**How do Profiles of Need-supportive and Controlling Coaching Relate to Team Athletes'
Motivational Outcomes? A Person-centered Approach**

Bart Reynders¹

Stef Van Puyenbroeck¹

Eva Ceulemans²

Maarten Vansteenkiste³

Gert Vande Broek¹

¹KU Leuven, Department of Kinesiology,
Tervuursevest 101, 3000 Leuven, Belgium

²KU Leuven, Faculty of Psychology and Educational Sciences
Tiensestraat 102, 3000 Leuven, Belgium

³Ghent University, Department of Developmental, Personality & Social Psychology
Henri Dunantlaan 2, 9000 Ghent, Belgium

As accepted for publication in *Journal of Sport & Exercise Psychology*

Abstract

Building on recent SDT research differentiating controlling coaching into a demanding and domineering approach, this study examined the role of both approaches in athletes' motivational outcomes when accompanied by autonomy support or structure. Within team sport athletes ($N = 317$; $M_{\text{age}} = 17.67$), four sets of K-means cluster analyses systematically pointed towards a four-cluster solution (e.g., high-high, high-low, low-high, low-low), regardless of the pair of coaching dimensions used. One of the identified coaching profiles involved coaches who are perceived to combine need-supportive and controlling behaviors (i.e., high-high). Whereas combining need-supportive and domineering behaviors (i.e., high-high) yield lower autonomous motivation and engagement compared to a high need support profile (i.e. high-low), this is less the case for the combination of need-supportive and demanding behaviors (i.e., high-high). This person-centered approach provides deeper insights in how coaches combine different styles and how some forms of controlling coaching yield a greater cost than others.

Keywords: autonomy support; structure; demanding; domineering; cluster analysis; coach behavior.

Introduction

According to Self-Determination Theory (Ryan & Deci, 2017), athletes' motivation and engagement gets promoted when coaches adopt a motivating style, such as through the provision of autonomy support (e.g. being participative) or structure (being clarifying; e.g., Curran et al., 2013). However, this may be undermined when coaches adopt a demotivating style, such as through the use of control (e.g., being coercive and intimidating; Bartholomew et al., 2011). Although the correlates of these separate coaching dimensions are well-documented (e.g., Mageau & Vallerand, 2003), coaches rely on a variety of coaching practices in daily practice. Yet, the question how coaches combine these different practices into a coaching profile and whether different coaching profiles yield different correlates has received far less attention (Haerens et al., 2018; Matosic & Cox, 2014). In light of the prevalence of controlling behaviors among coaches (e.g., Cushion, Ford & Williams, 2012) and congruent with the recent differentiation between a demanding and a domineering approach (Delrue et al., 2019), the present study sought to examine how these two forms of controlling coaching get combined with either coach autonomy support or control. By linking these coaching profiles to athlete outcomes, we aimed to gain insight in which coaching profiles yield the most and least optimal pattern of motivation and engagement outcomes.

Need-Supportive Coaching: Autonomy-Support and Structure

Within SDT (Ryan & Deci, 2017), one of the most researched theories on motivation in sports nowadays, it is maintained that three inherent psychological needs (i.e., need for competence, relatedness and autonomy) should be fulfilled to catalyze psychological growth, integrity, and well-being (Deci & Ryan, 2000; Vansteenkiste, Ryan, & Soenens, 2020). Given the manifold benefits associated with the satisfaction of these needs, such as improved motivation (e.g., Amorose & Anderson-Butcher, 2007), prosocial behavior (Delrue et al.,

2017), and persistence (e.g., Pelletier et al., 2001), considerable attention has been devoted to the coaching styles that support these needs.

The notion of coach *autonomy support* has received a lot of attention (e.g., Goudas et al., 1995; Aelterman, De Muynck, Haerens, Vande Broek, & Vansteenkiste, 2017). When autonomy-supportive, coaches display a general attitude of openness, acceptance, and curiosity towards the athletes such that they experience a sense of psychological freedom and volition in their acting, feeling, and thinking (Aelterman et al., 2017; Delrue et al., 2019). A coach can support players' need for autonomy by providing them choices, giving a meaningful rationale when decisions are made for athletes, validating their concerns and complaints, and supporting a dialogue and sense of initiative among players such that they willingly take action (Mageau & Vallerand, 2003; Conroy & Coatsworth, 2007). In addition to coach autonomy support, the provision of *structure* has also been increasingly researched. When coaches are highly structured, they support athletes' skill development by creating a predictable, safe, and progress-oriented environment (Delrue et al., 2019). Specifically, structuring coaches set and monitor clear expectations and goals, they express confidence in the athletes' capacity to effectively handle tasks and to achieve expectations, they offer helpful information, suggestions and strategies to guide their athletes, and they support athletes' development by providing informational and positive feedback and encouragement (Aelterman et al., 2017; Curran, Hill, & Niemiec, 2013).

Dozens of studies, both correlational and experimental (e.g., De Muynck et al., 2017), have shown that coach autonomy support and structure entail various benefits through actively fostering experiences of need satisfaction. Need satisfaction, in turn, relates to various positive outcomes, including persistence (e.g., Pelletier et al., 2001), motivation (e.g., Amorose & Anderson-Butcher, 2007; Carpentier & Mageau, 2013), engagement (Curran et al., 2013) and well-being (Adie et al., 2012; Gagné et al., 2003). Apart from this “bright”

pathway with need-supportive coaching yielding desirable outcomes through need satisfaction (Haerens, Aelterman, Vansteenkiste, Soenens, & Van Petegem, 2015; Vansteenkiste & Ryan, 2013), also a “dark” pathway has been uncovered in which controlling coaching and experiences of need frustration play a central role.

Controlling Coaching: Differentiating Demanding from Domineering Coaching

Coach control has long been dealt with indirectly and treated as the counterpart of autonomy support (e.g., Deci & Ryan, 2000). However, research (Bartholomew et al., 2011) points out that controlling coaching involves more than the absence of autonomy support, as it has been increasingly recognized that autonomy support and control should not be seen as two ends of one single continuum but instead represent separate coaching styles. When controlling, coaches actively engage in a variety of strategies that restrict and intrusively interfere with athletes’ acting, thinking, or feeling, thereby eliciting experiences of need frustration (Bartholomew et al., 2009; 2010). Apart from a “bright” pathway, linking coach need support to favorable outcomes via need satisfaction, a complementary dark pathway links control with unfavorable outcomes through need frustration (Bartholomew et al., 2011). In these studies, controlling coaching was found to relate to maladaptive outcomes, such as moral disengagement (Ntoumanis, Barkoukis, Gucciardi, & Chan, 2017), burn-out (Balaguer et al., 2012), and ill-being in sport (Bartholomew et al., 2011).

Most recently, Delrue et al. (2019) provided a nuanced viewpoint on coach control by separating a demanding from a domineering approach. When demanding, coaches use a variety of strategies to correct athlete misbehavior and push the athlete towards desired behaviors. They do so by insisting firmly on compliance or using controlling commands (e.g., Bartholomew et al., 2010; De Muynck et al., 2017). When domineering, coaches exert power through the use of intimidation, guilt- and anxiety-induction, and personal attack (Bartholomew et al., 2011). While domineering coaching practices are particularly harsh and

intrusive because they target the athletes as a person, demanding coaching practices are less pressuring because they target athletes' behavior.

