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The different faces of controlling teaching: implications of a distinction between externally and internally controlling teaching for students' motivation in physical education

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Background: In Self-Determination Theory (SDT), a well-validated macro-theory on human motivation, a distinction is made between internally controlling teaching practices (e.g. guilt-induction and shaming) and externally controlling practices (e.g. threats and punishments, commands). While both practices are said to undermine students' motivation, they would do so through somewhat differential motivational processes. Unfortunately, the relevance of the conceptual distinction between internally and externally controlling strategies has not been examined systematically. In the context of sport and physical education (PE), most studies on controlling teaching have either measured controlling teaching in an undifferentiated way or have focused on one particular feature of controlling teaching.

Purpose: The purpose of this study was to provide a more fine-grained picture on the differential de-motivational effects of internally and externally controlling teaching strategies in the domain of PE.

Participants: A total of 925 students with an average age of 15.80 years (± 1.99) coming out of 92 classes taught by 22 different PE teachers participated in the present study.

Data analysis: Data on perceived controlling teaching style and students' motivation were analyzed within a multilevel framework from both a variable-centered (regression analyses) and person-centered approach (cluster analyses).

Results: We found evidence for a distinction between perceived internally and externally controlling teaching. Both teaching styles were strongly related to each other ($r = .54$). At the level of zero-order correlations, both internally and externally controlling teaching related negatively to students' intrinsic motivation and identified regulation and related positively to introjected regulation, external regulation, and amotivation. However, when both teaching styles were included simultaneously as predictors of motivation in the regression analyses, only internally controlling teaching predicted poor quality and low quantity of motivation. A cluster analysis revealed different profiles of perceived controlling teaching style, with two profiles being characterized by either high or low levels of the two types of controlling teaching and other profiles displaying elevated or reduced levels of one of the types of controlling teaching. This person-centered analysis confirmed that particularly students who perceive their PE teacher as internally controlling are likely to report poor-quality motivation.

Conclusion: Controlling teaching (and internally controlling teaching in particular) is related to maladaptive motivational outcomes. As such, it can be advised to PE-practitioners to refrain from using controlling strategies when teaching students. More

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research is needed to identify the conditions under which teachers' behavior is perceived as externally and/or internally controlling.

Keywords: Self-Determination Theory; person-centered approach; teaching style; controlling; motivation; physical education

Introduction

Teachers vary substantially in the way they teach their classes. Sometimes teachers are open for students' perspective, encourage students' initiative, and are able to provide choices to the students, while at other moments teachers tend to adhere to their own agenda and pressure students to think, act, or feel in particular ways (Deci et al. 1994; Reeve 2009). Whereas in the former situation teachers rely on autonomy-supportive teaching practices, in the latter situation they rely on more controlling strategies. According to Self-Determination Theory (SDT; Deci and Ryan 2000), a well-validated macro-theory on human motivation, autonomy-supportive teaching nurtures students' basic psychological needs for autonomy (i.e. experience of volition), competence (i.e. experience of effectiveness), and relatedness (i.e. experience of closeness). This teaching style is related to students' autonomous functioning (Reeve 2009). In contrast, a controlling teaching actively thwarts students' basic needs and leads to need frustration and maladaptive outcomes (Vansteenkiste and Ryan 2013).

The effects of controlling teaching are said to be more detrimental than effects of a lack of autonomy support (Vansteenkiste and Ryan 2013). Thus, it has been argued (e.g. Vansteenkiste and Ryan 2013) and shown in several studies across a variety of domains (e.g. sport, physical education (PE), and work) that the presence of a controlling style is related specifically to maladaptive emotional and psychological outcomes, including negative affect, (Bartholomew et al. 2011), stress (Vansteenkiste et al. 2005b), and work–family-life conflicts (Stebbins et al. 2012). In the context of PE, Haerens et al. (2015) demonstrated that besides the existence of a bright pathway, with autonomy-supportive teaching predicting optimal student outcomes through need satisfaction, there is evidence for a dark pathway with controlling teaching predicting maladaptive outcomes such as need frustration and oppositional defiance.

The finding that controlling teaching has unique predictive value for maladaptive student outcomes is not only theoretically important but also relevant for practice. Specifically, this finding suggests that teachers need to be made aware of the detrimental outcomes associated with a controlling style. However, to inform teachers about the risks associated with using a controlling style, we need to gain more detailed insights into the nature and different manifestations of controlling teaching.

The relative lack of explicit attention devoted to the theme of controlling teaching in the context of PE is surprising because most PE teachers rely predominantly on more teacher-centered approaches (Curtner-Smith, Hasty, and Kerr 2001; Kulinna and Cothran 2003; Mawer 1999; Mosston and Ashworth 1990, 2002; Penney and Evans 1999). Although student-centered styles are gradually included in the teaching repertoire of physical educators (Byra and Jenkins 2000), many teachers still make the maximum number of decisions (e.g. on learning content, pace, and rhythm) and allow only minimal involvement of the students in decisions. The PE teacher typically selects and demonstrates the exercises, after which commands, directions, and cues are provided to guide the students through the exercises. Such a teacher-centered communication style has been found to yield motor learning effects, but has also been found to relate to less enjoyment among students (Boyce 1992; Hancock, Bray, and Nason 2002). Although a teacher-centered climate does not necessarily

involve that teachers interact with their students in a controlling manner, such an approach might increase the likelihood of teachers relying on controlling practices when compared to a more student-centered climate. Thus, it seemed important to examine the manifestations and outcomes of controlling teaching in greater detail in the context of PE. Specifically, the aim of the present study was to examine the relevance of a distinction between two different faces of controlling teaching, that is, internally controlling and externally controlling teaching.

Internally and externally controlling teaching behavior

According to SDT, a controlling style can be expressed in at least two different ways, that is, in an internally controlling way and in an externally controlling way (Ryan 1982; Soenens and Vansteenkiste 2010). Internally controlling strategies are intended to get students to pressure themselves by appealing to their feelings of guilt, shame, anxiety, or self-worth. Externally controlling strategies are aimed at coercing and controlling students with external contingencies, such as directives, deadlines, incentives, and (threats of) punishments. Whereas externally controlling strategies are often relatively visible and overt (e.g. rewarding, yelling, using controlling language, like you ‘should’ or you ‘must’), this will not necessarily be the case for internally controlling strategies. To illustrate, when a PE teacher obliges students to do push-ups because they are misbehaving (i.e. an externally controlling strategy), the contingency between students’ behavior and the punishment is obvious. However, when students misbehave, a teacher can also punish in a more covert and subtle way, for instance, through the facial display of disappointment or through the withdrawal of attention. Still, internally controlling strategies can also be displayed in an open and overt way, for instance when the teacher verbally expresses his/her disappointment with the behavior of the students.

