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Motivational clusters in a sample of British physical education classes

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Abstract

Objectives: Based on recommendations from a recent review of self-determination theory (Vallerand, R. J. (1997). In: M. Zanna (Ed.), *Advances in experimental social psychology* (pp. 271–360). New York: Academic Press) the present study aimed to uncover the different motivational profiles in physical education. It was expected that at least two motivational profiles would emerge: a self-determined profile and a controlling motivation/amotivation profile.

Design: Cross-sectional survey.

Method: Questionnaires were administered to 428 British students, aged between 14 and 16 years, from two schools in the Northwest of England.

Results: A cluster analysis produced three motivational profiles in the first school, which were replicated in the second school. The first was named the 'self-determined profile' because the students displayed high self-determined motivation, effort, enjoyment, and cooperative learning, and low controlling motivation, amotivation, boredom, and unequal recognition. The second profile was the 'moderate motivation profile' with moderate scores on all variables measured. The third was named the 'controlling motivation/amotivation' profile because the students demonstrated high controlling motivation, amotivation, boredom, and unequal recognition, and low self-determined motivation, effort, and enjoyment.

Conclusions: The results demonstrate the importance of developing self-determination in physical education, as it is associated with desirable behavioural and affective outcomes.

Keywords: Self-determination theory; Motivational profiles; Motivational climates

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Introduction

It is widely acknowledged that physical education (PE) can play a potentially important role in promoting public health (Haywood, 1991; Sallis & McKenzie, 1991). Professional organisations such as the American Academy for Physical Education, the American Academy of Pediatrics Committees on Sports Medicine and School Health, and the Physical Education Association of the United Kingdom (2000) (PEAUK), have highlighted the need to promote physical activity programmes in PE. For example, the policy statement on PE and health by the PEAUK states that quality physical activity should be promoted in schools because it is a key health behaviour which provides physical, mental and social benefits for young people. The aim of the physical activity programmes should be the development of regular patterns of physical activity which have the potential to carry over into adulthood and thereby improve public health. This goal is especially important in Western societies where a prevailing sedentary lifestyle is contributing to cardiovascular and other diseases (National Audit Office, 2001).

However, the promotion of physical activity programmes in PE (which should include both health-related exercises and sports/games) can be a difficult task in view of the high rates of drop out and the negative experiences reported. For example, Ross, Pate, Corbin, Deply, and Gold (1987) reported that although 97% of elementary school children in the US are enrolled in PE programmes, only about 50% of them stay enrolled by the end of high school. Furthermore, in the UK, Coakley and White (1992) carried out a survey to examine the impact of the Sports Council's "Ever Thought of Sport?" campaign in the South East of England. The results showed that decisions about sport participation were heavily influenced by past experiences in PE. Sometimes these experiences were positive, but most often they were negative and influenced current motivation to participate in sport in a negative fashion. Some of the negative experiences were defined in terms of boredom, lack of choice, incompetence, and negative evaluation from peers. Positive experiences were reported in situations where students had the opportunity to choose and participate in non-traditional activities like skating. Furthermore, studies in the UK indicate that the physical activity levels of young people of secondary school age are currently below the levels thought to be sufficient to promote health benefits (Health Education Authority, 1997).

The above findings have important implications for the success of physical activity programmes in PE If students are not motivated in PE, if they find it a boring or humiliating experience, they will form a negative attitude toward it. Therefore, it is logical to assume that physical activity programmes in schools will have a more positive impact when children are motivated to participate in PE, and when they experience positive cognitive and affective outcomes as a result of their participation. One of the implications of Coakley and White's (1992) study is that students' motivation can be enhanced by developing PE curricula which cater for choice and diversity. Specifically, the authors suggested that long-term benefits can be accrued when students are introduced to different physical activities and are given opportunities to *choose* from these activities.

It seems, therefore, that examining the role that *choice* can play in PE may facilitate our understanding of the motivational processes involved. To this end, self-determination theory (Deci & Ryan, 1985; Ryan & Deci, 2000) can be particularly useful because it is one of the very few motivational theories which focuses on the role of choice and autonomy in human behaviour. This theory has been successfully applied to a wide variety of contexts, including education (Deci, Vallerand, Pelletier, & Ryan, 1991) and sport (Vallerand, Deci, & Ryan, 1987), to explain the

'why' of behaviour. Self-determination theory can be helpful in understanding the energisation and direction of behaviour in compulsory contexts, such as PE. In PE the choice of tasks and sport skills is limited and individuals can feel non-autonomous (i.e. controlled) by external agents or means. Furthermore, self-determination theory can be particularly useful in the context of PE because it delineates the important role of competence in sustaining motivation. Coakley and White (1992) found that lack of competence was one of the most negative experiences reported in PE. The role of perceived competence in this context is crucial because some children do not have any prior experience of many sport activities (Papaioannou, 1994). Therefore, it is likely that only children who feel and are physically competent will find PE interesting and fun and will want to take part in it to further develop their sport skills.

