were no problems with collinearity  
18 (see Appendix).

#### 19 *2.3.3. Person-centered approach*

20 Teachers' motivational profiles were generated by adopting a combination of  
21 hierarchical and nonhierarchical clustering methods (Garson, 2014). In a first step, the  
22 standardized scores for the teachers' autonomous motivation, controlled motivation and  
23 amotivation were calculated. Then, univariate (i.e., values greater than three standard  
24 deviations above or below the mean) and multivariate (i.e., individuals with high

1 Mahalanobis values) outliers were removed (Steinley & Brusco, 2011). Secondly,  
2 hierarchical cluster analyses based on square Euclidian distances and Ward's method were  
3 performed (Everitt, Landau, & Leese 2001). The possibility of three-, four- and five-  
4 cluster solutions were considered based on previous studies with teachers (Author, 2001;  
5 Author, 2001; Jansen in de Wal et al., 2014). To identify the number of profiles, the  
6 increase in clustering variance in each of the possible groups was examined. The three-  
7 cluster solution was not retained because the explained variance for autonomous  
8 motivation was lower than 50% (Milligan & Cooper, 1985). A four-cluster solution  
9 explained 51%, 58% and 70% of the variance in autonomous motivation, controlled  
10 motivation and amotivation, respectively and five-cluster solution explained 51%, 62%  
11 and 74% respectively. The four-cluster solution was retained for two reasons. The four-  
12 cluster solution was theoretically more interpretable than the five-cluster solution. The  
13 low autonomous-controlled motivation group did not emerge in the four- or in the five-  
14 cluster solutions; instead, we retained a fifth cluster that was similar to the amotivation  
15 group. Second, the five-cluster solution explained the same variance in autonomous  
16 motivation as the four-cluster solution, and it did not explain a substantial additional  
17 variance (<5%) in controlled motivation and amotivation (Milligan & Cooper, 1985).

18 In a third step, the cluster centers obtained with Ward's hierarchical method were  
19 used as non-random starting points in an iterative, non-hierarchical k-means clustering  
20 procedure (Asendorpf, Borkenau, Ostendorf, & Van Aken, 2001). Further, the stability  
21 of cluster solutions was assessed by randomly splitting the sample into two and applying  
22 the full two-step procedure (i.e., Ward, k-means) in each half. The teachers in each half  
23 were assigned to new clusters based on their Euclidean distances to the cluster centers of  
24 the other half of the sample. Then, these new clusters were compared for agreement with

1 the original cluster solution using Cohen's kappa (K) statistic. The two resulting kappas  
2 were averaged and an agreement of at least 0.60 was considered acceptable (Asendorpf  
3 et al., 2001). Finally, Chi-square tests were computed across gender to explore the need  
4 to include it as a covariate in subsequent analyses.

#### 5 *2.3.4. Differences in teachers' motivation antecedents and outcomes*

6 We used a multivariate analysis of variance (MANOVA) with the cluster solution  
7 as independent variable to investigate differences between clusters in worn-out,  
8 engagement, teaching style and BPN. If significant differences were found, post-hoc tests  
9 by means of Bonferroni method were inspected. Effect sizes were considered small,  
10 moderate or large, when partial eta squared values were above .01, .06 and .14,  
11 respectively (Cohen, 1988).

### 12 **3. Results**

#### 13 *3.1. Preliminary descriptive and correlational results*

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

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19 <INSERT TABLE 1 ABOUT HERE>  
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#### 22 *3.2. Variable-centered approach*

23 SEM revealed that the model showed an adequate fit with the data ( $\chi^2= 4785.771$ ,  
24  $p<.001$ ;  $\chi^2/df=2.326$ ; RMSEA=.048; 90% CI=.046-.049; CFI=.942; TLI=.938).

