



Within-person profiles of teachers' motivation to teach: Associations with need satisfaction at work, need-supportive teaching, and burnout



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ABSTRACT

Objectives: According to self-determination theory, teachers can engage in their job for a variety of reasons. Motivation can be controlled (feeling externally or internally pressured) or autonomous in nature (enjoying teaching or valuing its importance). The aim of this study was to identify motivational profiles (i.e., within-teacher combinations of autonomous and controlled motivation) and to examine associations between these motivational profiles and the following variables: experiences of need satisfaction, dimensions of teaching style, and burnout.

Design: This study has a cross-sectional design based on teacher reports.

Methods: A total of 201 PE teachers signed in for an online questionnaire on motivation to teach, need satisfaction at work, need-supportive teaching and burnout.

Results: Four hypothesized motivational profiles were retained: a poor quality, a low quantity, a high quantity, and a good quality group. The good quality group displayed the most optimal pattern of antecedents and outcomes, closely followed by the high quantity group. The poor quality group displayed the most maladaptive pattern of associations with antecedents and outcomes, even in comparison to the low quantity group.

Conclusions: Endorsing a specific motivational profile has implications for teachers' need satisfaction and burnout, but also for students, because the quality of teachers' motivation also shows in provided need support toward the students. This finding might convince school policy members and other stakeholders to value the importance of nurturing teachers' autonomous motivation.

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Introduction

"I really enjoy my job as a physical education teacher, it makes me happy to see my students making progress, learning, and enjoying the lessons. That's what drives me as a teacher."

Peter, 35

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Ideally, physical education (PE) teachers engage in their job because they find teaching enjoyable. However, other reasons can underlie teachers' functioning as well. Teachers can engage in teaching because they see the value of learning new skills to students, because they want to prove to themselves that they are good teachers, or because they feel pressured by others to perform well as a teacher. According to Self-Determination Theory (SDT; Deci & Ryan, 2000, 2002), these various reasons or motivational regulations have a differential impact on teachers' functioning (i.e., behavior and emotions). Teachers' functioning is not only of importance for the teachers themselves, but also for students because it is hypothesized that teachers' functioning is related to their teaching practices in the classroom. Most research to date on teacher motivation has taken a variable-centered approach,

examining associations between the separate motivational orientations and teachers' functioning. Because teachers can have multiple reasons for engaging in the job, in the current study we adopted a person-centered approach, examining within-teacher combinations (i.e., profiles) of different motives. This approach allows for an examination of the interplay between different motives in relation to important features of teachers' personal functioning and interpersonal style. Therefore, this study aimed at investigating how PE teachers' motivational profiles relate to teachers' personal need satisfaction, need-supportive teaching behavior toward students, and burnout.

Teacher's motivation from a self-determination theory perspective

According to SDT, motivation to engage in specific behaviors can be situated on a continuum ranging from controlled to autonomous motivation, with autonomous motivation reflecting higher quality of motivation than controlled motivation (Deci & Ryan, 2000). In contrast to theories examining motivation from a quantitative point of view and defining more motivation as 'better' (for example self-efficacy theory, Bandura, 1977), SDT identifies autonomous and controlled motivation as qualitatively different orientations, with autonomous motivation being more adaptive than controlled motivation.

Controlled motivation refers to feeling pressured or coerced to engage in specific behavior or activities. This pressure can arise from external sources, such as a desire to obtain rewards or to avoid disapproval and criticism. With 'external regulation' a teacher would for instance dutifully prepare lessons because of a school inspection. Pressure can also originate from internal sources such as a desire to increase one's self-worth or a desire to avoid feelings of shame or guilt. With 'introjected regulation' a teacher might for instance want to prove herself and show off her skills as a good teacher.

Autonomous motivation involves a sense of volition and self-endorsement. It can arise from the identification with the values and importance of a behavior. With 'identified regulation' a teacher might deeply value the importance of transferring certain skills to students. Autonomous motivation might also arise from the pleasure or inherent satisfaction coming from engaging in the teaching activity itself. With 'intrinsic motivation' a teacher may enjoy enriching students with new insights and knowledge.

In most studies on antecedents and outcomes of teachers' quality of motivation to teach, a variable-centered approach has been taken. In these studies, autonomous motivation related to more optimal outcomes, such as more commitment and engagement in the work setting (Gagné & Deci, 2005), while controlled motivation related to more negative outcomes, such as burnout (Eyal & Roth, 2011; Fernet, Sen, Guay, Marsh, & Dowson, 2008).

Based on these previous studies (Eyal & Roth, 2011; Fernet et al., 2008; Gagné & Deci, 2005), it was expected in the present study that autonomous motivation would primarily relate positively to need satisfaction and need-supportive teaching behavior, while controlled motivation would more closely and positively relate to the more maladaptive outcome burnout.

The value of a person-centered approach

Although the variable-centered approach has yielded important insights in the role of quality of motivation in teachers' functioning, it has typically studied autonomous and controlled motivation as separate dimensions without focusing on their dynamic interplay. This is unfortunate because in reality, teachers can combine several reasons for engaging in their job. Some teachers can enjoy interacting with their students and value the learning outcomes, while

at the same time feeling pressured to attain the goals set for their course because they want to prove themselves or because they want to avoid getting reprimanded. Other teachers might have a more pure autonomous motivational profile, engaging in teaching mainly for volitional reasons without feeling pressured. The advantage of a person-centered approach with cluster analyses lies in the possibility to identify naturally occurring combinations of teachers' reasons to teach. These within-teacher combinations constitute different motivational profiles. Also, by examining whether these profiles differ in terms of antecedents and outcomes of teacher motivation, this approach allows researchers to address important questions about the combined role of types of motivation. One important question, for instance, is whether a profile characterized by high quantity of motivation (i.e., a combination of autonomous and controlled motivation) yields benefits relative to a profile characterized by high quality of motivation (i.e., a profile characterized by autonomous motivation only).

As SDT, in contrast to more quantitative theories of motivation, underscores the importance of qualitative differences in motivation, it would be considered more adaptive to predominantly endorse autonomous reason to teach, than to display high levels of both autonomous and controlled motivation. Similarly, SDT's qualitative view on motivation suggests that it would be better to endorse low autonomous and controlled motivation than to predominantly endorse controlled motivation to teach. As such, a person-centered approach allows for investigating the importance of a qualitative perspective on motivation.