Self-determination theory argues that individuals can be, to a different extent, intrinsically motivated, extrinsically motivated, and amotivated toward an activity. Intrinsic motivation reflects situations in which individuals perform an activity to experience fun, learn new things, or develop their competencies. When one is intrinsically motivated, one performs an activity for its own sake. In contrast, extrinsic motivation describes situations in which individuals perform an activity as a means of achieving certain desirable outcomes. These outcomes can be diverse reflecting the multidimensional nature of extrinsic motivation.[1]

Deci and Ryan (1985, 1991) argued that there are four types of extrinsic motivation: external regulation, introjected regulation, identified regulation, and integrated regulation. External regulation reflects what has traditionally been called extrinsic motivation when the latter was regarded as a unidimensional concept. Specifically, external regulation refers to situations in which individuals perform certain behaviours in order to receive rewards, or because they feel pressured and constrained to do so. For example, some students may participate in PE because they perceive that this is what they are supposed to do. The second type of extrinsic motivation is introjected regulation. With this type of motivation, the activity becomes more internalised, but again it is not performed out of choice. The prevailing feeling is that one 'ought' to carry out the activity (in contrast to external regulation where one 'must' do it) to avoid feelings of guilt and anxiety, or to please significant others. For example, a student may regard PE participation as a means of pleasing the PE teacher, or avoiding feelings of guilt associated with non-participation.

The third type of extrinsic motivation, identified regulation, refers to situations in which behaviour is performed out of choice ('I want to do it'). In contrast to the first two motivational types, identified regulation reflects behaviour that is self-initiated and internalised, even if the behaviour itself is not always very interesting. For example, some students may regard body flexibility as an important skill, and therefore, they decide to participate actively in gymnastics classes, although initially they may not have had a special interest in gymnastics. The fourth type of extrinsic motivation, integrated regulation, refers to activities which are also performed out of choice. However, in this case the interest is not limited to the activity itself because the decision to perform the activity is viewed as part of a wider effort to harmonise different parts of the self. For example, some students may decide to participate actively in PE because they view physical activity as an important aspect of a healthy lifestyle. However, according to Vallerand and Fortier

[1] Vallerand (1997) argued that intrinsic motivation is also multidimensional. However, in almost all studies, the intrinsic motivation components are combined into a single intrinsic motivation score because they represent the same degree of self-determination. In contrast, the extrinsic motivation components are treated independently because they represent different degrees of self-determination.

(1998), integrated reasons are not normally mentioned by children and adolescents, therefore, this type of extrinsic motivation is not usually assessed in these age groups.

Deci and Ryan (1991) argued that individuals can also be amotivated toward an activity. Amotivation refers to the relative absence of intrinsic or extrinsic motivation. This is evident when individuals do not value an activity, or when they believe that they cannot achieve a desirable outcome. Unfortunately, many students lack the motivation to take part in some PE activities. According to Coakley and White's (1992) findings, these students feel bored and incompetent, perceive that they waste their time in PE, and report that they do not feel that they get anything valuable out of it.

The different types of motivation can be placed along a self-determination continuum. Specifically, Deci and Ryan (1991) proposed that the regulation of behaviour can be viewed as being self-determined, controlled, or amotivated. Identified regulation, integrated regulation, and intrinsic motivation represent increasingly self-determined forms of motivation because they describe behaviours performed out of choice. In contrast, introjected regulation and external regulation represent increasingly controlling forms of motivation because they reflect behaviours that lack autonomy and choice.

The antecedents and outcomes of the different types of motivation have been described by Vallerand (1997) in his comprehensive model of motivation. According to this model, a number of social factors (e.g. cooperation, competition, autonomy-supportive or controlling-supportive teaching styles) can have an impact on the various motivational types just described. Social factors that satisfy the fundamental human needs for competence, autonomy and relatedness will promote self-determined forms of motivation. In contrast, social factors that undermine these needs will result in controlling and amotivated behaviour. In turn, the various motivational types can predict a number of cognitive, affective, and behavioural outcomes. Usually, intrinsic motivation predicts the most positive outcomes, whereas amotivation predicts the most negative outcomes (Vallerand, 1997).

Some of the predictions in Vallerand's (1997) model have been tested in PE contexts. For example, Biddle et al. (1995) showed that the self-determination levels of 85 British students were positively predicted by perceptions of a mastery motivational climate, but were unrelated to perceptions of a performance motivational climate. Mastery and performance motivational climates are two salient social factors. According to Ames (1992), these two types of climate represent qualitatively different interactions in the classroom which have potentially important implications for the achievement motivation of students. A mastery climate can promote cooperative learning, choice of tasks, and student evaluation based on individual improvement. In contrast, a performance climate is likely to promote interpersonal competition, limit the available choices, and reward students using comparative criteria.

As Ntoumanis and Biddle (1999) have argued, a mastery climate can satisfy the three needs for competence, autonomy, and relatedness and, therefore, can potentially enhance self-determination. In contrast, a performance climate can undermine these needs and promote extrinsic motivation or amotivation. Empirical support for these predictions has been offered by Ferrer-Caja and Weiss (2000). In a study of US high school students, a learning (mastery) climate had significant effects on competence and autonomy through task orientation. In contrast, a performance climate did not have any significant effects on competence and autonomy.

Various studies have shown that self-determined, controlling, and amotivated types of behav-

ioural regulation will predict a number of different motivational outcomes. In a review of educational literature, Deci et al. (1991) reported that self-determined motivation has been linked to a number of positive educational outcomes, such as greater conceptual understanding, academic performance, personal adjustment, and continuation of studies. In sport, Pelletier et al. (1995) studied young Canadian athletes and found that effort was positively predicted by intrinsic motivation, negatively predicted by amotivation, and was unrelated to external regulation and introjected regulation. Furthermore, in a small study of British undergraduate PE students, Goudas, Biddle, and Underwood (1995) reported that a composite measure of effort and enjoyment was positively related to self-determination.

