

Research article

## Relationships between physical education students' motivational profiles, enjoyment, state anxiety, and self-reported physical activity

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### Abstract

The purpose of this study was to analyze motivational profiles based on the self-determination theory (Deci and Ryan, 2000) and how these profiles are related to physical education students' enjoyment, state anxiety, and physical activity. The participants, 429 sixth grade students (girls = 216; boys = 213) completed SMS, Sport Enjoyment Scale, PESAS, and Physical Activity Scale. Cluster analyses identified two motivational profiles: 1) the "High motivation profile", in which the students had high intrinsic and extrinsic motivation, and low levels of amotivation, and 2) the "Low motivation profile", in which the students had low intrinsic and extrinsic motivation, and low levels of amotivation. The students in the first cluster enjoyed physical education more and were physically more active. The results revealed that students may be motivated towards physical education lessons both intrinsically and extrinsically, and still experience enjoyment in physical education.

**Key words:** Self-determination, cluster analysis, motivation, anxiety, behavioural.

### Introduction

Research has shown that participation in school physical education (PE) may affect students' motivation to engage in physical activity because it has the potential to provide both positive and negative experiences for the student population (Hagger et al., 2003; McKenzie, 2007; Pratt et al., 1999). When children and adolescents experience positive outcomes from their involvement in physical activity, they can also be expected to remain involved in physical activity in adulthood (Dishman et al., 2005; Sallis et al., 2000; Telama et al., 2005; Vlachopoulos et al., 1996). Previous findings, however, have indicated that motivation to participate in PE programs declines over the school years (Mowling et al., 2004; Sallis et al., 1992), suggesting a number of students may demonstrate negative perceptions toward school based physical activity. It is important, therefore, for researchers to acquire a clearer understanding of the motivational mechanisms that underlie the positive or negative affective outcomes of PE, such as enjoyment or anxiety.

### Self-determination theory

The complexity of human motivation is also evidenced in the motivational processes involved in the domain of PE. Self-Determination Theory (SDT; Deci and Ryan 1985; 2000) adopts a multidimensional perspective to motivation, proposing and distinguishing between different rea-

sons as to "why" individuals are impelled to act, rather than only viewing intrinsic versus extrinsic motivation as a dichotomy. SDT proposes that behavioural regulation towards an activity can be intrinsically motivated (self-determined), extrinsically motivated (controlled), or amotivated (non-intentional). Intrinsic motivation reflects situations in which individuals perform an activity to experience fun, learn new things, or develop their competence. In contrast, extrinsic motivation is represented in situations in which an individual performs activities with desirable outcomes in mind.

According to SDT, intrinsic and extrinsic motivations fall along the continuum of self-determination. The self-determined end of the continuum is represented by intrinsic motivation, the state that refers to fully regulated behaviours that are performed for the activity's sake with no external contingency (e.g. for personal interest and pleasure). The central area of the continuum constitutes the various forms of extrinsic motivation that vary in their degree of relative autonomy (Deci and Ryan, 2008). Ranging from high to low autonomy, these regulations include integrated regulation, identified regulation, introjected regulation, and external regulation. Integrated regulation refers to activities performed without choice. For example, some students may want to participate actively in PE not because they like it, but because it is perceived as an important part of a healthy lifestyle. These integrated reasons, however, are not normally expressed by children and adolescents, as younger populations may not yet have experienced a sense of integration. This dimension of extrinsic motivation is, therefore, not usually assessed in young children (Vallerand and Fortier, 1998; Vallerand and Rousseau, 2001). Identified regulation occurs when an individual freely chooses to carry out an activity that is not considered to be enjoyable, but is perceived as important. Introjected regulation refers to the incomplete internalization of a regulation that was previously solely external (e.g. the behaviour is performed to avoid feelings of guilt or for ego-enhancement) (Ryan and Deci, 2002). External regulation occurs when an individual engages in behaviours in order to receive a reward or to avoid punishment. The SDT also identifies the state of amotivation, which refers to a lack of intention or the absence of motivation. Therefore the involvement is likely to be disorganised and accompanied by frustration, fear or depressed feelings. Amotivation reflects a lack of motivation where no contingency between actions and outcomes is perceived, and there is no perceived purpose in engaging in the activity (Deci and Ryan, 1985;

Vallerand and Fortier, 1998). When focusing on settings where an activity may not be voluntary (e.g. mandatory PE), some researchers have treated amotivation as a sub-optimal state which falls at the low end of the continuum of relative autonomy (Pelletier et al., 1995).

