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Relationships between perceived teachers' controlling behaviour, psychological need thwarting, anger and bullying behaviour in high-school students

Vello Hein [a, *], Andre Koka [a], Martin S. Hagger [b]

[a] Faculty of Exercise and Sports Sciences, University of Tartu, 5 Jakobi Street, 51014 Tartu, Estonia
[b] Health Psychology and Behavioural Medicine Research Group, School of Psychology and Speech Pathology, Faculty of Health Sciences, Curtin University, GPO Box U1987, Perth, Western Australia 6845, Australia

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ABSTRACT

We tested a model of the associations between students' perceptions of their physical education teacher's controlling behaviour, perceptions of basic psychological need thwarting, anger and bullying behaviour. School students (N = 602; M age = 12.88, SD = 1.37) from 10 schools completed measures of perceived teachers' controlling behaviour and perceived thwarting of the psychological needs for autonomy, competence, and relatedness in physical education context and self-reported bullying and anger. A well-fitting structural equation model demonstrated that students' perceptions of the negative conditional regard and intimidation exhibited by the teacher had significant indirect effect on students' feelings of anger and bullying behaviour through the perceived psychological need thwarting in physical education. Findings suggest that physical education teachers who avoid the use of negative conditional regard and intimidation in their classes have students who perceive less need thwarting and report less bullying behaviour.

Bullying is defined as intentional verbal or physical aggressive behaviour with intent to harm and typically involves an imbalance of power between the victim and perpetrator (Rigby, 2002). Monks and Smith (2006) have classified bullying as a subset of aggression and several authors have viewed a state anger as potential precursor to aggressive behaviour (Dodge, 1991; Price & Dodge, 1989). Bullying among school children is a major social problem globally (Nansel, Craig, Overpeck, Saluja, & Ruan, 2004). A study by Ziegler, Rosenstein-Manner, and Toronto Board of Education (1991), based on self-report data from children in Canada, showed that 8% of children reported are bullied weekly and 20% of the respondents reported being bullied at least once per school term. Furthermore, 74% of those bullied reported being hit or kicked, 23% reported being teased, and 9% were threatened, intimidated, confined or suffered other types of bullying. According to the results of the cross-national Health Behaviour of School-aged Children (HBSC) study, 41% of school children aged 11–15 years in Estonia reported being a victim of bullying. Furthermore, 46% of students of this age reported engaging in bullying behaviour. Most important, however, the HBSC study reported more frequent incidents of bullying among younger school children aged 11–13 years in Estonia compared to other countries (Aasvee et al., 2012).

* Corresponding author. Tel.: +372 737 5382, +372 5532838 (mobile).
E-mail addresses: vello.hein@ut.ee (V. Hein), andre.koka@ut.ee (A. Koka), martin.hagger@curtin.edu.au (M.S. Hagger).

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There are several reasons for bullying. Besides demographic risk factors related to socioeconomic background like parental educational level and family income (Jansen et al., 2012), the school environment in which the students spend a substantial part of their day may have also impact on students' aggressive behaviour. Salmivalli and Peets (2009) have noted that the classroom context plays an important role in the occurrence of school bullying. Teachers' behaviour in the classroom context may play a central role in creating a positive or negative class climate that may have concomitant consequences on pupils' behaviour. In this article we investigate the different dimensions of perceived teacher's controlling behaviour and perceived thwarting of basic psychological needs from self-determination theory (SDT, Deci & Ryan, 2000) as potential contributors to aggressive and bullying behaviour and negative affect in Estonian school children.

Controlling teacher behaviour[1]

SDT is one of the most widely used approaches to explaining human behaviour (Deci & Ryan, 2000) and it has been applied intensively in educational contexts (Hagger & Chatzisarantis, 2007; Niemiec, Ryan, & Deci, 2009). SDT posits that individuals strive to satisfy three basic and universal psychological needs for autonomy (to feel self-determined in one's actions rather than feeling controlled), competence (to feel competent in interactions with the environment and experience opportunities in which to express one's capabilities), and relatedness (to feel a secure sense of belongingness and connectedness to others) (Deci & Ryan, 1985, 2000; Sheldon, Elliot, Kim, & Kasser, 2001). According to SDT, the satisfaction of these needs is related with social factors like school environment and teacher behaviour. A number of studies in educational settings (Barkoukis, Hagger, Lambropoulos, & Torbatzoudis, 2010; Hagger, Chatzisarantis, & Harris, 2006; Ntoumanis & Standage, 2009; Reeve & Jang, 2006; Ryan & Deci, 2000), including physical education among Estonian students (Hagger et al., 2009; Pihu, Hein, Koka, & Hagger, 2008), have demonstrated that autonomy-supportive teacher behaviour is related directly or indirectly via need satisfaction with positive affective and behavioural outcomes.

Although a large number of studies have examined the correlates of autonomy supportive teaching styles, the correlates of controlling teaching styles has only recently received attention. Moreover, according to Vansteenkiste and Ryan (2013), controlling teaching behaviours should be considered independent of autonomy-supportive behaviours and deserve separate attention in the scientific literature. Recent studies in educational settings have demonstrated that teacher controlling behaviours were related to lower levels of perceived psychological need satisfaction, less engagement during the lessons (Cheon & Reeve, 2015), increased levels of students' controlled motivation and amotivation (Cheon & Reeve, 2015; De Meyer et al., 2014), and increased cortisol levels, a physiological marker of stress, among students (Reeve & Tseng, 2011). Controlling teacher behaviours have also been shown to predict negative affect in students during learning like anger and anxiety (e.g., Assor, Kaplan, Kanat-Maymon, & Roth, 2005; Flink, Boggiano, & Barrett, 1990) and negatively related to overall academic achievement (Soenens, Sierens, Vansteenkiste, Dochy, & Goosens, 2012). It is noteworthy that studies have consistently shown relatively modest correlations between subordinates' perceptions of their supervisor's provision of autonomy support and controlling behaviours (Bartholomew, Ntoumanis, Ryan, Bosch, & Thøgersen-Ntoumani, 2011; Bartholomew, Ntoumanis, & Thøgersen-Ntoumani, 2010; Pelletier, Fortier, Vallerand, & Briere, 2001; Silk, Morris, Kanaya, & Steinberg, 2003; Tessier, Sarrazin, & Ntoumanis, 2008), indicating that controlling behaviours are not the conceptual opposite of autonomy supportive behaviours. According to Bartholomew, Ntoumanis, Ryan, Boch, et al. (2011), individuals in a position of authority thus may simultaneously use a variety of autonomy supportive and controlling behaviours and to varying extents. For example, a teacher may use conditional regard as a discipline strategy, a controlling behaviour, but may also provide a clear rationale for requested behaviours, and autonomy-supportive behaviour.

