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The Role of Teachers' Controlling Behaviour in Physical Education on Adolescents' Health-Related Quality of Life: Test of a Conditional Process Model

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Abstract

Students' health-related quality of life (HRQoL) may depend on the extent to which the school environment fostered by their teacher is perceived as autonomy-supportive. We tested a conditional process model in a physical education context in which students' perception of their teachers' autonomy-supportive behaviour moderated the relationship between perceived controlling behaviour and HRQoL via need frustration. School students (N = 1042) completed self-report measures of perceived teachers' autonomy support, perceived controlling behaviour, need frustration and HRQoL. As predicted, the effect of perceived teachers' controlling behaviour on HRQoL was mediated by need frustration. Perceived autonomy support did not moderate this indirect effect. Specifically, higher levels of autonomy support did not attenuate the indirect effect of perceived controlling behaviour on HRQoL through need frustration. Findings highlight the importance of minimizing controlling behaviour, rather than an exclusive focus on enhancing autonomy-supportive behaviour, to enhance students' HRQoL.

Keywords: controlling behaviour, autonomy support, need frustration, health-related quality of life, self-determination theory.

The Role of Teachers' Controlling Behaviour in Physical Education on Adolescents'
Health-Related Quality of Life: Test of a Conditional Process Model

Adolescents' health-related quality of life (HRQoL) has been identified as an important outcome in educational settings (Bisegger et al., 2005; Koka, 2014; Standage & Gillison, 2007). HRQoL is an individual's subjective evaluation of current health status and their capacity to achieve and maintain a level of overall functioning that allows the pursuit of valued health-related life goals (Shumaker & Naughton, 1995). HRQoL has an adaptive function in educational contexts and has been shown to be related to students' academic performance in school (Durlak, Weissberg, Dymnicki, Taylor, & Schellinger, 2011). Despite this, research has demonstrated a sharp decline in HRQoL among school children after the age of 12 years (Bisegger et al., 2005). It is, therefore, important to provide formative evidence on the determinants of HRQoL to inform teaching practices that may enhance HRQoL in school students.

Physical education (PE) classes are potentially a forum in which health-related messages can be communicated (Shephard & Trudeau, 2000). Given that PE is a compulsory subject in school, it is a context where teachers have the potential to deliver messages on health-related physical activity to the majority of children (Abildsnes, Stea, Berntsen, Omfjord, & Rohde, 2015; Gu & Solmon, 2016; Hagger, Biddle, Chow, Stambulova, & Kavussanu, 2003). Therefore, PE teachers can have an important role in promoting students' health behaviours. Research has shown that PE teachers can enhance young peoples' health perceptions through the adoption of supportive behaviours (Koka, 2014; Standage & Gillison, 2007; Standage, Gillison, Ntoumanis, & Treasure, 2012). Yet PE teachers may also undermine students' well-being through the controlling interpersonal behaviours they adopt (De Meyer et al., 2014; Haerens, Aelterman, Vansteenkiste, Soenens, & Van Petegem, 2015; Hein, Koka, & Hagger, 2015). One approach that researchers have taken to examine the

effects of teachers' behaviours on HRQoL is through motivational theories such as self-determination theory (SDT; Deci & Ryan, 2000; Ryan & Deci, 2017). In the present study, we propose and test a model based on SDT to investigate the processes by which PE teachers' controlling and autonomy supportive behaviours relate to students' HRQoL.

Students' HRQoL and psychological needs

Emerging adulthood represents a unique life stage when young people are becoming increasingly responsible for making choices about their lifestyle. Decisions made within this period may include health-related choices, such as physical activity participation (Laska, Larson, Neumark-Sztainer, & Story, 2010; Nelson, Story, Larson, Neumark-Sztainer, & Lytle, 2008), which could affect individuals' future well-being. For example, individuals who have experienced positive well-being during adolescence are more likely to report higher perceived health and fewer risky health behaviours during young adulthood (Hoyt, Chase-Lansdale, McDade, & Adam, 2012). General well-being is a resource for everyday living and is determined by a number of individual and community factors which contribute to overall HRQoL. In the context of this study, for example, researchers (Koka, 2014; Standage & Gillison, 2007; Standage et al., 2012) have found that perceived teachers' autonomy-supportive behaviour was related positively to HRQoL through psychological needs in PE.

Grounded in SDT, individuals strive to satisfy three basic psychological needs for autonomy (i.e., to feel self-determined in one's actions rather than feeling controlled), competence (i.e., to feel competent in interactions with the environment and experience opportunities in which to express their capabilities), and relatedness (i.e., to feel a secure sense of belongingness and connectedness to others) (Deci & Ryan, 1985; 2000; Sheldon, Elliot, Kim, & Kasser, 2001). When needs are satisfied people will experience activities as autonomous and tend to report optimal functioning, well-being, and adaptive outcomes (e.g., Mouratidis, Vansteenkiste, Sideridis, & Lens, 2011), but if these needs are thwarted, or

frustrated (De Meyer et al., 2014), people are more likely to experience activities as controlling and express sub-optimal functioning, ill-being, and maladaptive outcomes (Bartholomew, Ntoumanis, Ryan, Bosch, & Thøgersen-Ntoumani, 2011a; Vansteenkiste, & Ryan, 2013).