### The outcomes of motivation

The SDT proposes that intrinsic motivation and autonomous types of extrinsic motivation (identified and integrated regulation) lead to positive cognitive, affective, and behavioural consequences (Deci and Ryan, 1991; 2000). Evidence supporting this proposition has shown that self-determined forms of motivation correlate positively with many desirable responses toward engagement in PE. Previously identified relationships between the motivational categories of the SDT have been reported for physical education outcomes such as high effort (Goudas et al., 1995; Ntoumanis, 2001), increased interest (Goudas et al., 1994), high levels of positive affect (Ntoumanis, 2005), increased enjoyment (Goudas et al., 1995), preference for attempting challenging tasks (Standage et al., 2005), and intention to be physically active in leisure time (Hagger et al., 2003; Ntoumanis, 2001; Standage et al., 2003). Furthermore, non-autonomous forms of motivation in PE have also been shown to be related to negative outcomes, such as boredom and unhappiness (Ntoumanis, 2002; Standage et al., 2005). In addition, a negative link has emerged between amotivation towards physical education and students' intentions to be physically active during their leisure time (Standage et al., 2003). Overall, research guided by the SDT has shown that autonomous motives strongly influence adolescents' attitudes towards physical activity and other desirable motivational indices. In contrast, non-autonomous motivation has been shown to correlate negatively with positive outcomes and to undermine students' adaptive responses. Research to date provides support for the SDT by demonstrating that students benefit from being autonomously motivated in PE (e.g. Deci and Ryan, 2007).

Research has consistently demonstrated that enjoyment represents a key factor underlying the motivation for children and youth to maintain positive engagement in both physical activity and PE (e.g. Prochaska et al., 2003; Wallhead and Buckworth, 2004). Enjoyment is a multi-dimensional construct related to affect, excitement, perceptions of competence, attitude, and cognition (Crocker et al., 1995; Hashim et al., 2008; Wankel, 1997). A state or process of enjoyment within an individual reflects generalized feeling states described in terms such as "enjoy", "happy", "like", and "fun" (Scanlan and Simons, 1992). Enjoyment is perceived as an intrinsic, affective element associated with the motivation to engage in physical activity and physical education (Dishman et al., 2005; Hashim et al., 2008). In relation to school physical education, enjoyment represents a direct and tangible influence on students' participatory behaviour, providing immediate reward for being physically active (Vallerand et al., 1987).

Although physical education lessons are often seen as fun and enjoyable, they may also trigger negative feelings such as anxiety because of their comparative, competitive and evaluative nature (Barkoukis et al., 2005;

Tremayne, 1995). The normative evaluation demands may create worries within individual students regarding their level of competence relative to their peers (Roberts, 1984; Tsang, 2007). For example, a failure on performing a difficult task in front of the teacher and other classmates may raise negative affective responses. Anxiety in physical education classes can be manifested through cognitive (e.g. negative thoughts), bodily (e.g. alteration in muscle tension), and information processing (e.g. worry and attention disruption) symptoms (Barkoukis et al., 2005). Furthermore, Pérès et al. (2002) proposed that anxiety may serve as a motivational agent in relation to performance in physical education and sport.

### Methodological issues and previous studies

Several studies have raised questions regarding the hypothesized pattern of relationships of the SDT motivational continuum (Boichè et al., 2008; Cokley, 2000; Fairchild et al., 2005; Pelletier and Sarrazin, 2007). Typically, previous researchers have combined different subscales of the motivation continuum into an overall relative autonomy index (RAI) or self-determination index (SDI) (e.g. Blais et al., 1990; Vallerand et al., 1997; Vallerand and Losier, 1994). These indexes rely on an interactional hypothesis (Vallerand and Fortier, 1998), according to which intrinsic and extrinsic motivations are not independent constructs. These indices support a simplex model of the continuum of self-determination. A simplex model is observed when the correlation matrix between measures of two motivational constructs tends to decrease as the distance between these two constructs on the theoretical continuum increases. The correlations among the SDT continuum subscales, however, provide only limited support for the simplex pattern (Cokley, 2000; Fairchild et al., 2005). For example, Fairchild et al. (2005) found that the external regulation correlation coefficient is rather independent of the intrinsic motivation scores (correlation coefficients .05, .11, and .21). It has been suggested, therefore, that intrinsic and extrinsic motivations are not after all mutually exclusive, but represent more or less independent, orthogonal constructs (Amabile et al., 1994; Covington and Mueller, 2001). This set of findings has generated the alternative proposition, whereby, intrinsic and extrinsic motivations may be best conceived as two separate orientations rather than endpoints of a motivation continuum (Covington and Mueller, 2001; Deci and Ryan, 2007).