Controlling behaviour in teachers has been usually measured on a uni-dimensional scale (Assor et al., 2005; Reeve & Halusic, 2009; Soenens et al., 2012). In their review of parental and educational literature concerning the controlling strategies of significant others, Bartholomew, Ntoumanis, and Thøgersen-Ntoumani (2009) identified several dimensions of controlling behaviour (e.g., controlling use of praise and extrinsic rewards, negative conditional regard, intimidation, excessive controlling behaviour, judging/devaluing, and promoting ego-involvement). In their development and initial validation of the Controlling Coach Behaviours Scale (CCBS), Bartholomew et al. (2010) proposed a conceptual model of controlling behaviours comprising four controlling strategies by coaches: controlling use of praise and extrinsic rewards, negative conditional regard, intimidation, and excessive controlling behaviour. In the present study we focus on these four controlling strategies and adapt these to the physical education context.

According to Bartholomew et al. (2009, 2010), controlling use of praise and extrinsic rewards refers to the use of encouraging statements and extrinsic rewards by significant others to reinforce desired behaviours by their subordinates. An example of the controlling use of praise is a teacher who uses his or her positive feedback solely to direct the future behaviour of the students, as opposed to providing information regarding present performance. An example of the controlling use of extrinsic

[1] It is important to note that our conceptualization and definition of "controlling behaviours" is confined to the definition from self-determination theory i.e. the interpersonal style and actions of significant others (e.g., teachers) that reflect or communicate that the behaviour and outcomes of individuals in a particular context (e.g., students) are determined by others and external forces. It should be considered distinct from other conceptualizations of the construct of control, which generally reflects beliefs about capacity to engage in actions and agency (for a review see Skinner, 1996). From Skinner's perspective, our definition of "controlling behaviours" is most closely aligned with constructs that reflect coercion. We have taken care to ensure that we refer specifically to "controlling behaviours" rather than "control" in order to avoid terminological confusion and "jingle" fallacies i.e. referring to different constructs using the same term (Block, 1995; Hagger, 2014).

rewards is a teacher who promises to reward students if they engage in tasks he or she sets them or perform to a specified standard (Deci, Koestner, & Ryan, 1999). A leader or social agent shouting at his or her subordinates to intimidate them into doing the things he or she wants is a prime example of the use of intimidating behaviour. An example of intimidating behaviour is a teacher who uses the threat of punishment (e.g., push-ups) to motivate students to work harder or keep them in line during lessons or embarrasses students in front of their peers if they do not do certain things. Negative conditional regard refers to the withdrawal of attention, affection, and support from the significant other when specified behaviours by their subordinates are not displayed. An example of the negative conditional regard is a teacher who says things to make a student feel guilty (e.g., 'you have really let me down') when he or she does not perform well or behave as the teacher was expecting. Finally, excessive controlling behaviour refers to behaviours adopted by significant others that can be characterised as intrusive monitoring. An example of an excessive controlling behaviour is a teacher who attempts to interfere in aspects of the students' lives that are not directly associated with their schooling (e.g., teacher's duty to recruit students for extracurricular activities such as competition between schools) and pressure them to prioritise his or her lesson over other lessons.

The role of controlling teacher behaviours on basic psychological need thwarting and bullying behaviour

According to SDT, when psychological needs are satisfied people will develop and function effectively, but if these needs are thwarted, people report lower levels of well-being and experience non-optimal functioning (Bartholomew, Ntoumanis, Cuevas-Campos, & Lonsdale, 2014; Deci & Ryan, 2000). SDT also posits that the darker sides of human behaviour and experience, such as certain types of psychopathology, prejudice, and aggression are understood in terms of reactions to basic needs having been thwarted, either developmentally or proximally (Deci & Ryan, 2000). Researchers have noted that examining whether need thwarting has meaningful and empirical consequences can provide more robust tests of SDT's account of the darker sides of human behaviour (Bartholomew, Ntoumanis, & Thøgersen-Ntoumani, 2011). Studies have shown that whereas the satisfaction of psychological needs is directly or indirectly related to multiple adaptive behavioural and affective outcomes such as vitality and positive affect (Baard, Deci, & Ryan, 2004; Bartholomew, Noumanis, Ryan, Bosch, et al., 2011; Reeve & Jang, 2006; Ryan, Patrick, Deci, & Williams, 2008), the thwarting of these needs can lead to defensive or self-protective responses (e.g., compensatory motives or need substitutes, and rigid behaviour patterns) that have significant negative affective or behavioural consequences such as burnout, depression, and negative affect (Bartholomew, Noumanis, Ryan, Bosch, et al., 2011; Demaray & Malecki, 2002; Niemiec et al., 2009; Ryan, Deci, Grolnick, & La Guardia, 2006).

Research conducted in multiple contexts including education has demonstrated the detrimental effect of controlling strategies of significant others on their subordinates' basic psychological needs for autonomy, competence, and relatedness. Paying particular attention to the controlling behaviours most relevant to the current study, praise from supervisors given non-contingently, and perceived as inappropriate and insincere by subordinates, undermined their feelings of competence and autonomy (Henderlong & Lepper, 2002; Hollembeak & Amorose, 2005; Horn, 1985; Kohn, 1993). Mageau and Vallerand (2003) suggested that if athletes perceive their coaches to use conditional caring, either positive or negative, they were more likely to relinquish their autonomy to maintain a satisfactory relationship with their coach. Barber (2001) argued that the use of excessive controlling behaviour by parents can undermine children's needs for autonomy and relatedness. Similarly, research by D'Arripe-Longueville, Fournier, and Dubois (1998) revealed that sport coaches engaging in intimidating behaviours had a detrimental effect on the overall psychological experiences of their athletes, indicating that intimidating behaviours may impact negatively on all three psychological needs. Finally, as was pointed out by Skinner and Wellborn (1994), a social environment in classes can also block the development of the needs for competence, autonomy, and relatedness by providing inconsistency or chaos, coercion, and neglect, respectively.