SDT and interpersonal behaviours of teachers

SDT has been widely-used to explain the influence of social factors (e.g., supervisors' behaviour) on human psychological experiences and behaviour (Deci & Ryan, 2000; Ryan & Deci, 2017), and it has been applied extensively in educational (Niemic, Ryan, & Deci, 2009) and health (Hagger & Chatzisarantis, 2015) domains. Research suggests that authoritative others' behaviour can be viewed regarding two interpersonal styles: autonomy supportive and controlling (Amoura et al., 2015; Silk, Morris, Kanaya, & Steinberg, 2003). Autonomy support provided by salient others (e.g., teachers) in the actor's (e.g., students) environment is characterized by adopting the perspectives and feelings of the actor, and giving rationale, choice, and promoting self-endorsed reasons for acting (Deci, Eghrari, Patrick, & Leone, 1994; Jang, Reeve, & Deci, 2010; Reeve & Jang, 2006). Controlling behaviour, on the other hand, can be characterized as pressuring strategies used by the teacher to ensure students conform, thereby putting aside students' opinion (Reeve, 2009).

Research on teachers' controlling behaviour has adopted either a unidimensional (e.g., Assor et al., 2005; Reeve & Halusic, 2009; Soenens et al., 2012) or a multidimensional approach (Bartholomew et al., 2010; Hein et al., 2015). For example, Bartholomew et al. (2010) proposed a conceptual model of controlling behaviours comprising four controlling strategies (e.g., controlling use of praise and extrinsic rewards, negative conditional regard, intimidation, and excessive controlling behaviour). In educational contexts, teachers can use controlling behaviours like praise and extrinsic rewards to influence students to participate in desired behaviours. For example, a PE teacher may promise to praise or reward the students

only if they exercise harder. Similarly, a teacher may command or shout at his or her students to intimidate them into doing desired behaviours. A teacher's use of the threat of punishment to motivate students to keep them in line during lessons is an example of intimidating behaviour. Negative conditional regard refers to the withdrawal of attention, affection, and support from the teacher when specified behaviours by their students are not expressed. For example, a teacher can influence students in behaving in a required way by making them feel guilty (e.g., by saying "you make me sad"). Finally, excessive controlling behaviour refers to behaviours adopted by teachers that can be characterised as obtrusive monitoring toward their students. For example, a teacher can control students behaviour by attempting to interfere in aspects of the students' lives that are not associated with their schooling. Consistent with Bartholomew et al. (2010), we adopt a conceptual model of teachers' controlling behaviour from the teacher comprising these four controlling strategies. We acknowledge that the construct of psychological control (Barber, 1996; Madjar, Nave, & Hen, 2013), which refers to the use of emotional exploitation to induce desirable conduct, is in some extent similar to negative conditional regard, one dimension of perceived controlling behaviour referred to in the current study. The latter is consistent with an internally-controlling teaching style from the SDT framework (Plant & Ryan, 1985; Vansteenkiste et al., 2005), that refers to the use of strategies that activate perceived pressure in learners by appealing to their feelings of guilt, shame, anxiety, and self-worth. Other dimensions of controlling behaviour used in this study (i.e., intimidation, excessive personal control, and the controlling use of praise and extrinsic rewards) can be characterised as aspects of an externally-controlling teaching style. This style reflects to the activation of a sense of obligation in students by using strategies such as punishments, pressuring rewards and controlling language like "you must" and "you should". It is important to note that these types of controlling behaviours are often measured using self-report instruments in which students reflect on the extent to which their teachers typically

display these behaviours during lessons, and therefore reflects *perceived* controlling behaviours displayed by teachers.

Significant others' interpersonal style can be viewed along a continuum that ranges from highly controlling to highly autonomy-supportive (Deci, Nezlek, & Sheinman, 1981). Several authors have noted that such behaviours are not orthogonal and that significant others' behaviour can comprise autonomy-supportive and controlling behaviours over the course of an individual lesson (Amoura et al., 2015; Grolnick & Ryan, 1989). Studies have shown that supervisors tend to use both controlling and autonomy-supportive behaviours in interactions with actors but to different extents (Silk et al., 2003; Bartholomew, Ntoumanis, & Thøgersen-Ntoumani, 2010; Bartholomew et al., 2011a; Pelletier, Fortier, Vallerand, & Brière, 2001; Tessier, Sarrazin, & Ntoumanis, 2008). For example, a teacher may use controlling behaviours like praise and extrinsic rewards to try to promote greater attention during lessons, but may also use autonomy-supportive behaviours such as allowing students to express their opinion. Still, the supervisor's behaviour cannot be perceived simultaneously autonomy-supportive and controlling (Soenens & Vansteenkiste, 2010), instead he or she displays a mix of controlling and autonomous behaviours throughout a lesson.