Person-centered analyses (e.g., cluster analyses) have been performed in different contexts, including employees' motivation to work (Van den Broeck, Lens, De Witte, & Van Coillie, 2013), athletes' motivation (Gillet, Berjot, Vallerand, Amoura, & Rosnet, 2012; Gillet, Vallerand, & Paty, 2013), and students' motivation in general education (Hayenga & Corpus, 2010; Ratelle, Guay, Vallerand, Larose, & Sénécal, 2007; Vansteenkiste, Sierens, Soenens, Luyckx, & Lens, 2009). There were also studies specifically investigating motivational profiles in the context of physical education, focusing both on students' motivation (Boiché, Sarrazin, Grouzet, Pelletier, & Chanal, 2008; Haerens, Kirk, Cardon, De Bourdeaudhuij, & Vansteenkiste, 2010; Ntoumanis, 2002) and on teachers' motivation (Van den Berghe, Cardon, et al., 2013).

Most of the studies identifying motivational profiles have taken one of the following approaches. Whereas in some studies motivational profiles were identified on the basis of the four separate motivational regulations of SDT's continuum (i.e., intrinsic motivation, identified regulation, introjected regulation, and external regulation) (Boiché et al., 2008; Gillet et al., 2012, 2013; Ntoumanis, 2002), another strategy (Hayenga & Corpus, 2010) made use of the distinction between intrinsic and extrinsic motivation to identify clusters. Other studies have identified profiles on the basis of composite scores for autonomous and controlled motivation (Van den Berghe, Cardon, et al., 2013; Van den Broeck et al., 2013; Vansteenkiste et al., 2009). In addition to autonomous and controlled motivation, some studies also included a measure of amotivation in the analyses (Haerens et al., 2010; Ratelle et al., 2007).

Throughout the aforementioned studies (Boiché et al., 2008; Gillet et al., 2012, 2013; Haerens et al., 2010; Hayenga & Corpus, 2010; Ntoumanis, 2002; Ratelle et al., 2007; Van den Berghe, Cardon, et al., 2013; Van den Broeck et al., 2013; Vansteenkiste et al., 2009), six motivational profiles were identified, depending on the variation in the quantity of autonomous motivation (or intrinsic motivation and identified regulation), controlled motivation (or external and introjected regulation), and amotivation. A first motivational profile, identified in all of the studies (except for the study of Gillet et al., 2012), was generally referred to as the

'good quality' motivation group, because members typically endorsed high levels of autonomous motivation (or intrinsic motivation and identified regulation) and low levels of controlled motivation (or external or introjected regulation). Next, three profiles were identified that were defined as the 'high, moderate, and low quantity' group. These profiles were characterized by both a high (identified in eight studies, except for the studies of Ntoumanis (2002) and Boiché et al. (2008)), a moderate (Boiché et al., 2008; Gillet et al., 2012; Ntoumanis, 2002; Ratelle et al., 2007), or a low quantity (Gillet et al., 2012; Haerens et al., 2010; Hayenga & Corpus, 2010; Ratelle et al., 2007; Van den Berghe, Cardon, et al., 2013; Van den Broeck et al., 2013; Vansteenkiste et al., 2009) of autonomous and controlled motivation. Further, there was also a profile reflecting high scores on controlled motivation (or external or introjected regulation) and low scores on autonomous motivation (or intrinsic motivation and identified regulation), often referred to as the 'poor quality' group, because the reported motivation is mainly controlled in nature and thus of poor quality. This profile was found in all but one (Gillet et al., 2012) of the mentioned studies. The final profile, identified in two studies (Haerens et al., 2010; Ratelle et al., 2007), incorporated a group of people scoring especially high on amotivation.

When comparing the motivational profiles in relation to adaptive and maladaptive outcomes, two particularly interesting sets of hypotheses have been examined. In SDT, it is proposed that the presence of more motivation is not necessarily beneficial if the additional motivation is of poor quality (Deci & Ryan, 2000; Vansteenkiste et al., 2009). Therefore, it is expected that individuals in the good quality group would report more adaptive outcomes than individuals in the high quantity group. This hypothesis was partially confirmed in previous studies. The good quality profile indeed showed higher academic achievement than the high quantity group in middle school students (Hayenga & Corpus, 2010). Similar results were found in the study of Gillet et al. (2013), in which tennis players from the good quality group showed more optimal performance outcomes than tennis players in the high quantity group. Nevertheless, not all studies found systematic differences between the 'good quality' and 'high quantity' motivation group. Vansteenkiste et al. (2009) reported higher scores for academic performance and perceived autonomy support and lower scores on cheating attitude for the students in the good quality group relative to the high quantity group. However, no differences in favor of the good quality group were found for a range of other outcome variables such as cheating behavior, effort regulation or meta-cognitive strategy use. Also in the study of Haerens et al. (2010) among university students reporting on their motivational experiences during high school PE, differences between profiles were mixed. Although students in the good quality group reported higher levels of overall physical activity and in particular sport participation, no differences were found for active transportation.

Another SDT-based hypothesis was that it would be better to display low levels of motivation (low quantity group), as opposed to being predominantly controlled motivated (poor quality group), because high levels of controlled motivation could have a detrimental effect on adaptive outcomes (Vansteenkiste et al., 2009). Again, studies found partial evidence for this hypothesis. PE teachers experienced more emotional exhaustion (Van den Berghe, Cardon, et al., 2013), university students reported less sport participation in high school (Haerens et al., 2010), and high school students perceived less need support from their teachers and reported more test anxiety and procrastination (Vansteenkiste et al., 2009) when they had a poor quality profile rather than a low quantity profile. However, no clear differences between these two profiles were found for employees' job satisfaction and work

enthusiasm (Van den Broeck et al., 2013), university students' levels of physical activity and time spent active transportation (Haerens et al., 2010), and high school students' academic functioning in terms of cognitive processing or academic performance (Vansteenkiste et al., 2009). In conclusion, results regarding between-profile differences are somewhat inconsistent. We aimed to add to this literature by examining PE teachers' motivational profiles. To date, only one study addressed this issue (Van den Berghe, Cardon, et al., 2013). This study included only teachers' emotional exhaustion (as one dimension of burnout) as an outcome. The current study aimed to provide a more comprehensive examination of PE teachers' motivational profile by including a broader assessment of burnout, by examining associations with teachers' experiences of need satisfaction, and by examining associations with teachers' instructional style toward students.