There has not been systematic empirical research into the conceptual distinction between internally and externally controlling teaching. Most studies on controlling teaching have either measured controlling teaching in an undifferentiated way (e.g. De Meyer et al. 2014) or have focused on one particular feature of controlling teaching (e.g. Soenens et al. 2012). There is relatively more research on internally (Assor, Roth, and Deci 2004; Barber 1996) or externally (e.g. Gershoff 2013) controlling strategies in the literature on parenting. While internally controlling parenting has been found to be primarily predictive of internalizing problems in children such as depression and anxiety (Barber 1996), externally controlling parental strategies (such as physical punishment and verbal hostility) are robust predictors of externalizing problems such as aggression and delinquency (e.g. Gershoff et al. 2012).

More recently there is growing interest in the dynamics of controlling strategies in sports (Bartholomew, Ntoumanis, and Thøgersen-Ntoumani 2010; Bartholomew et al. 2011) and in the educational context (Assor et al. 2005; De Meyer et al. 2014; Haerens et al. 2015; Vansteenkiste et al. 2005a). To the best of our knowledge, however, only a few studies investigated the specific role of internally and externally controlling teaching. Assor et al. (2005) showed that students’ perceptions of externally controlling teaching strategies, such as not letting students work at their preferred pace, were associated with negative emotions and suboptimal forms of motivation. In a series of experimental studies, Vansteenkiste et al. (2005a) showed that, even subtle, implicit, and covert forms of pressure (i.e. internally controlling strategies) have a negative causal impact on early adolescents’ task involvement and achievement. In one of the few studies directly comparing internally and externally controlling teaching instructions, Wijnia et al. (2014) found that

both types of controlling practices undermined students' motivation and performance in problem-based learning to the same degree. Up until today, few studies have addressed the differential effects of internally and externally controlling teaching simultaneously. Hence, their differential associations with student outcomes remain to be examined, particularly in the context of PE. In this study, we examined associations between both types of perceived controlling teaching and students' motives for PE.

Perceived types of controlling teaching and students' motivation for PE

SDT conceptualizes motivation in terms of its quality, ranging from optimal motivation (i.e. intrinsic motivation and identified regulation), over introjected and external regulation, to a lack of motivation (amotivation) (Deci and Ryan 2000). Intrinsic motivation occurs when students engage in an activity for the sake of the enjoyment and challenge experienced in the activity itself. Identified motivation refers to students' understanding and personal endorsement of the value of an activity. In both cases, students experience a sense of volition and psychological freedom. In the case of introjected regulation, students act out of internal pressures, such as the avoidance of guilt, shame, or anxiety or attempts to bolster their self-worth. In the case of external regulation, students act because they feel pressured from the outside, such as by a desire to obtain rewards, to avoid punishments, or to meet external obligations. Although introjected and external regulation bring feelings of pressure and tension, they involve a certain goal-directedness and intentionality. This is not the case with amotivation, an orientation where people do not see any reason to act in a particular way. Amotivated students lack intentionality because they do not value the activity or because they do not feel able to do it (Deci and Ryan 2000).

Student motivation is of major importance in PE because it predicts important student outcomes (Van den Berghe et al. 2014). Autonomous motivation is related positively to concentration (Standage, Duda, and Ntoumanis 2005), vitality (Mouratidis et al. 2011), objectively recorded physical activity (Aelterman et al. 2012), and performance (Vansteenkiste et al. 2004). In contrast, controlled motivation and amotivation are either unrelated to these desirable outcomes or positively related to maladaptive student outcomes, such as boredom (Ntoumanis 2001) and unhappiness (Standage, Duda, and Pensgaard 2005).

According to SDT, the style used by teachers during interactions with students is one particular source of influence on students' quality of motivation (Reeve 2009). While an autonomy-supportive teaching style is said to foster autonomous motivation, a controlling teaching style would elicit controlled motivation and amotivation. Several studies in the context of PE have confirmed these hypotheses (e.g. De Meyer et al. 2014; Haerens et al. 2015; Standage, Duda, and Ntoumanis 2005). It has been argued that externally controlling socialization would be particularly predictive of amotivation and external regulation (Soenens and Vansteenkiste 2010). Exposed to externally controlling teaching practices, students would feel pressured from without (external regulation) and may even develop a helpless orientation towards the learning activity (amotivation). In contrast, an internally controlling style would be particularly predictive of external regulation and introjection. Because internally controlling teaching initially still represents a source of pressure from the outside, it would elicit external regulation (much like externally controlling teaching). At the same time it would appeal to internally pressuring feelings in students' own functioning (e.g. guilt and self-worth concerns), thereby eliciting introjected motivation. Theoretically, internally controlling teaching would not necessarily lead to amotivation because it would lead to at least a partial (yet conflicted) internalization of the teacher's instructions and standards (Assor, Roth, and Deci 2004).

The present study

The overall aim of the present study was to obtain more fine-grained insight in different manifestations of controlling teaching in relation to students' motivation for PE. A first aim was to examine, using both expert ratings and factor analysis on student ratings of perceived controlling teaching, whether internally and externally controlling teaching represent distinct dimensions. Second, we aimed to investigate whether internally and externally controlling teaching would relate differentially to students' quality of motivation for PE. We hypothesized that both internally and externally controlling teaching would be related negatively to autonomous forms of motivation (i.e. intrinsic motivation and identified regulation) and positively to external regulation. We also anticipated a number of differential associations. While externally controlling teaching would be related uniquely to amotivation, internally controlling teaching would be related uniquely to introjected regulation.