Although the cluster analysis technique has proven to be a valuable procedure for identifying different homogenous subgroups this methodological approach has not been widely used in the PE context. Cluster analysis has been promoted by Vallerand (1997) and Sallis and Owen (1999) to be useful when identifying different subgroups of young people who most likely represent different combinations of patterns based on motivational determinants. Additionally, research examining the clusters and their relationships towards different affective and behavioural consequences could be beneficial (Vallerand, 1997). In the present study cluster analysis was used as the basis to examine how the intraindividual differences in the forms of motivation proposed by the SDT are grouped. We also examined the relationships between the

resultant clusters, and students' self-reported enjoyment in physical education, anxiety in physical education, and involvement in physical activity. Several investigators have already undertaken studies of motivational profiles for individuals participating in PE (Boiché et al., 2008; Moreno et al., 2008; Ntoumanis, 2002; Wang et al., 2002). Ntoumanis (2002) and Boiché et al. (2008) reported a similar set of three motivational profiles for adolescent PE students. In the first profile students displayed high self-determination, low external regulation, and low amotivation. The second profile included students with moderate levels of both autonomous and non-autonomous forms of motivation, while the third cluster was characterized by high levels of non-autonomous forms of motivation and low levels of self-determined motivation. Further investigation of these motivational profiles and their relationships to outcomes, such as performance, effort, and prediction of final PE mark revealed that students, who exhibited a higher self-determined profile, also demonstrated greater effort, better final performances, and obtained higher PE marks. Previous studies (Ntoumanis, 2002; Wang et al., 2002), however, have combined the antecedents and consequences of motivation in cluster analyses. It can be argued, however, that the profiles in these studies are not motivational profiles at all, because they do not match with the original motivation pattern suggested by the SDT. For example, Wang et al. (2002) also included the variables of physical activity, beliefs, and competence in their cluster analysis. In this study, we conducted cluster analyses using only motivational continuum scores, and subsequently examined how these motivational profiles are associated with outcomes of engagement in physical education.

### Research questions

The purpose of this research was twofold. Firstly, based on the STD and the previous findings reviewed, we examined the motivational profiles demonstrated within a sample of Finnish PE students. We hypothesized that similar three motivational profiles would be evident. Secondly, to extend knowledge of motivational processes in the physical education context, we analyzed the associations between students' motivational characteristics and enjoyment in physical education, state anxiety in PE, and self-reported physical activity. In the present study, we hypothesized that the intrinsic profile would be positively associated with enjoyment and higher levels of physical activity, where the extrinsic profile would be correlating positively with state anxiety and lower levels of physical activity.

### Methods

#### Participants

The participants of the study comprised a sample of 429 Finnish Grade 6 students that included 216 girls and 213 boys, aged between 12 and 15 years ( $M = 13.04$ ,  $SD = 0.23$ ). A total of 17 elementary schools included 32 physical education classes were included in the study. Children and teachers were recruited through direct contact with the schools in consultation with the principal. All children in each class were asked to participate.

### Measures

#### *The Sport Motivation Scale (SMS)*

We used the Finnish version of the Sport Motivation Scale (Pelletier et al., 1995). The SMS includes seven four-item subscales: intrinsic motivation to know, intrinsic motivation to experience stimulation, and intrinsic motivation to accomplish, identified regulation, introjected regulation, external regulation, and amotivation. The 28-item scale used the stem: "Why I'm currently participating in PE?". When calculating the subscale of intrinsic motivation we combined all 12 items measuring three different types of IM, following the procedure proposed by Vallerand (1997). The measure uses a Likert type format with response anchors ranging from 1 = totally disagree to 5 = totally agree. Jaakkola et al. (2008) reported that the Finnish version of the SMS demonstrated adequate psychometric properties ( $CFI = 0.91$ ;  $RMSEA = 0.06$ ; Cronbach alphas between 0.71 and 0.93).

#### *Sport Enjoyment Scale*

Enjoyment in PE lessons was assessed using the Finnish version of the Sport Enjoyment Scale (Scanlan et al., 1993). The items were modified to represent the school PE setting. The individual items are: (a) I like PE lessons, (b) I have fun in PE lessons, (c) PE lessons make me happy, and (d) I enjoy PE lessons. The Finnish version of the scale has been found to have satisfactory internal consistency (Cronbach alpha = 0.93) (Soini et al., 2007).