Consequently, we contend that if students' basic needs for autonomy, competence, and relatedness are thwarted, they may experience feelings of anger and anxiety and turn to aggressive behaviour themselves. For example, if a student's genuine preferences are devalued and his or her sense of autonomy has been diminished, it may lead to the use of direct and hostile strategies to control his or her peers (Hawley, Little, & Pasupathi, 2002). One may also argue that if the student's need for competence is thwarted, he or she may have a desire to demonstrate physical superiority or power over other students. Finally, we argue that if a student perceives his or her belonging to a social group to be restricted, or feels isolated from others, thereby thwarting the need for relatedness, he or she may turn to aggressive behaviour.

The present study

Although the positive role of teachers' autonomy supportive behaviour and need satisfaction on students' different adaptive affective and behavioural outcomes are well documented, there is a lack of research on the effect of teacher's controlling behaviours on maladaptive outcomes related to anger and subsets of aggressive behaviour like school bullying. A recently proposed model based on SDT suggests that the thwarting of basic psychological needs may serve to mediate the link between these perceived controlling teacher behaviours and maladaptive outcomes (Bartholomew et al., 2010), but there is no direct evidence for this process model in the context of anger and bullying outcomes in a physical education context. The current study aims to fill this gap in the literature.

The main aim of the present study, therefore, is to develop and validate a model to understand the effect of students' perceptions of their teacher's controlling behaviours (e.g., controlling use of praise and extrinsic rewards, negative conditional regard, intimidation and excessive controlling behaviour) on their feelings of anger and bullying via the mediation of

perceived psychological need thwarting (see Fig. 1). To address this aim, we administered adapted versions of Bartholomew et al.'s (2010) multidimensional measure of teachers' controlling behaviours, Bartholomew, Ntoumanis, Ryan, and Thøgersen-Ntoumani's (2011) measure of perceived thwarting of the needs for autonomy, competence, and relatedness, and a measure of anger and bullying behaviour to a sample of Estonian school students. Consistent with the proposed model, we hypothesise that students' perceptions of physical education teachers' controlling behaviours will be related to the development of feelings of anger and bullying behaviour. We also expect perceived psychological need thwarting will mediate the effect of the perceived teacher controlling behaviours on feelings of anger and bullying behaviour. Finally, a feeling of anger was expected to act as a precursor to bullying behaviour (Dodge, 1991; Price & Dodge, 1989).

Methods

Participants and procedure

Participants were school children ($N = 602$; 309 boys, 293 girls) aged 12–16 years (M age $= 12.88$, $SD = 1.37$) from 10 schools in Estonia. Students were enrolled in physical education as a compulsory lesson twice per week. Permission to carry out the study in each school was obtained from the headteacher and ethical approval was granted from the university ethics committee. The questionnaire was uploaded to the internet and information about the website address was forwarded to each school's headteacher who, in turn, forwarded the information to students. Next, consent from class teachers was obtained in lieu of parental consent. Students completed the online questionnaire at their convenience. The purpose of the study was explained and the guidelines for completing the questionnaire were provided. It was also emphasised that the questionnaire was designed to measure students' general feelings about their PE teacher's behaviour and their self-reported frequency of aggressive behaviour. The questionnaire took approximately 10–12 min to complete. The students were assured that their responses would remain confidential.

Measures

Teachers' controlling behaviour

The multidimensional Controlling Coach Behaviours Scale (CCBS) developed by Bartholomew et al. (2010) was adapted to measure students' perceptions of the PE teachers' controlling behaviour. Participants were initially presented with a common