Third, as teachers can display unique combinations of (controlling) practices, we aimed to further examine the relevance of the distinction between internally and externally controlling teaching using a person-centered approach, that is, by means of a cluster analysis. Cluster analysis allows one to examine how perceptions of internally and externally controlling teaching co-occur within individual students. If the distinction between both types of controlling teaching is valid and relevant, we would find evidence not only for profiles characterized by similar levels of both types of control (e.g. students perceiving low levels of both types of controlling teaching and students perceiving high levels of both types of controlling teaching) but also for profiles characterized rather uniquely by one particular type of control (e.g. students perceiving elevated levels of externally controlling teaching but not internally controlling teaching or vice versa). Having identified different profiles of perceived controlling teaching, we also aimed to examine between-profile differences in students' motivation for PE. We generally expected that these between-profile differences would confirm the hypothesized differential associations between the two types of controlling teaching and the motives for PE.

Method

Participants

Participants were 925 students (57% were males) out of 92 classes in 5 different secondary schools in Flanders. A total of 19 different PE teachers taught PE to these students (ranging from 1 to 8 classes per PE teacher). Students were on average 15.80 years old ($SD = 1.99$ ranging from 12 to 21 years), with 43% following an academic track, 19% being enrolled in a technical track, and 38% following a vocational track. The distribution of students across the school years was as follows: 7th-grade students ($n = 69$, 7%), 8th-grade students ($n = 166$, 18%), 9th-grade students ($n = 158$, 17%), 10th-grade students ($n = 192$, 21%), 11th-grade students ($n = 173$, 19%), 12th-grade students ($n = 106$, 11%), and 13th-grade students ($n = 61$, 7%).

Procedure

Data collection took place in school during a 50-minute academic class. Questionnaires were administered in paper-and-pencil format. Prior to the research, parents received a letter explaining the purpose of the study and were provided with the possibility not to let their child participate in the study (passive informed consent). The study protocol was approved by the Ethical Committee of Ghent University.

Measures

All items in the questionnaires were rated on a 5-point Likert scale ranging from 1 (*not at all true for me*) to 5 (*very true for me*).

Controlling teaching

To assess students' perceptions of controlling teaching, we developed a scale containing six items for internally controlling teaching and six items for externally controlling teaching. Items were based on the 7-item Psychologically Controlling Teaching scale (Soenens et al. 2012) and a previously developed and validated observation instrument on controlling teaching (Van den Berghe et al. 2013). Information about the internal structure and psychometrics of this measure will be provided in the Results section.

Student motivation

Students' motivation toward PE was measured by means of the Behavioral Regulations in Physical Education Questionnaire (BRPEQ; Aelterman et al. 2012). This questionnaire has five subscales representing the motives proposed by SDT, each being assessed with four items. After an introduction in which it was explained that the questionnaire aimed at gaining insight into motives for participating in secondary school PE, students were presented 20 items representing intrinsic motivation and identified regulation (i.e. autonomous motivation), introjected and external regulation (i.e. controlled motivation), and amotivation. Internal consistencies were moderate to good with Cronbach's alphas of .92 for intrinsic motivation (4 items; e.g. 'I put effort in PE because PE is fun'), .86 for identified regulation (4 items; e.g. 'I put effort in PE because I value the benefits of PE'), .61 for introjected regulation (4 items; e.g. 'I put effort in PE because I would feel guilty if I didn't'), .66 for external regulation (4 items; e.g. 'I put effort in PE because others put me under pressure'), and .87, for amotivation (4 items; e.g. 'I think PE is a waste of time'). A confirmatory factor analysis using Mplus software (Muthén and Muthén 2012) was used to test the structure of the 20 items from the BRPEQ. Estimation of a five-factor model yielded fit indices that approached criteria for adequate fit [$\chi^2(160) = 494.10, p < .001, CFI = .95, RMSEA = .05, SRMR = .08$].

Plan of analysis

Aim 1: expert ratings and factorial validity

Expert rating. As a first way to validate the distinction between two types of controlling teaching, 15 experts in SDT judged the degree to which each of the 12 items for controlling teaching represented internally or externally controlling teaching behaviors. They first received a theoretical definition of the concepts of internally and externally controlling teaching (see the appendix) and were then asked to rate the degree to which the 12 items fit the definition of both concepts on a scale ranging from 1 (*totally not agree*) to 5 (*totally agree*). In addition to these continuous ratings, the content coders were asked to categorize each item into one of three categories: internally controlling, externally controlling, or unclear (undecided).

Confirmatory factor analysis. A confirmatory factor analysis using Mplus software (Muthén and Muthén 2012) was used to test the structure of the remaining items.

Descriptive statistics. Paired samples *t*-tests were used to investigate whether students perceived their teachers as more internally or more externally controlling. Furthermore, an independent samples *t*-test was conducted to explore differences between boys and girls in perceived internally controlling, externally controlling, and motivation. Finally, correlations between the variables of interest were computed.

Aim 2: dimensional approach

Given the nested structure of the data, we relied on multilevel analyses to examine the relation between perceived controlling teaching (i.e. internally and externally controlling) and students' motivation. In our data the hierarchical structure was not fully known because we did not have data on the class membership and teachers of 157 students of one school. For those cases (i.e. students) where information about the class level was lacking (i.e. it was not known which class they were in), we kept the class-level part of the model empty. The remaining 768 students were nested within 70 different classes and 19 different PE teachers from four different schools. Because it is ideal to have at least 30 units at each level (Hox 2010) and because a three-level model did not yield a better fit than a two-level model for most of the outcome variables, the data were conceptualized as a two-level model with students at Level 1 and classes at Level 2. Student age and gender were included as covariates at Level 1 and educational track was included as a covariate at Level 2. All quantitative explanatory variables were grand mean centered before entered into the predictor models.

All multilevel analyses were performed with MLwiN, version 2.31. First, we estimated variance components models (Rasbash et al. 2009) or intercept-only models (Hox 2010) to determine how much of the variation in students' motivation was situated at the student versus class level. This was done by calculating intraclass correlation coefficients (ICCs). The intercept-only model served as a baseline (i.e. null model) to compare subsequent more complex models with. In a next step, the three covariates (i.e. age, gender, and educational track) were included in the models. In the final step, both perceived internally and externally controlling teaching were entered simultaneously in the models as predictors of each of the student outcomes.

