

How teachers' controlling behaviour can ruin students' intrinsic motivation in a physical education lesson: Test of a conditional process model

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Students' intrinsic motivation in physical education may depend on the extent to which their teacher is perceived as autonomy supportive. In this study, we tested a conditional process model in which students' perception of their teachers' controlling behaviour moderated the relationship between perceived autonomy-supportive behaviour and intrinsic motivation via need satisfaction. School students (N = 592) completed self-report measures of perceived teachers' autonomy-supportive behaviour, perceived teachers' controlling behaviour, need satisfaction and intrinsic motivation. As expected, the effect of perceived teachers' autonomy-supportive behaviour on students' intrinsic motivation was partially mediated by need satisfaction. Perceived controlling behaviour did moderate this indirect effect. Specifically, higher levels of controlling behaviour did attenuate the indirect effect of perceived autonomy-supportive behaviour on intrinsic motivation through need satisfaction. The current findings highlight the importance of minimizing the controlling behaviours, as well as, enhancing the autonomy-supportive behaviours, to promote students' intrinsic motivation towards physical education.

KEY WORDS: Autonomy-supportive behaviour, Controlling behaviour, Intrinsic motivation, Need satisfaction, Self-determination theory.

Intrinsically motivated individuals participate in activities with pure inherent interest and enjoyment (Ryan & Deci, 2017). Adolescents' intrinsic motivation has been identified as an important outcome in various contexts, including physical education (PE) (e.g., Standage, Duda, & Ntoumanis, 2005; Taylor, Ntoumanis, Standage, & Spray, 2010). Previous research has found that intrinsic motivation in PE is related with higher concentration and greater effort in classes (e.g., Ntoumanis, 2001; Standage et al., 2005;

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Taylor et al., 2010). Based on self-determination theory (SDT; Deci & Ryan, 1985; Ryan & Deci, 2017), the antecedent of students' intrinsic motivation in PE is teachers' autonomy-supportive behaviour mediated by students' experiences of need satisfaction. However, students can also experience controlling behaviour from their PE teachers that has shown to frustrate students' psychological needs, which, in turn, predicts maladaptive outcomes (e.g., Haerens, Aelterman, Vansteenkiste, Soenens, & Van Petegem, 2015). In a PE lesson teacher might use autonomy-supportive and controlling behaviours inconsistently, coupled with each other. Previous research has highlighted that if PE teachers are perceived to use autonomy-supportive and controlling behaviours concurrently, it might lead to students' maladaptive outcomes (Tilga, Hein, Koka, Hamilton, & Hagger, 2019). It is important to provide formative evidence on the determinants of students' intrinsic motivation to inform teaching practices that may enhance or diminish pure enjoyment in school students. In the current study, we add to the extant literature by testing a model based on SDT to investigate the processes by which perceived PE teachers' autonomy-supportive and controlling behaviour relate to students' intrinsic motivation towards PE.

SDT (Deci & Ryan, 1985; Ryan & Deci, 2017) provides a framework of individuals' motivation explaining the possible mechanism of how the antecedents of individuals' behaviour are related to its motivational correlates. SDT (Ryan & Deci, 2017) differentiates between four types of motivational regulations depending on the degree of autonomy that individuals may possess for particular activity: intrinsic motivation (i.e., doing an activity for pure enjoyment), identified regulation (i.e., acting for self-endorsed outcomes), introjected regulation (i.e., to gain social recognition or avoid obligation, guilt, or worry), and external regulation (i.e., to avoid punishment or to receive a reward). According to the SDT (Ryan & Deci, 2017), the antecedents of these types of motivation are perceived autonomy-supportive and controlling behaviour from significant others. Autonomy-supportive behaviour includes adopting one's perspectives and feelings, providing rationales, choice, and encouraging self-endorsed action (Jang, Reeve, & Deci, 2010), whereas controlling behaviour is described as by using pressuring tactics to make one think, feel, or behave in a certain manner, with disregard to one's opinions and needs (Reeve, 2009). The central mechanism in the relationship between different types of motivation and perceived autonomy-supportive and controlling behaviour is satisfaction and frustration of basic psychological needs for autonomy (i.e., a need to feel as initiator of one's action), competence (i.e., a need to feel effective in one's action), and relatedness (i.e., a need to feel connected to others), respectively (Ryan & Deci, 2017). On the

one hand, previous research has demonstrated that perceived autonomy-supportive behaviour from PE teachers induced satisfaction of psychological needs of students that, in turn, resulted in higher levels of intrinsic motivation (Kalajas-Tilga, Koka, Hein, Tilga, & Raudsepp, 2019; Standage et al., 2005). On the other hand, it has been found that perceived controlling behaviour from PE teachers is related to students' experiences of need frustration and, in turn, to higher levels of introjected and external regulation alongside with lower levels of intrinsic motivation (Koka, Tilga, Kalajas-Tilga, Hein, & Raudsepp, 2019).