1 Regarding teacher outcomes (see Fig. 1), we found that autonomous motivation was  
2 significantly positively related to all three engagement factors and all positive dimensions  
3 of interpersonal teaching styles (i.e., autonomy support, relatedness support and task  
4 climate support), whereas it was negatively related to the three worn-out factors, and  
5 unrelated to ego climate support. Controlled motivation was unrelated to vigor and  
6 dedication (i.e., engagement factors), autonomy support, relatedness support and task  
7 climate support, while being positively, though weakly, associated with absorption. On  
8 the other hand, controlled motivation was significantly positively associated with the  
9 three worn-out factors and ego climate support. Finally, amotivation was significantly  
10 positively associated with all negative outcomes, while the opposite was true for the  
11 positive outcomes. Regarding antecedents, satisfaction of all BPNs was positively  
12 associated with autonomous motivation, whereas negative associations were found with  
13 amotivation. In addition, autonomy satisfaction was significantly negatively associated  
14 with controlled motivation, whereas competence satisfaction and relatedness satisfaction  
15 were unrelated.

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17  
18 <INSERT FIG. 1 ABOUT HERE>  
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### 21 3.3. *Person-centered approach*

22 Nine univariate outliers and 12 multivariate outliers were removed prior to  
23 conducting the cluster analysis (final sample= $n=563$ ; 248 males). Fig. 2 represents the  
24 graphical results for the four-cluster solutions. The Y-axis represents the Z-scores for

1 autonomous motivation, controlled motivation and amotivation. The four clusters were  
2 labelled as follows: (1) amotivation group characterized by very low autonomous  
3 motivation, medium-low controlled motivation and very high amotivation; (2) relatively  
4 controlled motivation group typified by low autonomous motivation, high controlled  
5 motivation and low amotivation; (3) combined autonomous-controlled motivation group  
6 characterized by relatively high levels of autonomous motivation, high to very high  
7 controlled motivation and low amotivation; and (4) relatively autonomous motivation  
8 group typified by high autonomous motivation, very low controlled motivation and low  
9 to very low amotivation. The double-split cross-validation method indicated an average  
10 kappa value, based on two random subsamples, of .77 (i.e., good agreement) for the four-  
11 cluster solution.

12  
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14 <INSERT FIG. 2 ABOUT HERE>  
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17 Next, the distribution across teacher gender in the four clusters was examined.  
18 Male and female teachers were almost equally distributed across the amotivation group  
19 (male=86, 15%; female=99, 17%), the relatively controlled motivation group (male=60,  
20 11%; female=82, 15%), the controlled-autonomous group (male=34, 6%; female=47,  
21 8%), and the relatively autonomous group (male=65, 12%; female=90, 16%). Chi-square  
22 testing revealed a non-significant cluster assignment by gender effect ( $\chi^2[3, n=563]=0.99$ ,  
23  $p>.05$ ). Based on these results, gender was not considered as a covariate in subsequent  
24 analyses.

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*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, 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 favour 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,

1 provided more task-climate support and experienced greater competence satisfaction, yet  
2 for all other variables differences were insignificant. Finally, the relatively controlled  
3 group reported significantly higher scores of vigor, dedication and absorption, and lower  
4 levels of worn-out than the amotivation group. They also provided more task-climate  
5 support and experienced more need satisfaction.

6  
7 <INSERT TABLE 2 ABOUT HERE>  
8

#### 9 **4. Discussion**

10 Most research so far has focused on organizational and interpersonal determinants  
11 of work-related engagement and burnout among teachers (Roth, 2014). Relying on both  
12 a variable- and person-centered approach, the present study aimed to add to this existing  
13 literature by examining how teachers' quality of motivation (i.e., personal factor) can be  
14 related to antecedents and outcomes at workplace.

##### 15 *4.1. Examining teachers' motivation by means of a variable-centered approach*

16 The first purpose of this study involved investigating the associations between  
17 teachers' motivation and their psychological functioning at work. Results revealed that  
18 teachers who report enjoying and valuing teaching more (i.e., autonomous motivation)  
19 are less likely to report symptoms of worn-out and are more likely to report higher  
20 engagement in their work. These findings confirm previous findings on associations  
21 between autonomous motivation, feelings of burnout (Author, 2001; Eyal & Roth, 2011;  
22 Fernet et al., 2008; Roth et al., 2007) and teacher engagement (Author, 2001; Author,  
23 2001; Cheon et al., 2014; Fernet et al., 2008).