Relations between perceived interpersonal behaviours, psychological needs and HRQoL

Consistent with SDT, several authors have indicated that need frustration is not merely the result of an absence of need satisfaction (Bartholomew et al., 2011a; Bartholomew, Ntoumanis, Ryan, & Thøgersen-Ntoumani, 2011b; Vansteenkiste & Ryan, 2013). Individuals are most likely to report that their needs are frustrated if they perceive that their teacher does not only fail to display autonomy support but also displays controlling behaviours. Previous research has shown that students perceiving that their teachers use controlling behaviours is related to lower perceived psychological need satisfaction (Cheon & Reeve, 2015), higher cortisol levels (Reeve & Tseng, 2011), a physiological indicator of stress, and frustration of

psychological needs. For example, when psychological needs are perceived to be frustrated, individuals are more likely to report feelings of pressure (i.e., autonomy need frustration), failure (i.e., competence need frustration), and loneliness (i.e., relatedness need frustration), which, in turn, predicts maladaptive outcomes (Bartholomew et al., 2011b; Chen et al., 2014; Haerens et al., 2015). Perceptions that teachers display controlling behaviours is also directly related to anger and anxiety in children, and these emotions are related to amotivation (i.e., a lack of any intention to act) and extrinsic motivation (i.e., motives to avoid punishments or obtain material rewards) which, respectively, undermine long-term academic engagement and promote restricted engagement in school lessons (Assor, Kaplan, Kanat-Maymon, & Roth, 2005). Previous findings also suggest that the students of PE teachers who perceived that their teachers do not display controlling behaviours in class, such as negative conditional regard and intimidation, are more likely to perceive the context as less need thwarting and report less bullying and intimidating behaviour toward their classmates (Hein et al., 2015). There is, however, no direct evidence on how perceived controlling behaviours exhibited by teachers in PE affect students' HRQoL. Based on findings above, it could be assumed that students' perception of teachers' controlling behaviour (e.g., use of negative feedback, use of punishment and rewards, or use of control behaviours such as controlling language like 'should' and 'must') would be negatively related to HRQoL.

On the contrary, optimal well-being and healthy functioning are facilitated if needs for autonomy, competence, and relatedness are met within a social context (Ryan & Deci, 2008). Studies have found that students who perceive their teachers as autonomy-supportive are more likely to report higher need satisfaction, and in turn, adaptive affective and behavioural outcomes such as concentration in the PE classes and intention to participate in optional PE (Ntoumanis, 2005), physical self-esteem and effort (Hein & Caune, 2014), and also HRQoL (Koka, 2014; Standage & Gillison, 2007; Standage et al., 2012). Several studies examining

motivational processes in PE context using structural equation modelling have found these to be invariant for both boys and girls (e.g., Standage, Duda, & Ntoumanis, 2005; Standage et al., 2012).

Although teachers at school may display autonomy supportive behaviours, they may fail to do so consistently and resort to controlling methods when under stress or pressure, or when they lack time (Pelletier, Seguin-Levesque, & Legault, 2002; Reeve, 2009; Stebbings, Taylor, Spray, & Ntoumanis, 2012). For example, teachers tend to be under time pressure on a regular basis and may perceive the need to maximize discipline to manage their classes, and view controlling behaviours as an easy means to do so. This approach may be at the expense of students' well-being and adaptive outcomes. As a result, students may be attuned to teachers' controlling behaviours and may experience need frustration and, in turn, maladaptive outcomes. Moreover, previous research has shown that students can be sensitive to controlling behaviour, revealing that controlling behaviour is highly influential even if teachers use such behaviours sparingly (De Meyer et al., 2014).

One intriguing possibility is that the controlling- and autonomy-supportive behaviours that teachers display, and students' perceptions of the behaviours, may interact in determining students' adaptive outcomes such as HRQoL. For example, a recent study by Haerens et al. (2017) using a cluster analysis found that teachers perceived as high on autonomy support and low on use of controlling behaviours, are likely to benefit most in terms of their motivation and well-being. Furthermore, results showed teachers' perceived to use controlling behaviours leads to maladaptive outcomes (e.g., higher need frustration perceived by students) even when the teacher is also perceived to use autonomy-supportive behaviours. Based on these findings, the effect of perceived controlling behaviours displayed by teachers on adaptive outcomes such as HRQoL through need frustration can be conceptualized as a mediation relationship in which the perceived controlling behaviours-HRQoL relation is mediated by need frustration.

It is this effect that is expected to be moderated by the students' perceived use of autonomy-supportive behaviours by the teacher. Specifically, we predict that when students perceive their teachers to provide more autonomy support, the undermining effect of the perceived controlling behaviours of teachers on HRQoL through need frustration will be weaker. Based on the assumption that controlling behaviours are likely to undermine adaptive outcomes because they induce need frustration, it may be that perceived autonomy-supportive behaviours may buffer, or *moderate*, the detrimental effects of need frustration on these adaptive outcomes.

The present study

In the present research, we test a conditional process model in which the negative indirect effect of students' perceptions of controlling behaviours of their PE teachers on HRQoL through psychological need frustration is moderated by students' perceptions of the autonomy support provided by their teachers. Central to our model is the role of need frustration in mediating the effect of perceived controlling behaviours on HRQoL. This central process relationship indicates the process by which controlling behaviours undermine HRQoL based on the concept of psychological needs from SDT. Our model extends this to explore the effect that perceived autonomy support has on this central process. Specifically, the model proposes that a moderated mediation process in which the strength of the indirect effect of perceived controlling behaviour on HRQoL through need frustration varies across different levels of perceived autonomy support. We expect that the test will further promote understanding of the process by which two types of behaviours displayed by teachers affect adaptive outcomes in an educational context, specifically a PE context, and demonstrate the potential value of autonomy support in buffering potentially detrimental effects of the use of controlling behaviours.