#### *Physical Education State Anxiety Scale (PESAS)*

The PESAS is a recently developed measure designed for the evaluation of state anxiety during PE lessons (Barkoukis, 2005; 2007). It assesses three dimensions of anxiety, labelled somatic anxiety, worry, and cognitive processes. The somatic anxiety sub-scale evaluates feelings of tension and apprehension (e.g. "I sense a feeling of pressure on my chest"), the worry subscale assesses negative expectations from involvement in the activity (e.g. "I am concerned about making errors during task execution"), and the cognitive processes subscale estimates anxiety symptoms related to information processing, such as attention, memory, and problem solving (e.g. "I find it difficult to focus on the PE task presented"). Participants were asked to rate their anxiety regarding successful participation in PE lessons. Barkoukis et al. (2005) reported adequate levels of factorial validity and reliability ( $CFI = .92$ ;  $RMSEA = .06$ ; Cronbach alphas between .79 and .83) for the original Greek version of the scale. The validity and reliability of the Finnish version of the PESAS has also been reported to be satisfactory ( $CFI = 0.93$ ;  $RMSEA = 0.07$ ; Cronbach alphas between 0.76 and 0.88) (Yli-Piipari et al., 2008).

#### *Physical activity*

To assess students' self-reported physical activity we used the Health Behaviour in School-aged Children Research Protocol (Currie et al., 2002) which incorporated a modified version of the Moderate to Vigorous Physical Activity (MVPA) measure (Prochaska et al., 2001). The introduction preceding the items was: "In the next two questions physical activity means all activities which raises

your heart rates or momentarily get you out of breath for example in doing exercise, playing with your friends, going to school, or in school physical education. Sport also includes for example jogging, intensive walking, roller skating, cycling, dancing, skating, skiing, soccer, basketball and baseball.” The items required students to summarize their time spent in physical activity each day following: (a) “When you think about your typical week, on how many days you are physically active for a total of at least 60 minutes per day?” and (b) “Over the past 7 days, on how many days were you physically active for a total of at least 60 minutes per day?”. Both items used an eight-point response scale (0 to 7 days in a week). The mean of the two item scores was calculated and used as the students’ physical activity score. Prochaska et al. (2001) reported that for a sample of US adolescents that the MVPA items were reliable (ICC = 0.77) and correlated moderately ( $r = 0.40$ ) with accelerometer data.

### Procedure

Children completed the questionnaires in their classroom. The researchers administered the questionnaires, and teachers collected the response sheets from the children. The teachers placed the questionnaires into envelopes which were immediately closed. To minimize children’s tendency to give socially desirable responses, children were encouraged to answer honestly and were assured that their responses were confidential. In addition, if for any reason they were unable to finish the inventory they were informed that they could take a short break and continue when they felt ready or, if necessary, they could cease completion of the measures at that point. Care was taken to ensure that children understood the constructs being assessed. The participants were advised to ask for help if confused concerning either the instructions or the clarity of a particular item. Participation was voluntary, and relevant permissions were obtained from school principals, parents, and children. The study was approved by the Ethics Committee of the University of Jyväskylä.

### Data analyses

Descriptive statistics, internal consistency, and correlations between motivational scores were calculated. Independent samples t-tests were conducted to determine if significant gender differences existed within any of the variables examined. No statistically significant differences were found, thus, we used the entire sample rather than gender groups in subsequent cluster analyses. To examine motivational clusters, two cluster analyses were carried out following the procedure suggested by Hair et al. (2006) and using SPSS 15.0 software. We randomly

divided the schools of our sample into two groups. The School group A consisted of nine and the School group B of eight schools. Firstly, we conducted an exploratory cluster analysis in order to identify the motivational profiles represented in the School group A. Secondly, to verify the results of these exploratory cluster profiles, we utilized the clusters emerging from the exploratory analysis as the basis for the K-Mean cluster analysis of the School group B. Finally, we conducted K-Mean cluster analysis of the entire sample and used independent samples t-tests to analyse the differences in enjoyment, state anxiety, and physical activity between the motivational cluster groups.

## Results

### Descriptive statistics, correlations, and internal reliabilities

The means, standard deviations, internal consistencies, and correlations of the variables are shown in Table 1. All variables had internal consistency reliabilities above 0.80. When examining the correlation coefficients for the five motivation subscales, the observed relationships should form a simplex pattern in which the scales that are theoretically closer are more strongly correlated. However, more controlling forms of motivation, such as introjected and external motivation, had moderate positive correlations with the self-determined forms of motivation of intrinsic motivation and identified regulation. Furthermore, amotivation had negligible correlations with the variables except for a weak positive correlation with external regulation. When examining the links between the motivational and consequence variables, enjoyment demonstrated a moderate positive relationship with intrinsic motivation and introjected regulation, a weak positive relationship with extrinsic regulation, and a moderate negative relationship with amotivation. State anxiety showed a weak positive correlation with external regulation, a moderate positive correlation with amotivation, a weak negative correlation with enjoyment and negligible correlations with all other motivational variables. Physical activity had overall weak positive correlations with all intrinsic and extrinsic forms of motivation, and a weak negative correlation with amotivation. Physical activity had a weak positive correlation with enjoyment and a weak negative correlation with anxiety. The correlation between enjoyment and state anxiety was weak and negative.