It is an ongoing debate if autonomy-supportive and controlling behaviours are on the opposite ends of a single continuum or not (Amoura et al., 2015). While several studies examining the differential associations of perceived autonomy-supportive and controlling behaviours from significant others simultaneously with subordinates' outcome favour the concept of an autonomy-control continuum (Mageau & Vallerand, 2003; Reeve & Tseng, 2011; Soenens & Vansteenkiste, 2010; Vansteenkiste et al., 2012), there are also studies demonstrating that the absence of autonomy support does not necessarily reflect the increased levels of control or vice versa (e.g., Bartholomew, Ntoumanis, Ryan, Bosch, & Thøgersen-Ntoumani, 2011). Studies in various contexts such as sport (Matosic & Cox, 2014), higher education (Amoura et al., 2015), and school PE (Haerens et al., 2018) have shown that both autonomy-supportive and controlling behaviours were distinctly perceived by subordinates as cluster analyses resulted in four, and not just two, distinct groups according to the perceptions of autonomy-supportive and controlling behaviours from instructors. Specifically, results yielded two groups characterised by the dominant presence of either perceived autonomy-supportive or controlling behaviours, and other two groups characterized by equally high or low presence of both perceived behaviours. Importantly, the studies demonstrated that the group who perceived instructors predominantly as autonomy-supportive reported the highest need satisfaction and autonomous motivation, whereas the opposite was evident for a group who perceived instructors as predominantly controlling. It is noteworthy that in studies by Matosic and Cox (2014) and Amoura et al. (2015), the group who perceived instructors predominantly as autonomy-supportive did not significantly differ in terms of need satisfaction and autonomous motivation from the group who perceived instructors as equally high in both autonomy-supportive and controlling behaviours. This indicated that moderate levels of perceived controlling behaviours from coaches (Matosic & Cox, 2014) or teachers (Amoura et al., 2015) are still motivationally adaptive to their athletes and students, respectively, when coupled with high levels of

perceived autonomy-supportive behaviours. Contrary, the study by Haerens et al. (2015) showed that the group of students who perceived their PE teachers as high on control alongside with high on autonomy support reported significantly lower need satisfaction and autonomous motivation, compared with the group who perceived their PE teachers as high on autonomy support and low on control. In sum, some discrepancies were found across the studies in terms of associations of different combinations of perceived autonomy-supportive and controlling behaviours from instructors with subordinates' adaptive outcomes. Nevertheless, recent studies in various contexts tend to favour the assumption that the two perceived teaching behaviours (i.e., autonomy-supportive and controlling) are independent and not exact opposites of a single continuum (Amoura et al., 2015; De Meyer et al., 2014; Haerens et al., 2015, 2018; Matosic & Cox, 2014).

Studies in a PE context have also revealed perceived autonomy-supportive behaviours from teachers to be primarily related to students' need satisfaction and autonomous motivation, whereas controlling behaviours primarily to need frustration, and controlled motivation and amotivation (De Meyer et al., 2014; Haerens et al., 2015). These results demonstrate that perceived autonomy-supportive and controlling behaviours from teachers affect different outcomes through different processes which is another indication that these two types of teaching behaviours are rather independent than two ends of a single continuum. However, one possibility is that the teachers' autonomy-supportive and controlling behaviours experienced by their students interact in predicting students' adaptive outcomes such as intrinsic motivation towards PE. This assumption is derived from the results of the recent study by Tilga, Hein, Hamilton & Hagger (2019b). Using a conditional process model, Tilga and colleagues (2019b) demonstrated a tendency towards a decrease in the negative indirect effect of students' perceived teacher controlling behaviour on students' health-related quality of life (HRQoL) via need frustration at different levels (i.e., low, average, and high, respectively) of perceived autonomy-supportive behaviour (i.e., the moderator). Specifically, results revealed that students who perceived higher levels of perceived autonomy-supportive behaviours from their teachers showed weaker negative indirect effect of perceived controlling behaviours on HRQoL, compared with students whose perceptions of teacher's autonomy-supportive behaviours was on average or lower levels. It should be noted, however, that the negative indirect effect of perceived controlling behaviour on HRQoL at each level of the moderator (i.e., perceived autonomy support) did not differ significantly from each other. The authors concluded that higher levels of perceived PE teachers' autonomy support did not attenuate

the negative indirect effect of perceived controlling behaviour on students' HRQoL via need frustration. To the best of our knowledge, there is no direct evidence in the PE literature on how teachers' autonomy-supportive and controlling behaviours experienced by their students may interact in predicting students' PE-related adaptive outcomes such as intrinsic motivation towards PE lessons. The present study aimed to fill this gap in the literature.