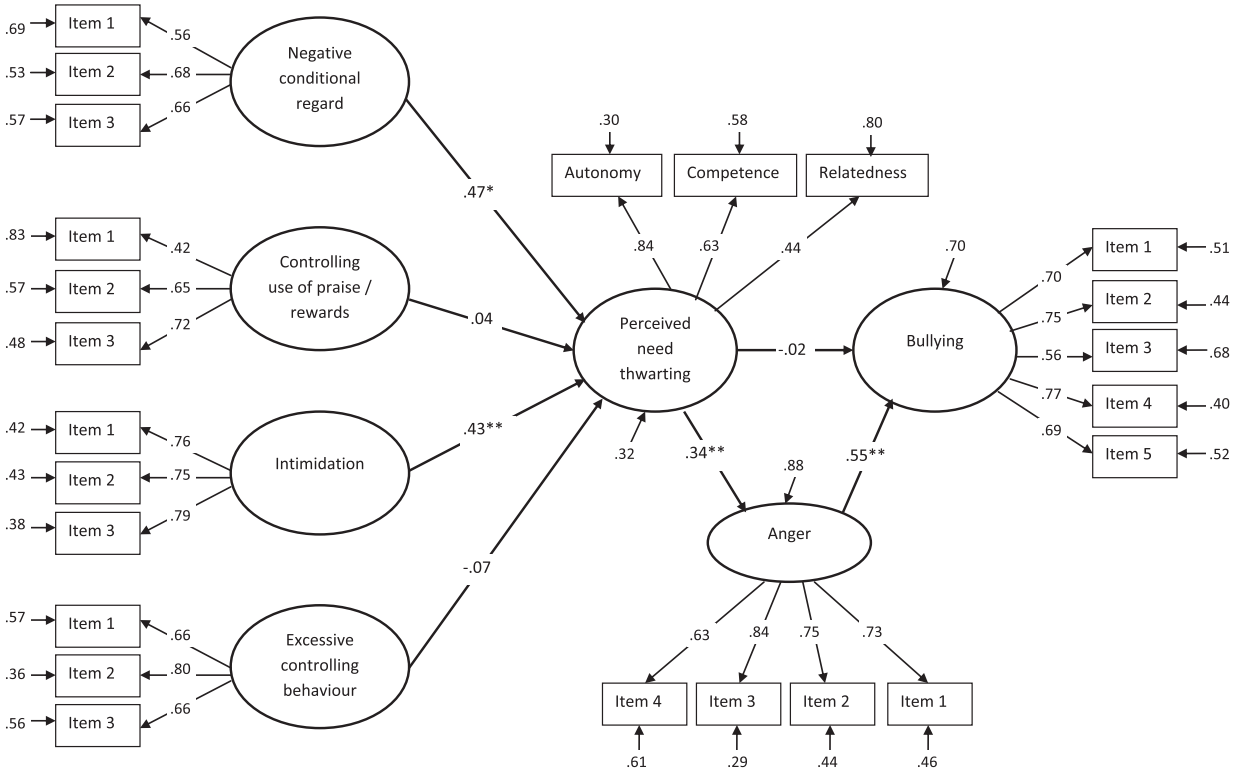

Fig. 1. Structural equation model measuring the associations between the students' perceptions of the teacher's controlling dimensions, perceptions of the need thwarting, anger and bullying behaviour. *Note*. $^{*}p < .05$, $^{**}p < .01$.

stem ("My PE teacher ….") followed by the items tapping the four subscales: controlling use of praise and rewards (e.g., "… uses rewards/praise so that I stay focused on tasks during lesson"), negative conditional regard (e.g., "… is less supportive of me when I am not exercise and perform well"), intimidation (e.g., "… uses the threat of punishment to keep me in line during lesson"), and excessive controlling behaviour (e.g., "…. tries to control what I do during my free time out of school"). Each of the four subscales comprised three items. Previous research have supported the reliability and factor structure of the subscales of the CCBS using confirmatory factor analysis (CFA) (Bartholomew et al., 2010).

The need thwarting scale

Students' perceptions of the thwarting of the psychological needs of autonomy, competence, and relatedness in physical education were assessed using an adapted and translated version of the 12-item Psychological Need Thwarting Scale (PNTS; Bartholomew, Ntoumanis, Ryan, & Thøgersen-Ntoumani, 2011). Example items were: "I feel pushed to behave in certain ways" (autonomy thwarting), "There are times when I am told things that make me feel incompetent" (competence thwarting), and "I feel I am rejected by those around me" (relatedness thwarting). Bartholomew, Ntoumanis, Ryan, and Thøgersen-Ntoumani (2011) have reported adequate reliability statistics for the PNTS and supported its three-factor structure using CFA. In line with a work of Baard et al. (2004), and recent work in physical education context (e.g., Taylor, Ntoumanis, & Standage, 2008), scores for each subscale were combined into a single latent variable and used as indicators of an overall need thwarting factor in our hypothesized structural model. Participants responses to the CCBS and PNTS were made on seven-point scales ranging from 1 (strongly disagree) to 7 (strongly agree).

Bullying behaviour and anger

Bullying behaviour and anger were measured using the Modified Aggression Scale (MAS) developed by Bosworth, Espelage, and Simon (1999). Five items of this instrument measure bullying behaviour and four items anger. For bullying behaviour, participants were asked how many times they did the following in the past 30 days: "I called other students names", "I teased students"; "I said things about students to make other students laugh"; "I threatened to hit or hurt another student"; and "I pushed, shoved, slapped, or kicked other students". For anger, participants asked how often they did the following in the past 30 days: "I was angry most of the day"; "I took my anger out on an innocent person"; "I frequently got angry"; and "I was grouchy or irritable, or in a bad mood, so that even little things would make me mad". Responses were made on four-point scales with scale points: 0 = *never*, 1 = *1 or 2 times*, 2 = *3 or 4 times*, and 3 = *5 or more times*. Previous research has confirmed the reliability (Bosworth et al., 1999; Espelage, Bosworth, & Simon, 2000) and the two-factor structure of this scale (Bosworth et al., 1999).

Translation procedures

Estonian versions of the questionnaires for the present study were developed using standardised back-translation procedures by two independent bi-lingual translators (Brislin, 1986). The back-translation procedure was repeated iteratively until the original and back-translated English versions of the questionnaires were virtually identical.

Data analyses

Study hypotheses were tested using confirmatory factor analysis (CFA) and structural equation modeling (SEM) with the LISREL 8.8 statistical package.[2] Corrected maximum likelihood estimation method was used. Model adequacy was evaluated by using multiple goodness-of-fit indexes: comparative fit index (CFI), normed fit index (NFI), the non-normed fit index (NNFI), and the root mean square error of approximation (RMSEA). A cut-off value greater than .95 for the CFI, NFI, and NNFI, and a cut-off value less than or equal to .08 for the RMSEA indicated adequate model fit (Hu & Bentler, 1999). Indirect

[2] Due to the hierarchical nature of the data (i.e., student data nested in classes and schools), we explored the use of multilevel analysis to analyse the data. The data available, however, only enabled us to analyse the two-level model (i.e., students at level 1 and schools at level 2). To determine how much of the total variance in each study variable could be attributed to between-school variability we conducted a series of separate null or no-predictor models. These models are considered the first step in developing multilevel models according to the recommendations of Heck, Thomas, and Tabata (2010). In each model, each study variable was specified as the dependent variable and school as grouping variable. Results indicated that the intercepts did not vary significantly across schools (Wald Zs = .28–1.72; ps > .05) for all of the study variables. The intraclass correlations (ICC) for most of the study variables suggested that only between 0.5 and 5.4% of the total variability between schools could be attributed to between-school variability. The only exception was the model for the teacher's controlling behaviour such as intimidation variable which suggested that 10.5% of the total variability was attributable to between-school variability. On the other hand, results of the null models indicated that significant proportions of the total variance could be explained from within student variability for all study variables without exception (Wald Zs = 17.02–17.20; ps < .001). Since the results of null models indicated that the total variability in study variables attributable to between-school variability was minimal for all but one of the factors, we deemed that conducting a multilevel analysis would add a little advantage as the higher level grouping had an unsubstantive effect in explaining variability in the study variables. Thus, an analysis conducted at the individual level (i.e., student-level) would be optimal. We also fit a multilevel SEM using LISREL 8.8 that included both between group (i.e., school-level) and within group (i.e., student-level) effects to our two-level dataset (χ^2 (509) = 1092,56, RMSEA = .061, CI_{90} for RMSEA range = .056–.066). Results of the multilevel SEM indicated that school level effects were not statistically significant, but student-level effects remained statistically significant with identical pattern to the single level model depicted in Fig. 1. Therefore the SEM with student-level effects only seems to be the most appropriate. With regard to the teacher's controlling behaviour such as intimidation, however, we caution the reader about the fact that in addition to the significant variance explained between students, a substantial amount of variability was also found between schools for this particular variable.