### Cluster analysis

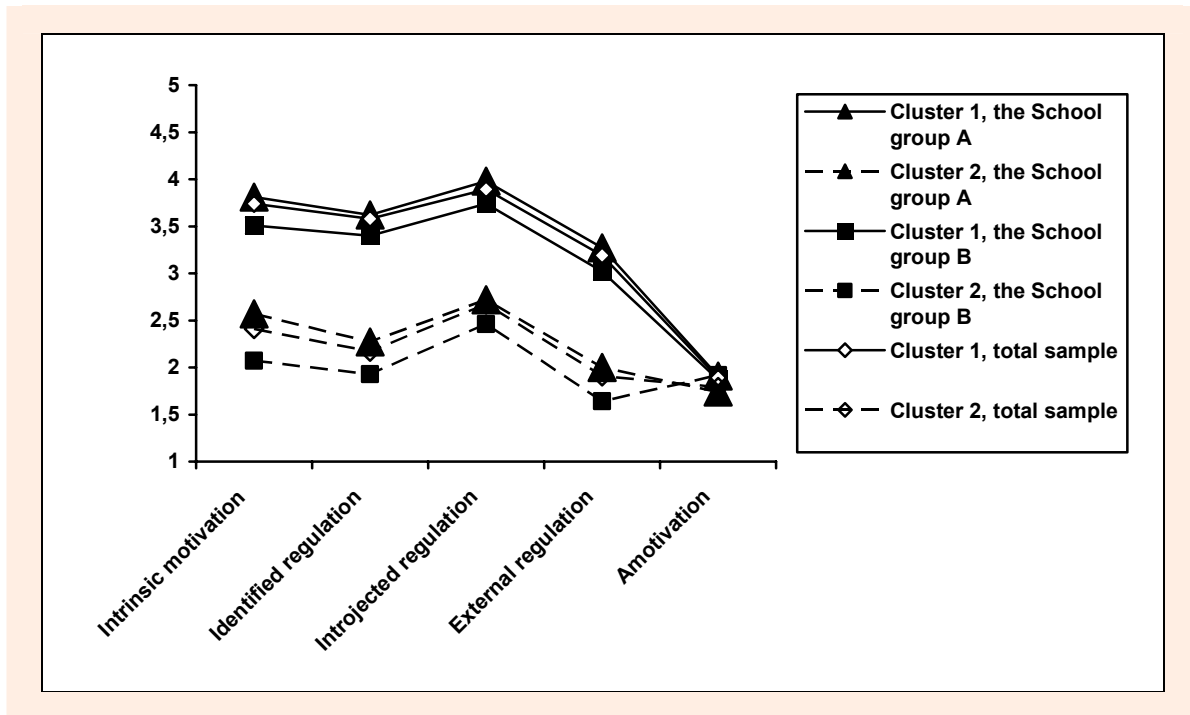
First, an exploratory, hierarchical cluster analysis was

**Table 1.** Descriptive statistics, internal consistencies, and correlations ( $n = 439$ ).

	M	SD	$\alpha$	2	3	4	5	6	7	8
1 IM	3.12	.95	.93	.79***	.67***	.64***	-.04	.58***	-.02	.23***
2 Identified regulation	2.93	.98	.91		.63***	.68***	.02	.45***	.01	.25***
3 Introjected regulation	3.33	.93	.85			.64***	.01	.39***	.05	.15**
4 External regulation	2.60	.97	.88				.22***	.30***	.19***	.22***
5 Amotivation	1.85	.90	.82					-.33***	.53***	-.19***
6 Enjoyment	3.56	1.08	.96						-.21***	.22***
7 State anxiety	2.01	.73	.94							-.13**
8 Physical activity	3.65	1.90								

\*\*\*  $p < .001$ , \*\*  $p < .01$





**Figure 1.** Motivational profiles of the School group A, the School group B, and total sample.

used to identify the number of clusters in the School group A. However, because of the exploratory nature of the analysis, it is important to confirm the results with an independent sample. Therefore, a K-means cluster analysis was used with the School group B. Cluster analysis is sensitive to outliers because they can affect the representativeness of the derived clusters. No outliers outside [2.5] were present. All the variables included in a cluster analysis have to share the same metric so that each of them contributes equally to the formation of the clusters. All the motivational constructs were assessed on a 5-point scale. Lastly, multicollinearity between variables may impact on the cluster analysis by giving more weight to the collinear variables. Given that none of the Pearson correlation coefficients were higher than .90, we considered that there was no problem of multicollinearity (Hair et al., 2006). Ward's method was chosen to minimize the within-cluster differences and to avoid problems with "long chaining" of the observations evident in other methods (Aldenderfer and Blashfield, 1984; Hair et al., 2006). The Euclidean distance was used as a similarity measure. To determine the number of clusters, the dendrogram was inspected. The first cluster was labelled the "High motivation profile" (n = 123; 48 %) and included students with high levels of intrinsic motivation, identified motivation, and introjected motivation, moderate