The Present Study

The present study, therefore, aimed to test a conditional process model in which the positive indirect effect of students' perceptions of their PE teachers' autonomy-supportive behaviour on students' intrinsic motivation through need satisfaction is moderated by students' perceptions of PE teachers' controlling behaviour. In line with the tenets of SDT (Deci & Ryan, 1985; Ryan & Deci, 2017) and previous studies in a PE context (e.g., Standage et al., 2005), the effect of perceived autonomy-supportive behaviour exhibited by teachers on students' intrinsic motivation via need satisfaction is conceptualized as a mediation relationship in which the perceived autonomy-supportive behaviours-intrinsic motivation relation is mediated by need satisfaction. Thus, central to our model is the role of need satisfaction in mediating the effect of perceived autonomy-supportive behaviour on intrinsic motivation. This central process relationship indicates the pathway by which autonomy-supportive behaviour buffer intrinsic motivation. It is this mediational effect that is assumed to be moderated by the students' experienced controlling behaviours expressed by their teachers. Based on previous research (Bartholomew et al., 2018; Koka et al., 2019; Liu, Bartholomew, & Chung, 2017; Tilga, Hein, Koka, & Hagger, 2019) that controlling behaviours are likely to diminish adaptive outcomes because they induce need frustration, it may be that perceived controlling behaviours may dampen, or moderate, the positive effect of need satisfaction on students' intrinsic motivation. We, therefore, propose a moderated mediation process in which the strength of the indirect effect of perceived autonomy-supportive behaviour on intrinsic motivation through need satisfaction varies across different values of perceived controlling behaviour. In other words, we propose that when students experience their teachers to display high level of controlling behaviours, the positive indirect effect of the perceived autonomy-supportive behaviours of teachers on students' intrinsic motivation through need satisfaction will be weaker.

Figure 1 presents the hypothesized moderated mediation process model.

In total, we propose three hypotheses derived from the model. Firstly, we hypothesize that perceived autonomy-supportive behaviour of teachers in PE is positively related to students' intrinsic motivation. Secondly, we hypothesize that the effect of perceived autonomy-supportive behaviour of PE teachers on students' intrinsic motivation is mediated by perceived need satisfaction. Thirdly, we hypothesize that the relationship between autonomy-supportive behaviour and intrinsic motivation mediated by need satisfaction is moderated by controlling behaviour. Specifically, we expect that students who perceive their teachers offering higher levels of controlling behaviour will show weaker indirect effects of perceived autonomy-supportive behaviour on intrinsic motivation through need satisfaction. Therefore, we examine the indirect effect of students' perception of autonomy-supportive behaviours from teachers on intrinsic motivation through perceived need satisfaction at all values of perceived controlling behaviour.

The present study contributes to the extant PE literature by examining the moderation effect of perceived controlling behaviour from teachers on the mediation relationship in which the perceived autonomy-supportive behaviours-intrinsic motivation relation is mediated by need satisfaction, a well-recognised tenet of SDT (Deci & Ryan, 1985; Ryan & Deci, 2017). Understanding the process by which perceived autonomy-supportive and controlling behaviours displayed by teachers affect students' adaptive outcomes such as intrinsic motivation towards PE is important for the refinement of intervention programs. If the moderation effect of perceived controlling behaviour on the mediation relationship between perceived autonomy-sup-

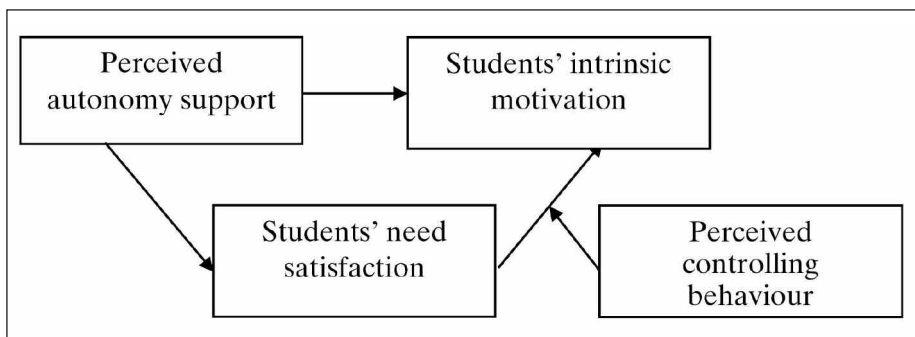


Fig. 1. - The hypothesized conditional process model demonstrating moderation of controlling behaviour on the indirect effect between autonomy-supportive behaviour and intrinsic motivation through need satisfaction.

portive behaviour and intrinsic motivation mediated by need satisfaction will be evident, programs focusing on teacher training that combines intervention to foster autonomy-supportive behaviour and minimize controlling behaviour should be the most effective. On the other hand, if the moderation effect of perceived controlling behaviour on the mediation relationship between perceived autonomy-supportive behaviour and intrinsic motivation mediated by need satisfaction is not evident, programs that focus solely on teaching the teachers to be autonomy-supportive should produce the most pronounced effects.