Basic psychological need satisfaction

According to SDT, experiences of need satisfaction are the driving force behind quality of motivation. In Basic Psychological Needs theory, one of the mini-theories in SDT (Ryan & Deci, 2002; Vansteenkiste, Niemiec, & Soenens, 2010), it is stated that the satisfaction of the three basic psychological needs for autonomy, competence and relatedness is required to develop autonomous motivation. In contrast, frustration of these needs would elicit controlled motivation. The need for autonomy refers to a sense of volition and psychological freedom (Ryan & Deci, 2002; Vansteenkiste et al., 2010). When teachers have their need for autonomy satisfied, they feel like they are allowed to express ideas and opinions, they experience authenticity, and they feel free to do things their own way. The need for competence involves feeling effective in one's actions or pursuits (White, 1959). Teachers will feel competent at work when they feel able to execute their job properly and when they can accomplish challenging tasks (Van den Broeck, Vansteenkiste, De Witte, Soenens, & Lens, 2010). The need for relatedness refers to the feeling of belongingness to important others, to care and to be cared for (Baumeister & Leary, 1995). This need will be satisfied when teachers feel connected to their colleagues and important other people in their working environment (e.g., students and parents). Studies adopting a variable-centered approach have shown that the more teachers feel satisfied in their needs at school, the more likely they are to be autonomously motivated for the job (e.g., Carson & Chase, 2009; Taylor, Ntoumanis, & Standage, 2008). Relationships between need satisfaction at work and controlled motivation were less clear-cut. In one study, need satisfaction at work even showed a weak positive relation with introjected regulation (Carson & Chase, 2009).

To our knowledge, no studies to date adopted a person-centered approach to investigate how perceived need satisfaction at work differs according to teachers' motivational profile. Based on previous variable-centered studies (Carson & Chase, 2009; Taylor et al., 2008), it was expected that need satisfaction would be most elevated in the good quality motivational profile, perhaps even more so than in the high quantity group. It was also deemed interesting to examine whether, as predicted by SDT, individuals in the low quantity group would report more need satisfaction compared to individuals in the poor quality group.

Need-supportive teaching behavior

In SDT, the quality of a motivating teaching style is defined along the three key dimensions of autonomy support, structure, and involvement. Autonomy support refers to teachers who explain the importance of tasks, ask questions, and encourage the expression of a personal opinion, structure is characterized by the provision of

positive feedback, instrumental help and support, and involvement refers to having warm interactions and gaining an understanding of the students (Belmont, Skinner, Wellborn, & Connell, 1988; Pelletier, Seguin-Levesque, & Legault, 2002; Taylor & Ntoumanis, 2007; Taylor et al., 2008). Research has shown that teachers' own motivation is a crucial determinant of the interactional style they use toward students (Pelletier et al., 2002; Taylor & Ntoumanis, 2007; Taylor et al., 2008). Pelletier et al. (2002), for instance, found that teachers' self-determined motivation to teach (i.e., a composite score of autonomous versus controlled motivation) was related positively to provided autonomy support. Similarly, studies by Taylor and Ntoumanis (2007) and Taylor et al. (2008) showed that teachers' self-determined motivation to teach related to more teacher autonomy support, structure, and involvement.

The current study aims to add to these studies by examining the association between teacher motivation and teaching style from a person-centered approach. It was hypothesized that teachers displaying a good quality motivational profile would report the highest levels of autonomy support, structure, and involvement, perhaps even more so than teachers with a high quantity profile. We also expected that teachers with a poor quality motivational profile would report the lowest levels of autonomy support, structure, and involvement, perhaps even lower than teachers with a low quantity profile.

Burnout

For teachers and school policy members, burnout and absenteeism are phenomena raising significant concern. Unfortunately, teachers sometimes suffer from feelings of burnout, and the quality of their motivation to teach might explain differences in this maladaptive outcome. Burnout is typically characterized by emotional exhaustion, depersonalization (i.e., an impersonal response toward others), and decreased feelings of personal accomplishment (Maslach & Jackson, 1981). When experiencing burnout, teachers are no longer able to be intensively involved and to have a meaningful impact at work (Maslach & Jackson, 1981; Schaufeli, Leiter, & Maslach, 2009). It has been theorized and shown that pressures teachers experience at work, such as work overload or students' disruptive behaviors, hamper autonomous motivation and, in turn, increase the risk for burnout (Fernet, Guay, Senecal, & Austin, 2012). Bartholomew, Ntoumanis, Cuevas, and Lonsdale (2014) hypothesized that processes of need satisfaction also play a role and showed that teachers who feel frustrated in their basic psychological needs (as a consequence of job pressure) showed more burnout.

To our knowledge, only two studies adopted a person-centered approach to investigate how motivational profiles relate to the occurrence of burnout, one among employees more generally (Van den Broeck et al., 2013) and one among PE teachers (Van den Berghe, Cardon, et al., 2013). These studies showed that employees with a motivational profile characterized by high levels of autonomous motivation are less susceptible for cynicism and emotional exhaustion. No difference in terms of burnout was found between employees with a good quality and a high quantity motivational profile. The current study further addresses the association between PE teachers' motivational profile and burnout, thereby relying on a larger sample of teachers and using a more comprehensive measure of burnout than in the Van den Berghe, Cardon, et al. (2013) study.

The present study

The first aim of this study was to determine PE teachers' motivational profiles on the basis of their scores for autonomous and controlled motivation. We decided to perform our analyses on the

basis of the composite scores for autonomous and controlled motivation (rather than on the four separate motivational regulations) because we did not have differential predictions about the two subdimensions of the autonomous and controlled composite scores. It was hypothesized that four motivational profiles would be identified when performing cluster analysis. We expected a good quality group, a high quantity motivation group, a low quantity group, and a poor quality group.

A second, more important, aim was to examine associations between the motivational profiles and key hypothesized antecedents and outcomes of teacher motivation, that is, experiences of need satisfaction, burnout, and quality of teaching style. It was expected that the good quality and the high quantity group would show the most optimal pattern of antecedents and outcomes (e.g., more need satisfaction and more need-supportive teaching), because both groups are characterized by high levels of autonomous motivation. If anything, we expected the good quality motivational profile to be even more adaptive than the high quantity profile. It was also expected that teachers in the poor quality motivation group would show the most maladaptive antecedents and outcomes (e.g., burnout), because this group is characterized by high levels of controlled motivation. This profile was expected to be even more maladaptive than the low quantity profile.

Method

Participants

Two digital recruitment strategies were used, that is, (a) an email boost to a list of 570 PE teachers who participated in previous research and (b) an advertisement placed in a professional journal for PE teachers. Two hundred twenty PE teachers from Flanders, the Dutch-speaking part of Belgium, registered to participate in the study, which consisted of four online questionnaires. Of these participants, 201 teachers (91.4%, M age = 41.9 ± 11.8 years, 42% male and 58% female) completed the first questionnaire, which tapped into motivation to teach and which was essential for the current study. We compared the sample of 201 participating teachers to the teachers who did not fill out the first questionnaire. There were no differences in terms of gender ($F(1, 218) = .45$, ns) or education degree ($F(1, 217) = .06$, ns). The included participants had significantly more years of teaching experience than the group of teachers who did not fill out the first questionnaire (i.e., 18.9 years versus 14.0 years, $F(1, 218) = 4.35$, $p = .04$). Thirty-seven percent of the included participants taught in a primary school, 59% in a secondary school, and four percent in higher education.