Aim 3: person-centered approach

Cluster analyses. To explore how students perceived the co-occurrence of internally and externally controlling teaching, cluster analyses were used to generate profiles of these teaching dimensions. The analysis required two steps, thereby using a combination of hierarchical and nonhierarchical clustering methods (Gore 2000). In the first step, a hierarchical cluster analysis was carried out using Ward's method based on squared Euclidean distances. Univariate outliers (values of more than 3SD above or below the mean) and multivariate outliers (individuals with high Mahalanobis values) were removed. The appropriate number of clusters was selected on the basis of the amount of variance that was explained by the clusters and the stepsize criterion (Milligan and Cooper 1985). In the second step, nonhierarchical k-means clustering was used to form the final groups. To examine stability of cluster solutions, the sample was randomly split into halves and the full two-step procedure (Ward, followed by k-means) was then applied to each half. The participants in each half of the sample were assigned

to new clusters on the basis of their Euclidean distances to the cluster centers of the other half of the sample. These new clusters were then compared for agreement with the original cluster solution by means of Cohen's kappa (K). The two resulting kappas were averaged, and an agreement of at least 0.60 was considered acceptable (Asendorpf et al. 2001).

Relations between cluster membership and outcomes. To explore the external validity of the retained cluster solution, we investigated whether the identified profiles yielded different scores on students' motivation. To this, we performed multilevel regression analyses by adding cluster membership as a predictor for each of the types of motivation in separate models. For each outcome (i.e. type of motivation), the regression equation was repeated five times (for the five clusters) by changing the reference category from the cluster membership, to obtain the different cluster means of students' motivation.

Results

Aim 1: expert ratings and factorial validity

Expert ratings

Table 1 shows the findings of the expert evaluation. Most items were rated clearly as representing one of the two concepts and could be classified clearly into the categories representing externally or internally controlling teaching. Specifically, 11 items were classified as supposed by at least 80% of the coders. Only one of the items ('Acts strictly when I disappoint him/her') was classified neither as internally controlling nor as externally controlling.

Confirmatory factor analysis

Initial estimation of a 2-factor model on the 11 remaining items yielded fit indices that approached criteria for adequate fit [$\chi^2(43) = 216.67, p < .001, CFI = .90, RMSEA = .07, SRMR = .05$]. Modification indices suggested removing two items. After removing these two additional items (i.e. 'My teacher is less friendly with me when I do not do the things his/her way' and 'My teacher punishes me'), a good model fit was established [$\chi^2(26) = 94.77, p < .001, CFI = .95, RMSEA = .05, SRMR = .04$], with four items representing internally controlling teaching and with five items representing externally controlling teaching. Internal consistencies for externally controlling and internally controlling teaching based on these nine remaining items (Cronbach's alpha were .78 and .71, respectively) were adequate.¹

Descriptive statistics

Correlations, descriptive statistics, and gender differences among the study variables are presented in Table 2. Students were found to perceive less internally controlling teaching ($M = 1.43 \pm .59$) compared to externally controlling teaching ($M = 2.09 \pm .94; t(924) = -25.09; p < .001$). The observed scores for both internally controlling (ranging between 1 and 3.5) and externally controlling teaching (ranging between 1 and 5) were positively skewed. They showed skewness values of 1.56 and 0.79, respectively. Furthermore, both types of perceived controlling teaching were positively related to each other ($r = .54, p < .001$). Boys reported higher levels of internally controlling teaching than girls. Boys also

Table 1. Expert evaluation of internally and externally controlling items.

Item	Internally controlling	Externally controlling	Expert assessment (number of experts)		
	Mean (SD)	Mean (SD)	Internal controlling	External controlling	Undecided
<i>Externally controlling teaching</i>					
My PE teacher ...					
1. Punishes me	1.53 (.83)	4.47 (1.13)	0	14	1
2. Threatens to give bad grades when I do not cooperate	1.40 (.63)	4.80 (.78)	0	15	–
3. Counts down aloud to make sure that I persist	1.87 (.92)	4.13 (1.13)	2	13	–
4. Threatens with sanctions when I am not doing what (s)he tells me to do	1.40 (.91)	4.73 (1.03)	0	15	–
5. Threatens that we will not do any fun activities when I do not cooperate	1.67 (.82)	4.67 (.49)	1	14	–
6. Yells when I am not doing what (s)he wants me to do	2.13 (.92)	3.47 (1.25)	3	12	–
<i>Internally controlling teaching</i>					
My PE teacher ...					
7. Is less friendly with me when I do not do the things his/her way	3.93 (1.39)	2.27 (1.22)	13	2	–
8. Pays less attention to me when I disappoint him/her	4.13 (1.41)	2.00 (1.46)	13	2	–
9. Makes me feel guilty when I disappoint him/her	4.87 (.35)	1.20 (.41)	15	0	–
10. Often shows that (s)he is disappointed in me	4.93 (.26)	1.33 (.49)	15	0	–
11. Acts strictly when I disappoint him/her	2.60 (.99)	3.67 (.90)	5	9	1
12. Shows that (s)he is personally hurt when I do not meet his/her expectations	4.87 (.35)	1.33 (.62)	15	0	–

reported more intrinsic motivation, more identified regulation, and less amotivation than girls. Students' age was related only to intrinsic motivation and amotivation.

Perceived internally and externally controlling teaching related negatively to autonomous motivation (i.e. intrinsic motivation and identified regulation) and positively to controlled motivation (i.e. introjected and external regulation) and amotivation. All relationships were significant and were in the expected direction. The associations were systematically stronger for perceived internally controlling (ranging between $-.25$ and $.37$) than for perceived externally controlling teaching (ranging between $-.14$ and $.21$).

Table 2. Correlations, means, and standard deviations for study variables.

Variables	1	2	3	4	5	6	7	Total ($n = 925$)	Boys ($n = 526$)	Girls ($n = 399$)	t -value
1. Internally controlling								1.43 (.59)	1.47 (.63)	1.37 (.51)	2.56*
2. Externally controlling	.54***							2.09 (.94)	2.11 (.98)	2.07 (.90)	.65
3. Intrinsic motivation	-.25***	-.14***						3.78 (1.12)	4.02 (1.04)	3.47 (1.12)	7.70**
4. Identified regulation	-.17***	-.12***	.69***					3.57 (1.11)	3.72 (1.08)	3.39 (1.12)	4.50**
5. Introjected Regulation	.27***	.09**	.02	.17***				1.90 (.78)	1.94 (.79)	1.86 (.77)	1.60
6. External regulation	.37***	.17***	-.23***	-.11***	.51***			1.75 (.76)	1.79 (.79)	1.69 (.70)	1.87
7. Amotivation	.32***	.21***	-.71***	-.63***	.09***	.37***		1.79 (.99)	1.68 (.93)	1.92 (1.03)	-3.65**
8. Age	.01	.00	-.18***	-.06	-.06	.00	.10**	15.77 (1.98)	15.71 (2.02)	15.85 (1.92)	

* $p < .05$.** $p < .01$.*** $p < .001$.