1 In line with our hypotheses and previous research (Fernet et al., 2008), results  
2 further showed that teachers who feel more pressurized (i.e., controlled motivation) were  
3 more likely to report symptoms of worn-out, while not necessarily putting less energy  
4 into their jobs. Specifically, controlled motivation was unrelated to two of the  
5 subdimensions of engagement (i.e., vigor or dedication), while it was  
6 weakly positively associated with absorption. It seems that teachers who are high on  
7 controlled motivation are still putting some effort into their jobs, yet they pay an  
8 emotional price. The findings may explain why inconsistent relationships between  
9 controlled motivation and engagement have been reported previously (Fernet et al., 2008;  
10 Jansen in de Wal, 2014), and correspond to previous research that reveals that burnout  
11 and engagement can, to some degree, co-occur among teachers (Mäkikangas, Hyvönen,  
12 & Feldt, 2017). Finally, results showed that, in particular, teachers who are highly  
13 amotivated, and do not see why they should put effort into their teaching, display higher  
14 risks of developing worn-out and display lower engagement, which is in line with  
15 previous research (Fernet et al., 2008; Nie, et al., 2015).

16 SDT suggests that teachers' motivation is not only relevant for their psychological  
17 functioning, but that is also relates to the quality of their interactions with their students  
18 (Deci & Ryan, 1985; Weinstein et al., 2010). As theoretically expected and consistent  
19 with past research (Author, 2001; Cheon et al., 2014; Pelletier et al., 2002; Taylor et al.,  
20 2008), teachers who enjoy and value teaching more (i.e., autonomous motivation), are  
21 also more likely to explain the relevance of a task, to involve students in decision-making  
22 and to show interest in students' preferences (i.e., autonomy support), while investing  
23 more in a close relationship with their students (i.e., relatedness support), and more  
24 strongly emphasizing individual progress and effort (i.e., task climate support). In line

1 with our hypotheses, we found that teachers, who are more controlled motivated, were  
2 more likely to create an ego-oriented learning climate. This is an interesting finding, as it  
3 suggests that teachers who feel pressurized to teach because they feel obliged to fulfill  
4 the expectations of others such as their principals (i.e., external regulation), or because  
5 they are higher on ego-involvement themselves (i.e., introjected regulation, deCharms,  
6 1968; Ryan, 1982) and are thus more likely to evaluate themselves in comparison to other  
7 teachers (Butler, 2014), are also more likely to take a more pressurizing stance towards  
8 their students (Pelletier & Rocchi, 2015; Retelsdorf & Günter, 2011). Although we  
9 expected controlled motivated teachers to also be less autonomy- or relatedness  
10 supportive, because they would have a less open view and less available energy, this was  
11 not the case. These results corroborate findings of previous research (Author, 2001), and  
12 align with the fact that controlled motivated teachers still invest some energy into their  
13 jobs, yet this energy does not always seem to be optimally directed.

14 As for amotivation, we expected teachers to invest minimal energy in the quality  
15 of their relationships with their students resulting in lower autonomy-, relatedness, or task  
16 climate support. This hypothesis was confirmed. Moreover, more amotivated teachers  
17 were more likely to instill an ego climate by reinforcing and assessing one student's  
18 success in comparison with other students' success (Butler, 2014; Soini, Liukkonen,  
19 Watt, Yli-Piipari, & Jaakkola, 2014). These findings might suggest that more motivating  
20 strategies (i.e., autonomy support, task climate) require more preparation and "positive"  
21 energy from teachers, and those teachers who lack this energy refrain from adopting  
22 motivating strategies, but instead instil an ego-oriented climate. This is quite worrying,  
23 as we know from past studies that students are less optimally motivated when exposed to  
24 an ego climate (Fernández-Río, Méndez-Giménez, & Cecchini, 2014), and teachers who

1 are high on amotivation could thus possibly be at risk of ending up in a negative vicious  
2 circle (Pelletier et al., 2002; Reeve, 2013). To illustrate, teachers who generate an ego  
3 climate may provoke negative outcomes in students (e.g., amotivation, boredom; Author  
4 2001; Author, 2001), which, in turn, could trigger feelings of incompetence and further  
5 reinforce teachers' amotivation. In contrast, if teachers interact with their students in a  
6 more need-supportive way or manage to instill a more task-oriented climate, this not only  
7 benefits students' autonomous motivation and engagement (Cheon, Reeve, & Song,  
8 2016; Leenknecht et al., 2017), but also positively affects teachers' own functioning as  
9 they will feel more competent and they will experience the value of their teaching more  
10 strongly (Butler, 2014; Cheon et al., 2014; Retelsdorf, Butler, Streblow, & Schiefele,  
11 2010), further reinforcing their interpersonal teaching styles (Reeve, 2013).