Our predicted moderated mediation process model is presented in Figure 1. We propose three specific hypotheses derived from the model. First, we hypothesize that perceived controlling behaviour of teachers in PE would be negatively related to students' self-reported HRQoL. Second, we hypothesize that the effect of perceived controlling behaviour of PE teachers on students' HRQoL would be mediated by perceived need frustration. Third, we hypothesize that the relationship between need frustration and HRQoL would be moderated by autonomy support. Specifically, we predict that students who perceive that their teachers offered higher levels of autonomy support would show weaker indirect effects of perceived controlling behaviour on HRQoL through need frustration. Thus, we will assess the strength of the indirect effect of students' perceived teacher controlling behaviours on HRQoL through perceived need frustration at different levels (i.e., high, average, or low) of perceived autonomy-supportive behaviour; a moderated mediation analysis.

[INSERT FIGURE 1 ABOUT HERE]

Method

Participants and procedure

The sample comprised secondary school students ($N = 1042$; boys, $n = 453$, girls, $n = 589$) aged between 12 and 15 years ($M_{age} = 13.40$; $SD = 1.03$) from 15 Estonian counties with the criterion that no more than five schools from the same county were selected. Students attended 45 minutes long compulsory PE lessons twice per week as part of the school curriculum. Participants were asked to voluntarily complete a questionnaire containing study measures at a single time point administered between October 2016 and November 2016. The questionnaire was administered online and designed so that participants were required to complete all the items. Information regarding the survey and a URL for the survey location was provided by the students' PE teachers. Students were told there was no obligation to respond. The URL directed participants to an introductory page which outlined the aim of the

research and provided general instructions on how to complete the questionnaire. Students were informed that their responses would remain confidential and anonymous. Consent to conduct the study was issued by the local university ethical committee, and written consent was obtained from the principal of each school, students, and parents.

Instruments

Perceived teachers' controlling behaviour. An adapted version (Hein et al., 2015) of the multidimensional controlling coach behaviours scale (CCBS; Bartholomew et al., 2010) was used to measure the students' perception of the PE teachers' controlling behaviour. Students were presented with a common stem: "My PE teacher...", followed by the items tapping the four CCBS subscales: negative conditional regard (e.g., "...is less friendly with me if I don't make the effort to see things his/her way"), intimidation (e.g., "... shouts at me in front of others to make me comply"), excessive personal control (e.g., "... tries to control what I do during my free time out of school"), and the controlling use of grades (e.g., "... promises to give me a good grade if I do well"). In the current study, we modified the controlling use of praise and extrinsic rewards subscale (e.g., "My PE teacher promises to reward/praise me if I do well"), and re-named it as the controlling use of grades subscale (e.g., "My PE teacher promises to give me a good grade if I do well") as it is more relevant to the PE context. Each subscale comprised three items with responses provided on seven-point scales ranging from 1 (strongly disagree) to 7 (strongly agree).

Perceived need frustration. Students' perception of need frustration was assessed by three need frustration subscales from the basic psychological need satisfaction and frustration scale (BPNSFS; Chen et al., 2014) adapted to PE (Haerens et al., 2015). Each subscale comprised four items and was presented with a common stem ("During the PE lesson...") followed by the set of items: need frustration for autonomy (e.g., "...I felt pressured to do too many exercises"), for competence (e.g., "...I felt insecure about my abilities"), and for

relatedness (e.g., "...I felt excluded from the group I want to belong to"). Participants' responses were provided on seven-point scales ranging from 1 (strongly disagree) to 7 (strongly agree).

Perceived teachers' autonomy-supportive behaviour. Students' perception of teachers' autonomy-supportive behaviour was measured using the learning climate questionnaire (LCQ; Reeve & Halusic, 2009), which comprised six items (e.g., "I feel that my teacher provides me with choices and options"). Responses were provided on seven-point scales ranging from 1 (strongly disagree) to 7 (strongly agree).

HRQoL. Students' HRQoL was measured using an adapted and validated version (Viira & Koka, 2011) of the 23-item pediatric quality of life inventory™ 4.0 generic core scales (PedsQL™ 4.0; Varni et al., 2001). The PedsQL™ 4.0 comprises five dimensions: physical health (eight items, e.g., "It is hard for me to run"), social functioning (five items, e.g., "I have trouble getting along with other kids"), emotional functioning (five items, e.g., "I feel afraid or scared"), school-related functioning (three items, e.g., "It is hard to pay attention in class"), and days missed from school due to illness (two items, e.g., "I missed school to go to the doctor or hospital"). Students were asked to indicate how much of a problem this had been over the past month. Responses were provided on five-point scales ranging from 0 (strongly disagree) to 4 (strongly agree). Prior to data analysis, items were reverse-scored and linearly transformed to a 0 to 100 scale (i.e., 0 = 100, 1 = 75, 2 = 50, 3 = 25, and 4 = 0).