A limitation of much of this research is that it examines the different motivational types, their antecedents, and their outcomes in isolation. However, Deci and Ryan (1991) and Vallerand and Fortier (1998) have argued that all types of motivation are present within an individual to different degrees. For example, assuming that an individual with high levels of intrinsic motivation should inevitably have low levels of extrinsic motivation ignores theoretical and empirical evidence showing that motivation is multidimensional, and that the relationship between intrinsic motivation and extrinsic motivation varies depending on which type of extrinsic motivation is assessed (Vallerand & Fortier, 1998). Therefore, Vallerand (1997) suggested that future research should examine how the types of motivation combine into different motivational profiles and look at which profiles relate to the most positive outcomes in various social contexts. Regarding sport and physical activity, Vallerand and Losier (1999) hypothesised that a strong self-determined profile (i.e. high intrinsic motivation and identified regulation, but low external regulation and amotivation) will relate to the most adaptive cognitive, affective, and behavioural outcomes.

A recent large study of British PE students by Wang and Biddle (2001) has examined motivational clusters in physical activity. The authors identified five motivational clusters reflecting two relatively self-determined and two moderate motivation profiles, as well as a clearly amotivated profile. However, the variables of the self-determination continuum were collapsed across a single index (i.e. the self-determination index), whereas the present study was interested in the independent contribution of each variable to the cluster solution. Furthermore, the type of the clusters found by Wang and Biddle (2001) were different from those under investigation in the present study, as no situational, affective, or behavioural variables were included.

In view of the above suggestions, and bearing in mind the important role that PE should have in modern education (e.g. see the policy statement of the PEAUK on the contribution of PE to the whole curriculum), the present study aimed to uncover different motivational profiles in PE by assessing each motivational type independently. The understanding of these profiles is important for both theoretical, empirical and practical reasons. From a theoretical and empirical viewpoint, it is imperative to move away from examining complex multidimensional motivational constructs in isolation and look at their interdependent effects. From a practical perspective, it is important to determine the relative proportions of students with positive or negative motivational profiles, the social/climate factors that elicit these profiles, as well as the behavioural and affective outcomes of such profiles. In this way, PE teachers will be able to evaluate, and perhaps re-examine, their methods of practice, especially in cases where many students exhibit maladaptive motivational profiles. As Fox (1988) remarked, the understanding of motivation in PE can help teachers to improve the quality of their interactions and enhance the positive experiences of their students.

No previous studies have attempted to develop motivational profiles in PE from a self-determination theory viewpoint. The present study, therefore, is largely exploratory. However, it was expected that at least two motivational profiles would emerge. The first one would be a self-determined profile, with students reporting high self-determined motivation, low controlling motivation and amotivation, and positive affective and behavioural outcomes. The second profile would be the controlling motivation/amotivation profile, which would include students with high controlling motivation, amotivation, low self-determination, and negative affective and behavioural outcomes.

Method

Participants

Letters of approach were sent to ten state schools in Northwest England. Of these, two showed willingness to participate and offered assistance with data collection. A number of different classes in the two schools were chosen after previous arrangements with the PE teachers, in order to minimise any potential interference with the school programme. The age of the students in both schools ranged from 14–16 years (M=14.84, SD=0.52). In School A there were 236 students (122 females, 111 males, 3 did not specify gender), and in School B there were 192 students (96 females, 95 males, 1 did not specify gender). At the time of data collection, the different classes were involved in a variety of activities taught by different PE teachers: aerobics (N=34), badminton (N=44), football (N=98), track and field athletics (N=71), trampoline (N=37), cricket (N=51), tennis (N=58), and rounders (N=30). Five students did not indicate their sport activity in the questionnaire.

Instruments

Social factors

Two aspects of the motivational climate were measured based on the perceived motivational climate in sport questionnaire-2 (PMCSQ-2; Newton, Duda, & Yin, 2000). The first aspect reflected a perceived mastery climate and measured the degree of cooperative learning and interaction between students in the class. The second aspect reflected a perceived performance climate and measured the degree to which the evaluation of students was unequal and based on comparative competence levels. Newton et al. (2000) provided extensive evidence for the validity and reliability of the PMCSQ-2. The decision to use only two of the six subscales of the PMCSQ-2 was based on the limited amount of time that the two schools offered to this study. Cooperative learning and unequal recognition by the PE teacher were selected because both are very important and relevant to PE (Lafont & Winnykamen, 1999; Papaioannou & Goudas, 1999). Both subscales had four items and were measured with 5-point scales.

Motivational types

The different motivational types in PE were measured with a questionnaire used by Goudas, Biddle, and Fox (1994). These authors adapted four subscales for the PE context, measuring

intrinsic motivation, identified regulation, introjected regulation, and external regulation. These subscales were originally developed by Ryan and Connell (1989) to measure motivation in the classroom. Goudas et al. (1994) also adapted the amotivation subscale of the academic motivation scale (Vallerand et al., 1993). The adaptations consisted of minor changes in the wording of some items so that they refer to PE and to sport skills. Each subscale had four items measured with 7-point scales. Goudas et al. (1994) reported alphas above 0.70 for intrinsic motivation, identified regulation and external regulation. The alphas for introjected regulation were close to 0.70 (α=0.69 for football/netball, and α=0.68 for gymnastics). Goudas et al. (1994) did not provide the alpha coefficients for amotivation, however, Vallerand et al. (1993) reported alphas above 0.85 for the original amotivation scale.

