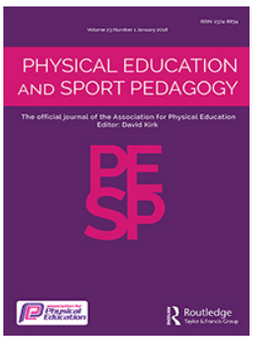

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Different combinations of perceived autonomy support and control: identifying the most optimal motivating style

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ABSTRACT

Background: According to Self-Determination Theory, teachers and sport coaches can differ in the motivating style they rely upon to motivate young people. When endorsing an autonomy-supportive motivating style, instructors try to identify, vitalize, and nurture youngsters' inner motivational resources. In contrast, instructors with a dominant controlling motivating style rather pressure youngsters to think, feel, or behave in prescribed ways. While the dimensions of autonomy support and control can be conceptually differentiated, in reality both dimensions may co-occur to different degrees.

Purpose: The present study investigates to what extent perceived autonomy support and control can be combined and which motivating style then yields the most optimal pattern of outcomes.

Research design: Multi-Study with Cross-Sectional Design.

Findings: In two studies, conducted among elite athletes ($N = 202$; $M_{age} = 15.63$; SD = 1.70) and students in physical education ($N = 647$; $M_{age} = 13.27$; SD = 0.68) reporting on their instructor's motivating style, cluster analyses systematically pointed towards the extraction of four motivating profiles. Two of these groups were characterized by the dominant presence of either autonomy support (i.e. high-autonomy support) or control (i.e. high control), while the two dimensions were found to be equally present in the two remaining groups (i.e. high–high or low–low). Results revealed that the high-autonomy support group showed to the most optimal pattern of outcomes (e.g. need satisfaction, autonomous motivation), while the high-control group yielded the least optimal pattern of outcomes. Results further showed that perceiving one's instructor as high on control is detrimental (e.g. higher need frustration, amotivation) even when the instructor is additionally perceived to be autonomy-supportive. Finally, it appeared better to be relatively uninvolved than to be perceived as exclusively high on control.

Conclusions: When coaches or teachers are perceived to be high on autonomy support and low on control, this is likely to benefit youngsters' motivation and well-being. Also, while some instructors, particularly those who are functioning in a more competitive context where pressure is considered more normative, may endorse the belief that the combination of autonomy support and control yields the most effective cocktail to motivate young people (e.g. using competitive and game-based activities to make it fun, while treating 'the losers' with

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punishments such as push-ups or humiliating comments), this perspective is not supported by the findings of the current study. Apart, from its theoretical relevance, the findings of the present study are valuable for future intervention development.

Introduction

According to Self-Determination Theory (Deci and Ryan 2000; Vansteenkiste and Ryan 2013), instructors (e.g. teachers, sport coaches) can differ in the motivating style they rely upon to motivate young people (e.g. Reeve 2009). Instructors with a predominantly autonomy-supportive motivating style share the assumption that youngsters have the capabilities to get self-motivated and thus acknowledge youngsters' natural tendency to grow and develop (Vansteenkiste and Soenens 2015). These held assumptions lead them to display a sincere respect for youngsters' individuality and to adopt an open and curious attitude, which is essential to identify, vitalize, and nurture youngsters' inner motivational resources (Reeve 2009; Soenens and Vansteenkiste 2010). In contrast, instructors with a dominant controlling motivating style rather take their personal standards and ambitions as a starting point, thereby bypassing, neglecting, or even thwarting youngsters' inner motivational resources (Haerens et al. 2015; Reeve 2009; Soenens and Vansteenkiste 2010). As such, they take a more pressuring stance so that youngsters feel obliged to think, feel, or behave in prescribed ways (Assor et al. 2005; Reeve, Deci, and Ryan 2004).

While the dimensions of autonomy support and control can be conceptually differentiated, in reality both dimensions may co-occur to different degrees, thereby constituting different motivating styles. However, the question which configuration of autonomy support and control yields the most desirable outcomes has received little, if any, prior attention (but see Amoura et al. 2015; Matosic and Cox 2014). Therefore, the first aim of the present study was to investigate which configurations of autonomy support and control naturally emerge among athletes' reporting on their sport coaches (Study 1), and secondary school students' reporting on their Physical Education (PE) teachers (Study 2) as to identify different perceived motivating styles. A second aim was then to examine whether the identified motivating styles help to explain differences in athletes' and students' motivational experiences.

Autonomy support and control in PE and sport

Autonomy support refers to actively soliciting and nurturing youngsters' interests, providing choices and asking for input, allowing the expression of deviant points of view, making use of inviting language, providing meaningful rationales for requests, and respecting youngsters pace of progress (e.g. Mitchell, Gray, and Inchley 2015; Reeve 2009; 2015; Vansteenkiste and Soenens 2015). Controlling instructions involve the use of punishments, commanding, yelling and shouting (e.g. Assor et al. 2005; Reeve and Jang 2006), or appealing to feelings of guilt and shame and triggering contingent self-worth (e.g. Soenens et al. 2012).

SDT suggests that an autonomy-supportive motivating style fosters individuals' development because it nurtures youngsters' psychological needs for autonomy (i.e. experience a sense of volition), competence (i.e. feeling effective), and relatedness (i.e. experience a warm relationship; Ryan and Deci 2000; Vansteenkiste and Ryan 2013). A controlling motivating style, on the other hand, may not only undermine need satisfaction, but may also engender need frustration (Vansteenkiste and Ryan 2013), as indexed by feelings of pressure and internal conflict (i.e. autonomy frustration), failure and inadequacy (i.e. competence frustration), or rejection and disrespect (i.e. relatedness frustration).

An increasing number of studies, both in the domain of sports (e.g. Bartholomew et al. 2011) and PE (e.g. Cheon, Reeve, and Moon 2012; De Meyer et al. 2014; Haerens et al. 2015; Perlman 2015)

confirmed that perceived autonomy support relates to desirable outcomes, such as need satisfaction, autonomous motivation, and well-being, while perceived control relates to maladjustment, as indexed by need frustration, controlled motivation, and even amotivation, and ill-being (see Vansteenkiste and Ryan 2013; Van den Berghe et al. 2014 for an overview).

These empirical studies also pointed to moderate ($-.50 < r < -.30$; Bartholomew et al. 2011; Cheon, Reeve, and Moon 2012) or small ($-.30 < r < -.10$; De Meyer et al. 2014; Haerens et al. 2015) negative correlations between perceived autonomy support and control. Such findings suggest that instructors' non-reliance on autonomy support does not automatically imply that they act in a controlling way (and vice-versa). To illustrate, while some instructors may fail to build in choice or to provide a meaningful rationale (i.e. autonomy support), that does not imply nor does it exclude that they rely on threats and sanctions to enforce youngsters' compliance (i.e. control). Similarly, it is not because instructors display curiosity in youngsters' viewpoints, or work from their perspective (i.e. autonomy support) that they necessarily refrain from using punishments or guilt-trips (i.e. control). As such different motivating styles are possible, depending on the degree to which autonomy support and control are configured.

Combinations of autonomy support and control in PE and sport

Extant SDT-based research on perceived autonomy support and control has predominantly relied on a variable-centered approach. In the current study, we extend this large body of work by adopting a person-centered approach (Magnusson 1988). Whereas a variable-centred approach describes the associations between variables and thus provides an overall picture of the average relationship between perceived autonomy support, control, and the various outcomes (e.g. Haerens et al. 2015); a person-centred approach identifies groups of individuals who share particular attributes or relations among attributes (i.e. perceptions of autonomy support and control) and thus allows to examine how perceptions of autonomy support and control can be combined within individuals (Magnusson 1988). In our view, such a person-centered approach has the potential to produce several new theoretical and practical insights.