Method

PARTICIPANTS AND PROCEDURE

The sample comprised 592 secondary school students (boys, $n = 278$, girls, $n = 314$) aged between 12 and 15 years ($M_{age} = 13.58$; $SD = 1.14$). The participants were recruited from randomly selected schools in Estonia. All the selected schools were comparable of its size. Students attended compulsory PE lessons twice per week as part of the school curriculum. All PE classes were single-gender and there were from 12 to 18 students in each class. In all schools, the PE teachers followed the national curriculum that aims at developing PE competencies of students, with special focus on students' ability to acknowledge the importance of physical activity and healthy living as part of their lifestyle.

Students were asked to voluntarily fill in a questionnaire containing all study measures. The questionnaire was set up online and required participants to provide an answer for all the items. More detailed information about the survey and a website address was communicated by the students' PE teachers. Students were informed that there was no obligation to respond and their responses would remain anonymous. Consent to conduct the study was obtained from the local university ethical committee, and written consent was obtained from the principal of each school, as well as from all the students and their parents.

INSTRUMENTS

Students' perception of teachers' autonomy-supportive behaviour. Students' perception of autonomy-supportive behaviour from their teacher was assessed by the multidimensional perceived autonomy support scale for physical education settings (MD-PASS-PE; Tilga, Hein, & Koka, 2017). Students were presented with a common stem: "My PE teacher ...", followed by the set of items: organisational autonomy support (e.g., "... allows me to choose sport equipment"), procedural autonomy support (e.g., "... offers hints how to do better"), and cognitive autonomy support (e.g., "... allows me to express my opinion"). Each subscale comprised five items with responses provided on 7-point scales (1 = *strongly disagree* and 7 = *strongly agree*). Previous research has supported the factor structure and reliability of the current measure (Tilga, Hein, Koka et al., 2019, Tilga, Hein, Koka, Hamilton et al., 2019).

Students' perception of teachers' controlling behaviour. Students' perception of controlling behaviour from their teacher was measured using an adapted version (Hein, Emeljainovas, & Mieziene, 2018) of the multidimensional controlling coach behaviours scale (CCBS; Bartholomew, Ntoumanis, & Thøgersen-Ntoumani, 2010). Students were presented with a common stem: "My PE teacher...", followed by the set of items: negative conditional regard (e.g., "... pays me less attention if I have displeased him/her"), intimidation (e.g., "... uses the threat of punishment to keep me in line during lesson"), and the controlling use of grades (e.g., "... only uses grades so that I stay focused on tasks during lesson"). Each subscale comprised three items with responses provided on 7-point scales (1 = *strongly disagree* and 7 = *strongly agree*). Previous research has supported the factor structure and reliability of the current measure (Hein et al., 2015; 2018).

Students' perceived need satisfaction. Students' perception of their need satisfaction was assessed by three need satisfaction subscales from the basic psychological need satisfaction and frustration scale (BPNSFS; Chen et al., 2015) adapted to PE (Haerens et al., 2015). Students were presented with a common stem: "During the PE lesson...", followed by the set of items: need satisfaction for autonomy (e.g., "... I felt a sense of choice and freedom in the things I undertake."), for competence (e.g., "... I felt competent to achieve my goals"), and for relatedness (e.g., "... I felt that the class members I care about also cared about me"). Each subscale comprised four items with responses provided on 7-point scales (1 = *strongly disagree* and 7 = *strongly agree*). Previous research has supported the factor structure and reliability of the current measure (Haerens et al., 2015; Tilga, Hein, Koka et al., 2019).

Intrinsic motivation. Students' perception of their intrinsic motivation in PE was measured using an adapted version of the Perceived Locus of Causality Questionnaire (PLOCQ; Goudas, Biddle, & Fox, 1994). Students were presented with a common stem: "I do PE...", followed by the set of items: intrinsic motivation (e.g., "... because I enjoy PE"). There were four items with responses were on 7-point scales (1 = *strongly disagree* and 7 = *strongly agree*). Previous studies have shown that PLOCQ is a valid and reliable measure (Kalajas-Tilga et al., 2019).