effects were computed using LISREL's indirect effects matrix with correction for multiple mediation effects. In order to examine the hypothesized model, we followed the three of Mulaik and Millsap's (2000) four steps for confirming the factor structure of multi-item scales of recommendations. First, separate CFA models that assumed discriminant validity between items representing four modified CCBS factors, three modified PNTS factors and two Modified Aggression Scale factors, respectively, were compared to corresponding congeneric CFA models that assumed lack of discriminant validity for the observed scales. Specifically, each CFA model that assumed discriminant validity between factors was specified by setting items of the respective latent constructs to load on their expected factors. Also, in each CFA model that assumed discriminant validity between factors, the latent constructs were set to correlate. Further, each corresponding congeneric CFA model that assumed lack of discriminant validity was specified in which a single factor would explain relationships between the items of different latent constructs. Discriminant validity of the components is supported if the CFA model that hypothesizes discriminant validity satisfies published cut-off criteria for indices of good fit and is superior in fit to the congeneric model in which all items are specified to indicate a single latent construct. Second, the CFA was performed to verify the measurement model. Third, pending a satisfactory fit was obtained for the measurement model, we tested the proposed model relations using SEM. The fourth and final step of the procedure in which pre-specified paths that were freed in the model from its inception are tested against unspecified paths was not relevant in the current model given the theory-based nature of our specified model.

Results

Preliminary analysis

Descriptive statistics, correlations among study variables and composite reliability coefficients for all measures are presented in Table 1. Analyses of the skewness and kurtosis values for the individual items revealed that not all data were normally distributed and therefore the polychoric correlations and the asymptotic covariance matrices were used in subsequent CFA and SEM analyses. The factor loadings and residuals for the CFA models for the modified CCBS, modified PNTS, and MAS are presented in Tables 2–4, respectively.

First, the discriminant validity CFA model for the modified CCBS with four latent factors and 12 items (Table 5, Model 1) met the criteria for good fit and was superior in fit to the congeneric model (Table 5, Model 2). The CFA model for modified PNTS with three factors and 12 items exhibited inadequate fit ($\chi^2 = 318.75$, df = 51, RMSEA = .098 with CI_{90} = .088–.110, NNFI = .094, NFI = .95, CFI = .095). Results revealed low factor loading (.25) for one item from the perceived need thwarting for autonomy subscale: "I feel under the pressure to agree with the exercises designed for me". Also, the standardized residual for this item and the item "I feel obliged to follow exercise decision made for" was very high (20.43). After removing the item with low factor loading, the composite reliability coefficient of this scale increased from .731 to .780. The exclusion of this item also resulted in improved psychometric parameters that reached an acceptable level. The discriminant validity CFA model for the modified PNTS with three latent factors and 11 items (Table 5, Model 3) met the criteria for good fit and was superior in fit to the congeneric model (Table 5, Model 4). The discriminant validity CFA model for the Modified Aggression Scale with two latent factors and 9 items (Table 5, Model 5) met the criteria for good fit and was superior in fit to the congeneric model (Table 5, Model 6). All factor correlations between the latent variables in each instruments were significantly different from unity according to the criteria specified by Bagozzi and Kimmel (1995), supporting the discriminant validity of the constructs.

Second, we tested our hypothesized measurement model based on 24 observed measures and seven latent constructs, representing the four factors of modified CCBS (comprising 12 items), one factor of PNTS (comprising 3 composite scores of needs) and two factors of Modified Aggression Scale (comprising 9 items). The latent factors were allowed to correlate freely during assessment of the measurement model (Anderson & Gerbing, 1988). The results from the CFA revealed that the measurement model was appropriate (Table 5, Model 7), where each factor was adequately explained by its respective set of indicator items. In addition, factor correlations among the constructs were significantly

Table 1
Descriptive statistics and factor correlations among study variables.

		ρc	Mean	SD	1	2	3	4	5	6
1.	Negative conditional regard	.703	3.59	1.27	–					
2.	Controlling use of praise and extrinsic rewards	.655	3.78	1.16	.80*	–				
3.	Intimidation	.845	2.67	1.48	.91*	.76*	–			
4.	Excessive controlling behaviour	.800	3.01	1.51	.70*	.54*	.77*	–		
5.	Need thwarting	.726	3.57	1.07	.79*	.67*	.77*	.56*	–	
6.	Anger	.892	2.34	2.56	.30*	.24*	.38*	.30*	.36*	
7.	Bullying	.889	2.83	3.04	.18*	.19*	.25*	.19*	.14*	.56*

Note. Scores for the need thwarting construct represents the mean values of items from three subscales.
*$p < .05$.

Table 2
Factor loadings and residuals following confirmatory factor analyses for the teachers' controlling behaviour subscales.