First, from a theoretical viewpoint, a person-centered approach helps to shed light on the question whether autonomy support and control represent perfect opposites or may instead be conceived as relatively distinct dimensions. If the two dimensions would stand in direct opposition, the number of identified motivating profiles should be rather limited because youngsters would not perceive their instructors as being simultaneously high or low on both.

Second, the identification of different profiles with some characterized by a mix of both autonomy support and control helps to shed light on the question whether the presence of perceived control may possibly yield some benefits. Indeed, coaches and PE teachers often express the idea that pressure may be better than being uninvolved and that such pressure, when used in combination with autonomy support, will do no harm. Yet, from a theoretical perspective, the perceived use of control – even in combination with autonomy support – is suggested to come with a cost, as manifested through elicited need frustration, oppositional defiance, or anger (e.g. Assor et al. 2005; Haerens et al. 2015).

Third, assessing an instructor's motivating style based on both dimensions is highly practically relevant as it might reveal that it is more useful for some instructors to learn to become less controlling (high on both), while others will gain more from learning how to become more autonomy-supportive (low on both).

We are aware of only two studies that have adopted a person-centered approach to investigate motivational styles based on configurations of autonomy support and control, the first among athletes reporting on their swimming coach (Matosic and Cox 2014) and the second among psychology students reporting on their university teacher (Amoura et al. 2015; Study 1). Both studies identified a predominantly autonomy-supportive group, characterized by high levels of perceived autonomy support and relatively low levels of control; and a pronounced controlling group, characterized by

relatively high levels of control and low levels of autonomy support. The two studies also identified a group that was perceived to combine relatively high levels of both autonomy support and control. The studies revealed that the predominantly autonomy-supportive group showed the most optimal pattern of outcomes, that is, they reported the most need satisfaction (Matosic and Cox 2014) and autonomous motivation (Amoura et al. 2015; Matosic and Cox 2014), while the opposite was true for the highly controlling group. Noteworthy, in both studies, the combined autonomy-supportive-controlling motivating style (high–high) did equally well as the purely autonomy-supportive motivating style (high–low) in terms of positive outcomes.

The present study

The present research consists of two cross-sectional studies, the first among athletes reporting on their sport coaches and the second involving secondary school students reporting on their PE teachers. Across both studies, a variety of adaptive (e.g. need satisfaction, autonomous motivation) and maladaptive (e.g. amotivation, controlled motivation) outcomes were assessed. The following two aims were examined across both studies. First, we aimed at investigating whether a similar set of naturally occurring motivating styles, each characterized by different levels of the dimensions of autonomy support and control, can be identified. Given the presumed relative distinctiveness of both dimensions, we hypothesized to find four different groups, with two of them being characterized by the differential presence of autonomy support and control (i.e. high–low and low–high groups) and two being characterized by simultaneously high or simultaneously low levels of autonomy support and control (i.e. high–high and low–low).

Our second aim was to examine whether different configurations would differentially be associated with motivational outcomes. In light of previous studies (e.g. Haerens et al. 2015) and based on theoretical grounds, we formulated the general expectation that instructional profiles characterized by the stronger presence of autonomy support and the lowered presence of control would yield the most optimal outcomes, while profiles that involve higher levels of control and relatively lower levels of autonomy support would yield the most maladaptive outcomes. In addition to this general hypothesis, we were also interested in directly contrasting the identified motivating styles on a pairwise fashion. For instance, we aimed to examine whether the hypothesized drawbacks of a perceived controlling instructor may also surface when the instructor is additionally perceived to be autonomy-supportive (i.e. when both dimensions are combined), or whether it is better to perceive one's instructor as controlling as opposed to relatively uninvolved (i.e. low on both).

Study 1[1]

Study 1 compromised young athletes who were engaging in an exclusive and selective school program involving a large proportion of sport-specific training sessions, and who reported on their school-coaches' motivating style. We deemed this highly competitive sport context to be ideal to begin examining the presence and correlates of different motivating profiles as many sport coaches argue that pressure is a normative or even inherent aspect of competitive sports (Cheon et al. 2015). Indeed, some sport coaches even argue that imposing pressure on athletes is critical, as it would increase athletes' resilience to handle future pressures. Apart from including measures of need satisfaction and motivation, Study 1 also incorporated more distal outcomes, such as athletes' self-reported well-being (i.e. positive affect; vitality) and ill-being (i.e. negative affect; depressive feelings), as well as coach-rated performance.

Participants and procedure

Athletes (69% boys, $M_{age} = 15.63 \pm 1.70$ years) out of four selective and elite sport schools in Flanders (Belgium) participated in this study. Athletes in these schools consist a highly selective, highly

talented group as they must meet very high and competitive standards outlined by the national sport federation. In total, approximately 400 athletes received a questionnaire, of whom 202 (51%) returned the questionnaire. Of all the participants 28.2% was specialized in soccer, 16.8% in handball, 12.5% in athletics, 10.4% in basketball, 4% in volleyball, 5.9% in cycling, 5.9% in swimming, 5% in golf, 3.5% in judo, 2.5% taekwondo, 2% triathlon, 1.5% in gymnastics, 1% skiing, and 0.5% table tennis. Athletes were engaging in competitive activities for on average 7.21 (SD = 2.71) years and they trained on average 18.11 (SD = 5.32) hours per week. Almost 16% (15.9%) competed at international level, while the majority of the sample competed at the national level (72.6%), and 11.5% competed regionally. Permission to conduct the study was granted from the respective school boards of four elite sport schools, and participation in the study was voluntary.

Measures

Unless mentioned otherwise, participants recorded their agreement with the items on a 5-point Likert scale ranging from 1 (completely *disagree*) and 5 (completely *agree*).

Perceived autonomy support and control

Athletes' perceptions of coaches' autonomy support was measured by means of 12 items, of which 5 items were derived from the Work Climate Survey (Deci, Connell, and Ryan 1989) and 7 additional items were adapted from the Perceptions of Parents Scale (Grolnick, Ryan, and Deci 1991) that was further validated by Soenens et al. (2007). An example of such an item was: 'Whenever possible, my coaches at school allow me to choose what to do'. Perceptions of psychologically controlling coaching were assessed by means of 5 items. These items were taken from an existing scale used in developmental psychology (Children's Report of Parental Behavior Inventory; Schaefer 1965), but the content was adapted to the sport context. An example of such an item is the following: 'My coaches at school make me feel guilty if I disappoint them'.

Confirmatory Factor Analysis (CFA) was performed with MPlus Version 7.0 (Muthén and Muthén 1998–2010) to test the proposed two-factor model of perceived autonomy support and control. The model showed moderate fit to the data ($\chi^2(118) = 252.34$, $p < .001$, RMSEA = .08, CFI = .83, SRMR = .09). After inspection of the modification indices it became clear that cross-loadings were found for the two negatively worded items of the autonomy support scale (i.e. 'My coaches were not really sensitive to the things that are important to me'; 'My coaches insisted on doing things their way'); while one item of the perceived control scale ('My coaches were less friendly with me when I did not see things in their way') also loaded on the autonomy-supportive scale. Removing the items with cross-loadings resulted in a better fit to the data ($\chi^2(76) = 136.60$, $p < .001$, RMSEA = .06, CFI = .91, SRMR = .06). Loadings ranged between .41 and .78 for the autonomy-supportive items, and between .45 and .89 for the perceived controlling items. Cronbach's alphas were .82 and .73 for perceived autonomy support and control, respectively. Latent constructs of perceived autonomy support and control were negatively correlated ($r = -.27$, $p = .009$).