Aim 2: dimensional approach*Regression analyses*

We first estimated the ICCs in the baseline variance component models for perceived controlling teaching and students' motivation. These estimates indicated that there was significant between-class-level variance for perceived internally and externally controlling teaching, with ICCs of 14% ($\chi^2 = 13.73$, $df = 1$, $p < .001$), and 27% ($\chi^2 = 21.20$, $df = 1$, $p < .001$), respectively. Note that the class-level variance for internally controlling teaching was somewhat lower than the class-level variance for externally controlling teaching. Next, the ICCs in the baseline variance component models for students' types of motivation indicated that introjected regulation and intrinsic motivation yielded significant between-class variance, with an ICC of 10% ($\chi^2 = 9.548$, $df = 1$, $p = .002$) and 5% ($\chi^2 = 4.52$, $df = 1$, $p = .03$), respectively. For amotivation, external regulation, and identified regulation, the ICCs were non-significant with values of 0% ($\chi^2 = 0.00$, $df = 1$, $p = 1.00$), 3% ($\chi^2 = 2.64$, $df = 1$, $p = .10$), 4% ($\chi^2 = 2.74$, $df = 1$, $p = .10$), respectively.

The results of the multilevel regression analyses are presented in [Table 3](#). After including the three covariates (i.e. students' age, gender, and educational track) in Model 1, we added perceived internally and externally controlling teaching as predictors in the model (Model2). Internally controlling teaching related negatively to intrinsic motivation, identified regulation and related positively to introjected regulation, external regulation, and amotivation. Surprisingly, externally controlling was no longer related to any type of motivation when controlling for internally controlling teaching.

Aim 3: person-centered approach*Cluster analyses*

Prior to conducting cluster analyses, we removed 26 univariate outliers and 30 multivariate outliers. This resulted in a total sample of 869 participants. The number of clusters was selected on the basis of a number of criteria. First, we looked at how much variance the clusters explain in internally and externally controlling teaching, using as a criterion that at least 50% of the variance needs to be explained (Milligan and Cooper 1985). This criterion was met from the three-cluster solution onwards. We then checked how much additional variance was explained when retaining more clusters. The four-cluster solution clearly explained additional variance (74% for internally and 74% for externally controlling teaching) compared to the three-cluster solution (61% for internally and 69% for externally controlling teaching). The five-cluster solution also explained a substantial amount of additional variance (77% for internally and 82% for externally controlling teaching) compared to the four-cluster solution (74% for internally and 74% for externally controlling teaching). A six-cluster solution (which explained 80% of the variance in internally controlling and 85% of the variance in externally controlling) no longer explained a substantial amount of additional variance (< 5%) and seemed theoretically less interpretable and less parsimonious than the five-cluster solution. A second criterion that is commonly used to select the optimal number of clusters is the stepsize criterion. This rather simple criterion involves examining the differences in fusion values between hierarchy levels. A large difference would suggest that the data were overclustered in the last merger (Milligan and Cooper 1985). Thus, the maximum difference is taken as indicating the optimal number of clusters in the data. The differences in fusion values indicated that the transition from four to five clusters was the last transition with a substantial difference in fusion values, suggesting

Table 3. Standardized regression coefficients of internally and externally controlling in the prediction of student motivation.

Parameter	Intrinsic motivation			Identified regulation			Introjected regulation		
	Model 0	Model 1	Model 2	Model 0	Model 1	Model 2	Model 0	Model 1	Model 2
<i>Fixed part</i>									
<i>Intercept</i>	3.91 (.05)	4.02 (.07)	4.02 (.07)	3.68 (.05)	3.89 (.08)	3.88 (.08)	1.91 (.04)	1.92 (.07)	1.92 (.06)
Students' age		-.06 (.02)**	-.06 (.02)**		-.01 (.02)	-.01 (.02)		-.02 (.02)	-.03 (.02)
Students' gender (girl) ^a		-.37 (.08)***	-.40 (.08)***		-.32 (.09)***	-.33 (.09)***		-.02 (.07)	.01 (.07)
Technical track		-.05 (.11)	-.03 (.10)		-.28 (.13)	-.27 (.12)		-.17 (.10)	-.18 (.10)
Vocational track		.17 (.07)	.22 (.09)		-.08 (.08)	-.05 (.11)		.12 (.10)	.09 (.09)
Internally controlling			-.51 (.07)***			-.30 (.08)***			.45 (.05)***
Externally controlling			.11 (.04)			.06 (.05)			-.04 (.04)
<i>Random part</i>									
Class-level variance	.05 (.03)	.01 (.02)	.00 (.00)	.04 (.02)	.04 (.03)	.03 (.02)	.06 (.02)	.05 (.02)	.04 (.02)
Student-level variance	1.00 (.05)	.99 (.05)	.93 (.05)	1.10 (.06)	1.09 (.06)	1.07 (.06)	.56 (.03)	.56 (.03)	.51 (.03)
Deviance test model	2165.416	2071.336	2020.634	2226.384	2159.604	2144.120	1741.102	1689.792	1614.110
χ^2 (df)		94.08 (4) ***	50.70 (2) ***		66.78 (4) ***	15.48 (2) ***		51.31 (4) ***	75.68 (2) ***

Note: Standard deviations are presented in parentheses. All p values have been adjusted by Bonferonni corrections ($\alpha = .05/5$).