Measures

Basic need satisfaction at work

The Work-related Basic Need Satisfaction Scale (W-BNS, Van den Broeck et al., 2010) captures employees', in this case teachers', satisfaction of the three basic psychological needs experienced in the work context. The subscales 'autonomy satisfaction' ($\alpha = .74$; e.g., "I feel like I can be myself at my job"), 'competence satisfaction' ($\alpha = .76$; e.g., "I have the feeling that I can even accomplish the most difficult tasks at work") and 'relatedness satisfaction' ($\alpha = .84$; e.g., "At work, I can talk with people about things that really matter to me") each contain six items capturing the degree teachers feel satisfied in their psychological needs. The items were rated on a 5-point Likert scale, ranging between indicating 1 (*completely disagree*), 2 (*rather disagree*), 3 (*sometimes disagree, sometimes agree*), 4 (*rather agree*), and 5 (*completely agree*).

Motivation to teach

Soenens, Sierens, Vansteenkiste, Dochy, and Goossens (2012) developed a questionnaire for teachers' motivation to teach. This questionnaire was an adaptation of the well-established Self-Regulation Questionnaire – Academic (Ryan & Connell, 1989). The validity of the questionnaire was demonstrated in terms of theoretically anticipated associations with teachers' burnout and teaching style (Soenens et al., 2012). The questionnaire started with the stem "I am motivated to teach well because ...". This stem was followed by 16 items representing four subscales; 'intrinsic motivation' (4 items, $\alpha = .85$; e.g., "... because I enjoy teaching"), 'identified regulation' (4 items, $\alpha = .70$; e.g., "... because it is an important life goal."), 'introjected regulation' (4 items, $\alpha = .66$; e.g., "... because I would feel bad about myself if I don't"), and 'external regulation' (4 items, $\alpha = .69$; "... because others force me to do so"). Items were rated on 5-point Likert scale, indicating 1 (*completely disagree*), 2 (*rather disagree*), 3 (*sometimes disagree, sometimes agree*), 4 (*rather agree*), and 5 (*completely agree*). For the purpose of the current study, we computed composite scores for autonomous and controlled motivation. Autonomous motivation ($\alpha = .85$) consisted of items representing 'intrinsic motivation' and 'identified regulation'. Controlled motivation ($\alpha = .80$) consisted of items for 'introjected' and 'external regulation'.

Burnout

Participants completed a Dutch version (Soenens et al., 2012) of the Maslach Burnout Inventory–Educators Survey (MBI-ES; Kokkinos, 2006; Maslach & Jackson, 1986), a validated questionnaire on burnout in teachers. The subscale 'personal accomplishment' ($\alpha = .83$) assesses feelings of competence and successful achievement of teachers and contains seven items (e.g., "I deal very effectively with the problems of my students"). High scores on this subscale indicate less burnout. The subscale 'emotional exhaustion' (8 items, $\alpha = .89$) measures feelings of tiredness at work (e.g., "I feel emotionally drained from my work"). The subscale 'depersonalization' (5 items, $\alpha = .63$) reflects teachers' impersonal response to students (e.g., "I don't really care what happens to some students"). All items in the questionnaire were rated on a 7-point Likert scale, indicating 1 (*never*), 2 (*sporadically*), 3 (*once in a while*), 4 (*frequently*), 5 (*often*), 6 (*very often*), and 7 (*always*).

Self-reported need-supportive teaching

Teachers' provision of need support toward students was measured by means of a Dutch version of the Teacher Report of the Teacher as Social Context Questionnaire (Belmont et al., 1988). The questionnaire was slightly adapted in order to capture a more general, class-level assessment of need support. Further, it was also adapted to the context of PE by replacing the specific references to academic subjects with PE-related terms (for instance, the item "I have to lead this student through his/her schoolwork step by step." was changed into "I have to lead my students through their exercises step by step"). The questionnaire captures the three dimensions of need-supportive teaching behavior; 'autonomy support' (12 items, $\alpha = .76$; e.g., "I try to give my students a lot of choices about exercises"), 'structure' (15 items, $\alpha = .82$; e.g., "I try to be clear with my students about what I expect of them in class"), and 'involvement' (14 items, $\alpha = .82$; e.g., "I know a lot about what goes on for my students"). All items in the questionnaire were rated on a 5-point Likert scale, indicating 1 (*completely disagree*), 2 (*rather disagree*), 3 (*sometimes disagree, sometimes agree*), 4 (*rather agree*), and 5 (*completely agree*).

Analyses

Motivational profiles in PE teachers were identified by means of a combination of hierarchical and non-hierarchical clustering methods (Gore, 2000). First, we computed standardized scores for the teachers' motives. Three univariate outliers for these variables were excluded, with outliers being defined as participants scoring higher than three standard deviations above or below the mean. Five multivariate outliers were excluded because they had high Mahalanobis distance values. The final sample for the cluster analysis consisted of 193 teachers. To identify hierarchical clusters based on the two dimensions of motivation, Ward's method based on squared Euclidian distances was used. In a second step, the cluster centers of the Ward's solution were used as non-random starting points in an iterative, non-hierarchical k-means clustering procedure. The stability of cluster solutions was assessed by randomly splitting the sample in two and then applying the two-step procedure in each half. The participants in each half were assigned to new clusters on the basis of their Euclidean distances to the cluster centers of the other half of the sample. Then, the new clusters of both halves were merged under the same variable names. Cohen's kappa (κ) was used for assessing the agreement between the original and the new cluster solution. A Cohen's kappa value between .80 and 1 indicates nearly perfect stability, between .60 and .80 indicates substantial agreement, between .40 and .60 indicates moderate stability, and between .20 and .40 indicates fair stability (Landis & Koch, 1977). Cross tabulation was used to compare the distribution of cases belonging to specific profiles between different cluster solutions. To investigate differences in need satisfaction, motivation to teach, burnout, and need support according to the teachers' personal motivational profile, a multivariate analysis of variance (MANOVA) with post-hoc tests using Scheffé's method⁵ was conducted. Effect sizes of .01 were considered small, effect sizes above .06 moderate, and effect sizes above .14 large (Cohen, 1988).