Consequences

Three outcomes of the different motivational types were measured with 7-point scales: effort, enjoyment, and boredom. These variables were chosen because they represent important behavioural and affective consequences of the different types of motivation (see Vallerand's model of motivation), and are frequently employed in the self-determination literature (for a review see Vallerand, 1997). Effort was assessed with three items taken from the intrinsic motivation inventory (McAuley, Duncan, & Tammen, 1989). Boredom and enjoyment were assessed with three and four items, respectively, developed by Duda, Fox, Biddle, and Armstrong (1992) to measure children's affective responses in physical activity. Evidence for the factorial validity and internal reliability of the questionnaires has been provided by the respective authors.

Procedure

In accordance with the ethical guidelines of the British Psychological Society (1997), the Head Teachers in both schools were asked to act in loco parentis and sign an informed consent form. The questionnaires were administered by an experienced researcher in the Sports Halls of the two schools under the supervision of the PE teachers. Before questionnaire administration, the students were given the option to decline participation in the study or withdraw at any time. Only around 5% decided not to participate and were asked to remain silent throughout the questionnaire completion. Students were explicitly told that their responses would be kept in strict confidence and would not be available to their teachers or parents.

Data analyses

Initially, descriptive statistics, Cronbach's alphas, and correlation coefficients were calculated. Then, one-way MANOVA was carried out to examine whether the variables measured in the study varied as a function of the different sport activities. Subsequently, confirmatory factor analysis was performed to test the factor structure of the different types of motivation. Lastly, separate cluster analyses were carried out for each school to identify the existing motivational profiles.

Results

Descriptive statistics and internal reliabilities

All subscales had internal reliabilities above 0.70 with the exception of introjected regulation (α=0.67). However, because its alpha coefficient was very close to 0.70, and because it is considered an essential component of self-determination theory, it was retained for the remaining analyses. An inspection of the mean scores in Table 1 shows that the students had moderate to high self-determined motivation (intrinsic motivation and identified regulation), moderate controlling motivation (introjected regulation and external regulation), and relatively low amotivation. Furthermore, the students reported moderate to high levels of enjoyment, effort, and cooperative learning, and relatively low levels of boredom. However, they perceived that, to a certain extent, evaluation and recognition by the PE teachers were not equal to all students. The correlation coefficients showed that amotivation and external regulation were negatively related to effort, enjoyment, and cooperation, and positively related to boredom and unequal recognition. In contrast, intrinsic motivation, identified regulation and introjected regulation were positively related to effort, enjoyment, and cooperation, and negatively related to boredom. Furthermore, unequal recognition was positively related to introjected regulation and negatively related to intrinsic motivation and identified regulation.

One-way MANOVA

One-way MANOVA was carried out to examine whether the variables in this study could vary as a function of the different sport activities. The eight sports served as the independent variable, and the different social factors, motivational types, and motivational outcomes were the dependent variables. The MANOVA was significant: Wilks' lambda=0.761; $F(70, 2350)=1.61$, $p<0.05$. However, with the exception of a marginally significant univariate effect for effort, the univariate effects for the other nine dependent variables were not significant. The post-hoc Tukey tests showed that only football and trampoline differed significantly in the reported levels of effort, with football having a higher mean score. In view of these results, it was concluded that the variables of interest in this study were largely unaffected by the different sport activities, and therefore, the whole sample was used for the remaining analyses.

Confirmatory factor analysis (CFA)

A CFA was carried out, using EQS 5.7 (Bentler, 1995), to examine the factor structure of the motivational questionnaire, as this was not tested by Goudas et al. (1994). In contrast to exploratory factor analysis, CFA examines the a priori factor structure of a questionnaire and evaluates whether this structure 'fits' a data set. A good factor structure is implied when the chi-square (X^2) statistic is non-significant. However, owing to the tendency of the chi-square to reject well-specified models with relatively large sample sizes, additional goodness of fit indices were used to evaluate the appropriateness of the solution (Hair, Anderson, Tatham, & Black, 1998). These indices were the comparative fit index (CFI), the Bentler–Bonett non-normed fit index (NNFI), the standardised root mean square residual (SRMR), the root mean square error of approximation

Table 1
Means, standard deviations, Cronbach's alphas and correlations between all variables (with the exception of the amotivation-introjected regulation relationship, all correlations were significant ($p<0.01$))

	M	SD	α	2	3	4	5	6	7	8	9	10
1. Amotivation	2.72	1.50	0.81	0.51	−0.07	−0.58	−0.60	−0.58	−0.52	0.59	−0.30	0.28
2. External regulation	3.53	1.68	0.82		0.23	−0.30	−0.41	−0.33	−0.39	0.41	−0.24	0.36
3. Introjected regulation	3.34	1.32	0.67			0.46	0.35	0.32	0.23	−0.18	0.17	0.13
4. Identified regulation	4.82	1.53	0.84				0.82	0.72	0.67	−0.58	0.42	−0.20
5. Intrinsic motivation	4.80	1.54	0.87					0.72	0.78	−0.65	0.45	−0.23
6. Effort	5.04	1.39	0.81						0.75	−0.70	0.40	−0.27
7. Enjoyment	4.99	1.46	0.86							−0.70	0.42	−0.27
8. Boredom	2.75	1.44	0.72								−0.31	0.27
9. Cooperative learning	3.31	0.84	0.73									−0.24
10. Unequal recognition	2.94	1.05	0.80									

(RMSEA) and its 90% confidence interval (CI). A Monte Carlo study by Hu and Bentler (1999) showed that a good model fit (i.e. a good factor structure) is achieved when the CFI and NNFI values are close to 0.95, the SRMR is close to 0.08, and the RMSEA is close to 0.06. Furthermore, a close fit of the model to the intended population is implied when the lower bound of the 90% CI of the RMSEA includes the value of 0.05 (Browne & Cudeck, 1993).