** $p < .01$.

*** $p < .001$.

Parameter	External regulation			Amotivation		
	Model 0	Model 1	Model 2	Model 0	Model 1	Model 2
<i>Fixed part</i>						
<i>Intercept</i>	1.73 (.03)	1.69 (.06)	1.70 (.05)	1.65 (.03)	1.59 (.06)	1.59 (.06)
Students' age		-.01 (.02)	-.01 (.01)		.01 (.02)	.00 (.02)
Students' gender (girl) ^a		-.05 (.06)	-.02 (.06)		.13 (.07)	.17 (.07)**
Technical track		.03 (.08)	.01 (.07)		.03 (.09)	.01 (.08)
Vocational track		.16 (.07)	.12 (.07)		.01 (.06)	-.02 (.08)
Internally controlling			.50 (.05)***			.50 (.06)***
Externally controlling			-.03 (.03)			-.02 (.04)
<i>Random part</i>						
Class-level variance	.02 (.01)	.01 (.01)	.00 (.01)	.00 (.00)	.00 (.00)	.00 (.00)
Student-level variance	.53 (.03)	.53 (.03)	.46 (.03)	.74 (.04)	.73 (.04)	.65 (.03)
Deviance test model	1679.762	1623.562	1514.206	1902.985	1844.983	1760.888
χ^2 (df)		56.20 (4) ***	109.36 (2) ***		58.00 (4) ***	84.10 (2) ***

that the five-cluster solution is indeed to be preferred. The stability of the five-cluster solution had a kappa value of .80, indicating good stability (Landis and Koch 1977).

Both the standardized and absolute scores for internally and externally controlling teaching within each of the five profiles are presented in Table 4 (top part). All groups differed significantly from each other on internally and externally controlling. The cluster labels were given based on the *z*-scores, which reflect relative differences between individuals in the sample.

Specifically, the clusters represented (1) a low internally controlling cluster ($n = 224$, 26%), with relatively low scores on internally controlling and average scores on externally controlling; (2) a low controlling cluster ($n = 352$, 40%), with relatively low scores on both internally and externally controlling; (3) a predominantly externally controlling cluster ($n = 110$, 13%), with high scores on externally controlling and average scores for internally controlling teaching; (4) a predominantly internally controlling cluster ($n = 103$, 12%), with only high scores on internally controlling teaching; and (5) a highly controlling cluster ($n = 80$, 9%), with both dimensions scoring relatively high. Figure 1 shows the final cluster solution, with the *Y*-axis representing the standardized scores.

Relations between cluster membership and outcomes

Table 4 shows pairwise comparisons between the clusters in terms of motivation conducted by means of multilevel regression analyses. Students reporting relatively low levels of controlling teaching (Cluster 2) and students in the predominantly externally controlling group

Table 4. Mean scores and cluster comparison for five clusters ($N = 869$).

Variables	Cluster 1: low internally controlling group	Cluster 2: low controlling group	Cluster 3: predominantly externally controlling group	Cluster 4: predominantly internally controlling group	Cluster 5: high controlling group
<i>Cluster dimensions (z-scores)</i>					
Internally controlling	-.40 (.04) ^a	-.61 (.04) ^b	.06 (.06) ^c	1.42 (.05) ^d	1.99 (.06) ^e
Externally controlling	.17 (.04) ^a	-.91 (.03) ^b	1.59 (.05) ^c	-.05 (.05) ^d	1.44 (.06) ^e
<i>Cluster dimensions (raw scores)</i>					
Internally controlling	1.17 (.02) ^a	1.07 (.09) ^b	1.37 (.03) ^c	2.00 (.02) ^d	2.25 (.03) ^e
Externally controlling	2.13 (.03) ^a	1.22 (.03) ^b	3.32 (.04) ^c	1.95 (.04) ^d	3.20 (.05) ^e
<i>Student outcomes</i>					
Intrinsic motivation	4.00 (.09) ^{a,b}	4.17 (.08) ^a	4.27 (.13) ^a	3.62 (.12) ^c	3.69 (.14) ^{b,c}
Identified regulation	3.90 (.11) ^a	3.91 (.10) ^a	4.03 (.14) ^a	3.72 (.13) ^a	3.69 (.16) ^a
Introjected regulation	1.75 (.08) ^{a,b}	1.72 (.07) ^a	2.00 (.10) ^{b,c}	2.31 (.10) ^d	2.26 (.11) ^{c,d}
External regulation	1.61 (.07) ^{a,b}	1.48 (.06) ^b	1.72 (.09) ^a	2.13 (.08) ^c	2.10 (.10) ^c
Amotivation	1.53 (.08) ^a	1.42 (.07) ^a	1.47 (.10) ^a	1.88 (.10) ^b	2.02 (.12) ^b

Notes: Values in parentheses are standard errors. A cluster mean is significantly different from another mean if they have different superscript letters. For the cluster dimensions, *p* values were evaluated at .05-level. The *p* values for student motivation have been adjusted by Bonferonni corrections ($\alpha = .05/5$). Differences between five clusters were tested by repeating the equations several times and changing the reference category.

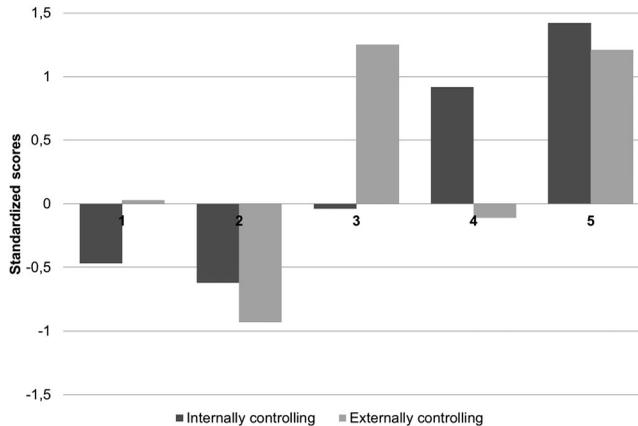


Figure 1. Cluster solution based on scores for internally and externally controlling teaching.

(Cluster 3) reported the highest levels of intrinsic motivation. More specifically, students in the predominantly externally controlling group (Cluster 3) were more intrinsically motivated when compared to all other groups, except when compared to the low controlling cluster (Cluster 2). With regard to identified regulation, none of the groups differed from each other significantly.

With regard to introjected regulation, students in the predominantly internally controlling cluster (Cluster 4) and the high controlling cluster (Cluster 5) reported the highest levels. The low internally controlling group (Cluster 1) and the low controlling group (Cluster 2) reported the lowest level of introjected regulation. A similar pattern was found for external regulation, with the predominantly internally controlling cluster (Cluster 4) and the highly controlling cluster (Cluster 5) reporting the highest levels of external regulation. Students in the low controlling group (Cluster 2) reported the lowest level of external regulation. The highest levels of amotivation were reported by the students in the highly controlling cluster (Cluster 5), which significantly differed from all other clusters but not from the predominantly internally controlling cluster (Cluster 4).