These two controlling approaches were identified in a circumplex model, which captures coaches' variation in need-supportive and need-thwarting coaching. In such a circular structure, the strength of the correlation between coaching approaches informs one on the conceptual relation between them. Adjacent approaches are highly correlated because of their shared conceptual features. In contrast, approaches that are situated at a greater distance or even in opposition to one another are, respectively, weakly or even negatively correlated because they share fewer conceptual features or stand even in a conceptual conflicting relation to each other. Within this circular structure, these two controlling approaches were adjacent to one another, yet they occupied a somewhat different position in relation to other identified coaching styles. Delrue et al. (2019) reported that the demanding approach was situated next to coach structure, implying that coaches who are demanding are also often structuring and vice versa. In contrast, the domineering approach fell next to chaotic coaching, suggesting that coaches who are domineering may also give up on their athletes and abandon them. In accordance with their different position in the circumplex, they yielded a partially similar and partially dissimilar pattern of correlates with external outcomes. Specifically, both controlling approaches correlated positively with athlete need frustration, controlled motivation, and amotivation, with the pattern of correlates being more pronounced in the case of a domineering approach. In contrast, while a domineering approach was negatively correlated with beneficial motivational outcomes such as athletes' autonomous motivation and need satisfaction, such associations were not found for the demanding approach.

Coaching Profiles: A Refreshing Approach to Study Coaching Behavior

In spite of the well-documented benefits associated with coach autonomy support and structure, coaches still rely upon a controlling coaching style for a number of reasons. For

example, in youth sports more than half of all coaches in Flanders (i.e., 62.42%; Vlaamse Trainersschool, 2018) lack a formal education in coaching, presumably because ex-players or parents serve as volunteering coaches (e.g., Conroy & Coatsworth, 2006). As a result, they may be inspired by tradition, personal experiences, or the observation that successful elite sport coaches within their sport often make use of a controlling style, which strengthen their belief that such a style is effective (e.g., Cushion et al., 2012; Ntoumanis & Mallet, 2014). For example, sports such as judo (e.g., d'Arripe-Longueville, Fournier, & Dubois, 1998) or soccer (e.g., Cushion et al., 2012) have been traditionally characterized by an underlying authoritarian and highly directive approach. Also, coaches of team athletes are more likely to adopt a controlling style (Delrue et al., 2019). Whereas the one-on-one relationship of individual sports allows for a more athlete-attuned and participative approach (e.g., Hollembeak & Amorose, 2005), team sport coaches may act in a more controlling way to maintain discipline (e.g., when a player is troubling the rest of the team) (e.g., Chelladurai, 1993; van de Pol, Kavussanu, & Kompier, 2015).

Yet, even when they are controlling, some coaches may additionally make use of need-supportive practices (Bartholomew, 2011). For example, coaches who push athletes to comply with their requests (i.e., demanding) may also provide a clear rationale for them (i.e., autonomy-support). In practice, it may therefore be incorrect to categorize coaches as being either controlling or need-supportive. Instead, some coaches may make use of a coaching profile characterized by the combined presence of need support and control. Unfortunately, most prior SDT-grounded coaching research relied on a more traditional, variable-centered approach (e.g., correlation or regression), thereby examining the *unique* or *separate* contribution of different coaching styles on athlete outcomes (e.g., Mageau & Vallerand, 2003; Carpentier & Mageau, 2013; Howard & Hoffman, 2018). Although being a valuable method that is not inferior or in competition with other methods, a variable-centered approach

limits the understanding of how need-supportive and controlling behaviors may group *within* individuals. Within a person-centered approach, typical configurations of variables within a person are identified which allows for the determination of subgroups of coaches, each characterized by specific coaching profiles or combination of different parameters (i.e., coaching styles) (Howard & Hoffman, 2018).

From such a person-centered perspective, several critical questions can be addressed. First, the question rises how many coaching profiles can be retained to parsimoniously capture the heterogeneity in coaches' combined use of different coaching styles. Second, the type of retained coaching profiles informs us on the extent to which coaching styles go hand in hand or, instead, stand in opposition. To illustrate, if profiles are identified in which coaches score simultaneously either high or low on two coaching styles (e.g., autonomy support and control) this provides evidence for the relative distinct nature of these coaching styles. Third, in terms of its external validity, identification of coaching profiles helps to shed light on the question whether the simultaneous presence of a need-supportive and controlling coaching style necessarily comes with a cost or may even yield supplementary benefits compared to when a need-supportive style is solely present.

Prior research within SDT has primarily focused on the interplay between autonomy support and structure (e.g., Jang et al., 2010). The question whether coaches do well to additionally adopt a controlling approach has received limited attention. A notable exception is the study by Haerens et al. (2018), which identified four coaching profiles based on the combination of perceived coach autonomy support and psychological control. In line with previous research within the sport context (Matosic & Cox, 2014), four clusters were identified characterized by varying levels of both autonomy support and control, with two groups displaying discrepant scores (i.e., high-low and low-high) and two groups displaying similar scores (i.e., high-high and low-low) on both dimensions. In terms of the association

with external outcomes, profiles characterized by higher levels of coach control yielded poorer motivational outcomes compared to profiles characterized by lower levels of coach control. Given a more differentiated view on controlling behaviors (Delrue et al., 2019), the question of how different forms of coach control combine with either autonomy support or structure deserves further attention. Possibly, a demanding approach in combination with a need-supportive style may yield a differential pattern of outcomes compared to when coaches are perceived to combine a domineering and need-supportive style.

Present Study

The question whether different configurations (i.e., profiles), consisting of both need-supportive and controlling styles, can be retained has received limited attention. Because a controlling coaching style is more normative within team, relative to individual, sports (e.g., Cushion et al., 2012; Delrue et al., 2019), the present study focused on the correlates of controlling approaches (i.e., demanding and domineering) in team sports when occurring in combination with a need-supportive style (i.e., autonomy support and structure). Using a person-centered approach (i.e., cluster analyses), the first aim of the present study was to examine the heterogeneity in coaching profiles by pairing each need-supportive style (i.e., autonomy support and structure) with each subdimension of coach control (i.e., demanding and domineering), resulting in four sets of analyses. Based on previous research (Haerens et al., 2018) and the assumption that need-supportive and controlling coaching do not necessarily represent the two ends of a single continuum (Bartholomew et al., 2011; Vansteenkiste & Ryan, 2013; Delrue et al., 2019), we hypothesized to find evidence for four different coaching profiles (i.e., high-high, high-low, low-high, or low-low) within each set of performed cluster analysis.

The second aim of the present research was to examine associations between coaching profiles and athletes' motivational outcomes (i.e., autonomous motivation, controlled

motivation, engagement). Based on the identification of a “bright” and “dark” pathway (e.g., Haerens et al., 2015), we expected that those profiles characterized by relatively high autonomy-supportive or structuring and low demanding or domineering coaching (i.e., high-low) would score the highest on autonomous motivation and engagement and the lowest on controlled motivation. In contrast, the opposite coaching profile (i.e., low-high), characterized by low autonomy support or structure and relatively high demanding or domineering coaching, were expected to yield lower scores on autonomous motivation and engagement and higher scores on controlled motivation. Yet, we considered the possibility that coaches who are perceived to be high on one of the need-supportive styles (i.e., autonomy-support or structure) and being demanding might not by definition differ from those perceived to be high on need-supportive coaching only. In contrast, the additional presence of a domineering approach next to a high need-supportive style would rather be detrimental as domineering coaches are too intrusively invading into athletes’ functioning for the athletes to perceive such an approach as legitimate and necessary.