Experienced need satisfaction

Experienced satisfaction of the need for autonomy, competence, and relatedness was assessed by means of 18 items from the Psychological Need Satisfaction in Exercise Questionnaire (Wilson et al. 2006), which were adjusted to the sport context. Because the autonomy items of this scale primarily tap into athletes' perception of decisional autonomy (e.g. 'I feel I can co-decide on the exercises I do'), we based our selves on previous research (Houlfort et al. 2002) to add three additional items assessing more their affective experiences (e.g. 'I have a feeling that my training plan is made like I want it to be'). As such, the need for autonomy was measured by means of 9 items ($\alpha = .88$). The need for competence was measured with 6 items (e.g. 'I feel competent to execute exercises that are challenging for me', $\alpha = .87$), and the need for relatedness was questioned by means of 6 items (e.g. 'I

feel closely connected to the people with whom I train and sport', $\alpha = .88$). Because all three needs were highly correlated, we used a single measure of need satisfaction ($\alpha = .90$).

Motivation

To assess athletes' motivation, we used a modified version of the Behavioral Regulation in Sport Questionnaire (Lonsdale, Hodge, and Rose 2008) as described by Assor, Vansteenkiste, and Kaplan (2009). After reading the stem 'I take part in my sport', athletes reported on their autonomous motivation (e.g. 8 items;'because I enjoy it;"because I personally value it', $\alpha = .82$), controlled motivation (e.g. 11 items;'because I can only be satisfied with myself if I continue';'because others force me to', $\alpha = .83$), and amotivation (e.g. 4 items;'but I often ask myself why', $\alpha = .87$).

Well-being

Two different well-being indicators were assessed. First, vitality denotes the extent to which athletes feel alive and energetic, and was measured by means of 7 items from the General Vitality Scale (Ryan and Frederick 1997, for example, 'The last couple of days I felt very energetic during sports'). Ratings were made on a scale ranging from (0) *rarely or none of the times (less than one day),* over (1) *a couple of times (1–2 days),* and (2) *sometimes or regularly (3–4 days),* to (3) *most or all of the time (5–7 days).* The reliability coefficient of this scale was .85. Second, positive affect (e.g. 'The last six weeks at the elite sport school I felt: 'enthusiastic') was measured with 10 items from the Positive Affect Schedule (PANAS; Watson, Tellegen, and Clark 1988). Items were adjusted so that they focused on experienced affect at the elite sport school over the past six weeks. The answering categories varied from 1 (*completely not experienced*) to 5 (*very strongly experienced*). Similar to previous studies (Mouratidis et al. 2008) scores were combined to form a composite score of well-being after z-scoring both variables.

Ill-being

Two ill-being indicators were included. First, depressive feelings were measured with 6 items from the Center for Epidemiological Studies-Depression (CES-D) scale (Radloff 1977). Items were adapted to the sport context, so that they all focused on athletes' experiences of depressive feelings over the past week at the elite sport school (e.g. 'During the last week I felt sad at the elite sport school'). The internal consistency was good with $\alpha = .76$. Second, negative affect was measured with 10 items from the Negative Affect Schedule (e.g. 'The last six weeks at the elite sport school I felt: anxious') (PANAS; Watson, Tellegen, and Clark 1988). Ratings were similar to the corresponding well-being subscale, and both subscales were *z*-scored and combined to form a composite score of ill-being.

Rated performance

Similar to previous studies (Mouratidis et al. 2008), performance was assessed based on ratings of inter-individual performance and intra-individual progress by the sport coaches. Because Flemish top sport students are all closely followed and trained by their coaches at the top sport school, these coaches are considered to have good insight in the progress and performance of the athletes. Inter-individual performance reflected the performance level of the athlete over the past school year in comparison with other athletes in the same sport and age category based on a 7-point scale ranging from much weaker than others (1), at the same level as others (4), to much better than others (7). Intra-individual progress referred to the progress made during the past year, thus in comparison to the beginning of the school year. Four different performance aspects (tactical, technical, physical, and psychological) were rated on a 7-point scale from very strong regression (1), stagnation (4) to very strong progress (7) and were aggregated into one total score for intra-individual progress ($\alpha = .86$).

Plan of analyses

To meet Aim 1 (i.e. the identification of motivating styles), cluster analyses were conducted on the dimensions of perceived coach autonomy support and control. The analysis required two steps, thereby using a combination of hierarchical and non-hierarchical clustering methods (Gore 2000). In the first step, a hierarchical cluster analysis was carried out using Ward's method based on squared Euclidean distances. To reduce the impact of univariate (values of more than 3SD above or below the mean) and multivariate (individuals with high Mahalanobis values) outliers, these were removed. In the second step, the extracted initial cluster centers based on Ward's hierarchical method were used as non-random starting points in an iterative, non-hierarchical *k*-means clustering procedure.

To examine stability of cluster solutions, the sample was randomly split into halves and the full two-step procedure (Ward, followed by *k*-means) was then applied to each half. The participants in each half of the sample were assigned to new clusters on the basis of their Euclidean distances to the cluster centers of the other half of the sample. These new clusters were then compared for agreement with the originals by means of Cohen's Kappa (*K*). The two resulting Kappas were averaged and an agreement of at least .50 was considered acceptable (Asendorpf et al. 2001). Finally, MANOVAs with follow-up pairwise comparisons (with the Least Significant Difference Test) were used to investigate differences in outcomes according to cluster membership. All analyses were conducted in IBM SPSS Statistics 22.0

Results

Aim 1: identification of motivating styles

Prior to conducting cluster analyses, we removed 2 univariate and 2 multivariate outliers. Four clusters were identified, explaining, respectively, 57.2% and 72.0% of the variance in perceived autonomy support and control, thereby surpassing the critical threshold of 50% (Milligan and Cooper 1985). A three-cluster solution explained less variance in the clustering dimensions, whereas the five and six cluster solutions were more difficult to interpret and some of the clusters became very small. Figure 1 (left half) presents the final four-cluster solution based on, the *z*-scores (Y-axis). As hypothesized, we identified two groups with a contrasting motivating style: that is, the high-autonomy support group ($n = 44$, 22.6%) who perceived their coaches as relatively high on autonomy support, but low on controlling coaching, whereas the high-control group ($n = 32$, 16.5%) displayed the opposite pattern. In addition, the two remaining groups of athletes perceived their coaches on both dimensions as either relatively high ($n = 70$, 36.1%; that is, high–high group) or low ($n = 48$, 24.7%; that is, low–low group). Figure 1 (right half) presents the clusters based on the absolute scores for both dimensions. Notably, the high-control group also experienced their coaches as significantly higher on control than autonomy support ($t = -7.80$, $p < .001$) in an absolute sense, indicating that the label 'high control' is justified. In contrast, in the three other clusters, absolute scores of perceived autonomy support were significantly higher than absolute scores of perceived control (all $t > 9.10$, $p < .001$). Finally,