12         Given that teachers' motivation is strongly related to their psychological and  
13 behavioral functioning, we have also examined their roots. According to SDT, for  
14 teachers to fully internalize their behaviors, it is important for all three needs, and  
15 particularly the need for autonomy, to be satisfied (Deci & Ryan, 2000). This assumption  
16 was confirmed in our findings, as all three needs were positively related to autonomous  
17 motivation. This indicates that satisfying the BPNs can supply the necessary fuel for  
18 teachers to identify the relevance of their work and experience the pleasure that teaching  
19 produces per se. However, whereas past studies pointed to autonomy (Author, 2001) or  
20 relatedness (Taylor et al., 2008) as the most influential needs in terms of physical  
21 education teachers' autonomous motivation, this study found the strongest relationships  
22 with competence satisfaction. As for controlled motivation, we only found negative  
23 relationships with autonomy satisfaction. In line with theory (Deci & Ryan, 2000) and  
24 previous empirical work (Author, 2001), it thus seems that, more specifically, teachers

1 who fail to grasp the value of teaching, and who experience a lack of freedom or a lack  
2 of possibilities for initiative taking, are feeling pressurized to teach. These results suggest  
3 that autonomy satisfaction is not only a prerequisite for autonomous motivation, but it  
4 could also be a buffer against feelings of pressure. As for amotivation, negative  
5 relationships with all three needs were found, yet, in line with our hypotheses and past  
6 research (Carson & Chase, 2009), relationships were the strongest for autonomy and  
7 competence satisfaction.

#### 8 *4.2. Examining teachers' motivation by means a person-centered approach*

9 While the previously discussed findings shed light on the relationships between  
10 different motivational regulations and teachers' psychological functioning, the quality of  
11 teacher-student interactions, and experienced need satisfaction, in reality most teachers  
12 can simultaneously have more than one motive for putting effort into their work (Author,  
13 2001). Therefore, it is interesting to identify which combinations of autonomous  
14 motivation, controlled motivation and amotivation in secondary teachers naturally co-  
15 occur, and how these differ in terms of outcomes and antecedents.

##### 16 *4.2.1. Clustering of teachers according to types of motivation*

17 Relying on a person-centered approach, four groups of teachers could be  
18 identified. As expected, we found a relatively autonomous motivation group accounting  
19 for 28% of the sample. We also identified a combined autonomous-controlled group  
20 accounting for 14% of the sample. Interestingly, this group displayed the highest scores  
21 on both autonomous and controlled motivation, while displaying relatively low levels of  
22 amotivation (relative to the sample). A relatively controlled motivation group also  
23 emerged accounting for 25% of the sample. Finally, an amotivation group was identified,  
24 comprising the largest group (33% of the sample). When presenting these four groups,

1 we deliberately use the term “relatively”. It is important to note that in an absolute sense,  
2 the teachers in all four groups reported very high levels of autonomous motivation  
3 ( $M=3.84-4.85/5$ ), low to medium levels of controlled motivation ( $M=1.83-3.19/5$ ) and  
4 low amotivation scores ( $M=1.04-2.06/5$ ). The labeling of the groups is thus a matter of  
5 gradation.