Data analysis

Data were analysed using confirmatory factor analysis (CFA) using the AMOS Version 23.0 statistical software and moderated mediation analysis using the SPSS PROCESS macro (Hayes, 2013). The adequacy of a multi-factor CFA that includes all the scales at the same analysis was estimated with multiple goodness-of-fit indices: the comparative fit index (CFI), non-normed fit index (NNFI), and the root mean square error of approximation

(RMSEA). Acceptable fit of the hypothesized CFA model with the data is supported if values exceed .90 for the CFI, and NNFI, and are equal to or less than .08 for the RMSEA (Hu & Bentler, 1999).

Prior to moderated mediation analysis, composite scores for the perceived autonomy support, perceived controlling behaviour, need frustration, and HRQoL variables were computed by averaging the items of each scale and weighting them by the first-order (perceived autonomy-supportive behaviour) or second-order (remaining constructs) factor loadings from the CFAs (Sebire, Standage, & Vansteenkiste, 2009). This method was used as it enables each item or subscale to make a unique contribution to the construct (Hair, Ringle, & Sarstedt, 2011).

To examine the first hypothesis, HRQoL was regressed on the controlling behaviour. To test the second hypothesis, a simple mediation model was carried out. Need frustration as the putative mediator was regressed on controlling behaviour and the dependent variable, HRQoL, was regressed on the independent variable controlling behaviour and need frustration. To test the third hypothesis, once simple mediation was corroborated, a conditional process analysis was conducted that integrates mediation and moderation analyses (Hayes, 2013). Specifically, need frustration was regressed on controlling behaviour and HRQoL was regressed on controlling behaviour, need frustration, autonomy support, and the interaction term computed from the mean-centred scores of the need frustration and autonomy support variables. Age and gender were also included in the model as covariates. Confidence intervals (95%) were generated by bootstrapping with 5000 re-samples.

Results

Preliminary analysis

The online questionnaire forced responses; thus, no missing data was recorded. Initial data screening indicated that 11 participants were insufficiently engaged in the questionnaire

as they provided the same response to all items. These participants were excluded from analyses, yielding a final sample of 1031 participants.

Values for skewness and kurtosis ranged $<|2.00|$ were considered acceptable to support normal univariate distribution (George & Mallery, 2010). Skewness values of the items ranged from -1.18 to 1.18 and kurtosis values ranged from -.99 to .87, suggesting that all items were within acceptable ranges. Mardia's normalized coefficient revealed that the data deviated from multivariate normality, so we used bootstrapping procedure to generate standard errors of optimal precision with 5000 resamples (Byrne, 2010; Preacher & Hayes, 2008).

The measurement model, descriptive statistics and reliability. Results of a CFA that includes all the scales demonstrated acceptable goodness-of-fit statistics: NNFI = .906; CFI = .914; RMSEA = .038. Descriptive statistics, Cronbach's α coefficients, and intercorrelations for all study variables are presented in Table 1. Perceived autonomy support was positively correlated with HRQoL, but negatively with perceived controlling behaviour and need frustration. HRQoL was negatively correlated with perceived controlling behaviour and need frustration, and need frustration was positively correlated with perceived controlling behaviour.

[INSERT TABLE 1 ABOUT HERE]

Main analyses

Mediation. To test our first two hypotheses, we computed an initial mediation model in which the relationship between perceived controlling behaviour and HRQoL was mediated by need frustration (see Table 2). Perceived controlling behaviour from teachers had a significant, direct, and positive effect on students' need frustration ($b = .3981, p < .0001$), and need frustration had a significant, direct, and negative effect on students' HRQoL ($b = -6.6658, p < .0001$). As predicted, there was a statistically significant, negative indirect effect

of perceived teachers' controlling behaviour on students' HRQoL through students' need frustration ($b = -2.6535, p < .0001, 95\%$ bias-corrected confidence interval (95% CI) = -3.1329, -2.2293). Controlling for the mediator, the direct effect of perceived teachers' controlling behaviour on students' HRQoL changed from $b = -2.6219 (p < .0001)$ to $b = .0316 (p = .932)$.

[INSERT TABLE 2 ABOUT HERE]

Test of the process model. Next, we computed a moderated mediation analysis to assess whether the indirect effect of perceived teachers' controlling behaviour on students' HRQoL through students' need frustration was moderated by perceived teachers' autonomy support. Results of the analysis are presented in Table 3. In the basic model, there was a statistically significant, direct, and negative effect of students' need frustration on their HRQoL ($b = -8.3599, p < .001$). The effect of interaction between perceived teachers' autonomy support and students need frustration to students' HRQoL was not found to be statistically significant ($b = .5951$). Importantly, we computed the conditional indirect effect of perceived teachers' controlling behaviours on students' HRQoL mediated by students' need frustration at the mean value of perceived teachers' autonomy support and one standard deviation (SD) above and below the mean. Results indicated significant indirect effects in all cases (Table 3). As the confidence intervals of the indirect effect at each level of the moderator significantly overlapped with the effects of the other, we concluded that the indirect effect was significant at all levels of the moderator with no support for our moderated mediation hypothesis. Also, controlling for age and gender did not change these results.