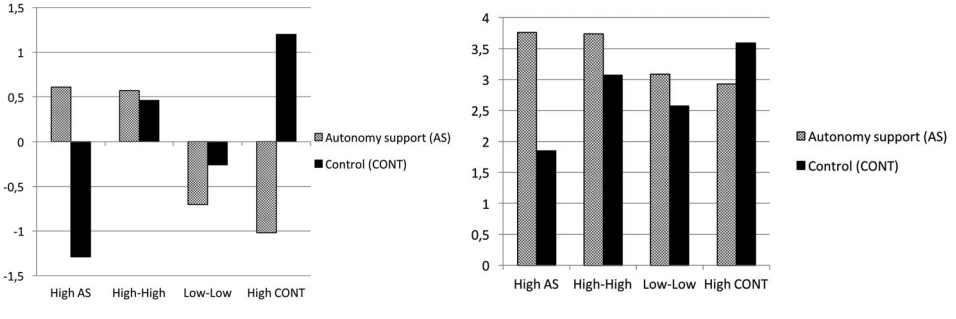

Figure 1. *Z*-scores (left half) and absolute scores (right half) of perceived autonomy support and controlling coaching.

the double-split cross-validation procedure provided significant evidence for the stability of the four-cluster solution resulted (average kappa value of 0.87) *Z*-scores (left half) and absolute scores (right half) of perceived autonomy support and controlling coaching (Study 1; top half) and teaching (Study 2; bottom half).

Aim 2: outcomes associated with the identified motivating profiles

Preliminary analyses. Age related significantly positively to perceived control and negatively to well-being, coach-rated progress, and performance (see Table 1). Further, weekly number of training hours correlated positively with perceived control and ill-being, while it yielded a negative relation with perceived autonomy support, need satisfaction, and rated performance by the coach. Next, MANOVAs showed that girls ($M = 0.20$; SD = 0.85) displayed higher ill-being ($F(1, 197) = 4.71$, $p = .03$) and were rated as performing better ($M = 5.97$; SD = 0.83; $F(1, 139) = 4.12$, $p = .04$) compared to boys ($M_{\text{ill-being}} = -08$; SD = 0.82; $M_{\text{performance}} = 5.59$; SD = 0.99). In contrast, boys reported higher autonomous motivation ($M = 4.15$; SD = 0.55) compared to girls ($M = 4.33$; SD = 0.48; $F(1, 197) = 5.52$, $p = .02$). Given these findings, we controlled for athletes' sex, age, and hours of training in all subsequent analyses by entering these variables as covariates in the MANOVAs.

Main analyses. MANOVAs were run separately for the athlete and coach-reported outcomes. MANOVAs revealed a significant multivariate effect of cluster membership for the athlete reported ($F(24, 523) = 25.33$, $p < .001$), but not for the coach-rated outcomes ($F(6, 206) = 1.19$, $p = .31$). For the athlete-reported outcomes, all univariate between subject effects were significant, whereas univariate effects were not significant for the coach-rated outcomes (see Table 2). Follow-up pairwise comparisons with the least significant difference test revealed that athletes in the high-autonomy support group clearly showed the highest levels of need satisfaction and autonomous motivation when compared to all other groups. The low–low group and the high-control group displayed the lowest levels of need satisfaction and autonomous motivation, followed by the high–high group. As for controlled motivation and amotivation, an opposite pattern of results was found, with especially the high-control group (both outcomes), but also the low–low group (especially amotivation) displaying high levels in these outcomes. Athletes in the high-control group reported the highest levels of controlled motivation, suggesting that of all athletes they felt most pressured. In terms of well-being, the highest levels were found in the high-autonomy support and the high–high group, while the high-control group displayed the lowest levels of well-being, followed by the low–low group. As for ill-being, the high-autonomy support and the high–high group reported the lowest levels, while the high-control group and the low–low group reported higher levels of ill-being.

Brief discussion

This first study generally confirmed our hypotheses. First, consistent with the idea that perceived control and autonomy support are not necessarily two poles of the same dimension, we found that (a) both were modestly negatively correlated and (b) four groups could be identified, each characterized by an unique motivating style. In two of these groups, the two dimensions were found to be equally present (either high or low), while two remaining groups were characterized by the dominant presence of either perceived autonomy support or control. Second, the results showed that profiles characterized by a stronger presence of perceived autonomy support displayed more optimal outcomes, whereas the high-control and the low–low group displayed a less optimal pattern of outcomes. Furthermore, the drawbacks of perceiving one's coach as high on control also surface when the coach is additionally perceived to be autonomy-supportive, with athletes reporting lower need satisfaction and less preferable outcomes in the high–high group when compared to the high-autonomy support group.

Table 1. Descriptive statistics and correlations between study variables – Study 1.

Athlete report ($N = 199$)	*M*	SD	1	2	3	4	5	6	7	8	9	10	11
1.Autonomy-supportive coaching	3.45	0.51	–			.							
2. Controlling coaching	2.75	0.70	−.25***	–									
3. Need satisfaction	3.60	0.50	.60***	−.24***	–								
4. Autonomous motivation	4.27	0.51	22**	−.12	.39***	–							
5. Controlled motivation	2.39	0.77	−0.16*	.35***	−.16*	−.04	–						
6. Amotivation	1.84	0.88	−.26***	.21**	−.36***	−.52***	.51***	–					
7. Well-being	−0.00	0.91	.47***	−.26***	.56***	.43***	−.19**	−.45***	–				
8. Ill-being	0.00	0.84	−.34***	.25***	−.38***	−.17*	.29***	.45***	−.35***	–			
9. Rated performance	5.69	0.97	.25**	−.14	.21*	.10	−.13	−.24**	.15	−.14	–		
10. Rated progress	5.07	0.83	.26**	−.04	.27***	.14	−.19*	−.29***	.24**	−.25**	.45***	–	
11. Age	15.63	1.71	−.12	.17*	−.06	−.07	.13	.11	−.20**	−.02	−.39***	−.24**	-
12. Hours of training	17.93	5.57	−.26***	.16*	−.16*	−.04	−.03	.05	−.10	.16*	−.35***	−.12	.39***

Note: *N* varied from 201 for the student outcomes to 140 for the coach-rated outcomes.
*$p \leq .05$.
**$p \leq .01$.
***$p \leq .001$.

Table 2. Differences in study variables according to cluster membership – Study 1.