DATA ANALYSIS

The data analysis was performed in two parts. In the first part, the data was first checked for assumptions regarding normality. Next, using AMOS Version 23.0 statistical software, the measurement confirmatory factor analysis (CFA) that included all the scales at the same analysis was conducted to test the adequacy of factor structure of the scales. Multiple goodness-of-fit indices were used to estimate the adequacy of the measurement CFA: the comparative fit index (CFI), non-normed fit index (NNFI), and the root mean square error of approximation (RMSEA). The acceptable fit of the measurement CFA model with the data is indicated if values reach over .90 for the CFI, and NNFI, and are less than .08 for the RMSEA (Hu & Bentler, 1995). In addition, descriptive statistics, intercorrelations, and internal consistency coefficients (Cronbach's alpha) were calculated for all measures.

In the second part of data analysis, moderated mediation analysis was conducted using the SPSS PROCESS macro (Hayes, 2013). Composite scores for the autonomy-supportive behaviour, controlling behaviour, need satisfaction, and intrinsic motivation variables were computed prior to moderated mediation analysis. To enable each item or subscale to make a

unique contribution to the construct (Hair, Ringle, & Sarstedt, 2011), the composite scores were calculated by averaging the items of each scale and weighting them by the first-order or second-order factor loadings from the CFA (Sebire, Standage, & Vansteenkiste, 2009).

Within the moderated mediation analysis, proposed study hypotheses were examined as follows. First, intrinsic motivation was regressed on the autonomy-supportive behaviour to examine the first hypothesis. Second, a mediation model was conducted to test the second hypothesis. Specifically, need satisfaction as the mediator was regressed on autonomy-supportive behaviour and the dependent variable, intrinsic motivation, was regressed on the independent variable autonomy-supportive behaviour and on need satisfaction. Third, a conditional process analysis was carried out by combining mediation and moderation analyses (Hayes, 2013) to test the third hypothesis. Specifically, need satisfaction was regressed on autonomy-supportive behaviour. In addition, intrinsic motivation was regressed on autonomy-supportive behaviour, need satisfaction, controlling behaviour, and on the interaction term computed from the scores of the need satisfaction and controlling behaviour variables. Bootstrapping with 5000 re-samples was used to generate confidence intervals (95% CI) for conditional indirect effects. The conditional indirect effect was considered statistically significant if its 95% CI did not contain the zero. Finally, in order to control for the effect of students' age and gender, the latter variables were included in the model as covariates.

Results

PRELIMINARY ANALYSIS

There was no missing data as the online questionnaire forced responses. Values for skewness and kurtosis ranged between -2 to $+2$ were considered acceptable regarding normal univariate distribution (George & Mallery, 2010). Skewness values of the items ranged from $-.61$ to $.36$ and kurtosis values ranged from $-.75$ to $.06$, suggesting that all items were within acceptable ranges. Mardia's normalized coefficient, however, indicated the data deviation from multivariate normality (282.48, critical ratio 107.84) and, therefore, bootstrapping procedure to generate standard errors of optimal precision with 5000 resamples was used (Byrne, 2010; Preacher & Hayes, 2008).

The measurement CFA model, descriptive statistics and reliability. Acceptable goodness-of-fit statistics were found for the measurement CFA that included all the scales: CFI = .944; NNFI = .937; RMSEA = .051. Table I presents intercorrelations, descriptive statistics, Cronbach's α coefficients for all study variables. Perceived autonomy support was positively correlated with need satisfaction and intrinsic motivation, but negatively with perceived controlling behaviour. Perceived controlling behaviour was negatively correlated with need satisfaction and intrinsic motivation. Need satisfaction was positively correlated with intrinsic motivation.

TABLE I
Descriptive Statistics, Correlations And Scale Reliabilities Among The Study Variables

Variable	Correlation					
	1	2	3	4	5	6
1. Autonomy support						
2. Controlling behaviour	-.43**					
3. Need satisfaction	.73**	-.33**				
4. Intrinsic motivation	.63**	-.36**	.73**			
5. Age	-.01	.01	-.06	-.09*		
6. Gender (1 = boys, 2 = girls)	-.10*	.02	-.13**	-.14**	.04	
<i>M</i>	4.70	3.20	4.65	4.78	13.58	N/A
<i>SD</i>	1.25	1.18	1.32	1.86	1.14	N/A
α	.94	.82	.93	.96	N/A	N/A

Note. $N = 592$. ** $p < .01$, * $p < .05$.