Methods

Participants and Procedure

Participants were 317 youth athletes (74% boys,) from sport clubs throughout Flanders (Belgium) who were practicing team sports (i.e., volleyball, basketball, soccer, American football, rugby, hockey, korfbal). Athletes’ age ranged from 16 to 23 with an average of 17.67 years old ($SD = 1.31$), and they were practicing their sport for 8.51 years on average ($SD = 3.55$, $range = 1 - 17$). Athletes were active at different levels of competition, ranging from the regional (e.g., regional level of korfbal) to the national level (e.g., highest division in hockey).

Team sport clubs were invited by email to participate in this study. Interested clubs were asked to incite their youth coaches to engage in the study. Interested coaches were

informed by email or telephone, and asked to pick out a moment to meet. That is, teams were visited once before or after practice to fill out the questionnaires, which approximately took twenty minutes. Participation in the study was voluntary and athletes were asked to sign an active informed consent. This study was approved by the Social and Societal Ethics Committee of the research institution.

Measures

Coaches' Need-Supportive/Thwarting Behavior

Athletes rated their coaches' autonomy supportive, structuring, demanding and domineering coach behavior using the Situations-in-Sport Questionnaire (Delrue et al., 2019). Within this questionnaire 15 autonomy support items (Cronbach's $\alpha = .82$), 15 structure items (Cronbach's $\alpha = .85$), 10 demanding items (Cronbach's $\alpha = .72$) and 5 domineering items (Cronbach's $\alpha = .69$) were answered regarding sport-specific vignette-like situations. Athletes had to answer to which degree the items corresponded to the behavior of their coach in a specific situation on a 7-point Likert scale from 1 (*does not describe my coach at all*) to 7 (*describes my coach extremely well*). Examples are: (a) *'In the first part of the competition/game you did not play at the level that the coach expected. During the break... - he/she gives you a stern talking-to: "It is up to you now to set this right and show what you are worth" (i.e., demanding); (b) An athlete is suffering from performance anxiety in the run-up to a competition. How does your coach respond? - He/she says: "You have to learn to cope with the stress. If you don't, the competition will be a disaster" (i.e., domineering); (c) The training session begins... - Your coach is interested to hear which specific skill you would like to practice and provides the necessary space for you to do so (i.e., autonomy); and (d) During a difficult moment in the training session an athlete begins to complain. Your coach... - gives him/her a helpful strategy to solve the problem step by step (i.e., structure).*

Athletes' Motivation

To measure athletes' motivation, we used 32 items based on the slightly modified version of the Behavioural Regulations in Sport Questionnaire (BRSQ; Lonsdale, Hodge, & Rose, 2008) as used by Assor, Vansteenkiste and Kaplan (2009). Athletes were asked to rate each of these items on a 7-point Likert scale from 1 (*totally disagree*) to 7 (*totally agree*). To become scores on autonomous motivation (e.g., "I participate in my sport because it is part of who I am") scores of intrinsic, integrated, and identified regulation were aggregated, whereas controlled motivation (e.g., "I participate in my sport to satisfy people who want me to") was measured by composing items regarding introjected and external regulation (Vansteenkiste et al., 2009). Internal consistencies of autonomous and controlled motivation were .87 and .89, respectively.

Athletes' Engagement

A set of 17 items, based on work of Skinner et al. (2009), Reeve (2013), Reeve and Tseng (2011), and Wolters (2004) was used to measure athletes' engagement (e.g., "I try hard to do well during training & competition" and "I express my preferences and opinions during training & competition"). All items were answered on a 7-point Likert scale ranging from 1 (*totally disagree*) to 7 (*totally agree*). Congruent with previous research studying engagement in the sport context (e.g., Reynders et al., 2019), scores on the four subcomponents (i.e., emotional, behavioral, cognitive and agentic) of engagement were aggregated and resulted in a total score of athletes' engagement (Cronbach's $\alpha = .90$).

Data Analysis

To identify the presence of clusters within our data, we used R (i.e., package "clusterSim" and "flexclust") to conduct K-means cluster analysis, using the Hartigan-Wong (1979) algorithm with 1000 random starts, on the combinations of autonomy support-demanding, structure-demanding, autonomy support-domineering, and structure-domineering. To remove differences in scale use across the different variables and focus on the within-scale

differences, scores on autonomy support, structure, demanding and domineering were standardized using z -scores prior to running cluster analyses. When further discussing relative scores within clusters and labelling the different clusters (i.e., high or low, or moderate low/high), these z -scores were used as criteria for interpretation of higher or lower levels of perceived coaching behaviour relative to the sample mean of that specific variable/scale. While z -scores above .30 were labeled as “High” and z -score under -.30 as “Low”, z -scores ranging from -0.30 to 0 and from 0 to 0.30 were considered to be “Moderately low” and “Moderately high” respectively. It is critical to emphasize that these labels need to be considered in comparative terms as they reflect *relative* differences between identified groups. Although these labels do not speak to the *absolute* presence of different coaching behaviors in each group, these absolute values are nevertheless added to the tables for informative purposes.

To obtain correct and clearly interpretable cluster solutions, we included a limited number of variables (Timmerman, Ceulemans, De Roover, & Van Leeuwen, 2013). That is, to get insight in the unique relations between distinct controlling (i.e., demanding and domineering) and need-supportive (i.e., autonomy support and structure) styles, we performed separate cluster analyses on the variables of either autonomy support or structure in combination with either demanding or domineering. Correlations between the study variables can be found in Table 1. To determine the optimal number of clusters, we looked for a theoretically meaningful, parsimonious, and interpretable solution (i.e., using the Pseudo F -statistic). The Pseudo F -statistic expresses the ratio of between-cluster variance to within cluster variance (Calinski & Harabasz, 1974). As a result, the highest values of Pseudo- F indicate the greatest cluster separation, and thus the most optimal solution (Wilkinson et al., 1985). However, the solution with the highest Pseudo F -statistic may sometimes show high complexity or explain only a limited amount of variance in cluster variables. Therefore, we

subjected the best solution to a check for (theoretical) interpretability and explained variance in cluster variables, thereby aiming towards a minimum of approximately 50% (Milligan & Cooper, 1985).

Second, MANOVAs were performed separately for the different combinations (e.g., autonomy-supportive and demanding coaching) with clusters as independent and athletes' outcomes as dependent variables were performed to check for cluster differences. Given the high correlations between autonomy support and structure (i.e., $r = .77$), we controlled for scores of structure within the autonomy clusters and scores of autonomy within the structure clusters when looking at multivariate tests. Next, to identify differences in study outcomes between the obtained profiles (i.e., clusters) within each combination, univariate ANOVAs were checked for the separate outcomes. Finally, we checked for mean differences in these outcomes between the obtained clusters by using pairwise comparisons with Bonferroni test.