N (%)	High-autonomy support 44 (22.6%)	High-autonomy support and control 70 (36.1%)	Low-autonomy support and control 48 (24.7%)	High control 32 (16.5%)	*F*-value	Effect size (η^2)
Cluster dimensions (raw scores)						
Perceived autonomy support	3.76 (0.36)[a]	3.74 (0.26)[a]	3.09 (0.29)[b]	2.93 (0.35)[c]	81.61***	.57
Perceived controlling teaching	1.85 (0.36)[a]	3.07 (0.33)[b]	2.57 (0.37)[c]	3.59 (0.36)[d]	171.10***	.73
Cluster dimensions (*z*-scores)						
Perceived autonomy support	0.61 (0.70)[a]	0.57 (0.52)[a]	−0.70 (0.57)[b]	−1.02 (0.69)[c]	81.61***	.57
Perceived controlling teaching	−1.29 (0.51)[a]	0.46 (0.48)[b]	−0.26 (0.53)[c]	1.20 (0.51)[d]	171.10***	.73
Athlete outcomes						
Need satisfaction	3.89 (0.42)[a]	3.70 (0.40)[b]	3.41 (0.37)[c]	3.24 (0.46)[c]	18.18***	.23
Autonomous motivation	4.49 (0.35)[a]	4.28 (0.46)[b]	4.07 (0.56)[c]	4.24 (0.61)[b]	6.78***	.10
Controlled motivation	2.06 (0.67)[a]	2.45 (0.75)[b]	2.33 (0.76)[b]	2.86 (0.71)[c]	7.93***	.11
Amotivation	1.42 (0.53)[a]	1.78 (0.81)[b]	2.14 (1.02)[c]	2.13 (0.97)[b,c]	7.01***	.10
Well-being	.44 (0.71)[a]	0.16 (0.70)[a]	−0.23 (1.00)[b]	−0.66 (0.91)[c]	12.21***	.16
Ill-being	−0.32 (0.61)[a]	−0.18 (0.63)[a]	0.23 (0.90)[b]	0.57 (1.09)[b]	9.44***	.13
Rated performance*	5.93 (0.54)	5.75 (0.81)	5.49 (1.25)	5.44 (1.16)	0.96	.02
Rated progress*	5.12 (0.80)	5.15 (0.69)	4.94 (1.00)	4.92 (0.89)	2.19	.05

*These analyses were performed on a truncated sample (*N* = 138).
[a,b,c]These values are significantly different from each other.
Note: All analyses controlled for sex, age and hours of weekly training.

Study 2[2]

Study 2 extended Study 1 in two significant ways. First, whereas, Study 1 tapped into athletes' perceived coach autonomy support at the domain level, Study 2 focuses on students' perceived autonomy support and control at the situational level (i.e. after a specific lesson with a specific teacher; Vallerand 1997). Second, different from Study 1, a broader range of maladaptive outcomes was included as we reasoned that such outcomes might especially surface in groups characterized by elevated perceived control. Specifically, apart from tapping into need satisfaction, we also assessed need frustration (e.g. Bartholomew et al. 2011; Haerens et al. 2015; Hein, Koka, and Hagger 2015). Next, apart from tapping into students' controlled reasons to be cooperative during a PE class, we also included a measure of controlled non-participation (Aelterman et al. 2016), which refers to the tendency to refrain from putting effort in PE for either externally (e.g. 'because my classmates would look up to me if I would do so') and internally ('because I had enough of continuously doing my best') pressuring reasons.

Methods

Participants and procedure

Participants were 647 8th grade secondary school students (69% boys, M_{age} = 13.27 ± .68 years) from 41 classes out of 13 different secondary schools throughout Flanders (Belgium). In terms of education, 431 students (69.9%) were enrolled in an academic track, 137 students (22.1%) in a technical track, and 51 students (8.2%) in a vocational track. In total, 14 PE teachers (92.9% men) were involved, each teaching 1–5 of the classes included. Teachers were on average 35.50 years old (SD = 13.82, range = 25–56), and had an average of 14.50 years of teaching experience (SD = 10.21, range = 2–37). All participating teachers were full-time certified PE teachers, who had received a teacher education program at college level. Class sizes ranged from 5 to 28 students per class. To

obtain standardization regarding the topic of the PE lesson across the different classes, all measures took place during a lesson on interactive games (e.g. basketball, badminton). Teachers and students' parents gave informed consent for their participation in the study. Participation was voluntary and confidentiality was guaranteed. Both students and PE teachers were asked to fill out a set of questionnaires at the end of the PE lesson about their experiences during the past PE class. The study protocol was approved by the Ethical Committee of The Ghent University.

Measures

Unless mentioned otherwise, participants responded to the items on a 5-point Likert scale ranging from 1 (*not at all true for me*) to 5 (*very true for me*).

Perceived autonomy-supportive and controlling teaching behaviors

Similar to previous studies (e.g. Haerens et al. 2015) with secondary school students, perceptions of autonomy support and controlling teaching were measured by means of items from the Teacher As Social Context Questionnaire (TASCQ; Belmont et al. 1988) and the Psychologically Controlling Teaching scale (PCT; Soenens et al. 2012). To measure perceived autonomy support, we used the six positively worded items from the TASCQ autonomy support scale (e.g. 'During this class my teacher gave me a lot of choices about how to do the exercise'). Controlling teaching was measured with the 7-item scale for psychologically controlling teaching (e.g. 'During this class the teacher made me feel guilty when I dissatisfied him/her') supplemented with the two negatively worded items from the TASCQ autonomy support scale (i.e. 'During this class it seemed like my teacher was always telling me what to do' and 'During this class my teacher often criticized me on how I do things during class').

CFA was performed with MPlus Version 7.0 (Muthén and Muthén, 1998–2010) to test the proposed two-factor model. The model showed good fit to the data ($\chi^2(89) = 290.35$, $p < .001$, RMSEA = .06, CFI = .91, SRMR = .06). Loadings for perceived autonomy support and perceived controlling ranged between .37 and .78, and .55 and .75, respectively. Internal consistencies were good with Cronbach's alpha of .77 and .86 for perceived autonomy-supportive and controlling teaching, respectively. Latent constructs of perceived autonomy-supportive and controlling teaching were unrelated ($r = -.05$, $p = .43$).

Experiences of need satisfaction and need frustration

Students' experiences of need satisfaction and frustration were measured with an adapted version of the Basic Need Satisfaction and Frustration Scale (BNSNF; Chen et al. 2015), a recently developed and validated 24-item scale. Each need was assessed with eight items, of which four tapped into need satisfaction and four into need frustration. Similar to previous studies (Haerens et al. 2015), this general need satisfaction scale was slightly adjusted by adding the stem 'During the past PE lesson' and by slightly rewording some of the items to better reflect the specific context of a PE lesson. To illustrate, the item 'I feel that my decisions reflect what I really want' was changed into 'I felt that the exercises reflected what I really wanted to do'. Internal consistency was good for both need satisfaction (Cronbach's $\alpha = .79$) and need frustration (Cronbach's $\alpha = .84$).

Motivation

Students' motivation towards the past PE lesson (i.e. situational motivation) was assessed by means of the validated Behavioral Regulations in Physical Education Questionnaire (BRPEQ; Aelterman et al. 2012). We used the stem 'I put effort in this past PE lesson … ' followed by items reflecting autonomous motivation (8 items; e.g. 'because I enjoyed this PE class', 'because I found this PE class personally meaningful'), controlled motivation (7 items; e.g. 'because I had to prove myself', 'because otherwise I got criticized'), and amotivation (4 items; e.g. 'I didn't see why this PE class

is part of the curriculum'). Internal consistencies were good with Cronbach's alphas of .85, .82, and .74 for autonomous and controlled motivation and amotivation, respectively.

Controlled non-participation

Controlled motivated non-participation was measured relying on a newly developed 8-item scale, thereby using the stem 'During the past PE lesson I sometimes did not do what the teacher requested', followed by items representing externally pressuring reasons (4 items; for example, 'because my classmates would look up to me if I would do so') and internally pressuring reasons (4 items; for example, 'because in my opinion only the teacher's pets always cooperate') (Aelterman et al. 2016). The scale had good reliability ($\alpha = .93$).

Plan of analyses

Similar to Study 1, cluster analyses relying on a two-step procedure were used to generate motivating profiles (i.e. Aim 1). Further, associations of student (i.e. sex and age) and class (i.e. educational track) characteristics with the study outcomes were explored in IBM SPSS Statistics 22.0 (see Table 3). Given that students ($n = 647$) were nested within classes ($n = 41$) being nested within teachers ($n = 14$), we relied on multilevel regression modelling in MLWin (Rasbash et al. 2009) to investigate differences between groups.