The normalised estimate of Mardia's coefficient was high (27.42) indicating multivariate non-normality. Therefore, the robust maximum likelihood (ML) estimation procedure was utilised. According to Bentler (1995), this procedure offers more accurate standard errors when the data are not normally distributed. Also, robust ML calculates the Satorra–Bentler scaled chi-square and the robust CFI. The results showed that the proposed five-factor structure was relatively good, but there was room for improvement: Scaled $X^2(160)=365.16$, $p<0.01$; robust CFI=0.94; NNFI=0.91; SRMR=0.05; RMSEA=0.07; 90% CI of RMSEA=0.06–0.08. An inspection of the modification indices suggested that the residuals of two indicators of intrinsic motivation should be correlated. This modification[2] resulted in a good model fit: Scaled $X^2(159)=309.59$, $p<0.01$; robust CFI=0.95; NNFI=0.93; SRMR=0.05; RMSEA=0.06; 90% CI of RMSEA=0.05–0.07. The factor loadings (all significant at the.01 level) and residuals are presented in Table 2.

Cluster analyses

To examine the motivational profiles or clusters in the two schools, two cluster analyses were carried out. The purpose of cluster analysis is to derive a classification scheme for grouping a number of individuals into clusters, so that individuals within clusters are similar in some respect and unlike those from other clusters (Aldenderfer & Blashfield, 1984). A hierarchical cluster analysis was used to identify the number of clusters in School A. However, because this analysis is exploratory, it is important to confirm the results with an independent sample. Therefore, a *k*-means cluster analysis was used with School B to confirm the number of clusters identified in School A. According to Aldenderfer and Blashfield (1984), this cross-validation technique is important because if the same cluster solution is found across different samples from the same population, it is plausible to assume that the solution has a certain degree of generality.

Cluster analysis is sensitive to outliers because they can distort the representativeness of the derived clusters. Therefore, four multivariate outliers were removed from the data set using the Mahalanobis distance criterion suggested for data screening (Hair et al., 1998). Furthermore, the scaling of variables is important because if the variables are measured on different scales, the results can be misleading. Therefore, all variables were converted into *Z* scores before the cluster analyses were carried out. Lastly, multicollinearity may impact on the clustering results because variables that are multicollinear are weighted more heavily. Table 1 shows that there was not a problem of multicollinearity. However, there was a substantial correlation between intrinsic motivation and identified regulation ($r=0.82$), which implied collinearity. Despite the large size of this correlation, one should bear in mind that correlation values of 0.90 and above are taken to indicate substantial collinearity (Hair et al., 1998). Furthermore, the variance inflation factor (VIF) of the

[2] This modification did not alter the interpretation of the factor structure because the free parameters in the original and the modified model were almost identical. Correlated residuals indicate unique variance between the two items which cannot be explained by the underlying factor.

Table 2
Standardised factor loadings and residuals of the five types of motivation ('I take part in this PE class…')

Items	Loadings	Residuals
Amotivation		
But I really don't know why	0.580	0.814
But I don't see why we should have PE	0.755	0.656
But I really feel I'm wasting my time in PE	0.819	0.574
But I can't see what I'm getting out of PE	0.741	0.671
External regulation		
Because I'll get into trouble if I don't	0.762	0.648
Because that's what I am supposed to do	0.632	0.775
So that the teacher won't yell at me	0.772	0.635
Because that's the rule	0.795	0.607
Introjected regulation		
Because I want the teacher to think I'm a good	0.577	0.817
Because I would feel bad about myself if I didn't	0.580	0.815
Because I want the other students to think I'm skilful	0.575	0.818
Because it bothers me when I don't	0.585	0.811
Identified regulation		
Because I want to learn sport skills	0.805	0.593
Because it is important for me to do well in PE	0.736	0.677
Because I want to improve in sport	0.796	0.605
Because I can learn skills which I could use in other areas of my life	0.721	0.693
Intrinsic motivation		
Because PE is fun	0.811	0.585
Because I enjoy learning new skills	0.777	0.629
Because PE is exciting	0.844	0.536
Because of the enjoyment that I feel while learning new skills/techniques	0.801	0.598

two variables was 3.11, a value well below 10 which indicates substantial collinearity (Hair et al., 1998). In view of these findings, it was deemed appropriate to include all variables in the cluster analyses.

The Ward hierarchical method was preferred because it can minimise within-cluster differences and avoid problems with 'chaining' of observations encountered with the single linkage method (Hair et al., 1998). The squared Euclidean distance was used as a similarity measure. To determine the number of clusters in School A, the agglomeration schedule coefficients were inspected. According to Norusis (1992), small coefficients indicate that fairly homogenous clusters are being merged. Large coefficients indicate that clusters with quite dissimilar members are being combined. To decide the number of clusters in the data, one should look at fairly large increases in the coefficients between two adjacent sets. In School A, the agglomeration schedule showed that there was a large increase in the coefficients when moving from a three-cluster to a two-cluster solution. Therefore, it was concluded that there were three distinct motivational profiles in School A (Fig. 1).