Subscale and items	Factor loading	Residual
Negative conditional regard		
My teacher is less friendly with me if I don't make the effort to see things his/her way	.60	.64
My teacher is less supportive of me when I do not exercise and perform well	.72	.49
My teacher pays me less attention if I have displeased him/her	.67	.55
Controlling use of praise and extrinsic rewards		
My teacher promises to reward/praise me if I do well	.43	.81
The only way my teacher rewards/praises me is to make me exercise harder	.69	.52
My teacher only uses rewards/praise so that I stay focused on tasks during lesson	.73	.47
Intimidation		
My teacher shouts at me in front of others to make me comply	.80	.36
My teacher uses the threat of punishment to keep me in line during lesson	.80	.35
My teacher intimidates me into doing the things that he/she wants me to do	.81	.34
Excessive controlling behaviour		
My teacher tries to control what I do during my free time out of school	.73	.47
My teacher tries to interfere in aspects of my activities outside physical education lessons	.86	.26
My teacher expects me to appreciate physical education more than other lessons	.67	.55

Note. All factor loadings are statistically significant ($p < .05$).

different from unity according to the criteria specified by Bagozzi and Kimmel (1995), supporting the discriminant validity of the constructs.

Main analysis

The main purpose of the SEM was to examine how students' perceptions of the different dimensions of their teacher's controlling behaviour (controlling use of rewards, negative conditional regard, intimidation and excessive controlling behaviour) were related to anger and bullying via the mediation of the perceived thwarting of their basic psychological needs (see Fig. 1). A SEM was used to test a model with direct paths from the dimensions of the perceived teachers' controlling behaviour to perceived need thwarting and from perceived need thwarting to anger and bullying. The subscale scores of each perceived need thwarting (i.e., thwarting of the need for autonomy, competence and relatedness) were used as indicators of an overall perceived need thwarting latent variable. Also, the indirect effects from the dimensions of perceived teachers' controlling behaviour on students' aggressive behaviour were calculated.

The structural model demonstrated a good fit with the data.[3] The fit indices are presented in Table 5 (Model 8) and standardized coefficients are presented in Fig. 1. Overall, the model explained 68%, 30%, and 12% of the variance in perceived psychological need thwarting, bullying, and anger latent factors, respectively. Focusing first on the effects of the four controlling behaviour dimensions, students' perceptions of the negative conditional regard and intimidation exhibited by the teacher were uniquely significantly related to students' perceived psychological need thwarting. There were no unique significant effects for the controlling use of praise and rewards, and excessive controlling behaviour on need thwarting. Focusing on the effects of psychological need thwarting on outcomes, there was a statistically significant direct path from perceived need thwarting to anger, but no statistically significant direct path from perceived need thwarting to bullying. However, anger was strongly related to bullying and there was also a significant indirect effect of perceived need thwarting on bullying via anger (see Table 6). It was also hypothesized that perceived controlling teacher's behaviours would be indirectly related to anger and bullying via perceived need thwarting. An examination of the indirect effects indicated that the perceived negative conditional regard and intimidation were statistically significantly related to students' anger and bullying, supporting our hypothesis for these variables, but rejecting the hypotheses for the effects of the controlling use of praise and rewards, and excessive controlling behaviour on the outcomes mediated by psychological need thwarting (see Table 6). Although the observed indirect effects of the dimensions of perceived negative conditional regard and intimidation on students' anger were stronger than the indirect effects of these constructs on students' bullying behaviour, there were no statistically significant differences across the two predicted variables as indicated by the overlap in the 95% confidence intervals (see Table 6).

[3] We also tested two alternative models and compared those against the hypothesized model depicted in Fig. 1. In both alternative models, the direct paths from all of the dimensions of perceived teachers' controlling behaviour to perceived need thwarting were specified. In the first alternative model, only direct paths from perceived need thwarting to anger and from anger to bullying were specified, whereas in the second alternative model only direct paths from perceived need thwarting to bullying and from bullying to anger were specified. Results of the both alternative models exhibited acceptable fit to the data [$\chi^2(239) = 705.12$, CFI = .96, NFI = .95, NNFI = .96, RMSEA = .057, CI_{90} for RMSEA range = .052–.062 and $\chi^2(239) = 745.93$, CFI = .96, NFI = .94, NNFI = .96, RMSEA = .060, CI_{90} for RMSEA range = .055–.064 for the first and second alternative model, respectively]. The model AIC was 828.33, 827.12, and 867.93 for the hypothesized model, first alternative model, and second alternative model, respectively. According to the Rigdon (1999), lower model AIC values indicate a better fit. Although the model AIC values for hypothesized model and first alternative model were almost identical, the hypothesized model was deemed to be the best fitted model as it included also a direct path from perceived need thwarting to bullying representing thus better the real life situation.

Table 3
Factor loadings and residuals following confirmatory factor analyses for the need thwarting subscales.

Subscale and items	Factor loading	Residual
Need thwarting for autonomy		
I feel prevented from making choices as to how I exercise	.84	.29
I feel pushed to behave in certain ways	.90	.19
I feel obliged to follow exercise decisions made for me	.40	.84
I feel under the pressure to agree with the exercises designed for me		
Need thwarting for competence		
There are occasions where I feel incompetent because others impose unrealistic expectations upon me	.79	.37
There are times when I am told things that make me feel incompetent	.83	.32
There are situations where I am made to feel inadequate	.67	.55
I feel inadequate because I am not given opportunities to fulfil my potential	.69	.52
Need thwarting for relatedness		
I feel I am rejected by those around me	.87	.25
I feel others can be dismissive of me	.88	.22
I feel other students dislike me	.85	.27
I feel some of the students around me are envious when I achieve success	.38	.85

Note. All factor loadings are statistically significant ($p < .05$). Item in italics were removed due to low factor loading.

Discussion

The purpose of this study was to investigate whether the perceptions of physical education teachers' controlling behaviours by students were related to students' perceived psychological need thwarting, feelings of anger, and bullying behaviour. Based on self-determination theory, we hypothesised that the different dimensions of perceived controlling behaviours of teachers would be related to maladaptive outcomes of anger and bullying mediated by perceived thwarting of psychological needs.