Results

Descriptive statistics

Table 1 represents the descriptive statistics and Pearson correlations among all study variables. Autonomous motivation related significantly positive to all positive outcomes including personal accomplishment as a dimension of burnout, whereas negative relationships were found with emotional exhaustion and depersonalization. Relationships were less clear-cut for controlled motivation. While controlled motivation was related negatively to overall need satisfaction, and to autonomy satisfaction in particular, it was unrelated to competence and relatedness satisfaction. With regard to need support, controlled motivation was only related negatively to self-reported involvement with the students. Controlled motivation also had a significant positive relationship with emotional exhaustion and depersonalization. Just for information, Table 1 also displays the correlations of each of the 4 separate motivational regulations with the study variables. As can be seen, intrinsic and identified regulation ($r = .56, p < .01$) were highly correlated, as were introjected and external regulation ($r = .56, p < .01$). Also, the subdimensions of both autonomous and controlled motivation correlated in a similar way to all study variables, thus justifying our choice to perform the analyses on the composite scores for autonomous and controlled motivation.

⁵ When applying a Bonferroni correction to the post-hoc analyses, all differences between the clusters remained significant.

Table 1
Descriptive statistics and correlations among study variables.

	M (SD)	N	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. Autonomous motivation	4.17 (.51)	193	1																
2. Controlled motivation	1.96 (.65)	193	-.09	1															
3. Intrinsic motivation	4.38 (.58)	193	.87**	-.21**	1														
4. Identified regulation	3.98 (.63)	193	.89**	.04	.56**	1													
5. Introjected regulation	2.30 (.86)	193	-.03	.91**	-.12	.07	1												
6. External regulation	1.62 (.62)	193	-.15*	.83**	-.28**	-.01	.53**	1											
7. Need satisfaction	4.00 (.52)	193	.42**	-.15*	.38**	.36**	-.11	-.17*	1										
8. Autonomy satisfaction	3.93 (.63)	193	.42**	-.17*	.42**	.33**	-.12	-.20**	.85**	1									
9. Competence satisfaction	4.19 (.57)	193	.27**	-.13	.24**	.24**	-.08	-.16*	.79**	.60**	1								
10. Relatedness satisfaction	3.89 (.78)	193	.30**	-.08	.26**	.27**	-.07	-.06	.79**	.47**	.30**	1							
11. Need support	3.69 (.33)	189	.51**	-.08	.43**	.48**	-.02	-.13	.33**	.31**	.30**	.18*	1						
12. Autonomy support	3.35 (.45)	176	.29**	.03	.21**	.29**	.02	.03	.18*	.20**	.20**	.07	.76**	1					
13. Structure	4.05 (.39)	186	.38**	-.08	.29**	.38**	-.01	-.16*	.26**	.20**	.29**	.15*	.78**	.37**	1				
14. Involvement	3.66 (.43)	189	.54**	-.15*	.49**	.46**	-.11	-.16*	.33**	.31**	.22**	.25**	.79**	.37**	.46**	1			
15. Emotional exhaustion	2.49 (1.02)	193	-.41**	.20**	-.51**	-.22**	.17*	.19**	-.51**	-.57**	-.28**	-.37**	-.24**	-.12	-.09	-.32**	1		
16. Personal accomplishment	4.90 (.81)	193	.54**	-.04	.48**	.47**	.02	-.10	.43**	.40**	.35**	.29**	.66**	.39**	.45**	.68**	-.37**	1	
17. Depersonalization	1.75 (.62)	193	-.45**	.24**	-.44**	-.35**	.17*	.27**	-.46**	-.42**	-.31**	-.36**	-.37**	-.15	-.34**	-.40**	.55**	-.44**	1

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

Motivational clusters

In a first step, three cluster solutions (with the number of clusters ranging between 3 and 5) based on the two dimensions of autonomous and controlled motivation were compared. A three-cluster solution explained 40% of the variance in autonomous motivation and 61% of the variance in controlled motivation. A four-cluster solution explained 68% of the variance in autonomous motivation and 68% of the variance in controlled motivation. A five-cluster solution explained 71% of the variance in autonomous motivation and 76% of the variance in controlled motivation. Because the three-cluster solution only explained 40% of the variance in autonomous motivation, this solution was not withheld for further analyses (Milligan & Cooper, 1985). The follow-up iterative, non-hierarchical *k*-means clustering procedure was applied to both the four- and five-cluster solutions. In both cases, this procedure again resulted in solutions that explained more than 50% of the variance in the clustering dimensions. Additional Fig. 1 (Four-cluster solution based on autonomous and controlled motivation) presents the four-cluster solution and additional Fig. 2 (Five-cluster solution based on autonomous and controlled motivation) presents the five-cluster solution, with the Y-axis representing standardized scores for autonomous and controlled motivation. Based on their relative, standardized scores, the following labels were given to the four clusters: (a) a relatively controlled group or a poor quality group (i.e., cluster 1, $N = 30$), (b) a relatively lowly motivated group or a low quantity group (i.e., cluster 2, $N = 47$), (c) a relatively highly motivated group or a high quantity group (i.e., cluster 3, $N = 52$), and (d) a relatively autonomous group or a good quality group (i.e., cluster 4, $N = 64$). The clusters in the five-cluster solution (Additional Fig. 2) were labeled analogously; (a) a poor quality group (i.e., cluster 1, $N = 22$), (b) a low quantity group (i.e., cluster 2, $N = 32$), (c) a high quantity group (i.e., cluster 4, $N = 34$), (d) a good quality group (i.e., cluster 5, $N = 43$), and (e) an additional group characterized by relatively moderate motivation overall ('average motivation' i.e., cluster 3, $N = 43$).

Through cross-tabulation, we then investigated how teachers changed clusters from the four cluster solution to the five cluster solution (see Table 2). This analysis revealed that the four clusters were quite stable, and that the teachers in the average motivation group had their roots in all four clusters. Due the limited theoretical added value of the fifth cluster and that fact that it seemed to consist of a moderate group because it brought together teachers with all kinds of profiles, it was decided not to include the moderate group in the multivariate analyses of variance with the clusters.