Results

Aim 1: identification of motivating styles

Prior to conducting cluster analyses, we removed five univariate outliers for perceived controlling teaching and one multivariate outlier. Four clusters were retained, explaining 68.0% and 58.0% of the variance in perceived autonomy support and control, respectively (all values > threshold of 50%) (Milligan and Cooper 1985). A three-cluster solution explained less variance, particularly in perceived autonomy support (53.4%), and a five-cluster solution appeared less interpretable and less parsimonious.

Figure 2 (left half) presents the final four-cluster solution, based on respectively the *z*-scores (*Y*-axis), and the absolute scores for both dimensions. As hypothesized, we identified two groups with a contrasting configuration: that is the high-autonomy support group who perceived their teachers as predominantly autonomy-supportive but low on controlling teaching ($n = 167$; 26.1%), and a high-control group who perceived their teacher as largely controlling but low on autonomy support ($n = 101$; 15.8%). In addition, there were two groups of students who perceived their teachers as either relatively high ($n = 172$; 26.9%) or low ($n = 200$; 31.3%) on both dimensions. Notably, as can be seen in Figure 2 (right half), the high-control group also perceived their teachers as significantly higher on perceived control than on autonomy support ($t = -6.73$, $p < .001$), indicating that the label 'high control' is justified. In each of three other groups absolute scores for perceived autonomy

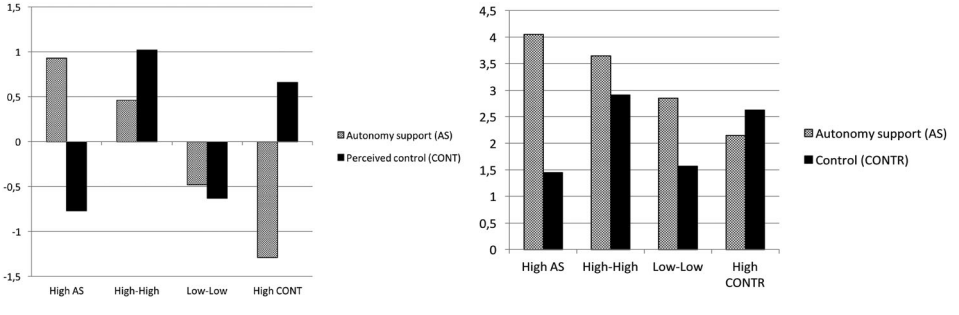

Figure 2. *Z*-scores (left half) and absolute scores (right half) of perceived autonomy support and controlling teaching.

Table 3. Descriptive statistics and correlations between study variables Study 2.

	Total sample $N = 623$		Boys $N = 425$		Girls $N = 198$									
	M	SD	*M*	SD	*M*	SD	*F*	1	2	3	4	5	6	7
1. Autonomy-supportive teaching	3.26	0.85	3.24	0.88	3.33	0.78	1.62	–						
2. Controlling teaching	2.05	0.80	2.15	0.80	1.83	0.75	22.57***	−.02	–					
3. Need satisfaction	3.30	0.66	3.30	0.65	3.31	0.67	0.05	.38***	−.08*	–				
4. Autonomous motivation	3.24	0.84	3.27	0.83	3.17	0.84	2.18	.39***	−.12**	.54***	–			
5. Need frustration	2.17	0.73	2.17	0.07	2.17	0.77	0.01	−.01	.50***	−.17***	−.17***	–		
6. Controlled motivation	2.34	0.84	2.39	0.82	2.24	0.85	4.22*	.14***	.46***	.08*.	.23***	.55***	–	
7. Amotivation	1.97	0.92	2.02	0.93	1.87	0.90	3.86*	−.13***	.41***	−.20***	−.30***	.51***	.40***	–
8. Controlled non-participation	1.64	0.82	1.73	0.85	1.44	0.77	16.93***	−.04	.36***	−.07	−.09*	.44***	.40***	.48***

Note: Considering missings were random, analyses were conducted on the largest sample as possible as such *N* varied from 645 to 600 depending on the outcome variable or type of analyses.
*$p \leq .05$.
**$p \leq .01$.
***$p \leq .001$.

Table 4. Differences in study variables according to cluster membership for Study 2.

$N = 608$	High-autonomy support $N = 157$ (25.6%)	High-autonomy support and control $N = 155$ (25.2%)	Low-autonomy support and control $N = 197$ (32.1%)	High control $N = 99$ (16.1%)
Cluster dimensions (raw scores)	β (SE)	β (SE)	β (SE)	β (SE)
Perceived autonomy support	4.05 (.05)[a]	3.65 (.05)[b]	2.85 (.05)[c]	2.15 (.06)[d]
Perceived controlling teaching	1.45 (.04)[a]	2.91 (.04)[b]	1.57 (.04)[c]	2.62 (.05)[d]
Cluster dimensions (*z*-scores)				
Perceived autonomy support	0.93 (.06)[a]	0.46 (.06)[b]	−0.48 (.05)[c]	−1.29 (.07)[d]
Perceived controlling teaching	−0.77 (.05)[a]	1.02 (.05)[b]	−0.63 (.04)[c]	0.66 (.06)[d]
Student outcomes				
Need satisfaction	3.65 (.06)[a]	3.40 (.06)[b]	3.35 (.06)[b]	3.05 (.07)[c]
Autonomous motivation	3.71 (.08)[a]	3.37 (.08)[b]	3.32 (.07)[b]	2.86 (.09)[c]
Need frustration	1.73 (.08)[a]	2.37 (.08)[c]	1.88 (.07)[b]	2.30 (.09)[c]
Controlled motivation	2.03 (.09)[a]	2.83 (.08)[b]	2.09 (.08)[a]	2.45 (.10)[c]
Amotivation	1.46 (.08)[a]	2.18 (.08)[b]	1.77 (.07)[c]	2.40 (.09)[d]
Controlled non-participation	1.41 (.08)[a]	1.85 (.08)[b]	1.51 (.08)[a]	1.94 (.10)[b]

[a,b,c,d]These values are significantly different from each other.
Note: All analyses were controlled for age, sex and educational track.

support were significantly higher than perceived control (all $t > 13.82$, $p < .001$) (see Table 4 and Figure 2). Finally, the double-split cross-validation procedure resulted in an average Kappa value of 0.85, providing significant evidence for the stability of the four-cluster solution.

Aim 2: outcomes associated with the identified motivating styles

Preliminary analyses. Need frustration, autonomous motivation, and controlled motivation were found to increase with increasing age (see Table 3). Next, MANOVAs revealed that boys experienced more control by their teacher ($F(1, 621) = 22.57$, $p = .04$) and also displayed significantly higher levels of controlled motivation ($F(1, 621) = 4.22$, $p = .04$), amotivation ($F(1, 621) = 3.86$, $p = .05$) and controlled non-participation ($F(1, 621) = 19.93$, $p < .001$) when compared to girls. We also found differences in perceived autonomy support ($F(2, 600) = 5.91$, $p = .003$) and amotivation ($F(2, 600) = 5.19$, $p = .006$) according to educational track, with students of vocational education reporting higher levels of perceived autonomy support ($M = 3.59$; SD = 0.91) when compared to students from technical ($M = 3.11$; SD = 0.90) and academic track ($M = 3.25$; SD = 0.81), and students from academic track ($M = 1.88$; SD = 0.86) reporting lower levels of amotivation when compared to students from technical ($M = 2.11$; SD = 1.00) and vocational track ($M = 2.20$; SD = 1.04). Based on these findings, we controlled for sex, educational track, and age in all subsequent analyses by adding these variables to the null model prior to investigating differences between.