[INSERT TABLE 3 ABOUT HERE]

Finally, the Johnson-Neyman technique (Preacher, Rucker, & Hayes, 2007) was used to examine the regional significance of the conditional indirect effect beyond a range of values of the moderator (see Figure 2). Results revealed that the indirect relationship between

perceived teachers' controlling behaviour and students' HRQoL through students' need frustration was significant at all the values of perceived teachers' autonomy support.

[INSERT FIGURE 2 ABOUT HERE]

Discussion

The purpose of the present study was to test a process model in which the relation between students' perceived controlling behaviour displayed by their PE teachers and their overall HRQoL, mediated by their need frustration, would be moderated by perceived autonomy support of teachers. Results supported our hypothesis that the negative effect of perceived controlling behaviour of teachers on students' HRQoL was mediated by students' need frustration. However, our prediction that the negative indirect effect of perceived controlling behaviour from teachers on students' HRQoL mediated by students' perceived need frustration in PE would be moderated by perceived teacher autonomy support was not supported. Perceived teachers' autonomy support does not buffer the undermining effect of perceived controlling behaviour via need frustration on students' HRQoL.

We hypothesized that perceived controlling behaviour from teachers would be negatively related to students' HRQoL and our findings supported this hypothesis, a finding consistent with previous studies that need thwarting environment is related to individuals' sub-optimal functioning via experiences of need frustration (Vansteenkiste & Ryan, 2013). This indicates that students reporting that their teachers used controlling behaviours such as intimidation (e.g., verbal abuse, shouting, physical punishment, humiliation, and personal attacks) and negative conditional regard (e.g., focusing less on students when they are struggling or offering no attention, affection, and support when they are not behaving as asked) when communicating with them were more likely to report lower HRQoL. This finding is consistent with SDT (Deci & Ryan, 2000; Ryan & Deci, 2017), which posits that significant others' controlling interpersonal style will be related to subordinates' maladaptive

affective and behavioural outcomes. This is also consistent with findings of previous studies demonstrating that teachers' controlling motivational strategies such as intimidation and negative conditional regard could be detrimental to adolescents' psychological experiences and well-being (Bartholomew et al., 2010; Hein et al., 2015).

Overall, according to observed means of students' perceptions of negative conditional regard, excessive personal control, intimidation, and controlling use of grades we contend that these behaviours were not perceived as occurring with very high frequency as students' average scores were below the scale midpoint (i.e., 3.5). This is compared with perceived autonomy support which has mean scores in excess of the scale mid-point. This means that the teacher who displays controlling behaviours towards their students infrequently if they do not perform well or if the teacher uses the threat of punishment only few times to keep students in line during the lesson are still detrimental to their students' HRQoL. This finding supports previous research that students can be highly sensitive to controlling behaviour, and its effects can be highly influential even in cases where teachers using controlling behaviours sparingly (De Meyer et al., 2014).

We also hypothesized that the relationship between perceived controlling behaviour of PE teachers and students' HRQoL would be mediated by the perceived need frustration of students in PE. Current findings indicated that students' need frustration fully mediated the negative indirect relationship between perceived teachers' controlling behaviour and students' HRQoL as there was no significant direct effect of controlling behaviour on HRQoL. This finding is in line with the tenets of SDT and previous research (Haerens et al., 2015; Ryan & Deci, 2000; Vansteenkiste & Ryan, 2013), and indicates that need frustration might be a pathway to maladaptive outcomes in educational contexts, which is activated by teachers' controlling behaviour and acts by evoking need frustration in students.

Before turning to our main hypothesis, it is worth noting that although autonomy support was correlated with HRQoL, it did not significantly predict HRQoL in our model. This is because the relationship between perceived autonomy support and adaptive outcomes such as HRQoL is, according to SDT (Deci & Ryan, 2000; Ryan & Deci, 2017), indirect mediated by need satisfaction than direct. Our process model tested whether perceived autonomy support from teachers moderated the indirect pathway of perceived controlling on HRQoL through perceived students' need frustration. Results revealed that the indirect effect was significant at all levels of autonomy support leading us to reject our hypothesis. We concluded that perceived autonomy support does not buffer the undermining effect of controlling behaviour via need frustration on students' HRQoL. It is also consistent with a previous study which found that perceiving one's instructor as high on control is detrimental even when the instructor is perceived to be autonomy-supportive (Haerens et al., 2017). From a practical perspective, current findings suggest that interventions should focus as much on minimizing controlling behaviours rather than promoting autonomy support. Much of the research on interventions based on SDT advocate promoting autonomy support, suggesting that teachers should adopt behaviours that foster student autonomy including PE teachers adopting the perspectives and feelings of the students, and giving rationale, choice, and promoting self-endorsed reasons for acting. Although there is often a stipulation in autonomy-support interventions that controlling behaviours should be minimized, there is often little emphasis placed on this aspect (e.g., Su & Reeve, 2011). Our findings suggest that this lack of emphasis is misplaced given that students perceiving that their teachers use controlling behaviours may experience detrimental effects on their HRQoL, regardless of whether they also perceive that their teachers adopt autonomy supportive behaviours. In other words, autonomy support displayed by teachers will not be effective in countering the detrimental effects of their perceived controlling behaviours on adaptive outcomes on students' HRQoL.

Overall, our findings imply that minimizing controlling behaviours is just as important as enhancing autonomy-supportive behaviours.