In a final step, cross-validation of the four-cluster solution resulted in a moderate kappa value of .55, indicating moderate stability (Landis & Koch, 1977). The mean scores for autonomous and controlled motivation in each cluster are reported in Table 3. Multivariate differences were found between the four clusters ($F(39,475) = 16.98, p < .001, \eta^2_p = .58$). The univariate differences and contrasts between clusters are presented in Table 3. The differences in autonomous and controlled motivation between the groups confirmed the labeling of the clusters.⁶

⁶ We also performed a cluster analysis on the four separate scores for the motivational regulations. This analysis essentially resulted in the same 4-cluster solution as the one performed on the composite scores for autonomous and controlled motivation. The meaning of the four clusters obtained was the same. Moreover, a cross-tabulation of both cluster solutions showed a strong degree of convergence (i.e., on average 91% of the participants remained in the same cluster). Finally, the cluster-solution based on the four separate motivational regulations yielded a similar pattern of associations with the other study variables and did not explain more variance compared to the solution based on the composite scores for autonomous and controlled motivation.

Table 2

Cross tabulation of the four-cluster and five-cluster solution.

Four-cluster solution		Five-cluster solution	Proportion coming from the group in the four-cluster solution going to the five-cluster solution	Proportion from total cluster count in the five-cluster solution coming from the four-cluster solution	
1. Poor quality group	→	1. Poor quality group	83.3%	25/26	96.2%
		2. Low quantity group	0%	0/34	0%
		3. Moderate group	10%	3/45	6.7%
		4. High quantity group	6.7%	2/40	5%
		5. Good quality group	0%	0/48	0%
2. Low quantity group	→	1. Poor quality group	2.1%	1/26	3.8%
		2. Low quantity group	68.1%	32/34	94.1%
		3. Moderate group	29.8%	14/45	31.1%
		4. High quantity group	0%	0/40	0%
		5. Good quality group	0%	0/48	0%
3. High quantity group	→	1. Poor quality group	0%	0/26	0%
		2. Low quantity group	0%	0/34	0%
		3. Moderate group	26.9%	14/45	31.1%
		4. High quantity group	73.1%	38/40	95%
		5. Good quality group	0%	0/48	0%
4. Good quality group	→	1. Poor quality group	0%	0/26	0%
		2. Low quantity group	3.1%	2/34	5.9%
		3. Moderate group	21.9%	14/45	31.1%
		4. High quantity group	0%	0/40	0%
		5. Good quality group	75%	48/48	100%

Differences in teachers' need satisfaction between the four clusters (Table 3)

Teachers in the good quality group (cluster 4) reported most overall need satisfaction, autonomy satisfaction, and competence satisfaction and they scored even higher on need satisfaction than teachers in the high quantity group. In turn, teachers in the high quantity group (cluster 3) scored higher on autonomy satisfaction than those in the poor quality group (cluster 1). No significant differences between groups were found for relatedness satisfaction.

Differences in need support toward the students between the four clusters (Table 3)

Teachers in the good quality group (cluster 4) reported to provide more need support, autonomy support, and structure while teaching PE than those in the poor quality (cluster 1) and the low quantity group (cluster 2). There were no differences, however, between the good quality group and the high quantity group. In turn, teachers in the high quantity group (cluster 3) did not differ from those in the poor quality (cluster 1) and low quantity group (cluster 2). Teachers in the poor quality group (cluster 1) provided the least need support and involvement with their students compared to all other groups.

Differences in burnout between the four clusters (Table 3)

Teachers in the good quality group (group 4) reported less burnout (emotional exhaustion and depersonalization) and more personal accomplishment. They differed significantly in this regard from participants in both the poor quality group and the low quantity group (although the difference with the low quantity group in terms of depersonalization did not reach significance). They did not differ significantly, however, from teachers in the high quantity group. Teachers in the poor quality group displayed the least favorable profile of burnout, indicating more emotional exhaustion and depersonalization and more personal accomplishment than participants in all other groups.

Effect sizes for all differences between clusters were considered to be moderate to large, except for a small effect size for relatedness satisfaction (partial $\eta^2 = .04$).

Discussion

The current study aimed to compare PE teachers' motivational profiles in terms of personal need satisfaction at work, self-reported need-supportive teaching behavior toward students, and feelings of burnout. Motivating teaching behavior and teacher burnout are relevant outcomes for the practice of education. Differences in psychological need satisfaction between motivational profiles might provide further insight into the antecedents of the quality of teacher motivation.

Consistent with previous research and as expected theoretically, we found that scores for autonomous and controlled motivation to teach were related differentially to need satisfaction, teaching style, and burnout. Specifically, autonomous motivation was related positively to experiences of need satisfaction at work, which is consistent with the notion that need satisfaction provides the fuel necessary to identify with the importance of one's job or even to do the job out of interest and enjoyment. Autonomous motivation was also related to a more need-supportive teaching style, confirming the idea that autonomous motivation energizes teachers to relate to their students in a way that supports the students' basic psychological needs during PE. Also consistent with the idea that autonomous motivation has an energizing effect on teachers' functioning, it was found to relate negatively to burnout. Controlled motivation showed a largely opposite pattern of associations with these variables, although associations were somewhat less pronounced and consistent compared to those obtained with autonomous motivation.

The essential question in this study, however, was how these two motivational orientations would combine within teachers and how these within-teacher motivational profiles relate to the antecedents and outcomes of quality of motivation. Such a person-centered approach allows for a more fine-grained picture of differences between unique combinations of motivational regulations.

By identifying four motivational profiles using cluster analysis, the current study confirmed results from other studies that have adopted a person-centered approach to investigate how autonomous and controlled motivation co-occur within individuals. PE teachers scored either relatively high on autonomous motivation and low on controlled motivation (i.e., the good quality group), relatively high on both controlled and autonomous motivation (i.e.,

Table 3Four-cluster solution: motivational clusters' mean scores and *F*-values for motivation, need satisfaction at work, need support, and burnout.