Main analyses. Differences in outcomes according to cluster membership were investigated by means of multilevel regression analyses. First, in a fully unconditional three-level null model (students being nested within classes being nested within teachers), intraclass correlation coefficients (ICCs) were estimated for each of the outcomes. These analyses indicated that there was significant between-teacher and between-class level variance in perceived autonomy support ($\chi^2_{\text{teacher}} = 4.37$, $df = 1$, $p < .05$, ICC = 19.7%; $\chi^2_{\text{class}} = 5.37$, $df = 1$, $p < .05$, ICC = 8.3%), but not in perceived controlling teaching ($\chi^2_{\text{teacher}} = 3.55$, df = 1, *ns*, ICC = 9.8%; $\chi^2_{\text{class}} = 2.20$, df = 1, *ns*, ICC = 3.9%). As for the motivational outcomes, most of the variance was significantly situated at the student level, but not at the teacher or class level, except for the outcomes of autonomous motivation ($\chi^2_{\text{class}} = 6.39$,

df = 1, $p < .05$, ICC = 7.8%) and need satisfaction ($\chi^2_{class} = 4.95$, df = 1, $p < .01$, ICC = 9.0%) that displayed significant between-class variance. In a next step, we controlled for sex, age, and educational track. Because some students had missing data on one of these covariates, the final sample consisted of 608 students nested within 41 classes and 14 teachers. Pairwise comparisons are presented in Table 4 and were conducted by changing the reference category of the predictor (i.e. cluster). Students in the high-autonomy support group clearly reported the highest levels of need satisfaction and autonomous motivation, while the opposite was true for the high-control group. The high–high group reported higher levels of need satisfaction and autonomous motivation than the high-control group, but did not differ from the low–low group.

In terms of negative outcomes, it appeared that students in the high-autonomy support group reported the lowest levels of need frustration, controlled motivation, amotivation, and controlled non-participation, when compared to the high-control group, but also when compared to the high–high group. The high–high group resembled the high-control group on several negative outcomes (i.e. need frustration, controlled non-participation), and even displayed the highest levels of controlled motivation, suggesting that the downsides of a controlling approach also surfaced when combined with autonomy support. The low–low group displayed lower levels of need frustration, controlled motivation, amotivation, and oppositional defiance than the high–high group or the high-control group, but higher levels than the high-autonomy group (except for controlled motivation and controlled non-participation).

Brief discussion

Similar to the findings of Study 1 and in line with our hypothesis that perceived autonomy support and control are not necessarily bipolar, we found that (a) both were unrelated and (b) that four groups could be identified each characterized by a unique motivating profile, that is a high-autonomy support group, a high-control group, a high–high and a low–low group. As for Aim 2, it was shown that profiles characterized by a stronger presence of perceived autonomy support showed a more optimal pattern of results, while the high-control group displayed the worst pattern of outcomes. Furthermore, results indicated that the drawbacks of a perceived controlling approach also occur when the PE teacher is additionally perceived to be autonomy-supportive.

General discussion

A first aim of the current study was to investigate whether we could identify a set of naturally occurring motivating profiles, characterized by different configurations of autonomy support and control in two different samples of athletes and students reporting on their coaches' and PE teachers' motivating style, respectively. Profile analyses systematically pointed towards the extraction of four markedly different groups. Consistent with two studies that have previously adopted a person-centered approach in the context of coaching (Matosic and Cox 2014) and teaching (Amoura et al. 2015), we identified a group high on autonomy support, a group high on control, and also a group that combines both (i.e. high–high). Further, similar to Amoura et al. (2015), we also identified a fourth group characterized by low levels of both (i.e. low–low). The high–high and low–low group would not have emerged if the dimensions of perceived autonomy support and control would fall along a single continuum (i.e. two sides of the same coin). Yet, it seems that – at least in the eyes of youngsters – some instructors tend to combine both dimensions to similar degrees. In support of this argument, we found that correlations between perceived autonomy support and control were modest, being slightly negative in the sample of athletes ($r = -.25$) and non-significant among students ($r = -.02$), which is in line with previous work in PE (De Meyer et al. 2014; Haerens et al. 2015; Van den Berghe et al. 2013) and sport (Bartholomew et al. 2011).

Next to the inspection of the relative presence of autonomy support and control, we also considered the absolute values within each profile. Consistent with our labeling, it was only in the

high-control group that absolute scores for perceived control exceeded absolute scores for perceived autonomy support. Noteworthy, in the high-autonomy support group youngsters consistently perceived their coaches' (Study 1) or teachers' (Study 2) reliance on control to be generally absent (i.e. absolute score lower than 2 indicating strong disagreement with the statements), while in the high–high group absolute scores for perceived control were consistently higher than average, further confirming our labeling. Only the low–low group slightly differed in absolute values across both studies representing perceptions of a more neutral style among athletes when compared to a more uninvolved style among students. These differences in absolute values are important to keep in mind, in light of the second aim of the current study, which was to examine whether the motivating profiles would relate differently to the outcomes.

The perceived presence of autonomy support yields important benefits

Previous studies making use of a variable-centered approach found perceived autonomy support to relate particularly to need satisfaction and autonomous motivation, and perceived control to need frustration and amotivation (e.g. Bartholomew et al. 2011; Haerens et al. 2015). Consistent with such findings, the profile characterized by high-autonomy support and low control displayed the highest levels of need satisfaction and autonomous motivation in both studies, while the profile characterized by low-autonomy support and high control yielded the highest level of need frustration (Study 2) and amotivation (Study 1 and Study 2).

The advantage of perceived autonomy support was also visible when the high–high group was compared with the high-control group. Across both studies, the high–high group was found to report more need satisfaction than the high-control group, and Study 1 additionally revealed that athletes in the high–high group also experienced more well- and less ill-being. Nonetheless, the perceived presence of autonomy support in the high–high group could not buffer the presence of perceived control in terms of need frustration and controlled non-participation that reached similar levels as in the high-control group. These findings possibly suggest that in the high–high group two pathways are activated, that is a positive pathway towards more positive outcomes such as need satisfaction due to the presence of autonomy support, and a negative pathway towards more negative outcomes due to the reliance on control (Haerens et al. 2015). Yet, this dual pathway was clearer among students when compared to athletes.

The presence of control does not yield any benefits, on the contrary

Results consistently showed that youngsters who perceived their instructors to be high on control on top of high on autonomy support (i.e. high–high) compared to those perceiving their instructor to be high in autonomy support only reported less need satisfaction, lower autonomous motivation, as well as more-controlled motivation and amotivation. Study 2 further added to these findings by showing that students in the high–high group experienced more need frustration and reported more-controlled non-participation relative to those in the high-autonomy support group. In earlier studies of Matosic and Cox (2014) and Amoura et al. (2015) no significant differences between the high-autonomy support group and the high–high group were found, and based on these results Matosic and Cox (2014) suggested that control is adaptive when paired with high-autonomy support. Yet, when further inspecting their results a tendency towards more favorable outcomes in the high-autonomy support group was notified as well. Because both studies had small samples sizes, and Amoura et al. (2015) did not include maladaptive motivational outcomes, differences between both groups might have remained uncovered.