Discussion

Up until today, few studies on PE teachers' way of interacting with the students focused on controlling teaching as such, that is, without considering it simply as the opposite of autonomy support. Recent theorizing within SDT (Vansteenkiste and Ryan 2013), however, suggests that it is important to study controlling teaching in its own right. In addition, empirical work revealed separate and unique effects of controlling teaching in relation to important student outcomes, including negative emotions (Assor et al. 2005), oppositional defiance (Haerens et al. 2015), low quality motivation (De Meyer et al. 2014), and low task involvement and achievement (Vansteenkiste et al. 2005a). However, in previous studies, controlling teaching was measured either in an undifferentiated way (not clearly distinguishing between internally and externally controlling strategies), or focusing on one of both features of controlling teaching.

This study provided evidence that controlling teaching has different faces. Specifically, we provided three types of evidence for the relevance of the distinction between internally and externally controlling teaching. First, the large majority of content coders agreed on

the assignment of 11 of the 12 controlling items to either the internally or the externally controlling category. Second, also on the basis of a factor analysis internally and externally controlling teaching were clearly distinguished. Finally, making use of cluster analyses, we found evidence not only for profiles characterized by similar levels of both types of controlling teaching but also for profiles characterized rather uniquely by one particular type of controlling, which means that internally and externally controlling teaching can occur separately.

A comparison of the mean levels of both types of controlling teaching showed that, when teachers pressure students, they rely predominantly on overt and observable tactics, such as threats and punishments for not fulfilling teachers' expectations. A possible explanation for the relatively high occurrence of externally controlling strategies might be that a teacher-centered approach is widely prevalent among PE teachers (Curtner-Smith, Hasty, and Kerr 2001; Kulinna and Cothran 2003; Mawer 1999; Mosston and Ashworth 1990, 2002; Penney and Evans 1999). Such a teacher-centered approach involves a commanding and directive style, which sometimes may be experienced as externally controlling by students. While teachers were perceived to engage relatively more frequently in externally controlling strategies, it seems that they make little use of internally controlling strategies. A possible reason might be that the use of internally controlling depends relatively less on contextual factors (e.g. lesson goals and content, safety issues, etc.), but instead is more related to personal characteristics of the teachers. For instance, while shouting and yelling may be elicited by situational features such as safety hazards, the inclination to induce guilt and to display disappointment might be intertwined more closely with a teacher's personality functioning. Beausaert et al. (2009), for instance, demonstrated that the use of an internally controlling teaching style was predicted by teachers' self-critical perfectionism.

Although internally and externally controlling strategies were quite strongly positively associated with each other, the relationship between controlling teaching and students' motivation was driven mainly by internally controlling aspects of teaching. The findings with regard to internally controlling teaching are in line with the findings previously reported in the parenting domain, where internally controlling strategies such as contingent regard provided by the parents were also associated with higher levels of introjected regulation (Assor, Roth, and Deci 2004). We extended these findings to the physical educational domain and provided evidence that students' perceptions of internally controlling teaching were related not only to higher levels of introjected regulation, but also to higher levels of external regulation and lower levels of identified regulation and intrinsic motivation. In other words, even when students perceive their teachers as making use of sometimes covert forms of controlling strategies, they will be more likely to act for controlling reasons (e.g. avoiding punishments or feeling of shame) or will lack intentionality to engage (i.e. amotivation) instead of engaging out of interest or because they see the utility of the activity. Remarkably, these associations were obtained even though the occurrence of internally controlling teaching behavior was quite low. Such low levels of controlling socialization are quite common in research on teaching (De Meyer et al. 2014; Haerens et al. 2015) and parenting (Barber 1996). In spite of the low prevalence of a controlling socialization style, it robustly related with maladaptive outcomes (e.g. Barber 1996; Roth et al. 2009). These findings are consistent with a general principle in social psychology, referred to by Baumeister et al. (2001) as the phenomenon that 'bad is stronger than good.' Because bad events, including need-thwarting and controlling teaching, are typically very salient when they occur, even a sporadic exposure to controlling teaching may provoke detrimental effects (Kins, Soenens, and Beyers 2012). Externally controlling teaching was related in the same way to the motivational outcomes at the level of zero-order correlations, but did no longer predict any of the motivational outcomes when we controlled for students'

perceptions of internally controlling teaching. Similarly, in the person-centered analyses, we found that associations between perceived teaching profiles and the motivational outcomes were driven mainly by internally controlling teaching and to a lesser extent by externally controlling teaching. Another unexpected result was that students in the predominantly externally controlling cluster even reported the highest levels of intrinsic motivation.

Herein we forward some possible explanations for these unexpected results. First, internally controlling teaching (relative to externally controlling teaching) was reported less commonly and might therefore be less normative in PE, which might explain why it is more detrimental to students' motivation. Gershoff et al. (2010) indeed demonstrated that some discipline techniques (e.g. corporal punishment, yelling) are less strongly associated with maladaptive outcomes when these techniques were perceived as normative by children. Second, compared to internally controlling strategies, externally controlling strategies such as yelling or counting down (e.g. 'You have five seconds to be back, five, four, three, etc.') may be provided more often towards the class as a whole and not to a single student. Internally controlling strategies such as paying less attention or being less friendly are perhaps more commonly directed towards individual students, such that these strategies have a stronger impact on students' motivation, because students feel personally rejected or disapproved by the teacher. Third, students may interpret externally controlling strategies in a relatively more benign manner. Some students may even feel that teachers relying on externally controlling strategies, at least in the absence of internally controlling strategies, are more involved because they put a lot of energy into the lesson and are committed to the students and their learning process. To illustrate, some students might perceive a punishment in case of lack of student cooperation, as an effort of the teacher to keep the coherence and focus of the group. It could also be that students sometimes find these strategies warranted for instance when the teachers aims to encourage performance (e.g. synchronic dancing) or when security issues are at stake (e.g. children learning to swim). In some cases, for instance with the acquisition of basic skills, there is evidence that a teacher-centered approach (which can involve externally controlling practices) is superior to a student-centered approach (Graham and Heimerer 1981). In those particular circumstances, some of the externally controlling strategies such as yelling (e.g. 'You are slowing down, you need to speed up! Come on, keep going!') may even be interpreted as stimulating and encouraging rather than as need frustrating. The same externally controlling strategies (e.g. yelling) could then be perceived somewhat differently in other contexts, for instance in an academic class.