6 The first three profiles found in the current study, were also found in previous  
7 research with teachers (Author, 2001; Author, 2001; Jansen in de Wal et al., 2014), while  
8 the fourth amotivation profile is broadly aligned with previous research that included  
9 amotivation among a population of students (Author, 2001) and employees (Howard et  
10 al., 2016). Also note that in contrast to previous work (Author, 2001, Author, 2001) a low  
11 autonomous-controlled motivational group did not emerge. There is a possibility that the  
12 addition of amotivation explains why this profile did not emerge, as the presence of  
13 amotivation was combined with relatively low levels of both autonomous and controlled  
14 motivation. With regard to the representation of teachers in each of the clusters, the results  
15 differ from previous studies. While in the current study the amotivation group constituted  
16 the largest group, previous studies with teachers identified the relatively autonomous  
17 motivation group and the autonomous-controlled group as comprising the majority of the  
18 sample (Author, 2001; Author, 2001; Jansen in de Wal et al., 2014).

#### 19 4.2.2. *Differences in teachers’ psychological functioning, interpersonal styles and need* 20 *satisfaction according to cluster membership*

21 Based on SDT, a first assumption was that teachers who display high levels of  
22 autonomous and relatively low levels of controlled motivation or amotivation would  
23 display the most optimal pattern of outcomes, particularly when compared to teachers

1 high on amotivation, or on controlled motivation. This assumption was largely confirmed.  
2 The purely autonomously motivated group displayed less burnout, higher engagement,  
3 better quality teacher-student interactions and more need satisfaction when compared to  
4 the amotivation group that displayed the opposite pattern of results. Differences with the  
5 purely controlled group were along the same line but less pronounced and not for all  
6 outcomes. The relatively autonomously motivated group displayed less worn-out (i.e.,  
7 lower levels of neglect and lack of control), higher engagement (i.e., higher levels of vigor  
8 and dedication), provided more autonomy and less ego climate support, and experienced  
9 more autonomy and competence satisfaction when compared with the controlled  
10 motivated group. Such findings align with previous studies (not including amotivation)  
11 indicating that the relatively controlled motivation group displayed more feelings of  
12 burnout (Author, 2001), lower engagement (Jansen in de Wal et al., 2014), a less optimal  
13 teaching style and less need satisfaction (Author, 2001).

14 A second assumption, according to SDT, is that the presence of controlled  
15 motivation in addition to autonomous motivation, is not beneficial, on the contrary. This  
16 premise can be studied by comparing the relatively autonomously motivated group with  
17 the combined autonomous-controlled motivated group. Both the predominantly  
18 autonomously motivated group and the combined autonomous-controlled group showed  
19 high levels of engagement and good teacher-student quality interactions, and high levels  
20 of need satisfaction, and thus both showed to be adaptive profiles. When comparing both  
21 groups, only three differences were found, with two of them being in favor of the purely  
22 autonomously motivated group that displayed less lack of control and less ego-climate  
23 support, but also displayed lower levels of absorption. Although these findings seem to  
24 suggest that the combination of high levels of autonomous and controlled motivation with

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

18 Overall, it is clear from these comparisons that the presence of high levels of  
19 autonomous motivation, preferably in combination with low levels of amotivation and  
20 controlled motivation, energizes teachers towards their jobs and constitutes a protective  
21 factor against worn-out. With worn-out constituting a more severe subtype of burnout,  
22 which is related to many symptoms akin to those of depression (Farber, 2000), it is  
23 important to gain these insights, as prevention strategies might be aimed at identifying  
24 teachers with at-risk profiles. Moreover, because teachers with high levels of autonomous

1 motivation interact in a more motivating way with their students, their students will more  
2 likely be engaged and satisfied (Cheon et al., 2016; Leenknecht et al., 2017; Roth, 2014),  
3 which will further boost teachers' own motivation and need satisfaction (Pelletier et al.,  
4 2002; Retelsdorf et al., 2010), and in turn reinforce their interpersonal teaching styles  
5 (Reeve, 2013).

#### 6 *4.3. Implications for practice*

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



1 courses are fostered, this will likely create a friendlier working environment in schools  
2 (Durksen, Klassen, & Daniels, 2017).