Results

Aim 1: Identification of Coaching Profiles

Configurations with Demanding Coaching Behavior

In determining the number of clusters, analysis suggested a 3-or 4-cluster solution regarding the autonomy support-demanding combination, with Pseudo F values (Calinski & Harabasz, 1974) of 188.2 (i.e., 3 clusters) and 187.2 (i.e., 4 clusters). As the 3-cluster solution only explained 27% variance in autonomy support and given the small difference in the Pseudo F values of the two solutions, we opted for the richer 4-cluster solution, which explained, respectively, 49% and 59% of the variance in the dimensions of autonomy-supportive and demanding coaching. The z -scores of the four cluster profiles can be found in the top half of Table 2 and Figure 1. Cluster 1 represents coaches who are perceived to be relatively low on autonomy support and demanding coach behavior ($N = 61$, 19.43%; low-low), while cluster 4 ($N = 58$, 18.47%; high-high) scores relatively high on both dimensions.

Cluster 2 and 3 yielded an opposite pattern, with cluster 2 representing coaches who are perceived to be moderately low on autonomy support but high on being demanding ($N = 94$, 29.93%; moderate low-high) and cluster 3 involving coaches who are perceived to be high on autonomy support and low on demanding ($N = 101$, 32.17%; high-low).

Cluster analysis regarding the structure-demanding combination again suggested two possible cluster solutions, that is a 2-cluster (Pseudo $F = 193.43$) and 4-cluster solution (Pseudo $F = 209.53$). Because the 4-cluster solution yielded a higher Pseudo F value (Wilkinson et al., 1998) and explained more variance in both structuring (i.e., 50%) and demanding (i.e., 59%) coaching, it was preferred over the 2-cluster solution. The bottom half of Table 2 and Figure 1 depicts the obtained cluster solution, which was very much in line with the profiles identified when combining autonomy supportive and demanding coaching: coaches were perceived to be either low ($N = 39$, 12.42%; low-low, Cluster 1) or high ($N = 75$, 23.89%; high-high, Cluster 4) on both dimensions. The second and third cluster yielded more opposing scores, that is, low structuring and high demanding coaching ($N = 108$, 34.39%; low-high) and high structuring and low demanding coaching ($N = 92$, 29.30%; high-low).

Configurations with Domineering Coaching Behavior

In line with previous combinations, cluster analysis again proposed two possible solutions regarding the autonomy-domineering combination, that is a two-cluster solution (Pseudo $F = 205.31$) and four-cluster solution (Pseudo $F = 194.75$). Taking into account the explained variance in autonomy supportive and domineering coaching in both cluster solutions, we opted for a 4-cluster solution. More specifically, whereas in the two-cluster solution 13% and 46% of variance in autonomy-supportive and domineering coaching was explained, the 4-cluster solution accounted for 49% and 55% of variance in both dimensions, respectively. *Z-Scores* of these four clusters can be found in Figure 1 and the top half of Table

3. Cluster 1 encompassed athletes who scored their coaches moderately low on autonomy support and low on domineering coaching ($N = 78$, 24.8%; moderate low-low) and cluster 4 involved coaches scoring moderately high and high on both dimensions, respectively ($N = 114$, 36.3%; moderate high-high). Next, cluster 2 displayed coaches who were perceived to be low on autonomy support and high on domineering coaching ($N = 62$, 19.7%; low-high), while cluster 3 represents high scores on autonomy-supportive and low scores on domineering coaching ($N = 60$, 19.1%; high-low).

Regarding the configurations involving structure and domineering coaching, cluster analysis pointed towards a 3- (Pseudo $F = 207.01$) or 4-cluster solution (Pseudo $F = 192.50$). Although it clearly showed the highest Pseudo- F value, the 3-cluster solution only explained 32% of variance in structure. Because the 4-cluster solution significantly improved explained variance in structure (i.e., 47%), we again opted for the 4-cluster solution. As can be seen from Figure 1 and the bottom half of Table 3, athletes perceived their coaches to be either moderately low ($N = 101$, 32.2%; moderate low-moderate low, Cluster 1) or high ($N = 80$, 25.5%; high-high, Cluster 4) on both dimensions. Cluster 2 and 3 again showed an opposite pattern. More specifically, cluster 2 involved low structuring and high domineering coaching ($N = 48$, 15.3%; low-high), while cluster 3 included high scores on structure and low scores on domineering coaching ($N = 85$, 27.1%; high-low).

Aim 2: Relation between Obtained Clusters and Motivational Outcomes

Configurations with Demanding Coaching Behavior

A MANOVA-test with the profiles of the autonomy-support and demanding coaching clustering as the independent variable and outcome variables as the dependent variables revealed a significant effect ($F(9, 915) = 9.46$, $p < .001$, Pillai's Trace = 0.25, partial $\eta^2 = .08$). Also, all univariate effects were significant, except for controlled motivation (see Table 2). Pairwise comparisons indicated that athletes who perceived their coaches to be high on

both autonomy-supportive and demanding coaching reported the highest levels of desirable motivational outcomes (i.e., engagement and autonomous motivation) compared with the three other groups (all $ps < .05$, all $ds > 0.56$). Regarding engagement, all other clusters also differed from each other with the high autonomy - low demanding cluster showing the second highest score (all $ps < .05$, all $ds > 0.47$), followed respectively by the low autonomy – high demanding cluster (all $ps < .05$, all $ds > 0.47$), and the low autonomy – low demanding cluster (all $ps < .05$, all $ds > 0.47$).

Following a significant multivariate effect of the structure – demanding clusters on outcome variables, as revealed by MANOVA ($F(9, 915) = 4.30$, $p < .001$, Pillai's Trace = 0.13, partial $\eta^2 = .04$), univariate effects for all separate outcomes were significant (see Table 2). Pairwise comparisons indicated an almost identical pattern for both desirable outcomes (i.e., autonomous motivation and engagement). That is, compared to the two clusters low on structure, scores on these outcomes were found to be the highest in the high structure - low demanding (all $ps < .05$, all $ds > 0.50$) and high structure - high demanding clusters (all $ps < .001$, all $ds > 0.66$). It should however be noted that the difference in autonomous motivation failed to reach significance between the low structure-high demanding and the high structure-low demanding groups ($p = .35$). Regarding controlled motivation, the clusters involving low structure revealed higher scores compared to the cluster high structure-low demanding (all $ps < .05$, all $ds > 0.42$).

Configurations with Domineering Coaching Behavior

MANOVA test showed a significant effect regarding the outcome variables among the clusters differing in terms of autonomy-supportive and domineering coaching ($F(9, 915) = 2.30$, $p < .05$, Pillai's Trace = 0.07, partial $\eta^2 = .02$). Yet, the follow-up univariate analyses were not significant for autonomous motivation, engagement, and controlled motivation (See Table 3).

Finally, a MANOVA test with the clusters differing in terms of structure and domineering coaching differed from each other at the multivariate level ($F(9, 915) = 4.68, p < .001$, Pillai's Trace = 0.13, partial $\eta^2 = .05$). Univariate effects for all separate outcomes were significant (see Table 3). Compared to the two clusters low on structure, scores on desirable outcomes (i.e., autonomous motivation and engagement) were found to be higher in the high structure – low domineering (all $ps < .01$, all $ds > 0.62$) and high structure – high domineering cluster (all $ps < .05$, all $ds > 0.50$), with the low structure – high domineering cluster clearly showing the lowest level of engagement (all $ps < .01$, all $ds > 0.63$). Regarding controlled motivation, clusters involving high levels of domineering behavior showed significant higher levels compared to the high structure – low domineering cluster (all $ps < .05$, all $ds > 0.43$).