Limitations and future research

Although our study makes a unique contribution to understanding the processes by which perceived controlling behaviours and autonomy support relate to HRQoL in students through perceived need frustration, some limitations should be acknowledged. Data were collected from adolescents in one country. Future research should, therefore, investigate whether the proposed pattern of effects in the proposed process model varies across national groups. For example, results may not be so pronounced in collectivistic cultures in which controlling teaching styles are representative of culturally-normative classroom practices (Reeve et al., 2014). Further, all data were collected using self-report measures, which may be subject to common method variance and may inflate associations among constructs (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Future research should consider alternative measures such as behavioural observation to provide converging evidence for the proposed effects.

A further limitation is that students' perceived teachers' autonomy-supportive behaviour was measured in this study by unidimensional scale such as LCQ (Reeve & Halusic, 2009), consisting of items that assess predominantly the cognitive dimension of autonomy support from authoritative others'. Recently, a multi-dimensional perceived autonomy support scale for physical education (MD-PASS-PE) was developed by Tilga, Hein, and Koka (2017) that, in addition to assessing perceptions of cognitive dimension of autonomy support from teachers, also includes items assessing other important dimensions of autonomy support such as organisational and procedural autonomy support. It was found that MD-PASS-PE has the potential to predict PE-related outcomes to a greater extent than some previously developed unidimensional perceived autonomy support scales. Particularly, results

revealed that the MD-PASS-PE accounted for a significantly greater proportion of the variance in students' competence need satisfaction compared to the unidimensional LCQ. One may argue, therefore, that accounting the multiple dimensions of perceived autonomy support may provide greater precision when testing the moderation of the effect of need frustration on students' HRQoL by perceived autonomy support. It is also important to acknowledge that the cross-sectional design of our study is a limitation. It is important to note that any inferences on the direction of effects are based on theory rather than the data. This is true for all research based on correlational data and is a caveat may be resolved by further tests of model hypotheses using designs which model change such as experimental or panel designs (Hagger & Chatzisarantis, 2016). Finally, testing the model in PE is also a limitation and future research may consider applying the model in other subjects.

Conclusions

Our research has demonstrated that students perceiving their PE teachers as less controlling are more likely to report higher levels of HRQoL. This is because controlling environments offer fewer opportunities for the satisfaction of basic psychological needs for autonomy, competence, and relatedness and, instead, is likely to frustrate these needs. Importantly, PE teachers should acknowledge that providing autonomy support in academic contexts like PE alone without minimizing controlling behaviours may not buffer the undermining effects of the controlling behaviours on adaptive outcomes. In the light of our findings, future interventions in educational contexts should consider stemming controlling behaviour with the same or even greater importance as increasing teachers' autonomy-supportive behaviour to enhance the students' HRQoL.

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Table 1

Descriptive statistics, correlations and scale reliabilities among the conditional process model components

Variable	Correlation							
	1	2	3	4	5	6	7	8
1. Perceived autonomy support								
2. Controlling behaviour	-.33*							
3. Negative conditional regard	-.44*	.82*						
4. Excessive controlling behaviour	-.08†	.70*	.48*					
5. Intimidation	-.40*	.84*	.61*	.48*				
6. Controlling use of grades	-.06	.73*	.47*	.43*	.46*			
7. Perceived need frustration	-.25*	.44*	.42*	.31*	.36*	.32*		
8. Health-Related Quality of Life	.24*	-.21*	-.22*	-.08†	-.22*	-.13*	-.49*	
<i>M</i>	4.30	2.98	3.39	2.73	2.34	3.47	3.42	70.91
<i>SD</i>	1.33	1.15	1.57	1.28	1.54	1.46	1.10	15.13
<i>α</i>	.88	.87	.78	.63	.84	.71	.87	.89

Note. $N = 1031$. † $p < .05$; * $p < .01$; Variables from 1 to 7 were measured on a 7-point scale, whereas variable 8 was measured on a 5-point scale that

was transformed to 0-100 scale. Mean scores and standard deviations of the variables presented in this table are not weight loaded.

Table 2

Mediation model testing the indirect effect of controlling behaviour on students' Health-Related Quality of Life through basic psychological need frustration (N = 1031)

	<i>b</i>	<i>SE</i>	<i>t</i>
Direct and total effects			
The total effect of controlling behaviour on HRQoL	-2.6219	.4255	-6.1615***
Controlling behaviour on need frustration	.3981	.0270	14.7169***
Need frustration on HRQoL, controlling IV	-6.6658	.3954	-16.8605***
Controlling behaviour on HRQoL, controlling mediator	.0316	.4033	.0784
	Effect	<i>SE</i>	<i>Z</i>
Indirect effect and significance using normal distribution	-2.6535	.2396	-11.0763***
	Mean	<i>SE</i>	95% BCa CI
Bootstrap results for indirect effect	-2.6535	.2331	(-3.133, -2.229)
	κ^2	<i>SE</i>	95% BCa CI
Effect size for indirect effect	-.2160	.0177	(-.2519, -.1832)

Note. IV = independent variable; *b* = unstandardized parameter estimate; *SE* = standard error of parameter estimate; *t* = test of significance of parameter estimate; *Z* = test of significance from zero; 95% BCa CI = bias correction and acceleration confidence interval; κ^2 = standardized value of the indirect effect. *** $p < .0001$.