levels of external motivation, and low levels of amotivation. The second profile was labelled the "Low motivation profile" (n = 132; 52%) and included students with low levels of intrinsic motivation, identified motivation, introjected motivation, and external motivation, and low levels of amotivation (Figure 1). The cluster sizes, and the means and standard-deviations of the centroids, are displayed in Table 2. T-test analyses indicated that both motivational profiles were significantly distinct from each other for all motivational subscales except amotivation.

The K-mean cluster analysis using the students of School group B identified two clusters (Figure 1). K-mean cluster analysis is considered confirmatory, because it requires apriori provision of the specific number of clusters expected to emerge in the sample. The students of the School group B shared similar characteristics with the first random group and was comparable in terms of age and gender. According to Aldenderfer and Blashfield (1984), matched validation techniques are important because if the same cluster solution is found across different groups from the one sample, it is possible to assume that the solution has a certain degree of generalizability.

The resultant motivational profiles were similar to those observed in the exploratory analysis and were represented by a "High motivation profile" (n = 118; 68%) and a "Low motivation profile" (n = 56; 32%) (Figure1).

**Table 2.** Descriptive statistics for cluster 1 and 2, and mean differences in School groups A and B.

Measure Scores	School group A				School group B			
	Cluster 1 (n = 123) "High motivation"		Cluster 2 (n = 132) "Low motivation"		Cluster 1 (n = 118) "High motivation"		Cluster 2 (n = 56) "Low motivation"	
	M	SD	M	SD	M	SD	M	SD
IM	3.81	.63	2.57	.75	3.51	.66	2.07	.74
Identified regulation	3.62	.71	2.27	.69	3.40	.68	1.93	.74
Introjected regulation	3.98	.64	2.72	.67	3.74	.67	2.46	.78
External regulation	3.27	.62	2.00	.62	3.02	.75	1.64	.53
Amotivation	1.91	.87	1.74	.87	1.87	.85	1.92	.84

**Table 3.** Sample descriptive statistics for cluster 1 and 2, and mean differences (t-test).

Measure Scores	Cluster 1 (n = 229) "High motivation"		Cluster 2 (n = 200) "Low motivation"		T-test		
	M	SD	M	SD	t	p	df
IM	3.74	.63	2.41	.73	19.93	<.001	394.31
Identified regulation	3.58	.68	2.17	.69	21.24	<.001	427
Introjected regulation	3.89	.65	2.67	.73	18.16	<.001	427
External regulation	3.19	.75	1.91	.61	19.18	<.001	427
Amotivation	1.89	.95	1.79	.84	1.17	.224	427
Enjoyment	3.92	.91	2.91	1.11	7.95	<.001	380.22
State anxiety	2.15	.74	2.01	.84	2.02	.034	427
Physical activity	3.98	1.84	3.34	1.90	3.66	<.001	427

Differences were found regarding the distribution of students within the two clusters between the two groups. There was a larger representation of the "High motivation profile" in the School group B compared to the School group A. Moreover, both profiles of the School group A demonstrated higher overall scores for self-determined and non self-determined regulation than the School group B. The cluster sizes and means and standard deviations of the centroids are displayed in Table 2.

### Relationships between Motivational Profiles' and Outcome Variables

K-mean cluster analysis of the entire sample revealed similar cluster profiles as found in the analyses of the random sample groups, a "High motivation profile" (n = 229; 53%) and a "Low motivation profile" (n = 200; 47%) (Figure 1). The students' within the "High motivation profile" reported higher levels of intrinsic, identified, introjected, and moderate levels of extrinsic regulations. No differences were found in amotivation scores. The results of t-tests examining profile group differences between the dependent variables of enjoyment, state anxiety, and physical activity revealed statistically significant differences in all variables (Table 3).

### Discussion

The purpose of this study was to examine the motivational profiles of Finnish physical education students. We used a pattern-centred approach involving cluster analysis to test how different types of motivation combine to formulate motivational clusters. The current study showed that two motivational clusters emerged in the analyses of both School group A and School group B, revealing contrasting patterns in the regulatory processes regarding students' motivation towards physical education. Furthermore, we analysed the relationships between the resultant motivational profiles, self-reported physical activity and enjoyment and state anxiety in PE.