Discussion

Congruent with the recent decomposition of controlling coaching into a demanding and domineering approach (Delrue et al., 2019), the present study aimed to examine the heterogeneity in coaching profiles by pairing these two controlling approaches with each need-supportive style (i.e., autonomy-support or structuring coaching). As hypothesized, evidence was found for four different coaching profiles regardless of the used pair of coaching behaviors. Next, the person-centered approach allowed us to examine associations between those coaching profiles and athletes' motivational outcomes. As hypothesized, profiles characterized by relatively low need-support and high, isolated controlling behavior yielded the least optimal pattern of motivational outcomes. While the presence of need-supportive coaching yields a desirable pattern of motivational outcomes, the additional presence of a demanding approach showed similar associations. In contrast, the additional presence of a domineering approach next to a high need-supportive style does come with a cost in terms of athletes' outcomes.

Theoretical Implications

In line with previous research (Delrue et al., 2019), the person-centered approach (cluster analyses) revealed that at least some athletes indicate that their coaches are not necessarily either need-supportive or *demanding*. In contrast, some coaches are perceived to combine these behaviors in a more (or less) balanced way thereby scoring high or fairly low on both, with the latter suggesting a lack of involvement with their players (Delrue et al., 2019). Analogously, the retained coaching profiles regarding the combination of need support and *domineering* behavior implied that also domineering coaching could either differentiate from or somehow go along with coaches' need support. Altogether, the pattern of results is congruent with the dual pathway model, which suggests that there exists a "bright" and "dark" pathway from need-supportive and need-thwarting coaching to, respectively, need satisfaction and need frustration. If need-supportive (i.e., autonomy support and structure) and controlling behaviors (i.e., demanding and domineering) would fall along a single continuum and thus be mutually exclusive, no coaching profiles should be found in which both styles are equally present (e.g., a high-high group).

Together with the identification of different profiles combining need-supportive and controlling coach behaviours, the current study examined associations between these profiles and athletes' motivational outcomes (i.e., autonomous motivation, controlled motivation, and engagement). First, the detrimental role of a domineering approach, although being complemented with high structure, seems not limited to its associations with maladaptive outcomes (e.g., controlled motivation) through a "dark" pathway (Haerens et al., 2015). That is, based on a more detailed inspection of the cluster scores, the presence of a domineering approach seem to deflate the level of athletes' autonomous motivation and engagement, even when combined with high need support. These results are in line with the study of Haerens et al. (2018), which made use of a harsh operationalization of a controlling style. That is,

athletes in the high autonomy support and low control group reported the highest levels of athletes' autonomous and lowest levels of controlled motivation. In contrast, the diametrically opposing group (i.e., low autonomy support and high control) reported the lowest level of autonomous and highest level of controlled motivation.

In contrast to profiles involving the presence of a domineering approach, coaches combining high need-supportive and demanding behavior showed a more optimal pattern with respect to athletes' autonomous motivation and engagement. It should be noted that within profiles combining high need support and high demanding behaviour both relative (i.e. compared to the other profiles) and absolute (i.e., compared to the midpoint of the scale) scores on autonomy and structure were the highest, which may account for these profiles to yield the absolute highest scores on desirable outcomes. Indeed, the degree of need-supportive behaviors may regulate positive motivational outcomes such as autonomous motivation through a "bright" pathway (e.g., Haerens et al., 2015). Accordingly, high autonomy support and structure may stimulate a positive pathway towards more positive outcomes. Nevertheless, it is important to notice that the presence of highly demanding behavior, when accompanied with high need support, does not seem to harm athletes' autonomous motivation and engagement. Such findings are in line with the study of Matosic and Cox (2014), in which no significant differences were found between a high-autonomy support group and a high autonomy-high control (i.e., controlling use of rewards) group regarding athletes' autonomous forms of motivation. Yet, demanding behaviours should not be considered as being innocuous as they can provoke higher scores on controlled motivation when relied on in isolation. These results also bear similarities with those reported by Matosic and Cox (2014), who found high-control coach profiles (i.e., only controlling) to be associated with higher levels of athletes' controlled forms of motivation compared to high-autonomy coach profiles (i.e., only autonomy-supportive).

Practical Implications

The use of the person-centered approach within this study may increase the ecological validity of the existing body of research in coaching, as coaches in practice will probably rely on a mixture of coaching behaviors, instead of relying on one single coaching style. Therefore, findings of this study may extend existing literature by highlighting some practical relevance for coaches as well. For example, results of the present study show that demanding and need-supportive behaviours may co-occur within team sport coaches' daily practice. Regarding a demanding approach in particular, results from the study of Delrue et al. (2019), showed coaches in team sports to be more demanding when compared with coaches from individual sports, as reported by both athletes and coaches themselves. While implementing need-supportive strategies may be more straightforward within individual sport settings, coaches may be skeptical towards a need-supportive, and in particular autonomy-supportive coaching style, which they may associate with deregulation (e.g., Mageau & Vallerand, 2003; Cushion et al., 2012; Reynders et al., 2019). Besides, it may be not self-evident for coaches to unconditionally rely on a need-supportive coaching style within the context of team sports (Cushion et al., 2012; Rhind, Jowett, & Yang, 2012; Vroom & Yago, 2007). As team sports are characterized by high interdependency, there may be circumstances (e.g., when a player is disturbing the rest of the team) in which coaches act in a more demanding manner as they may suppose this to be beneficial for the functioning of the team as a whole (e.g., Chelladurai, 1993; van de Pol, Kavussanu, & Kompier, 2015). It would therefore be naïve to ignore that demanding coaching behaviors are part of daily coaching in team sports. Results of the current study point out that the use of demanding strategies does not have to affect athletes' autonomous motivation and engagement in a negative way, yet, on the precondition that they are combined with need-supportive behavior. For example, when coaches consult their athletes (i.e., participative) in making clear agreements about rules and guidelines within the

team (i.e., structure), the motivational impact of pushing athletes for compliance (i.e., demanding) may be somehow mitigated. As a result, a demanding approach may be considered as a milder form of coach control, when compared with domineering behavior. Yet, given the gradual perspective following the circumplex structure (Delrue et al., 2019), it is important for coaches to be aware that an isolated demanding approach may account for higher levels of controlled motivation and eventually may open the door for slipping further away into a domineering approach, which should be considered as a no-go zone. It is unlikely that athletes benefit from guilt- and anxiety-induction, intimidation or personal attack (Bartholomew et al., 2011).

Limitations and Future Research

The present study also has some limitations. First, this study was conducted within a team sport setting, thereby limiting our findings to the context of team sports. Previous research indicated coaches' behavior to be perceived differently within samples of team and individual sport athletes (Hollembek & Amorose, 2005). In line with this, empirical evidence suggested that team sport settings are characterized by higher levels of demanding and domineering coaching behaviour, when compared with individual sports (Delrue et al., 2019). As team and individual sports may diverge in terms of complexity and prevailing coaching culture, coaches from team and individual sports may act in a different way, resulting in a varied set of (de)motivating coaching profiles (Rhind, Jowett, & Yang, 2012; van de Pol et al., 2015). Therefore, it would be interesting to see if the same results would be obtained among individual sport athletes. In line with this, this study only comprised a limited amount of female coaches. Therefore, when performing cluster analyses, future work may intend to include a sufficient amount and equal distribution of male and female athletes to test for possible gender differences as well.