The first was named the 'self-determined profile' (N=104; 45%) and included students with high

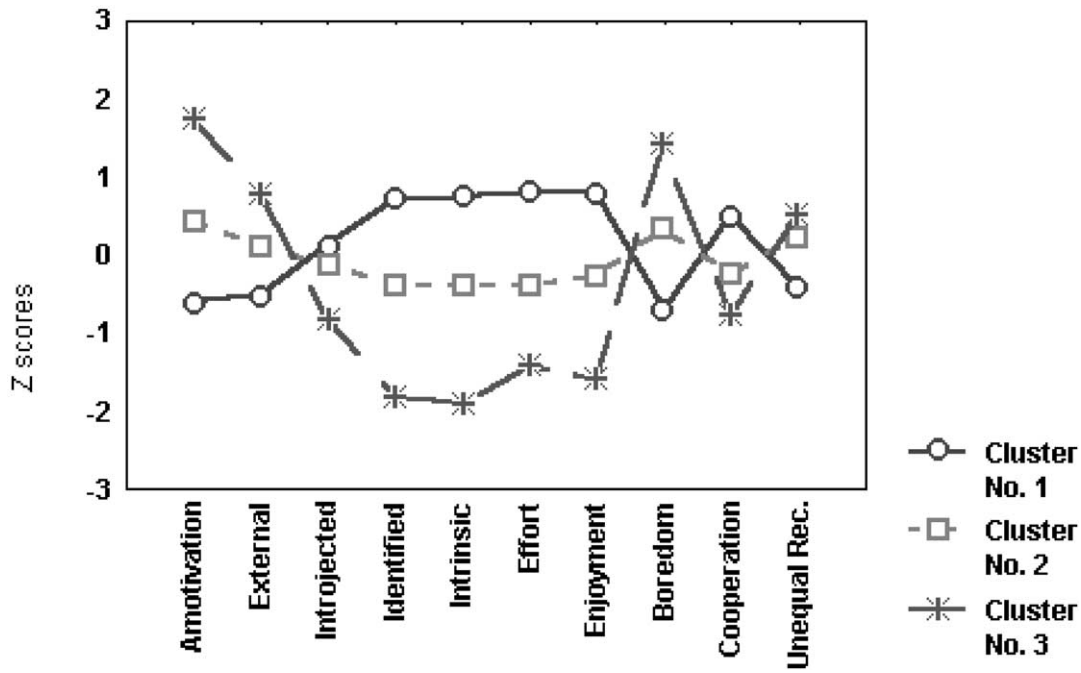

Fig. 1. Motivational clusters in School A (all scores are standardised).

intrinsic motivation, identified regulation, effort, enjoyment, and cooperative learning, moderate introjected regulation, and low amotivation, external regulation, boredom, and unequal recognition. The second profile was the 'moderate motivation profile' (N=103; 45%) and described students with moderate scores on all variables measured. The third profile was named the 'controlling motivation/amotivation profile' (N=24; 10%) and included students with relatively high amotivation, external regulation, boredom, and unequal recognition, and low introjected regulation, cooperative learning, identified regulation, intrinsic motivation, effort, and enjoyment. Note that the terms 'high' and 'low' describe standardised differences from the mean scores of each variable, and therefore, they do not represent absolute 'high' and 'low' scores.

The *k*-clusters analysis with School B identified three clusters (Fig. 2). Eighty-one (43%) students were allocated to cluster 1, 75 (39%) students were allocated to cluster 2, and 35 (18%) students were allocated to cluster 3. The standardised scores, means and standard deviations for each variable in the three clusters are presented in Table 3. The patterns of the three clusters in both schools were remarkably similar, although amotivation, identified regulation and intrinsic motivation in cluster 3 had relative differences in Z scores. A chi-square analysis in both schools showed that there were no significant gender differences in the classification of students into the three clusters (School A: $X^2(2)=1.66$, $p>0.05$; School B: $X^2(2)=4.91$, $p>0.05$).

Discussion

The purpose of the present study was to examine the number and structure of motivational clusters in two samples of British school students in PE classes. Three motivational clusters emerged in the first sample which were cross-validated with the second sample.