Table 3

Moderated mediation model testing the indirect effect of controlling behaviour from teachers on students' Health-Related Quality of Life through basic psychological need frustration (N = 1031)

Dependent variable model (DV = Health-Related Quality of Life)			
	<i>b</i>	<i>SE</i>	<i>t</i>
Predictor			
Basic psychological need frustration	-8.3599	1.2165	-6.8719**
Controlling behaviour	.3815	.4269	.8938
Autonomy support	-.0638	.9359	-.0682
Interaction: Need frustration x autonomy support	.5951	.3656	1.6277
Covariates			
Age	-.2914	.3013	-.9671
Gender	.2008	.6366	.3154
Conditional indirect effect at different values of moderator			
	<i>b</i>	<i>SE</i>	<i>Z</i>
Values of autonomy support			
-1 SD	-2.8010 (-3.3789; -2.2910)	.2812	-9.9609**
Mean	-2.5665 (-3.0461; -2.1415)	.2311	-11.1056**
+1 SD	-2.3320 (-2.8867; -1.8626)	.2607	-8.9452**

Note. DV = dependent variable; *b* = unstandardized parameter estimate; *SE* = standard error of parameter estimate; *t* = test of significance of parameter estimate; *Z* = test of significance from zero; 95% BCa CI = bias correction and acceleration confidence interval. ***p* < .001.

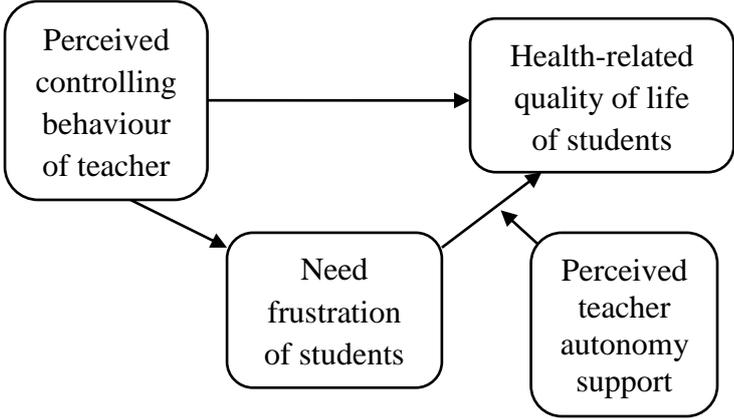


Figure 1. The hypothesized conditional process model demonstrating moderation of autonomy support on indirect effect between controlling behaviour and HRQoL through need frustration.

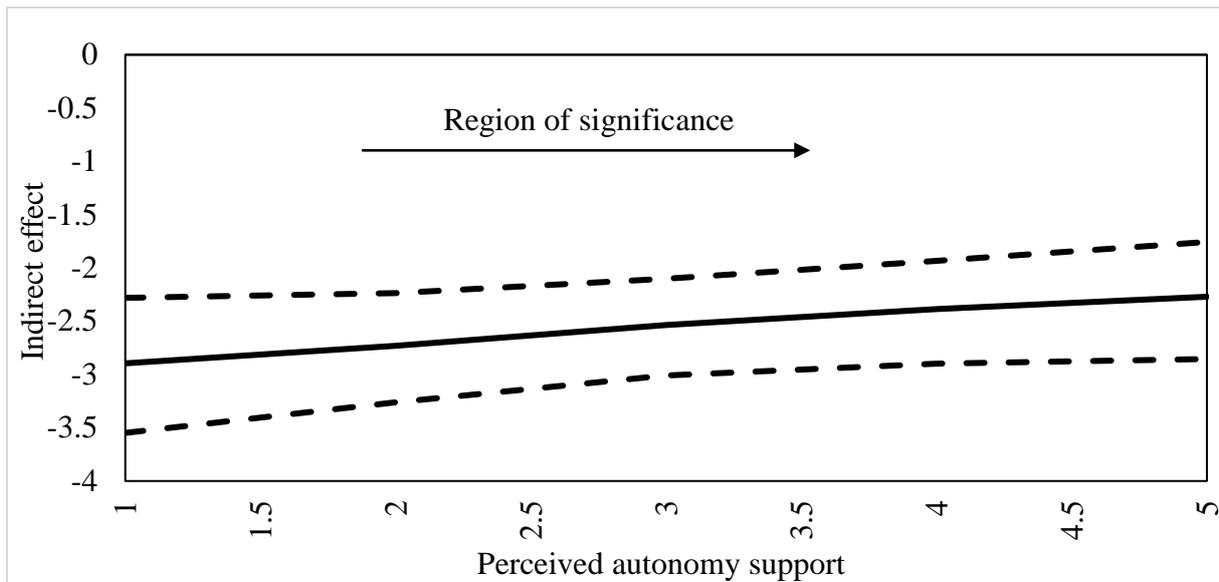


Figure 2. The conditional indirect effect of perceived teachers' controlling behaviour to students' HRQoL through need frustration at all values of autonomy support.

Note. The conditional indirect effect is depicted by the trajectory of a solid plot, the upper and lower limits of the 95% CI are depicted by dashed plots.