Prior to testing hypotheses, we needed to confirm the validity of the psychological measures constructs adapted for use with the current Estonian sample and in a physical education context. Three scales measuring the multidimensional aspects of controlling behaviours (CCBS; Bartholomew et al., 2010), psychological needs thwarting (PNTS; Bartholomew, Ntoumanis, Ryan, Bosch, et al., 2011; Bartholomew, Ntoumanis, Ryan, & Thøgersen-Ntoumani, 2011; Bartholomew, Ntoumanis, & Thøgersen-Ntoumani, 2011), and the feelings of anger and bullying behaviour (MAS; Bosworth et al., 1999) were subjected to CFA to confirm their construct and discriminant validity. In each case, the analyses revealed acceptable psychometric properties and each factor was adequately explained by its respective set of indicator items. The only exception was the CFA of the adapted version of the PNTS (Bartholomew, Ntoumanis, Ryan, & Thøgersen-Ntoumani, 2011) which led to a deletion of one item from the perceived need thwarting for autonomy subscale ("I feel under the pressure to agree with the exercises designed for me") that was removed due to low factor loading. In Estonia, individual design for exercise is not a common practice among PE teachers given the curriculum requirements so future studies may consider rewording the item to refer to designing activities for the class (e.g., "… exercises designed for the class"). This item aside, the analysis supported the construct validity of the scale.

Focusing on the main hypotheses of the study, our structural equation model revealed that different dimensions of perceived controlling behaviours of the physical education teacher were positively related to students' perceived need thwarting. This was in keeping with our original hypothesis. However, the proposed relations were confirmed for only two of the dimensions (intimidation and negative conditional regard) with no unique effects for the others (controlling use of praise and extrinsic reward and excessive controlling behaviour). These findings suggest that the more students reported that their teachers used intimidation (e.g., verbal abuse, shouting, physical punishment, humiliating and belittling behaviour, and personal attacks) when communicating with the class, the more they felt that their basic psychological needs were thwarted.

Table 4
Factor loadings and residuals following confirmatory factor analyses for the modified aggression scale.

Subscale and items	Factor loading	Residual
Bullying		
I pushed, shoved, slapped, or kicked other students	.79	.38
I called other students names	.81	.34
I said things about other students to make other students laugh	.66	.57
I teased other students	.86	.26
I threatened to hit or hurt another student	.82	.33
Anger		
I was angry most of the day	78	.39
I was grouchy or irritable, or in a bad mood, so even little things made me mad	.80	.36
I frequently got angry	.91	.17
I took my anger out on an innocent person	.77	.40

Note. All factor loadings are statistically significant ($p < .05$).

Table 5
Fit indices for confirmatory factor analyses and structural equation models.

Models	S-Bχ^2	d.f.	CFI	NNFI	NFI	RMSEA	CI_{95}RMSEA
Model 1	174.52	48	0.98	0.98	0.99	0.066	0.056–0.077
Model 2	318.75	54	0.96	0.95	0.95	0.091	0.081–0.160
Model 3	143.08	41	0.98	0.98	0.98	0.064	0.053–0.076
Model 4	882,36	44	0.85	0.82	0.85	0.178	0.180–0.190
Model 5	91.51	26	0.99	0.98	0.98	0.065	0.051–0.079
Model 6	452.52	27	0.92	0.90	0.92	0.160	0.150–0.180
Model 7	477,49	231	0.99	0.98	0.97	0.042	0.037–0.047
Model 8	704.33	238	0.96	0.96	0.95	0.057	0.052–0.062

Note. Model 1 = discriminant validity of modified CCBS with four factors and 12 items; Model 2 = congeneric model with 12 items; Model 3 = discriminant validity of modified PNTS with three factors and 11 items; Model 4 = congeneric model with 11 items; Model 5 = discriminant validity of Modified Aggression Scales with two factors and 9 items; Model 6 = congeneric model with 9 items; Model 7 = Measurement model with all study variable; Model 8 = Hypothesised structural equation model.

Further, if the students were more likely to report that their teachers used negative conditional regard (e.g., focusing less on student when he or she is struggling or offering no attention, affection, and support when the student is not behaving as asked), their perceptions of basic psychological needs were also more likely to be more thwarted. This is, to some extent, consistent with findings of Blanchard, Amiot, Perreault, Vallerand, and Provencher (2009) who demonstrated that coaches' controlling behaviour measured by unidimensional scale were negatively related to the satisfaction of the need for autonomy.

In addition, Bartholomew et al. (2009) argued that some of the controlling motivational strategies could be more damaging to young athletes' psychological well-being than others. They suggested that controlling motivational strategies such as intimidation, negative conditional regard and guilt-induction will have stronger negative relationships with athlete well-being, compared to strategies such as the use of extrinsic rewards. Our findings are consistent with these proposals. That perceived intimidation and negative conditional regard in the present study are the most damaging behaviours to well-being is not surprising as previous research on parents has demonstrated these types of behaviours are associated with severe negative effects on the well-being of those subjected to them as well as serious forms of psychological ill-being (e.g., Hewitt & Flett, 1991). To the best of our knowledge, however, this is the first study that has examined these effects in physical education teachers.

The student perceptions that their physical education teachers' used excessive controlling behaviour and controlling use of praise and extrinsic rewards did not have a uniquely significant relationship with students' perceived basic psychological need thwarting. There are several possible reasons for these non-significant effects. First, the nature of the teacher–student interaction in the latter types of controlling behaviours is less blatantly negative relative to the effects of the intimidation and negative conditional regard behaviours (Bartholomew et al., 2009). Second, physical education as a subject is consistently rated by students as one of the most popular subjects in school, while its perceived importance relative to other 'academic' subjects (e.g., mathematics, science, languages) is rated much lower (Ormerod, 1975; Stables & Wikeley, 1997). One may argue, therefore, when the physical education teachers pressure students to prioritise physical education over other 'academic' subjects, the pressure is not taken particularly seriously. The same might be true with physical education teachers' attempts to control students' behaviour by promising to reward them if they engage in the tasks he or she has set them. Consequently, although perceived incidence of these behaviours was relatively high (e.g., the mean score of the controlling use of praise and extrinsic rewards was above the midpoint of the scale; see Table 1), it is fairly understandable why the controlling use of praise and extrinsic rewards, as well as the use of excessive controlling behaviour, were not substantially related to students' perceived psychological need thwarting in physical education compared with teachers' intimidation and negative conditional regard.