#### 3 *4.4. Limitations and future directions*

4 A first limitation of the current study relates to its cross-sectional design,  
5 hampering drawing causal effect conclusions. Future studies, adopting a longitudinal or  
6 interventional design, are needed to further unravel the direction of the relationships  
7 studied. In addition, it is important to note that the response rate (i.e., 8%) was not very  
8 high, which could explain why our sample was highly autonomously motivated, overall.  
9 Future studies with a larger sample could contribute to verifying the evidence found in  
10 this study. Third, the present study focuses on teachers' motivation in general. However,  
11 teaching requires a wide range of tasks, such as class preparation, evaluating students, or  
12 administrative tasks (Fernet et al., 2008). Additional research about the extent to which  
13 the same motivational profiles would be retained with regard to specific teaching tasks  
14 could provide more detailed evidence on teaching motivation at work. Fourth, only worn-  
15 out and engagement have been measured as indicators of teachers' well-being. Future  
16 studies could go deeper into the differences between the retained groups with  
17 complementary indicators of teachers' well-being (e.g., job satisfaction or intention to quit  
18 the job). Finally, only need satisfaction was studied as an antecedent of teachers'  
19 motivation. In future studies, other antecedents such as experienced need frustration,  
20 could also be included (Author, 2001).

#### 21 **5. Conclusion**

22 The results of the present study show that teachers who are more autonomously  
23 motivated, and thus value or enjoy teaching more, are better protected against the  
24 development of burnout, and are more engaged in their jobs, they teach in a more

1 motivating way, while the opposite is true for teachers who are highly amotivated.  
2 Teachers who feel more pressurized are still absorbed in their work, yet they are more  
3 likely to develop worn-out, and to instill an ego-oriented learning climate. Finally, BPN  
4 satisfaction related positively and negatively to autonomous motivation and amotivation,  
5 respectively. Particularly, when teachers feel less satisfied in their need for autonomy,  
6 they are more likely to teach as a result of pressurized reasons. Therefore, with a view to  
7 preventing burnout, and to stimulate the motivation of teacher-student interactions, it  
8 seems important to search for ways to better support the BPN of teachers at work.

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POST PRINT VERSION

**Table 1**

Descriptive statistics and latent correlations for the study variables

Study variables	<i>M</i> ( <i>SD</i> )	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: \* =  $p < .05$ ; \*\* =  $p < .01$

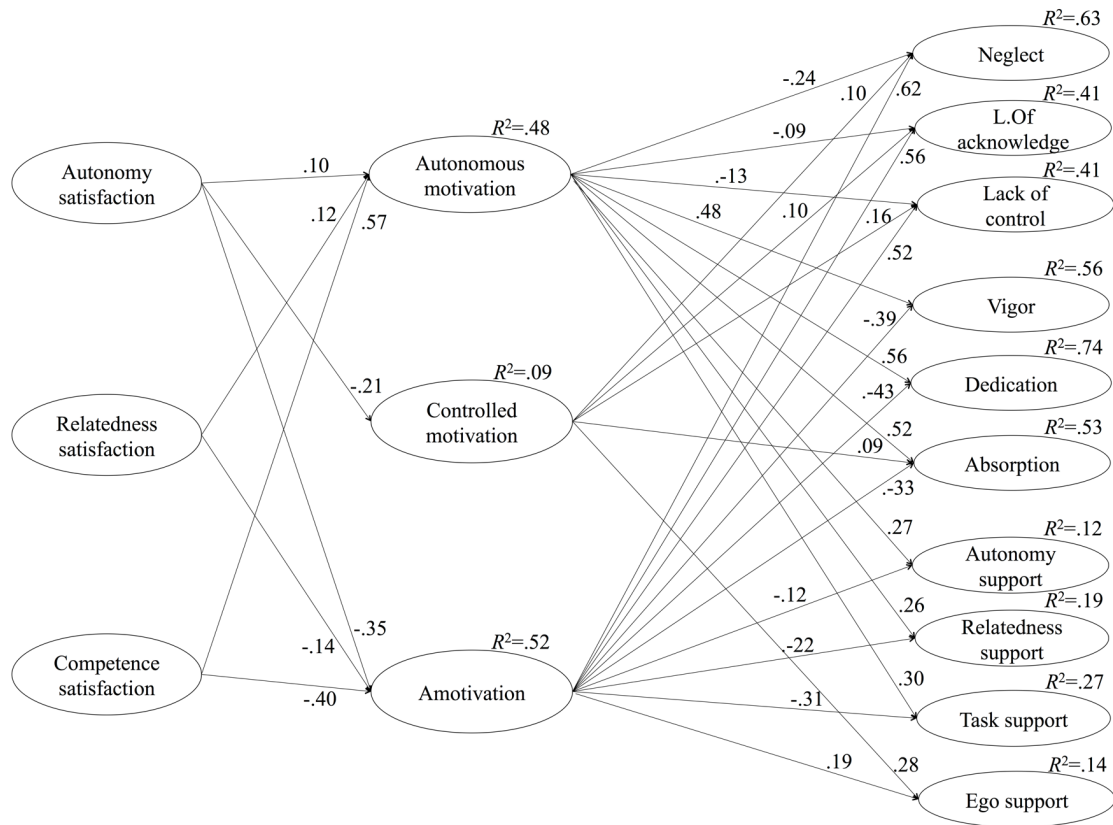
**Table 2** Motivational clusters' mean scores, F-values and effect sizes for teachers' motivation, antecedents and outcomes.