MAIN ANALYSES

Mediation. An initial mediation model in which the relationship between perceived autonomy-supportive behaviour and intrinsic motivation was mediated by need satisfaction was computed to test our first and second hypothesis (see Table II). Perceived autonomy-supportive behaviour from teachers had a significant, direct and positive effect on students' need satisfaction ($b = .77$, $p < .01$), and need satisfaction had a significant, direct and

TABLE II
Mediation Model Testing The Indirect Effect Of Perceived Autonomy Support On Students' Intrinsic Motivation Through Psychological Need Satisfaction ($N = 592$)

	<i>b</i>	<i>SE</i>	<i>t</i>
Direct and total effects			
The total effect of autonomy support on intrinsic motivation	.93	.05	19.46*
Autonomy support on need satisfaction	.77	.03	25.94*
Need satisfaction on intrinsic motivation, controlling IV	.83	.06	14.58*
Autonomy support on intrinsic motivation, controlling mediator	.29	.06	4.87*
	Effect	<i>SE</i>	<i>Z</i>
Indirect effect and significance using normal distribution			
	.43	.03	12.70*
	<i>M</i>	<i>SE</i>	95% CI
Bootstrap results for indirect effect			
	.43	.03	(.36, .50)
	κ^2	<i>SE</i>	95% CI
Effect size for indirect effect			
	.37	.03	(.31, .43)

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% CI = 95% confidence interval; κ^2 = standardized value of the indirect effect. * $p < .01$.

positive effect on students' intrinsic motivation ($b = .83, p < .01$). As expected, a statistically significant, positive indirect effect of perceived teachers' autonomy-supportive behaviour on students' intrinsic motivation through students' need satisfaction was found ($b = .43, p < .01$, 95% bias-corrected confidence interval (95% CI) = .36, .50). Controlling for the mediator, the direct effect of perceived teachers' autonomy-supportive behaviour on students' intrinsic motivation changed from $b = .93 (p < .01)$ to $b = .29 (p < .01)$.

Test of the process model. Next, a moderated mediation analysis was computed to examine if the indirect effect of perceived teachers' autonomy-supportive behaviour on students' intrinsic motivation through students' need satisfaction was moderated by perceived teachers' controlling behaviour (see Table 3). A statistically significant, direct and positive effect of students' need satisfaction on their intrinsic motivation was found ($b = .96, p < .01$). There was statistically significant interaction between perceived controlling behaviour and students' need satisfaction ($b = -.19, p < .01$). Also, we computed the conditional indirect effect of perceived teachers' autonomy-supportive behaviour on students' intrinsic motivation mediated by students' need satisfaction at all values of perceived teachers' controlling behaviour (see Table III). As can be seen and supported by 5000 re-samples bootstrapped 95% CI that did not include zero, the conditional indirect effect of perceived autonomy-supportive behaviour on students' intrinsic motivation mediated by need satisfaction was significant when students' scores on perceived teachers' controlling behaviour were ≤ 5.8 . With scores of ≥ 6.1 on perceived teachers' controlling behaviour, the perceived autonomy-supportive behaviour was not significantly related to students' intrinsic motivation mediated by need satisfaction. The latter was supported by conditional indirect effects with associated bootstrapped 95% CI that included zero. This analysis indicated that the positive indirect effect of perceived teachers' autonomy-supportive behaviour on students' intrinsic motivation mediated by need satisfaction was weaker for students with very high perceptions of controlling behaviour from their PE teachers. Therefore, our moderated mediation hypothesis found support. Finally, controlling for students' age and gender as covariates did not change the results.

Discussion

The aim of the current study was to test a process model in which the relation between students' perceived autonomy-supportive behaviour

TABLE III
 Moderated Mediation Model Testing The Indirect Effect Of Perceived Autonomy Support From Teachers
 On Students' Intrinsic Motivation Through Psychological Need Satisfaction (N = 592)

Dependent variable model (DV = intrinsic motivation)				
	<i>b</i>	<i>SE</i>	<i>t</i>	
Predictor				
Psychological need satisfaction	.96	.12	8.37*	
Autonomy support	.24	.06	3.89*	
Controlling behaviour	.05	.15	0.32	
Interactions:				
Psychological need satisfaction x controlling behaviour	-.19	.04	-2.45*	
Covariates				
Age	-.07	.05	-1.55	
Gender	-.17	.10	-1.62	
The conditional indirect effect at different values of the moderator				
	<i>b</i>	<i>LLCI</i>	<i>ULCI</i>	
Values of controlling behaviour				
1	0.78	0.53	1.03	
1.3	0.75	0.53	0.98	
1.6	0.72	0.52	0.92	
1.9	0.69	0.51	0.87	
2.2	0.66	0.50	0.81	
2.5	0.62	0.48	0.76	
2.8	0.59	0.47	0.72	
3.1	0.56	0.45	0.68	
3.4	0.53	0.42	0.64	
3.7	0.50	0.38	0.61	
4	0.46	0.34	0.59	
4.3	0.43	0.30	0.57	
4.6	0.40	0.25	0.56	
4.9	0.37	0.20	0.54	
5.2	0.34	0.14	0.53	
5.5	0.31	0.09	0.52	
5.8	0.27	0.03	0.52	
6.1	0.24	-0.02	0.51	
6.4	0.21	-0.08	0.50	
6.7	0.18	-0.14	0.50	
7	0.15	-0.20	0.49	