	Total (<i>N</i> = 193)	Cluster 1 Poor quality group (<i>N</i> = 30)	Cluster 2 Low quantity group (<i>N</i> = 47)	Cluster 3 High quantity group (<i>N</i> = 52)	Cluster 4 Good quality group (<i>N</i> = 64)	<i>F</i> (df)	Partial η^2
Autonomous motivation	4.16 (.52)	3.38 ^a (.32)	3.88 ^b (.26)	4.39 ^c (.34)	4.58 ^d (.25)	129.86 (3, 172)***	.69
Controlled motivation	1.97 (.66)	2.51 ^a (.48)	1.44 ^b (.34)	2.64 ^a (.40)	1.56 ^b (.32)	120.43 (3, 172)***	.68
Intrinsic motivation	4.37 (.57)	3.52 ^a (.51)	4.16 ^b (.37)	4.55 ^c (.42)	4.77 ^d (.29)	72.92 (3, 172)***	.56
Identified regulation	3.96 (.61)	3.23 ^a (.39)	3.60 ^b (.49)	4.22 ^c (.40)	4.39 ^c (.40)	62.61 (3, 172)***	.52
Introjected regulation	2.29 (.85)	2.94 ^a (.63)	1.66 ^b (.52)	3.11 ^a (.58)	1.82 ^b (.51)	80.42 (3, 172)***	.58
External regulation	1.64 (.63)	2.08 ^a (.67)	1.23 ^b (.30)	2.18 ^a (.54)	1.31 ^b (.23)	49.71 (3, 172)***	.46
Need satisfaction	3.99 (.53)	3.71 ^a (.54)	3.86 ^a (.52)	3.96 ^a (.49)	4.26 ^b (.44)	10.00 (3, 172)***	.15
Autonomy satisfaction	3.91 (.65)	3.48 ^a (.60)	3.73 ^{ab} (.61)	3.91 ^b (.54)	4.27 ^c (.60)	13.48 (3, 172)***	.19
Competence satisfaction	4.19 (.57)	4.01 ^a (.53)	4.04 ^a (.53)	4.10 ^a (.67)	4.46 ^b (.44)	7.29 (3, 172)***	.11
Relatedness satisfaction	3.88 (.78)	3.64 (1.01)	3.81 (.73)	3.86 (.68)	4.06 (.74)	2.05 (3, 172)	.04
Need support	3.69 (.34)	3.42 ^a (.30)	3.59 ^b (.29)	3.72 ^{bc} (.31)	3.86 ^c (.31)	15.63 (3, 172)***	.21
Autonomy support	3.35 (.45)	3.19 ^a (.37)	3.23 ^a (.48)	3.38 ^{ab} (.41)	3.50 ^b (.46)	4.63 (3, 172)***	.08
Structure	4.06 (.39)	3.86 ^a (.45)	3.97 ^a (.36)	4.08 ^{ab} (.37)	4.21 ^b (.36)	6.57 (3, 172)**	.10
Involvement	3.65 (.45)	3.20 ^a (.42)	3.58 ^b (.40)	3.69 ^b (.44)	3.88 ^{bc} (.35)	18.49 (3, 172)***	.24
Emotional exhaustion	2.50 (1.00)	3.40 ^a (1.32)	2.64 ^b (1.02)	2.36 ^{bc} (.70)	2.07 ^c (.72)	13.72 (3, 172)***	.19
Personal accomplishment	4.89 (.82)	4.13 ^a (.82)	4.68 ^b (.76)	5.13 ^c (.66)	5.23 ^c (.71)	16.84 (3, 172)***	.23
Depersonalization	1.76 (.62)	2.32 ^a (1.01)	1.75 ^b (.47)	1.73 ^b (.43)	1.54 ^b (.46)	11.35 (3, 172)***	.17

Notes. [†]*p* < .10; ***p* < .01; ****p* < .001. A cluster mean is significantly different from another mean if they have other superscript letter.

the high quantity group), relatively low on both controlled and autonomous motivation (i.e., the low quantity group), or relatively high on controlled and low on autonomous motivation (i.e., the poor quality group). However, it has to be noted that 'relatively' high or low scores refer to scores compared with the scores of other teachers in this sample. In the relatively controlled motivated group, absolute scores for autonomous motivation were still rather high (3.38/5) and scores for controlled motivation were still rather low (2.51/5). Apparently, the teachers participating in the present study were predominantly autonomously motivated to engage in their job. However, despite this observation, clear differences in need satisfaction, need support, and burnout were identified between the four groups of teachers.

The existence of a group of teachers characterized by high autonomous and controlled motivation is particularly interesting because it shows that both types of motives can be combined. It also raises the question whether such a high quantity motivational profile is better compared to a profile characterized by lower quantity of motivation but higher quality of motivation (i.e., high autonomous motivation and low controlled motivation). According to SDT's qualitative view on motivation, a profile typified by good quality motivation would be considered the most optimal profile because autonomous motivation is combined with low controlled motivation when compared to a profile characterized by both high autonomous and controlled motivation. So it is assumed that the presence of more motivation would not necessarily be more adaptive in function of outcomes if the additional motivation is of poor quality (Deci & Ryan, 2000; Vansteenkiste et al., 2009). However, no clear-cut results were obtained throughout previous profile studies (e.g., Vansteenkiste et al., 2009).

In the present study, teachers in the good quality group and teachers in the high quantity group differed in terms of experienced need satisfaction. The first group of teachers, who predominantly identify with the value of teaching children and who enjoy the interactions with students without feeling pressured to engage in the profession (i.e., the good quality motivation group), reported more psychological need satisfaction at the workplace, and more specifically, experienced more autonomy satisfaction and felt more competent in their job than teachers who combined autonomous motives with controlled motives. These findings indicate that more motivation is not necessarily better.

There were no differences however between teachers in the good quality and high quantity groups in terms of need-supportive

teaching style and burnout. When teachers embraced autonomous reasons for teaching combined with controlled reasons, they were equally need-supportive toward their students as teachers in the good quality group, even though they were, to some extent, controlled motivated to teach. The results in the current study also implied that the good quality and high quantity group did not differ in teachers' reports of burnout. So in line with previous studies (Van den Berghe, Cardon, et al., 2013; Van den Broeck et al., 2013), it is suggested that autonomous motivation could act as a buffer in the burnout process, even when a teacher also shows a relative high degree of controlled motivation.

Although no differences in need-supportive style and burnout were found between the good quality and high quantity group, it is worth noting that teachers in the good quality group did differ significantly from those in the poor quality and low quantity group, which was not the case for teachers from the high quantity group. As such, the high quantity group does seem to take an intermediate position in between the high quality group and the two more maladaptive motivational profiles. Future research might elaborate on these findings when exploring differences between the high quantity and good quality group by exploring possible explanatory mechanisms for the (in)active role of controlled motivation in combination with autonomous motivation in relation to various outcomes.

A second way to compare a quantitative view on motivation with SDT's more qualitative view is by contrasting teachers in the poor quality group with those in the low quantity group. Because it is assumed in SDT that a high quantity of motivation is not necessarily beneficial if the supplementary motivation is of poor quality (Deci & Ryan, 2000; Vansteenkiste et al., 2009), teachers in the relatively controlled motivated group (i.e., the poor quality group) were expected to have even lower levels of optimal antecedents and outcomes than the low quantity group. Again, results from previous studies were not always clear-cut as for some variables, such as emotional exhaustion in PE teachers (Van den Berghe, Cardon, et al., 2013) differences between both groups were found, whereas for other variables, such as job satisfaction (Van den Broeck et al., 2013) no differences were found. Even though not all results confirmed our hypothesis (e.g., no differences were found in need satisfaction, autonomy support and structure), teachers in the poor quality profile were even less likely to be need-supportive toward their students than teachers with a low overall quantity of motivation. Additionally, the poor quality teachers

reported more burnout compared to low quantity teachers. These findings indicate that, in spite of their quantity of motivation being higher, teachers with a poor quality motivational profile fare worse and interact worse with their students than teachers with low overall motivation for teaching.