Second, current research involved rather young athletes from different levels of

competition. Therefore, it could be questioned if the same coaching profiles would be obtained when performing cluster analysis within samples of elite athletes. In a high-stakes, elite sport context coaches experience high levels of accountability and responsibility which may incite them to rely more on these behaviors where they perceive feelings of control (i.e., demanding) (Cushion et al., 2012; Din et al., 2015; Ntoumanis & Mallet, 2014). Moreover, within this elite sport context, a demanding approach have been identified as common coach behavior among high-performing coaches (Din et al., 2015). Accordingly, the present study examined the role of different coaching profiles on rather proximal & positive outcomes such as athletes' motivation and engagement. Therefore, when the obtained profiles could be replicated, future research should also consider focusing on performance-related and/or more negative outcomes (e.g., ill-being) as these may benefit more or differently from certain combinations of coaching styles.

Third, the rather explorative nature of this study, with the circumplex model being only recently developed, led us to opt for K-means clustering (Stanley, Kellermanns, & Zellweger, 2017). However, Latent Profile Analysis (LPA) would have been a valuable person-centered alternative to K-means clustering. Simulation studies have shown that none of both techniques consistently outperforms the other, yet highlighting some strengths and limitations of LPA and K-means (Steinley & Brusco, 2011a; Steinley & Brusco, 2011b). As opposed to K-means clustering, LPA is often considered as a more suitable method as it is model-based, and yield fit statistics and probability measures (e.g., the probability that a coach belongs to one profile vs. another), while K-means focuses on minimizing within-cluster differences and maximizing between-cluster difference in determining cluster solutions (Stanley et al., 2017). Future work could therefore consider LPA as a suitable alternative approach when aiming to replicate or expand upon the current findings.

Finally, although the number of coaching variables that was included in the person-

centered analysis was limited to two, coaches are perceived to differ on multiple dimensions. Future research may include three or more coaching dimensions to examine whether this allows for the identification of a more diverse and greater number of clusters, possibly yielding more refined insights. Moreover, due to the correlational design of this study, the obtained coaching profiles may reflect coach behavior only at one moment in time. Yet, as also more situational or contextual factors such as serial winning or losing (e.g., Fry, Kerr & Lee, 1986) may affect coaches' behavior, longitudinal studies may extend the current research and obtain more dynamic coaching profiles.

Conclusion

While need support is widely recognized to foster desired motivational outcomes, coaches may still be hesitant towards a need-supportive coaching style and display controlling behavior from time to time (Cushion et al., 2012; Ntoumanis & Mallet, 2014). The current study within team sports emphasized the interplay between need-supportive and controlling behaviors, thereby distinguishing between a domineering and demanding approach among the latter. By identifying a set of different coaching profiles, it was found that some coaches are perceived to combine need-supportive and controlling behaviors. This more person-centered and nuanced perspective on coaching may not only provide new theoretical insights in research involving need-supportive and controlling (i.e., demanding and domineering) coach behaviors but also play a key role in fostering a conceptual change in coaches' beliefs regarding need-supportive and controlling coach behavior.

Acknowledgments

The research was funded by the Government of Flanders, Department of Sport (B/14197/02-IV2)

References

- d'Arripe-Longueville, F., Fournier, J. F., & Dubois, A. (1998). The perceived effectiveness of interactions between expert French judo coaches and elite female athletes. *The Sport Psychologist, 12*(3), 317-332.
- Adie, J. W., Duda, J. L., Ntoumanis, N. (2012). Perceived coach-autonomy support, basic need satisfaction and the well- and ill-being of elite youth soccer players: A longitudinal investigation. *Psychology of Sport and Exercise, 13*, 51-59.
- Aelterman, N., De Muynck, G.-J., Haerens, L., Vande Broek, G., & Vansteenkiste, M. (2017). *Motiverend coachen in de sport*. Leuven, Belgium: Acco.
- Amorose, A.J., & Anderson-Butcher, D. (2007). Autonomy-supportive coaching and self-determined motivation in high school and college athletes: A test of self-determination theory. *Psychology of Sport and Exercise, 8*, 654-670.
- Assor, A., Vansteenkiste M., & Kaplan, A. (2009). Identified versus introjected approach and introjected avoidance motivations in school and in sports: The limited benefits of self-worth strivings. *Journal of Educational Psychology, 101*, 482-497.
- Balaguer, I., Atienza, F. L., & Duda, J. L. (2012). Self-perceptions, self-worth and sport participation in adolescents. *The Spanish Journal of Psychology, 15*(2), 624-630.
- Bartholomew, K. J., Ntoumanis, N., & Thøgersen-Ntoumani, C. (2009). A review of controlling motivational strategies from a self-determination theory perspective: Implications for sports coaches. *International Review of Sport and Exercise Psychology, 2*(2), 215-233.
- Bartholomew, K. J., Ntoumanis, N., Ryan, R. M., Bosch, J. A., & Thøgersen-Ntoumani, C. (2011). Self-determination theory and diminished functioning: The role of interpersonal control and psychological need thwarting. *Personality and Social Psychology Bulletin, 37*(11), 1459-1473.

- Bartholomew, K. J., Ntoumanis, N., & Thøgersen-Ntoumani, C. (2010). The controlling interpersonal style in a coaching context: Development and initial validation of a psychometric scale. *Journal of Sport and Exercise Psychology*, 32(2), 193-216.
- Calinski, T., Harabasz, J. (1974). A dendrite method for cluster analysis. *Communications in Statistics*, 3, 1-27.
- Carpentier, J., & Mageau, G. A. (2013). When change-oriented feedback enhances motivation, well-being and performance: A look at autonomy-supportive feedback in sport. *Psychology of Sport and Exercise*, 14(3), 423-435.
- Chelladurai, P. (1993). Leadership. In R. N. Singer, M. Murphey, & L. K. Tennant (Eds.), *Handbook of research on sport psychology* (pp. 647-671). New York, NY: Macmillan.
- Conroy, D. E., & Coatsworth, J. D. (2006). Coach training as a strategy for promoting youth social development. *The Sport Psychologist*, 20, 128-144.
- Conroy, D. E., & Coatsworth, J. D. (2007). Assessing autonomy-supportive coaching strategies in youth sport. *Psychology of Sport and Exercise*, 8(5), 671-684.
- Curran, T., Hill, A. P., & Niemiec, C. P. (2013). A conditional process model of children's behavioral engagement and behavioral disaffection in sport based on self-determination theory. *Journal of Sport and Exercise Psychology*, 35(1), 30-43.
- Cushion, C., Ford, P. R., & Williams, A. M. (2012). Coach behaviours and practice structures in youth soccer: Implications for talent development. *Journal of Sports Sciences*, 30, 1631-1641.
- Deci, E. L., & Ryan, R. M. (2000). The "what" and "why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11, 227-268.