Significant indirect effects from perceived negative conditional regard and intimidation on students' anger and bullying behaviour were found via the mediation of perceived need thwarting. It is noteworthy that the indirect effects of perceived negative conditional regard and intimidation on anger were stronger than for the indirect effects on bullying. In general,

Table 6
Indirect effects of teachers' controlling behaviour on students' aggression behaviour.

Independent variables	Mediating variables	Predicted variables	Indirect effects (95% CI)
Negative conditional regard	Need thwarting	Anger	.16* (.02; .29)
	Need thwarting; Anger	Bullying	.08* (.00; .16)
Controlling use of praise and extrinsic rewards	Need thwarting	Anger	NS
	Need thwarting; Anger	Bullying	NS
Intimidation	Need thwarting	Anger	.15* (.01; .29)
	Need thwarting; Anger	Bullying	.07* (.01; .13)
Excessive controlling behaviour	Need thwarting	Anger	NS
	Need thwarting; Anger	Bullying	NS
Need thwarting	Anger	Bullying	.19** (.13; .25)

Note. *p < .05. **p < .01.

results confirmed our second hypothesis that students' perceptions of controlling behaviours used by their teacher were indirectly related with anger and bullying via perceived need thwarting. This finding also supports one of the main tenets of Deci and Ryan's (2000) SDT that the relationship between social factors such as perceived teacher's controlling behaviour and students' affective and behavioural outcomes such as feelings of anger and aggressive behaviour will be mediated by the satisfaction or dissatisfaction of the basic psychological needs for autonomy, competence, and relatedness. This finding is also consistent with previous results that indicated the role of the need thwarting as the mediator between the relationship of job pressure and burnout among physical education teachers (Bartholomew et al., 2014).

The proposed model showed that the anger was strongly related to bullying behaviour. This finding supports hypotheses proposed by Dodge (1991) and Price and Dodge (1989) who view anger as precursor of aggressive behaviour. Our specified alternative models further supported the view that feelings of anger is a precursor of students' bullying behaviour.

We contend that the statistically significant relationship between perceived need thwarting and bullying behaviour that was completely mediated by anger (i.e., a significant indirect effect with no direct effect) suggests that disaffection in terms of one's basic need satisfaction in physical education may be related to the feelings of anger, which in turn, are linked to aggressive behaviour toward other students. This indicates that negative emotional responses are implicated in the process by which perceived need thwarting impacts on aggression. This is consistent with hypotheses from a number of theories relevant to the current research. According to SDT, need thwarting is not only related to changes in motivational orientations toward particular behaviours but also maladaptive outcomes including emotional responses, such as frustration and, at times, anger. Whether or not perceived basic need thwarting in physical education will result in feelings of anger may depend on the importance students attach to physical education, as discussed earlier. Similarly, in frustration-aggression theory (Dollard), frustration and anger evoked by frustration of goal may lead to aggression, including aggression directed at targets that were not the original source of the aggression. Together, these hypotheses indicate that the interplay between perceived need thwarting and aggression may reflect a key process by which organismic needs explain the subsequent behaviour.

Limitations

Although the present study provided some unique findings for the relationship between students' perceptions of their physical education teachers' use of controlling behaviour and students' aggressive behaviour, there are also some limitations that must be acknowledged. First, the sample used in this study should be considered as the convenience sample that may not be representative of the student population in Estonia. Future studies should focus on randomly selected, stratified samples to permit better inference of findings to the population. The second limitation was that the data only permitted us to determine individual- and school-level variance, but not class-level variance in behaviour. Researchers should, therefore, consider collecting full data at the individual, class, and school levels in order to test all possible sources of variance in the prediction of the psychological variables in the model tested in the current study. Third, the data from the present study were based entirely on students' self-reports. Although, the cautious should be exercised when interpreting self-reports of students, researchers (e.g., Anderson & Walberg, 1974; Fraser, 1989; Scriven, 1988) have claimed that students' subjective ratings about learning environment as well as teacher's behaviours and about themselves are comparatively valid. Fourth, the data are correlational in nature, which precludes the inference of causality. The possibility still remains that students' who engage in bullying behaviour themselves may feel anger and consequently perceive their teacher to exhibit higher degrees of controlling behaviours. It is also possible that angry, aggressive adolescents are more sensitive to basic psychological needs not being met. Future research would do well to explore the role that feelings of anger play in the motivational sequence proposed in SDT. It is also possible that examining the relations between other psychological variables such as global or physical self-esteem and bullying behaviour may give more useful information. These possible alternatives could be tested in future research by adopting a cross-lagged panel design measuring the psychological antecedents of bullying behaviour and self-reported bullying behaviour and anger at two points in time and analysing for reciprocal relations between the variables over time. Another direction of future research would be to examine the role of observed actual controlling teaching behaviours in physical education on corresponding perceived controlling teaching behaviours and maladaptive affective and behavioural outcomes such as feelings of anger and bullying behaviour (De Meyer et al., 2014).

Overall, findings of the present study are unique because they provide additional empirical support for the role of perceived psychological need thwarting in SDT's theoretical account of the darker sides of human existence and enable a better understanding of the processes related to aggressive behaviour in school students. In terms of implications for school practice the model will help the physical education teachers to better understand how perceptions of their controlling behaviour are related with students' perceived need thwarting and how this is related with negative affective and behavioural outcomes. Based on the findings of the present study, physical education teachers should be encouraged to avoid intimidating and guilt-inducing behaviours in their lessons as these kinds of behaviours are related to the students' experience that their basic psychological needs are thwarted. The controlling types of behaviours are also related to feelings of anger and bullying behaviour toward others, both of which are aversive and maladaptive outcomes for the students. Although the results of the present study did not demonstrate the unique, statistically significant effects of over-intrusive behaviour (i.e., excessive controlling behaviour) and controlling use of praise and extrinsic rewards on students' basic psychological need satisfaction, the positive, statistically significant correlations between these dimensions and students' perceived need thwarting suggest that physical education teachers should also avoid these types of behaviours when communicating with their students.

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