Results of the cross-validation of the two random school groups highlighted similar profile patterns for the motivation variables. Overall, students included in the "high motivation" cluster had high levels of intrinsic motivation, identified regulation, and introjected regulation, moderate levels of external regulation, and low levels of amotivation. In contrast, the "Low motivation" profile represents students with low levels of both intrinsic and extrinsic regulation and, furthermore, low levels of amotivation. The cluster analyses revealed contrasting results regarding the number of profiles generated in

comparison with previous findings within school students. Firstly, in this study, instead of three motivational profiles (Boichè et al., 2008; Moreno et al., 2008; Ntoumanis 2002), only two profiles emerged, similar to the cluster pattern reported by Vlachopoulos et al. (2000). The mean motivational variable scores of the "Low motivation profile" fall between the values reported for less preferred profiles (e.g. moderate and non-self-determined profiles) detailed in aligned school-based research (Boichè et al., 2008; Ntoumanis, 2002). This finding may constitute a basis for the greater than expected representation of students (47%) in the "Low motivation profile". The low score profiles described in similar studies (Boichè et al., 2008; Moreno et al., 2008; Ntoumanis, 2002) typically had substantially smaller sample sizes than the profiles with high or moderate scores.

The SDT outlines that introjected and extrinsic regulation are located toward the extrinsic endpoint of the self-determination continuum (Deci and Ryan, 1991), therefore, we could assume that students in the "High motivation profile" should report low levels of introjected regulation and extrinsic motivation, and the mirror image representation for the "Low motivation profile" (Vallerand and Fortier, 1998). In the current sample, this was not the demonstrated pattern in either of the two randomly divided school groups as demonstrated by the large number of students who are either motivated or under motivated both intrinsically and extrinsically towards physical education. Vallerand et al. (1997) have suggested that introjected regulation can sometimes lead to adaptive consequences in the area of school education. They have argued that due to parental influences, students may partially internalize the value of participating in the various school activities. In the context of physical education, for example, some students may decide to be actively involved, not because they enjoy physical education, but because they don't want to let down their parents or friends. According to Deci and Ryan (2007), many students in physical education may be in the preinternalization stage which precedes moving into internalization where external regulations are transformed into internal regulations. Accordingly, they engage in physical education activities solely because they are told to do so by the physical education teacher. Possible reasons for the current findings are that the sample constituted younger students than the participants of several other studies (e.g. Moreno et al., 2008; Ntoumanis, 2002), and they were also attending elementary rather than high school settings (Boiche et al., 2008). Upper elementary aged students may still be more highly reliant on acknowledgement of

performance from parents and teachers in relation to their motivation towards school PE. Additionally, the Finnish education system requires the generation of subject marks for PE, a pedagogical outcome which may impact on the externally regulated motivation of students to participate in PE classes.

Examining the scores of the motivational determinants within the current “Low motivation profile” revealed that the mean values are low for all dimensions including amotivation. In previous research detailing profiles that reflect a lack of student motivation for PE, amotivation is high (e.g. Boichè et al., 2008; Moreno et al., 2008). Our finding that both overall motivation and amotivation were low suggests that this group of students is not currently motivated by their involvement in PE, but have not yet become disinterested in participation or begun to devalue their experiences in PE. A similar pattern observed in adult sport participants highlighted that some athletes reported to be actively involved in sport and have low levels of both intrinsic and extrinsic motivation, but are not amotivated by their engagement in sport (Vlachopoulos et al., 2000). In relation to young peoples engagement in PE it is important to adopt approaches that facilitate lower levels of amotivation. To address the profile of both low motivation and low amotivation observed in the current sample, PE teachers should work toward the development of pedagogical approaches, such as the Target model (Epstein, 1989) that have a focus on the improvement of intrinsic and self-determined forms of extrinsic motivation, particularly for students who are under motivated but not as yet amotivated.

From examining the structure of these two clusters, we determined that the students’ in the “High motivation profile” are motivated towards PE both intrinsically and extrinsically. Moderate to strong positive correlations were found between all cluster variables excluding amotivation. According to SDT (Deci and Ryan, 1991; 2000), intrinsic and extrinsic motivations should fall along a continuum of self-determination correlations decreasing as the distance between each motivational construct on the theoretical continuum increases. In this study, when moving along the self-determination continuum from autonomous to more controlled regulations, there were only minimal decreases in the differences between the motivational variable correlations. Our results, therefore, support an alternative position that suggests that intrinsic and extrinsic motivation towards PE have an additive relationship (Atkinson, 1964). In the current context the motivational reasons of students underlying their engagement in PE may converge in producing either high or low levels of all types of motivation.