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

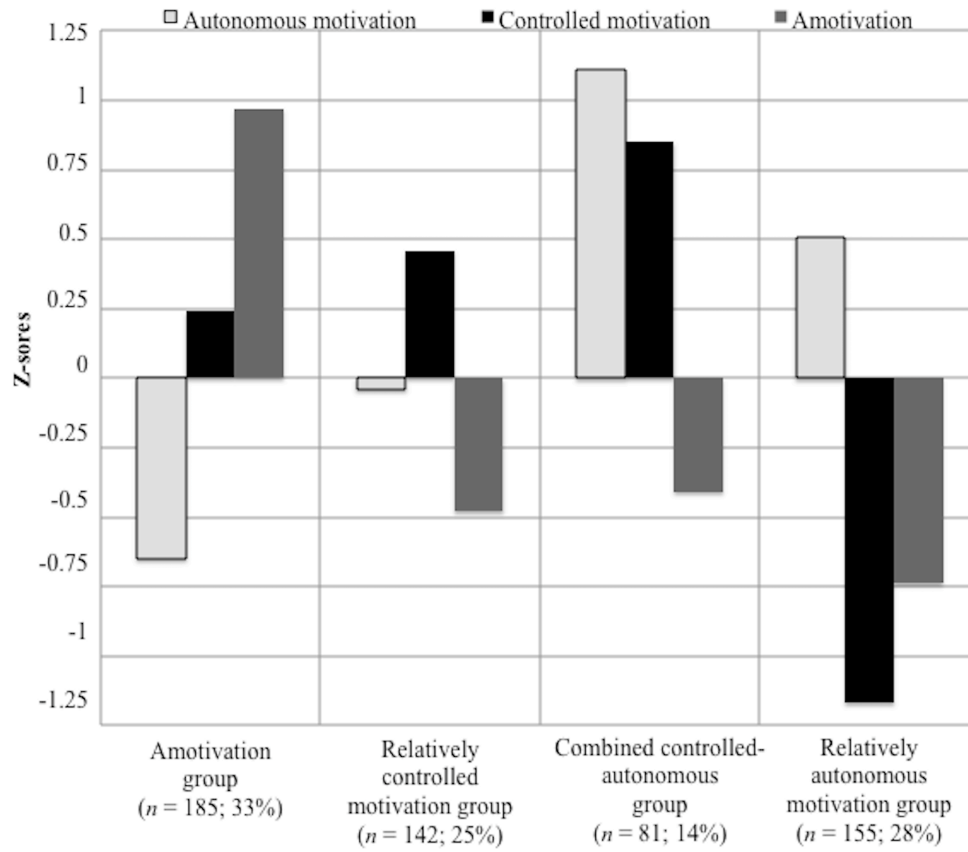
\*\*\* =  $p < .001$





**Fig. 1.** Structural model of the teachers' motivation antecedents and outcomes from a variable-centered approach.

Note:  $p < .05$  = values between .12 and -.14;  $p < .01$  = values greater than .12 and lower -.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.



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

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