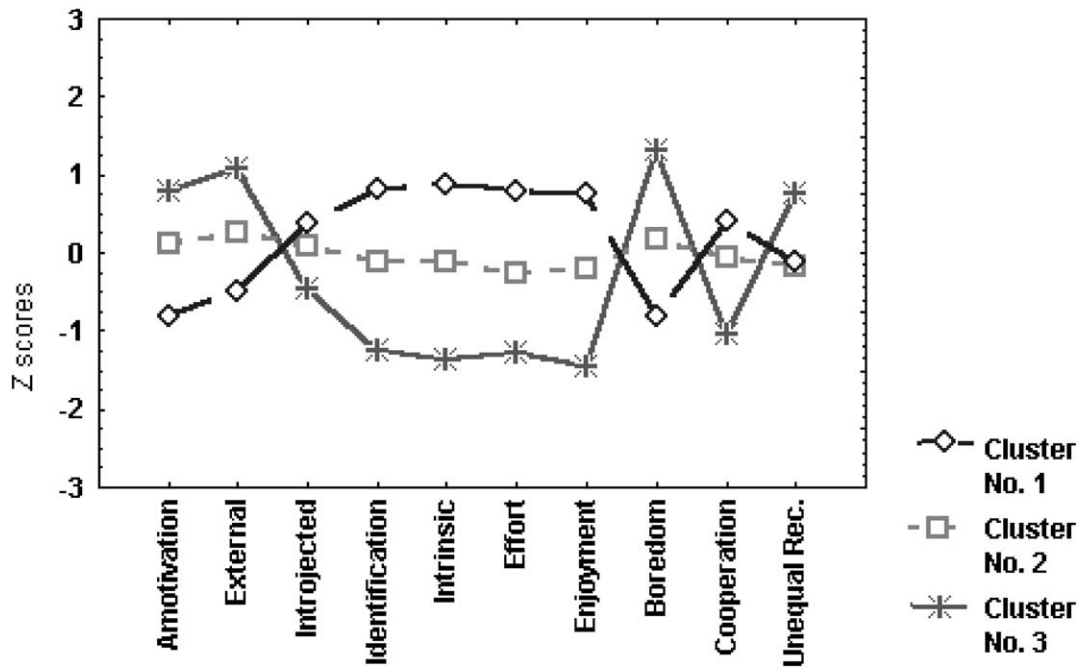

Fig. 2. Motivational clusters in School B (all scores are standardised).

The first motivational cluster was a clear example of a self-determined profile. Students in this cluster had relatively high levels of intrinsic motivation and identified regulation, which are considered to be self-determined types of motivation (Vallerand & Fortier, 1998). Students in this group also reported relatively low levels of amotivation and external regulation. This is encouraging, in view of the evidence that these latter two motivational types are negative predictors of future participation levels in different contexts, such as sport (Pelletier et al., 1995) and education (Vallerand, Fortier, & Guay, 1997).

Bearing in mind that introjected regulation is located toward the lower end of the self-determination continuum (Deci & Ryan, 1991), one might have anticipated that students in the first cluster would report low levels of introjected regulation. Unexpectedly, this was not the case in either of the two samples. However, Vallerand et al. (1997) suggested that introjected regulation can sometimes lead to adaptive consequences in the area of education. They argued that due to parental influences, students may partially internalise the value of participating in the various school activities. In the context of PE, for example, some students may decide to be actively involved, not because they enjoy PE, but because they would feel guilty of letting down their parents or some fellow students if they decided to act otherwise.

Students in the first motivational profile group also reported positive affective and behavioural outcomes, namely, relatively high levels of effort and enjoyment, and low levels of boredom. Similar results have been presented in other studies. For example, Pelletier et al. (1995) found positive relationships between intrinsic motivation, identified regulation, and effort in a sample of Canadian University athletes. In a similar study, Briere, Vallerand, Blais, and Pelletier (1995) showed that self-determined motivation was positively related to high levels of positive affect.

Table 3
Standardised scores, means, and standard deviations of the variables in each cluster for School A and School B (Note: cooperative learning and unequal recognition were measured with 5-point scales. All other variables were measured with 7-point scales.)

	School A									School B								
	Cluster 1 (*N*=104) 'Self-determination'			Cluster 2 (*N*=103) 'Moderate motivation'			Cluster 3 (*N*=24) 'Controlling motivation/amotiv.'			Cluster 1 (*N*=81) 'Self-determination'			Cluster 2 (*N*=75) 'Moderate motivation'			Cluster 3 (*N*=35) 'Controlling motivation/amotiv.'		
	Z	*M*	SD	*Z*	*M*	SD	*Z*	*M*	SD	*Z*	*M*	SD	*Z*	*M*	SD	*Z*	*M*	SD
Amotivation	−0.61	1.81	0.90	0.46	3.39	1.32	1.81	5.32	1.31	−0.80	1.52	0.62	0.11	2.89	1.00	0.87	3.90	1.37
External regulation	−0.51	2.67	1.42	0.14	3.75	1.37	0.75	4.86	1.61	−0.51	2.68	1.42	0.30	4.00	1.51	1.05	5.38	1.50
Introjected regulation	0.13	3.51	1.39	−0.11	3.18	1.19	−0.81	2.27	1.10	0.37	3.82	1.38	0.08	3.46	1.14	−0.50	2.72	1.14
Identified regulation	0.73	5.94	0.81	−0.35	4.25	1.08	−1.81	2.01	0.94	0.81	6.06	0.72	−0.12	4.62	0.99	−1.33	2.91	1.14
Intrinsic motivation	0.75	5.96	0.89	−0.36	4.21	0.93	−1.93	1.82	0.67	0.88	6.15	0.65	−0.15	4.60	0.70	−1.37	2.69	1.04
Effort	0.81	6.17	0.74	−0.38	4.51	0.92	−1.47	3.08	1.05	0.79	6.14	0.68	−0.24	4.70	0.88	−1.41	3.28	1.06
Enjoyment	0.79	6.15	0.62	−0.24	4.61	1.04	−1.66	2.66	1.09	0.75	6.08	0.64	−0.23	4.67	0.90	−1.46	2.86	1.13
Boredom	−0.69	1.75	0.82	0.36	3.24	1.13	1.41	4.82	1.50	−0.81	1.58	0.59	0.19	2.99	1.04	1.32	4.62	0.89
Cooperative learning	0.51	3.74	0.67	−0.22	3.12	0.70	−0.77	2.68	0.74	0.42	3.67	0.83	−0.11	3.26	0.75	−0.96	2.43	0.69
Unequal recognition	−0.42	2.49	1.00	0.21	3.17	0.92	0.57	3.51	1.15	−0.11	2.82	1.07	−0.16	2.76	0.92	0.75	3.74	0.96

Students in the self-determined cluster also reported that their PE teachers promoted cooperative learning. This finding makes sense because self-determination is enhanced in situations where cooperation is encouraged (Vallerand & Losier, 1999). As Ames (1984) noted, motivational climates that promote cooperation can bring students together to help each other learn and improve their skills. Increased competence will subsequently lead to higher levels of self-determination (Vallerand, 1997). Moreover, the intrinsic interest of the students in PE is higher when they are in a motivational climate which does not promote interindividual comparison and does not reward only the most competent students (i.e. unequal recognition; see Figs. 1 and 2). Overall, approximately 44% of the students were classified into the self-determined profile. This finding is encouraging, as it shows that a significant percentage of students have adaptive motivation in PE Wang and Biddle's (2001) study of motivational clusters in British PE also reported two similar motivational clusters with relatively high self-determination index and low amotivation.