Note. DV = dependent variable; *b* = unstandardized parameter estimate; *SE* = standard error of parameter estimate; *t* = test of significance of parameter estimate; *LLCI* = lower limit of 95% confidence interval; *ULCI* = upper limit of 95% confidence interval. **p* < .01.

expressed by their PE teachers and students' intrinsic motivation, mediated by their need satisfaction, would be moderated by perceived controlling behaviour of teachers. Results supported our hypothesis that the positive effect of perceived autonomy-supportive behaviour of teachers on students' intrinsic motivation was partially mediated by students' need satisfaction. In addition, our hypothesis that the positive indirect effect of perceived auto-

onomy-supportive behaviour from teachers on students' intrinsic motivation mediated by students' perceived need satisfaction in PE would be moderated by perceived teacher controlling behaviour was also supported. Perceived teachers' controlling behaviour did undermine the positive indirect effect of perceived autonomy-supportive behaviour via need satisfaction on students' intrinsic motivation.

Firstly, it was hypothesized that perceived autonomy-supportive behaviour of teachers in PE is positively related to students' intrinsic motivation, a finding in line with previous studies indicated that need supportive environment is associated with individuals' adaptive outcomes. This demonstrates that students experiencing their teachers using autonomy-supportive behaviours such as organisational autonomy support (e.g., allowing to choose between different exercises), procedural autonomy support (e.g., explaining the effect of exercises) and cognitive autonomy support (e.g., understanding students needs) when receiving instructions were more likely to report higher intrinsic motivation. This finding is in line with SDT (Deci & Ryan, 2000), which posits that significant others' autonomy-supportive behaviour is associated with individuals' adaptive affective and behavioural outcomes. It is also in line with previous findings demonstrating that teachers' autonomy-supportive motivational strategies could have a positive relationship with adolescents' adaptive outcomes such as intrinsic motivation (Kalajas-Tilga et al., 2019), and HRQoL (Tilga, Hein, Koka et al., 2019).

Secondly, it was hypothesized that the effect of perceived autonomy-supportive behaviour of PE teachers on students' intrinsic motivation is mediated by perceived need satisfaction. Current findings demonstrated that students' need satisfaction partially mediated the positive indirect association between perceived teachers' autonomy-supportive behaviour and students' intrinsic motivation as there was a significant direct effect of autonomy-supportive behaviour on students' intrinsic motivation. This finding is consistent with the tenets of SDT and previous research (Haerens et al., 2015; Ryan & Deci, 2000; Vansteenkiste & Ryan, 2013), and demonstrates that need satisfaction is a pathway to adaptive outcomes in a physical education context, which is activated by teachers' autonomy-supportive behaviour and acts by generating need satisfaction in students.

Thirdly, it was hypothesized that the relationship between autonomy-supportive behaviour and intrinsic motivation via need satisfaction is moderated by perceived controlling behaviour. Results revealed that controlling behaviour did moderate this indirect effect, leading us to confirm our hypothesis. Specifically, the indirect effect of autonomy-supportive behaviour on intrinsic motivation via need satisfaction was not significant if students per-

ceived their teachers to exhibit high levels of controlling behaviours (i.e., scores on perceived controlling behaviour of ≥ 6.1). This led us to conclude that higher levels of perceived controlling behaviour do diminish the positive effect of autonomy-supportive behaviour through need satisfaction on students' intrinsic motivation. This is also in line with a study by Haerens et al. (2018) demonstrating that perceiving one as high on control is detrimental even when the one is perceived to be autonomy-supportive at the same time. One aspect worth discussing is that studies conducted in contexts such as sport (Matosic & Cox, 2014) and higher education (Amoura et al., 2015) suggested that perceived controlling behaviour from instructors is adaptive if paired with autonomy-supportive behaviours, the finding that is somewhat inconsistent with the results of the present study and the study of Haerens et al. (2018) conducted in a context of school PE. The possible reason for this discrepancy may be proceed from different contexts in which these studies were carried out. For instance, as argued by Cheon, Reeve, Lee & Lee (2015), compared with PE teachers, engaging in controlling practices are considered normative for sport coaches, which may diminish the detrimental effect of perceived controlling behaviour from coaches on athletes' adaptive outcomes. Another explanation, though speculative, for more favourable impact of perceived controlling behaviours on athletes' and university students' adaptive outcomes, compared with school children, may be related to the nature of contexts (i.e., optional or compulsory). Specifically, contexts such as sport and higher education are mainly optional, whereas school PE is commonly compulsory. Therefore, it may be plausible that athletes and university students realizing the possibility that one could withdraw at any time from exercising or studying, contrary to school children who are obliged to continue to participate in PE, could also reduce the negative effect of a controlling approach.