The high-control group also did not display a more desirable pattern of outcomes compared to the low–low group. Students (Study 2) in the low–low group experienced more need satisfaction and autonomous motivation when compared to the high-control group. In athletes (Study 1) in the high-

control group more-controlled motivation and lower well-being was found, but they also reported being more autonomously motivated.

Overall, the drawbacks of a controlling approach were clearer among secondary school students than among athletes, which might have several, yet at this point speculative, explanations. First, the student study included more advanced and proximal maladaptive outcomes such as need frustration and controlled non-participation. As such, it is recommended for future studies to include a broader range of maladaptive outcomes to get a fuller picture of the possible drawbacks of a controlling approach in high-performance contexts. Secondly, the sample of athletes – when compared to the sample of students – reported higher absolute levels of perceived autonomy support and control overall. Thirdly, it might be more normative in a highly competitive sport environment (also see Cheon et al. 2015), when compared to a PE lesson, to engage in controlling practices, which could reduce the negative impact of a controlling approach. A study on parenting, Gershoff et al. (2010) indeed demonstrated that some discipline techniques (e.g. corporal punishment, yelling) are less strongly associated with maladaptive outcomes when these are perceived as normative. As such, some athletes may think it is justified for their coach to engage in some of the controlling practices because they understand the coaches' underlying intention is to enhance their performances. Developing this reasoning, it would be interesting to investigate whether there are certain circumstances (e.g. a player is disrupting the training, thereby preventing team members to stay focused) under which athletes (or students) belief it is justified for their coach (or teacher) to enact in a controlling way because they fully understand the reason for doing so is 'for the best of the group', and whether this would affect the effects of a controlling approach.

Finally, some interesting correlational findings warrant further discussion. Although sport performance is a crucial outcome for elite sport athletes, only few studies (e.g. Gillet et al. 2010) investigated how coaches' motivating style relates to athletes' performance. It was interesting to note that athletes' self-reported perceptions of autonomy support directly positively related to coach-rated performance. Moreover, also experienced need satisfaction positively related to coach-rated performance, while negative relationships between amotivation and performance were notified. As such, it is also well possible that the relationships between performance and motivating styles are more indirect. Future studies could investigate the intervening role of need satisfaction and motivation in the relation between coaches' motivating style and athletes' performance (e.g. Gillet et al. 2010).

Practical recommendations

In addition to its theoretical relevance, the identification of different groups has clear practical implications. When coaches or teachers are perceived to rely on an autonomy-supportive non-controlling motivating style, because they, for instance, acknowledge youngsters' concerns, provide opportunities for initiative taking and input, or afford youngsters with choices while simultaneously refraining from pressuring them, this is likely to benefit youngsters' motivation and well-being. Also, while some instructors, particularly those who are functioning in a more competitive context where pressure is considered more acceptable (Cheon et al. 2015), may endorse the belief that the combination of autonomy support and control yields the most effective cocktail to motivate young people (e.g. using competitive and game-based activities to make it fun, while treating 'the losers' with punishments such as push-ups or humiliating comments), this perspective is not supported by the findings of the current study. Finally, profile analyses, as presented in the current study, might inform future interventions (Aelterman et al. 2014; Cheon et al. 2015; Reeve et al. 2004) as diagnosing an instructor's motivating style based on both dimensions might reveal that it might be more useful for some instructors to learn to become less controlling (high on both), while others will gain more from learning how to become more autonomy-supportive (low on both). For others, a two-step procedure might be more helpful, with instructors first learning how to be less controlling, prior to learning how to become more autonomy-supportive (Reeve 2015). Profile analyses might

also lead towards new and more refined understandings of the antecedents of an instructors' motivating style. Studies, for instance, showed that the degree to which teachers or coaches felt more accountable for the performances of their students (Deci et al. 1982; Reeve 2009; Soenens et al. 2012) or athletes (Cheon et al. 2015; Pelletier, Seguin-Levesque, and Legault 2002), explained whether they interacted in a less autonomy-supportive and more controlling way. It is also well possible that some circumstances elicit a more controlling reaction of the instructor, for instance, when disruptive or unsafe behavior of one student (or athlete) prevents the group from engaging in the exercises.

Future directions

In the current study, we measured rather stringent person-oriented forms of control (e.g. the instructor made me feel guilty, criticized me, …). Yet, the impact of controlling instructions that are more closely directed towards players' or students' actions (e.g. the coach is pressuring athletes to persist in hard and exhausting exercises) or attitudes (e.g. a teacher is reprimanding a student who is disturbing the lesson) has not been investigated up to now. The latter forms of control might be considered as more acceptable or normative, as the athletes or students might more fully understand why the instructor is enacting in a controlling way for their own good.

Secondly, future studies could rely on observations of instructors' motivating style (e.g. De Meyer et al. 2014; Haerens et al. 2013) to investigate whether a motivating style not only exists in the eye of the beholder (i.e. youngsters' perception), but instead, can be traced back to real observable behaviors. In that respect, it would also be interesting to simultaneously observe various need-supportive (i.e. autonomy support, structure, relatedness support) and need-thwarting (i.e. control, chaos, cold) dimensions to allow determining a more complete picture of teachers' or coaches' motivating style (e.g. Van den Berghe et al. 2013). Finally, it becomes exciting to investigate whether it is possible to boost the effectiveness of existing intervention programs (e.g. Aelterman et al. 2014), by determining teachers' or coaches' motivating style, and tailoring the intervention to their teaching profile.

Limitations

The cross-sectional design, as well as the dominant reliance on self-reported data from athletes or students, forms a limitation of the current study. In the first study we did not have descriptive information on the involved sport coaches, although they provided anonymous information on the athletes' performances. Also, the athletes' questionnaires used a very general stem, that is: 'my coaches at the top sport school … e.g. insist on doing everything in their way'. As such, it was not possible to detect which coach was the athletes' point of reference when responding to the items about their experiences at the top sport school. It would have been interesting to be able to aggregate scores of athletes who were trained by the same coach, to see whether there were between coach differences that could have explained the motivational outcomes. Unfortunately, this was not possible with the present data set.

Conclusion

Four comparable motivating styles were identified across two studies conducted among elite sport athletes and secondary school students in PE who reported on their coaches' and teachers' reliance on autonomy support and control, respectively. Comparison of the motivating styles in terms of outcomes led to the conclusion that the presence of autonomy support, particularly in the absence of control, yields the most optimal pattern of outcomes. In contrast, motivating profiles characterized by high control displayed less desirable outcomes. The latter conclusion also holds true when control is combined with autonomy support since more maladaptive outcomes (i.e. controlled motivation, amotivation, need frustration) were observed when youngsters perceived high-autonomy support combined with high control, rather than high-autonomy support only.

Notes

1. Part of the data of Study 1 were previously published to answer research questions on the motivating role of positive feedback in Mouratidis et al. (2008, Study 2), and to investigate the conceptual distinction between identified regulation and introjected approach and avoidance motivations in Assor, Vansteenkiste, and Kaplan (2009, Study 2). However, none of these two previously published studies investigated perceived autonomy support and perceived control, and how these relate to outcomes.
2. Part of the data of Study 2 were previously published to investigate students' controlled reasons for non-participation in Aelterman et al. (2016). However, the latter study did not investigate how perceived autonomy support and perceived control relate to motivational outcomes in PE.

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