The second purpose of the study was to analyze the relationships between these motivational profiles, and the variables of enjoyment, state anxiety, and physical activity. SDT links more self-determined regulations to positive consequences and controlled forms of motivation and amotivation to negative consequences (Deci and Ryan, 1991; 2000). In the present study, students in the “High motivation profile” reported moderate levels of engagement in physical activity, high enjoyment in PE, and low levels of state anxiety in PE. Alternatively, the students of the “Low motivation profile” demonstrated moderate

levels of engagement in physical activity and enjoyment in PE, and low levels of state anxiety.

Results demonstrated that the self-reported physical activity levels of both profiles were generally similar to the moderate physical activity engagement levels of the Finnish upper elementary school sample detailed in the 2001 HBSC. In relation to the significant physical activity differences found between the profiles, our findings are aligned to the pattern of dissimilarity between high and low motivation profiles reported by Wang and Biddle (2001) and Biddle and Wang (2003) in which highly motivated students report being more physically active than under motivated students. Physical activity levels of the current profiles, although different, did not suggest concerning levels of inactivity. As these students were of elementary school aged, practitioners in PE should remain diligent in ensuring that programs continue to promote the positives of engagement in physical activity as pedagogically acceptable approach to minimising the reported declines in adolescent participation in school and leisure time physical activity (Allison et al., 2007; Pratt et al., 1999).

Profiles differences regarding enjoyment in PE were similar to those reported by Ntoumanis (2002), who found a contrast between clusters he labeled as high and moderate in which students that were high in motivation were also high in enjoyment, whereas, students who were lower in all motivation variables reported lower levels of enjoyment in PE. The high level of enjoyment in the structure of the “High motivation profile” suggests that students can be motivated towards physical education both intrinsically and extrinsically and still enjoy physical education classes. State anxiety levels of the current sample, however, were significantly higher in the “High motivation profile”. This may be due to the fact that students in the “High motivation profile” also experienced higher levels of nonautonomous regulations. Tsang (2007) suggested that if students consider the evaluations and assessments within PE to be highly important, and a possible threat to their perceived performance, then the outcome of engagement may be higher levels of anxiety. It is also possible that students who are highly intrinsically and extrinsically motivated may also use low to moderate levels of anxiety to facilitate performance in physical and sport oriented tasks (Pérès et al., 2002). Overall, students in the “Low motivation profile” are motivationally at risk because low levels of self-determined motivation have been shown to relate with negative outcomes such as boredom and unhappiness (Ntoumanis, 2002; Standage et al., 2005) and constitute negative predictors of future physical activity participation levels (Pelletier et al., 1995; Vallerand et al., 1997). In this study, despite the fact that the students in this cluster reported both being more physically inactive and lower levels of enjoyment in physical education, they did experience a lower level of state anxiety.

An important limitation of the present study is the correlation design, which does not enable causal relationships to be established. Future research should be considered at a longitudinal level, in which school-aged student samples are assessed several times over an extended period of participation in PE to determine the stability of

both the profiles and the associated outcome relationships over time. Additionally, the use of an intervention approach on the basis of longer term information regarding the motivational characteristics of school students would provide the opportunity to examine causal factors such as curriculum and teaching practices as mediators of motivation toward PE.

In summary, these results provide further impetus to the need to answer the question of whether students engaging in physical education benefit more from the presence of both self-determined and non-self-determined forms of motivation, or are the benefits higher if students are primarily self-determined? Our results generate additional evidence that the intrinsic and extrinsic dimensions of the SDT are independent rather than additive. This sample of Finnish children demonstrated profiles that highlight that they have either high or low levels of both autonomous and non-autonomous motives for their involvement in school PE. On-going development of PE practices may benefit from a focus on both intrinsic and extrinsic dimensions as an option to stimulate more positive engagement from under motivated students.

## Conclusion

The present study examined the motivational characteristics of students involved in PE at the upper elementary school level. We clearly identified profiles representative of a highly intrinsically and extrinsically motivated group and a low intrinsically and extrinsically motivated group. Significant differences were found between these two profiles in enjoyment, state anxiety, and self-reported engagement physical activity. These findings pose a particular challenge to educational professionals in their work to ensure that all students are highly motivated as a result of their experiences in school physical education.

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### Key points

- Two motivational profiles were revealed: 1) the “High motivation profile”, in which the students had high intrinsic and extrinsic motivation, and low levels of amotivation, and 2) the “Low motivation profile”, in which the students had low intrinsic and extrinsic motivation, and low levels of amotivation.
- The students in the first profile enjoyed physical education more and were physically more active than the students in the second profile.
- Moreover, the representatives of the “High motivation profile” experienced greater anxiety toward physical education than the representatives of the “Low motivation profile”
- These findings raised an interesting question whether students engaging in physical education benefit more from the presence of both self-determined and non-self-determined forms of motivation, or are the benefits higher if students are primarily self-determined?

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