- Delrue, J., Reynders, B., Aelterman, N., De Backer, M., Decroos, S., De Muynck, G.-J., Fontaine, J., Fransen, K., Stef Van Puyenbroeck, S., Haerens, L., & Vansteenkiste, M. (2019). Adopting a helicopter- perspective towards motivating and demotivating coaching: A circumplex approach. *Psychology of Sport and Exercise*, 40, 110-126.
- Delrue, J., Vansteenkiste, M., Mouratidis, A., Gevaert, K., Broek, G. V., & Haerens, L. (2017). A game-to-game investigation of the relation between need-supportive and need-thwarting coaching and moral behavior in soccer. *Psychology of Sport and Exercise*, 31, 1-10.
- Delrue, J., Soenens, B., Morbée, S., Vansteenkiste, M., & Haerens, L. (2019). Do athletes' responses to coach autonomy support and control depend on the situation and athletes' personal motivation? *Psychology of Sport and Exercise*, 43, 321-332.
- De Muynck, G.-J., Vansteenkiste, M., Delrue, J., Aelterman, N., Haerens, L., & Soenens, B. (2017). The effects of feedback valence and style on need satisfaction, self-talk, and perseverance among tennis players: an experimental study. *Journal of Sport and Exercise Psychology*, 39, 67-80.
- Din, C., Paskevich, D., Gabriele, T., & Werthner, P. (2015). Olympic medal-winning leadership. *International Journal of Sports Science and Coaching*, 10(4), 589-604.
- Fry, L., Kerr, S., & Lee, C. (1986). Effects of different leader behaviors under different levels of task interdependence. *Human Relations*, 39, 1067-1082.
- Gagné, M., Ryan, R. M., & Bargmann, K. (2003). Autonomy support and need satisfaction in the motivation and well-being of gymnasts. *Journal of Applied Sport Psychology*, 15, 372-390.
- Goudas, M., Biddle, S. J. H., Fox, K. R., & Underwood, A. M. (1995). It ain't what you do, it's the way that you do it! Teaching style affects children's motivation in track and field lessons. *The Sport Psychologist*, 9, 254 - 264.

- Haerens, L., Aelterman, N., Vansteenkiste, M., Soenens, B., & Van Petegem, S. (2015). Do perceived autonomy-supportive and controlling teaching relate to physical education students' motivational experiences through unique pathways? Distinguishing between the bright and dark side of motivation. *Psychology of Sport and Exercise*, 16, 26-36.
- Haerens, L., Vansteenkiste, M., De Meester, A., Delrue, J., Tallir, I., Vande Broek, G., Goris, W., & Aelterman, N. (2018). Different combinations of perceived autonomy support and control: identifying the most optimal motivating style. *Physical Education and Sport Pedagogy*, 23(1), 16-36.
- Hartigan, J., & Wong, M. (1979). Algorithm AS 136: A k-means clustering algorithm. *Journal of the Royal Statistical Society. Series C (Applied Statistics)*, 28(1), 100-108.
- Hollembeak, J., & Amorose, A. (2005). Perceived coaching behaviors and college athletes' intrinsic motivation: A test of self-determination theory. *Journal of Applied Sport Psychology*, 17 (1), 20-36.
- Howard, M. C., & Hoffman, M. E. (2018). Variable-centered, person-centered, and person-specific approaches: where theory meets the method. *Organizational Research Methods*, 21(4), 846-876.
- Jang, H., Reeve, J., & Deci, E. L. (2010). Engaging students in learning activities: It is not autonomy support or structure but autonomy support and structure. *Journal of Educational Psychology*, 102(3), 588-600.
- Lonsdale, C., Hodge, K., & Rose, E. A. (2008). The behavioral regulation in sport questionnaire (BRSQ): instrument development and initial validity evidence. *Journal of Sport & Exercise Psychology*, 30, 323-355.
- Mageau, G. A., & Vallerand, R. J. (2003). The coach-athlete relationship: A motivational model. *Journal of Sports Sciences*, 21, 883-904.

99 Matosic, D., & Cox, A. E. (2014). Athletes' motivation regulations and need satisfaction
100 across combinations of perceived coaching behaviors. *Journal of Applied Sport*
101 *Psychology*, 26(3), 302-317.

102 Milligan, G. W., & Cooper, M. C. (1985). An examination of procedures for determining the
103 number of clusters in a data set. *Psychometrika*, 50(2), 159-179.

104 Ntoumanis, N., Barkoukis, V., Gucciardi, D. F., & Chan, D. K. C. (2017). Linking coach
105 interpersonal style with athlete doping intentions and doping use: A prospective study.
106 *Journal of Sport and Exercise Psychology*, 39(3), 188-198.

107 Ntoumanis, N., & Mallet, C. (2014). Motivation in sport: A self-determination theory
108 perspective. In A. Papaioannou & D. Hackfort, *Routledge companion to sport and*
109 *exercise psychology: Global perspectives and fundamental concepts* (pp. 67-82). Hove,
110 United Kingdom: Routledge.

111 Pelletier, L. G., Fortier, M. S., Vallerand, R. J., & Brière, N. M. (2001). Associations among
112 perceived autonomy support, forms of self-regulation, and persistence: A prospective
113 study. *Motivation and Emotion*, 25, 279-306.

114 Reeve, J. (2013). How students create motivationally supportive learning environments for
115 themselves: The concept of agentic engagement. *Journal of Educational Psychology*,
116 105, 579-595.

117 Reeve, J., & Tseng, C.-M. (2011). Agency as a fourth aspect of students' engagement during
118 learning activities. *Contemporary Educational Psychology*, 36, 257-267.

119 Reynders, B., Van Puyenbroeck, S., Decroos, S., De Backer, M., Delrue, J., De Muynck, G.-
120 J., Fransen, K., Haerens, L., & Vande Broek, G. (2019). Coaching the coach: intervention
121 effects on need-supportive coaching behavior and athlete motivation and engagement.
122 *Psychology of Sport and Exercise*, 43, 288-300.

- Rhind, D., Jowett, S. & Yang, S. (2012). A comparison of athletes' perceptions of the coach-athlete relationship in team and individual sports. *Journal of Sport Behavior*, 35, 433-452.
- Ryan, R. M., & Deci, E. L. (2017). *Self-determination theory: Basic psychological needs in motivation, development, and wellness*. New York, NY: Guilford Publishing.
- Skinner E., Kindermann, T., & Furrer, C. (2009). A motivational perspective on engagement and disaffection: Conceptualization and assessment of children's behavioral and emotional participation in academic activities in the classroom. *Educational and Psychological Measurement*, 69, 493-525.
- Stanley, L., Kellermanns, F. W., & Zellweger, T. M. (2017). Latent profile analysis: Understanding family firm profiles. *Family Business Review*, 30(1), 84-102.
- Steinley, D., & Brusco, M. J. (2011a). Evaluating mixture modeling for clustering: Recommendations and cautions. *Psychological Methods*, 16(1), 63-79.
- Steinley, D., & Brusco, M. J. (2011b). K-Means Clustering and Mixture Model Clustering: Reply to McLachlan (2011) and Vermunt (2011). *Psychological Methods*, 16(1), 89-92.
- Timmerman, M., Ceulemans, E., De Roover, K., & Van Leeuwen, K. (2013). Subspace k-means clustering. *Behavioral Research Methods*, 45, 1011-1023.
- van de Pol, P. K., Kavussanu, M., & Kompier M. (2015). Autonomy support and motivational responses across training and competition in individual and team sports. *Journal of Applied Social Psychology*, 45, 697-710.
- Vansteenkiste, M., & Ryan, R. M. (2013). On psychological growth and vulnerability: Basic psychological need satisfaction and need frustration as a unifying principle. *Journal of Psychotherapy Integration*, 23(3), 263-280.
- Vansteenkiste, M., Ryan, R. M., & Soenens, B. (2020). Basic Psychological Need Theory: Trends, critical themes, and future directions. *Motivation and Emotion*, 44, 1-31.