A finding of the current study is important because it suggests that it is important to put a special focus on minimizing teachers' controlling behaviour as well as increasing autonomy-supportive behaviour if the aim is to increase intrinsic motivation towards PE for all students. Although previous SDT-based autonomy-supportive interventions highlight that controlling behaviours should be minimized, there is still a little focus on this aspect (Su & Reeve, 2011). The possible reason for this might be that perceived autonomy support and controlling behaviours are often considered as related constructs and it is argued that the more one is perceived as autonomy-supportive, the less there will be perceived controlling behaviour (Soenens & Vansteenkiste, 2010). However, research indicates that autonomy-supportive and controlling behaviour might be separate constructs which indicate that both of these behaviours need separate focus (Bartholomew et al., 2011). From a practical point

of view, perceived autonomy-supportive behaviour from teachers might not be effective in countering the detrimental effects of perceived controlling behaviour on all students' intrinsic motivation towards PE. The reason for this is that when autonomy-supportive behaviour is increased, then controlling behaviour will not automatically decrease and, therefore, minimizing controlling behaviour needs special focus to ensure higher levels of intrinsic motivation via need satisfaction among students in a PE lesson.

To sum up, teachers are advised to acknowledge that autonomy-supportive behaviours that they display in PE lessons and are perceived by students will have positive impact to students' intrinsic motivation towards PE. In addition, teachers should acknowledge that the positive association of autonomy-supportive behaviours with students' intrinsic motivation is likely to emerge because autonomy-supportive environments offer opportunities for the satisfaction of basic psychological needs, the finding which is well known in PE literature (for a review, see Van den Berghe, Vansteenkiste, Cardon, Kirk, & Haerens, 2014). However, based on the results of our moderated mediation model, if students perceive higher levels of controlling behaviours from their PE teachers, then the positive mediation effect of teachers' autonomy-supportive behaviour on students' intrinsic motivation via perceived need satisfaction may not to be followed. For example, if the student has strong perceptions that the PE teacher uses threats of punishment to keep him/her in line during the lesson (i.e., controlling behaviour), then perceptions that the teacher also uses an autonomy-supportive behaviour, such as displaying an understanding of students' needs, may not have its positive influence on intrinsic motivation of the student. The reason for this is that higher levels of perceived controlling behaviour might hinder the positive mediation effect of autonomy-supportive behaviour on students' intrinsic motivation mediated by need satisfaction. This is an important information for future autonomy-supportive intervention programs because it highlights the need to focus on both decreasing teachers' controlling behaviour as well as increasing their autonomy-supportive behaviour if the aim is to promote intrinsic motivation towards PE in all students. Teacher training programs focusing solely on teaching the teachers to become more autonomy-supportive may not produce the most pronounced effects.

Limitations and Future Research

Despite this study extends the understanding of how perceived controlling behaviours might interfere to the mediational relationship of perceived

autonomy-supportive behaviour from PE teachers with students' intrinsic motivation via perceived need satisfaction, some limitations should be acknowledged. Firstly, in this study, the participants were recruited from a rather homogeneous age-group (i.e., students from 12 to 15 years old). Future research should examine whether our conditional process model is applicable in other age groups. Secondly, all the participants in this study were from one and the same cultural group. To provide further validity and reliability for our process model, the equivalence of this model should be examined across different cultural groups. Thirdly, all data collected in this study is self-reported that can be subject to common method variance and may inflate relationships among constructs (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Future studies should employ behavioural observations to provide converging evidence for the proposed associations. Fourthly, there can be other factors not estimated in the current study determining students' basic psychological need satisfaction. For example, a recent study by Li et al. (2019) demonstrated that mindfulness might be a potential pathway to basic psychological need satisfaction in educational settings.

Conclusions

The current research indicates that students perceiving their PE teachers as more autonomy-supportive are more likely to report higher levels of intrinsic motivation. The reason for this is that autonomy-supportive environments offer more opportunities for the satisfaction of psychological needs. However, it is important for PE teachers to recognize that being autonomy-supportive alone without minimizing controlling behaviours may not result in higher intrinsic motivation for all students because controlling behaviours can undermine need supportive environment. Taking this into account, SDT-based autonomy-supportive intervention programs should consider increasing autonomy-supportive behaviour as same important as decreasing controlling behaviour if the aim is to contribute to the promotion of intrinsic motivation towards PE for all students.

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