Together, these explanations for the lack of associations between externally controlling teaching with motivational problems (after taking into account internally controlling teaching) point to an important role for students' appraisal and interpretation of teachers' controlling practices (Soenens, Vansteenkiste, and Van Petegem 2015). An important goal for future research is to examine (a) when actual teachers' behavior is perceived as being (externally and/or internally) controlling and (b) how students interpret both types of perceived controlling teaching (e.g. in terms of normativeness, legitimacy, and experiences of need satisfaction and need frustration). Students' personal characteristics (e.g. personality and past motivational experiences) are likely to play a role in these processes that give meaning to teachers' behavior. Given that in our study the individual-level variance was more pronounced in internally compared to externally controlling teaching, it seems likely that personal characteristics play a particularly prominent role in students' perception of internally controlling teaching strategies. Such research can help us to obtain a better understanding of the gap between students' perceptions of a teachers' behavior, and actual teaching behavior. It can also highlight students' active role in constructing perceptions of teaching behavior and dealing with need-thwarting events in particular.

Limitations and directions for future research

A limitation of the present study was the cross-sectional design, which prevented us from drawing conclusions about direction of effects, let alone causality. The direction of the relationships warrants further investigation through longitudinal studies.

Moreover, students' perceptions of teaching behavior might be colored by their motivation or it might be that students' motivation influences teachers' behavior rather than vice versa. In that respect, future research would do well to include an assessment of actual teaching behavior by external observers or reported by the teachers themselves.

In future research it would also be interesting to investigate underlying mechanisms that explain the differential relationships between externally and internally controlling teaching and students' motivation. The inclusion of an assessment of need frustration and need satisfaction would provide such an opportunity. While previous research showed that perceived controlling teaching relates to maladaptive motivational outcomes particularly because students experience more need frustration (Haerens et al. 2015), no distinction has been made between externally and internally controlling teaching. With internally controlling teaching, there is a clear message that the teacher rejects the student. This is less the case with externally controlling teaching which, for instance, refers to the teacher punishing a student when not cooperating. If externally and internally controlling teaching differentially relate to need frustration, this might also explain some of the differences found in the current study. In that respect, it might also be interesting to let students evaluate the controlling items in terms of how controlling they are experienced. Such an assessment would provide better insight in how students perceive externally and internally controlling behaviors.

It would also be interesting to investigate what drives teachers to engage in some of the identified internally controlling strategies and whether this also depends on their own characteristics (e.g. maladaptive perfectionism) and contextual factors (e.g. student motivation, accommodation, learning goals, subject matter). Finally, future research would do well to include a measure of teachers' provision of structure. It might be interesting to try to differentiate some of the included controlling strategies from teachers' provision of structure because some strategies such as counting down might be interpreted by the students as the teachers adequately leading the learning process (Soenens, Vansteenkiste, and Van Petegem 2015).

Practical implications

From an applied perspective, it seems important for teachers to avoid using controlling strategies. Our results provided evidence that especially those strategies that are sometimes difficult to observe (e.g. showing feelings of disappointment through facial expressions) because they are expressed in a subtle and covert way, and are related to less optimal forms of motivation. Although externally controlling teaching seems to have relatively less detrimental effects on students' motivation, we suggest teachers also to refrain from these strategies because both types of controlling teaching were quite strongly interrelated, because externally controlling strategies were related to suboptimal motivational outcomes at the level of zero-order correlations, and because studies in other domains have shown the detrimental effects of these strategies (Assor et al. 2005; Gershoff 2013; Gershoff et al. 2012).

Current evidence-based continuous professional development programs are focusing mostly on how teachers can engage and motivate students during their lessons through becoming more autonomy supportive (e.g. Aelterman et al. 2013). The results of the current study suggest that it is equally important to increase teachers' insight in the detrimental effects of controlling teaching.

Conclusion

This study provided some empirical evidence for the conceptual distinction between internally and externally controlling teaching in the context of PE. Because both types of controlling teaching did not display the anticipated differential pattern of associations with motivational outcomes, there is clearly a need for further research into the undoubtedly complex processes involved in teachers' application of these teaching practices and in the way they are appraised by students. Such research is important not only from a theoretical perspective but also for practice because controlling teaching is detrimental for students' motivation for PE and possibly also for their lifelong engagement in physical activity.

Summary

The current study investigated two different faces of controlling teaching in relation to students' motivation within the context of PE. We found evidence for a distinction between internally and externally controlling teaching strategies. When using externally controlling strategies, teachers typically try to pressure students from outside by shouting, punishing, or commanding. Internally controlling teaching might be more difficult to observe. It involves pressuring students in a more subtle way by inducing feelings of guilt and shame, by providing conditional regard, and by showing disappointment when expectations are not met. Both types of controlling teaching were related to maladaptive motivational outcomes in students, with internally controlling yielding the most adverse effects. Students reported teachers to use more externally controlling strategies relative to internally controlling strategies. It can be advised to teachers to refrain from using controlling strategies.

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Note

1. In addition to the CFA, a principal components analysis (with promax rotation) was also performed. Two components had an eigenvalue > 1 , explaining 54.47% of the total variance. The final factorial structure was identical to the one obtained with CFA.

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Appendix. Theoretical definition of the concepts of internally and externally controlling teaching

Definition of internally controlling teaching.

Internally controlling teaching is characteristic of teachers who want to pressure students by appealing to students' self-worth. Their aim is to let students pressure themselves from within. The finality of this style is that students feel obliged from the inside to participate in an activity, for example to avoid feelings of guilt, shame, inferiority, and disappointment or to prove their worth to themselves or to the teacher. The strategies are sometimes subtle and difficult to observe directly because, for example, they are shown in a non-verbal way.

Definition of externally controlling teaching.

Externally controlling teaching is characteristic of teachers who want to pressure students explicitly and from the outside, that is, using strategies external to the individual. The finality of this style is that students feel obliged from the outside to participate in an activity: there are external contingencies that either need to be avoided (punishment and negative consequences) or achieved (deadlines, privileges, and rewards). The strategies used are usually clearly visible to others. If students do not meet the expectations of the teacher, clear tangible consequences will follow.