- 148 Vansteenkiste, M., Sierens, E., Soenens, B., Luyckx, K., & Lens, W. (2009). Motivational
149 profiles from a self-determination perspective: The quality of motivation matters. *Journal*
150 *of Educational Psychology*, 101, 671-688.
- 151 Vlaamse Trainersschool. (2018). *Visienota 2025 Vlaamse Trainersschool*. Brussel: Vlaamse
152 Trainersschool.
- 153 Vroom, V. H., & Jago, A. G. (2007). The role of the situation in leadership. *American*
154 *Psychologist*, 62(1), 17–24.
- 155 Wilkinson, L., Engelman, L., Corter, J., & Coward, M. (1998). Cluster Analysis. In L.
156 Wilkinson (Eds.), *SYSTAT 8.0 Statistics* (pp. 53–86). Chicago, IL: SPSS Inc.
- 157 Wolters, C. A. (2004). Advancing achievement goal theory: Using goal structures and goal
158 orientations to predict students' motivation, cognition, and achievement. *Journal of*
159 *Educational Psychology*, 96, 236– 250.

162 *Figure 1. z-Scores in each 4-cluster solution for a) perceived autonomy support and perceived*
 163 *demanding behavior, b) perceived structure and perceived demanding behavior, c) perceived*
 164 *autonomy support and domineering behavior, and d) perceived structure and perceived*
 165 *domineering behavior.*

166 Table 1.

167 *Means, Standard Deviations and Correlations Between all Variables (N = 314).*

Variables	M	SD	1	2	3	4	5	6	7
1. Autonomy	4.35	0.86	-						
2. Structure	5.03	0.85	.77**	-					
3. Demanding	4.15	0.87	.12*	.28**	-				
4. Domineering	3.15	1.08	-.22**	-.16**	.58**	-			
5. Autonomous Motivation	5.63	0.86	.17**	.25**	.08	-.03	-		
6. Controlled motivation	3.39	1.08	.01	-.08	.15**	.19**	.15**	-	
7. Engagement	5.18	0.80	.50**	.54**	.08	-.09	.43**	.01	-

168 *Note.* * $p < .05$, ** $p < .01$

Table 2.
Differences in Study Variables and Motivational Outcomes for Autonomy-Demanding and
Structure-Demanding Clusters.

Autonomy- Support/Demanding (C = 4)	Clusters				F(3,309)	η^2
	Low- Low	Moderate Low- High	High- Low	High- High		
Cluster Centers						
Autonomy (z-score)	-1.36 ^a	-0.27 ^b	0.38 ^c	1.21 ^d	92.51**	0.49
Demanding (z-score)	-0.52 ^a	0.77 ^b	-0.86 ^c	0.81 ^b	133.69**	0.59
Autonomy (raw-score)	3.19 ^a	4.12 ^b	4.68 ^c	5.39 ^d	92.51**	0.49
Demanding (raw score)	3.70 ^a	4.82 ^b	3.41 ^c	4.85 ^b	133.69**	0.59
Outcomes						
Autonomous motivation	5.43 ^a	5.63 ^a	5.58 ^a	6.03 ^b	6.10**	0.05
Engagement	4.65 ^a	5.01 ^b	5.33 ^c	5.78 ^d	4.55*	0.05
Controlled motivation	3.26	3.48	3.24	3.65	2.41	0.02
Structure/Demanding (C = 4)	Clusters				F(3,309)	η^2
	Low- Low	Low- High	High- Low	High- High		
Cluster centers						
Structure (z-score)	-1.69 ^a	-0.42 ^b	0.43 ^c	0.96 ^d	95.63**	0.50
Demanding (z-score)	-0.93 ^a	0.36 ^b	-0.88 ^a	1.05 ^c	148.10**	0.59
Structure (raw-score)	3.59 ^a	4.67 ^b	5.39 ^c	5.85 ^d	95.63**	0.50
Demanding (raw score)	3.35 ^a	4.46 ^b	3.99 ^a	5.07 ^c	148.10**	0.59
Outcomes						
Autonomous motivation	5.26 ^a	5.50 ^{ab}	5.72 ^{bc}	5.99 ^c	5.66*	0.05
Engagement	4.52 ^a	4.93 ^b	5.41 ^c	5.62 ^c	5.07*	0.05
Controlled motivation	3.62 ^a	3.50 ^a	3.08 ^b	3.49 ^{ab}	4.88*	0.05

Note. * $p < .05$, ** $p < .001$; C = Number of obtained clusters.

^{a, b, c, d} Different superscripts indicate a significant difference in means at the $p < .05$ level.

Table 3.
Differences in Study Variables and Motivational Outcomes for Autonomy-Domineering and
Structure-Domineering Clusters.

Autonomy Support- Domineering (C = 4)	Clusters				F (3,309)	η^2
	Moderate Low- Low	Low- High	High- Low	Moderate High- High		
Cluster centers						
Autonomy (z-score)	-0.12 ^a	-1.37 ^b	1.28 ^c	0.15 ^d	100.49**	0.49
Domineering (z-score)	-1.12 ^a	0.69 ^b	-0.49 ^c	0.65 ^b	128.18**	0.55
Autonomy (raw-score)	4.25 ^a	3.18 ^b	5.45 ^c	4.48 ^d	100.49**	0.49
Domineering (raw score)	1.94 ^a	3.90 ^b	2.62 ^c	3.85 ^b	128.18**	0.55
Outcomes						
Autonomous motivation	5.62	5.56	6.00	5.52	2.26	0.03
Engagement	5.19	4.64	5.75	5.18	1.80	0.02
Controlled motivation	3.15	3.47	3.38	3.52	2.10	0.02
Structure-Domineering (C = 4)	Clusters				F(3,309)	η^2
	Moderate Low- Moderate Low	Low- High	High- Low	High- High		
Cluster centers						
Structure (z-score)	-0.27	-1.62	0.90	0.36	88.24**	0.47
Domineering (z-score)	-0.26	0.43	-0.97	1.10	138.33**	0.57
Structure (raw-score)	4.80 ^a	3.65 ^b	5.80 ^c	5.34 ^d	88.24**	0.47
Domineering (raw score)	2.86 ^a	3.62 ^b	2.09 ^c	4.34 ^d	138.33**	0.57
Outcomes						
Autonomous motivation	5.40 ^a	5.39 ^a	5.94 ^b	5.80 ^b	6.09**	0.05
Engagement	5.00 ^a	4.54 ^b	5.61 ^c	5.34 ^c	4.95*	0.05
Controlled motivation	3.40 ^{ab}	3.61 ^a	3.10 ^b	3.54 ^a	5.38*	0.05

Note. * $p < .05$, ** $p < .001$. C = Number of obtained clusters.

^{a, b, c, d} Different superscripts indicate a significant difference in means at the $p < .05$ level.