Although the evidence is somewhat mixed, overall the findings of this study provide relatively more evidence for a qualitative view on teachers' motivation than for a quantitative view. For instance, if differences emerged, they emerged in favor of teachers with a high quality motivational profile rather than teachers with a high quantity profile. Similarly, any differences between teachers with a poor quality profile and teachers with a low quantity profile demonstrated that the former teachers displayed more maladaptive personal and interpersonal functioning, in spite of their higher quantity of motivation than teachers with low overall quantity of motivation.

Practical implications

Although the nature of the data does not allow us to make causal inferences, the results suggest that when the school climate promotes autonomous motivation by supporting teachers' basic psychological needs for autonomy, competence, and relatedness, teachers will develop a more optimal and qualitatively high motivational profile. In order to promote autonomous motivation in teachers, it is advised to create an autonomy supportive, well-structured and warm working environment for teachers, which is known to nourish the basic psychological needs for autonomy, competence, and relatedness. Specifically, to nurture the need for autonomy, it is crucial to create a school climate in which there is room for teachers to be themselves and to take initiative. Principals could allow and encourage teachers to express personal ideas and opinions and leave room to act upon them. To nurture the need for competence, the creation of a well-structured environment is advised. For example, it is important to create clear expectations so that teachers know what is expected from them. Principals can acknowledge teachers' good practices or effectiveness through personal conversations with them. A warm school climate in which teachers for example can have personal chats about work-related or personal issues will enhance teachers' need for relatedness (Van den Broeck, Vansteenkiste, De Witte, & Lens, 2008).

We believe that a person-centered approach to teachers' motivation has important added value for practice. Gaining a better understanding of teachers' individual motivational profiles could be of added value for school policies concerned with the well-being of their teachers or for the practice of continuous professional development programs aiming at the development of optimal need-supportive teaching styles. One reason for this is that, when discussing motivational principles with teachers, they tend to think about people rather than motivational dimensions. As such, the motivational profiles identified in this study may provide ways to communicate with teachers in a way that is more consistent with their laymen's view on motivation. For instance, while teachers with a good quality motivational profile might be more open for advice (Assor, Kaplan, Feinberg, & Tal, 2009; Deci, 2009) regarding how to teach in a need-supportive fashion, teachers with a more maladaptive motivational profile might respond more defensively to such advice and might display resistance against intervention-based recommendations. Encouraging teachers with such a motivational profile to be need-supportive might require more effort and perhaps even a different approach to explain the benefits and importance of a need-supportive approach, as also suggested by Vansteenkiste et al. (2009) in the context of students' motivational profiles. By addressing feelings of resistance, acknowledging

concerns, and looking for attainable solutions, a more need-supportive climate is created which could avoid ineffective attempts to change the teaching style.

Also, teachers often spontaneously mention that, in reality, many teachers are not characterized exclusively by one type of motivation. This is apparent from the results in the present study, in which for instance even teachers in the good quality group still endorse controlled motives to teach to some degree. Recognizing that autonomous and controlled motivation are not necessarily mutually exclusive but that teachers can indeed combine different motives in their personal functioning might increase teachers' readiness to reflect upon their own motivational functioning as well as their openness to interventions fostering high-quality motivation.

Limitations

The results of the current study are based on cross-sectional data, making it impossible to explore how teachers' motivational profiles change and how their motivational profiles are related to changes in need satisfaction, need support and burnout. Future studies could explore whether teachers in one motivational profile are particularly likely to change into a different motivational profile. For instance, it might be easier to move from a high quantity profile to a good quality profile than from a poor quality profile to a good quality profile. It would also be interesting to examine whether such shifts have subsequent implications for changes in need satisfaction and burnout over time. Longitudinal research is also needed to address the issue of direction of effects. Even though need satisfaction is claimed to be an antecedent of teachers' motivational profile and need support is claimed to be an outcome of their profile, these relationships could be partly reciprocal in nature. It would be interesting to examine changes in need satisfaction and motivation over time and to explore possible repercussions for a variety of outcomes, such as motivating teaching behavior or mental health. To be able to draw causal conclusions, intervention studies could be set up to investigate how changes in the school climate (e.g., where teachers are provided with regular feedback on their functioning) affect teachers' need satisfaction at work and, in turn, their motivational profiles.

Since all measures relied on self-reports of teachers, common method variance may have influenced the results. In future research, additional objective observations of need support (as for example in the studies of Haerens et al. (2013), Reeve and Jang (2006), and Van den Berghe, Soenens, et al. (2013)) could eliminate teachers' possible perceptual bias, making differences between motivational profiles in terms of outcomes even more strong. It could be the case, for instance, that although teachers with a high quantity motivational profile think and say that they are equally need-supportive toward students as teachers with a good quality profile, students themselves do not experience this as such. Students themselves might experience relatively more teacher need support from teachers with a good quality profile. As such, examining students' perceptions may allow for another way of comparing quantitative and qualitative views on motivation. This is also important because students' perceptions of teacher behavior ultimately determine their motivation and performance.

In future research, it would be interesting to compare and extend the current results with teachers in other subjects, such as mathematics, science, or language. Possible differences between teachers could be identified and specific approaches could be developed, each aiming at the unique needs and characteristics of specialist teachers (e.g., PE, mathematics, science or language teachers).

Conclusions

The results of the current study shed new light on PE teachers' motivation by looking at their motivation from a person-centered perspective. The most optimal motivational profile is one characterized by high levels of autonomous motivation and low levels of controlled motivation. Such a good quality motivational profile seems beneficial not only for the teachers' personal functioning but also for the quality of the teacher's interactional style toward students. The least adaptive motivational profile was one characterized by high levels of controlled motivation and low levels of autonomous motives. These teachers seem to be most vulnerable to burnout and most likely to interact with their students in a less need-supportive fashion. Overall, results of the present study partially confirmed SDT's qualitative view on motivation, stating more motivation is not always better. As such, quality of motivation in PE teachers is an important concept to consider both in research and practice.

Appendix A. Supplementary data

Supplementary data related to this article can be found at <http://dx.doi.org/10.1016/j.psychsport.2014.04.001>.

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