The second motivational profile that emerged from the cluster analyses represented those students with relatively moderate levels of self-determined motivation, controlling motivation, and amotivation. The students in this group also reported moderate levels of effort, boredom, enjoyment, cooperative learning, and unequal recognition. Overall, approximately 42% of the students belonged to this group, a relatively high percentage. Clearly, this is an interesting finding that deserves further research attention. What are the social factors that make a student feel self-determined, controlled, and amotivated in PE at the same time? Is this a relatively stable profile, or is it a transitory one because students will eventually shift to either a self-determined or to a controlling motivation/amotivation profile? These are some questions that deserve future research attention. One can hypothesise that the students in the moderate motivation profile perceived mixed (positive and negative) cues in their motivational climate. The latter did not discourage cooperation among students, but at the same time it undermined their social relations by applying unequal recognition. This finding implies that PE teachers are not always successful in creating an adaptive motivational climate. Wang and Biddle (2001) also reported two similar motivational clusters with moderate degree of self-determination index and amotivation.

The most undesirable motivational profile, however, was the third one, labelled controlling motivation/amotivation profile. Students in this cluster reported very low levels of intrinsic motivation and identified regulation, low levels of introjected regulation, and high levels of amotivation and external regulation. Clearly, these students are motivationally at risk because the latter two forms of motivation are negative predictors of future participation levels (Pelletier et al., 1995; Vallerand et al., 1997). These children also reported negative affective and behavioural outcomes, namely very high levels of boredom, and very low levels of enjoyment and effort. Similar results have been reported elsewhere. For example, Pelletier et al. (1995) showed that effort was negatively related to amotivation and unrelated to external regulation. Furthermore, Vallerand and Losier (1999) argued that negative affect, such as boredom, is likely to be experienced when one lacks self-determination.

Students in this cluster also reported low levels of cooperative learning and relatively high levels of unequal recognition in their PE classes. As Ntoumanis and Biddle (1999) emphasised, motivational climates which do not value cooperation and which promote competition and interindividual comparison, may undermine the three human needs for competence, relatedness, and autonomy, and consequently weaken the self-determination of students. Although perceptions of competence were not assessed here, it is possible that the students in this cluster felt amotivated

to try hard because they had low perceived competence. Fortunately, only approximately 14% of the total sample belonged to this cluster. For these students, it is important that intervention programmes are developed, based on the suggestions made by Vallerand and Losier (1999), with the aim of enhancing their perceived competence, intrinsic interest and enjoyment of PE Wang and Biddle (2001) also reported a motivational cluster with low self-determination index and high amotivation.

It should be noted that the present study assessed only two aspects of a motivational climate (i.e. cooperative learning and unequal recognition). Future research should expand on the present findings and investigate the role of additional climate factors. Furthermore, it would be interesting to examine whether the motivational profiles identified in this study and the relative distribution of individuals in each of these profiles will be replicated with students of different age groups. The need to examine the developmental pattern of motivated behaviours in education was also indicated as a key area for future research by Deci et al. (1991). Are self-determined motivational profiles more evident in early childhood, and controlling motivation/amotivation profiles more widespread in late childhood and adolescence, when the influence of peers increases (Brustad, 1992)? Although, undoubtedly, PE teachers exert a significant influence on students' motivational levels, one should not overlook that peer influence (in the form of peer acceptance and friendship) can also play an important role (Weiss, Smith, & Theeboom, 1997). Also, it would be particularly interesting to examine whether the motivational profiles identified in this study and their relative proportions could be replicated with students from different cultures and PE curricula. For example, there is evidence to suggest that choice is less valued in Asian cultures compared to Western cultures (Iyengar & Lepper, 1999).

In conclusion, the results show that there should not be a great amount of concern regarding the motivation of students in school PE. Approximately, 44% of the students in the present sample were self-determined and experienced positive affective and behavioural outcomes. Furthermore, another 42% of the sample reported moderate levels of self-determination. However, at the same time the findings signify that policy makers and PE teachers should have some cause for concern. Approximately 42% of the students reported moderate levels (whilst another 14% indicated high levels) of amotivation and external regulation, and these were accompanied by negative affective and behavioural outcomes. It is worth noting that Wang and Biddle (2001) reported identical proportions of students in the two relatively self-determined, two moderate motivation and the amotivation clusters.

These findings may be useful for a number of theoretical and practical reasons. Firstly, they offer support to Deci et al.'s (1991) call for prioritising the promotion of self-determined motivation in education. Secondly, they show that the different motivational types are independent, and therefore, they can be encountered in different degrees within the same student. Thirdly, the clusters give PE teachers an important insight into the complexities of student motivation. That is, the clusters offer potential explanations regarding the behaviour and affective experiences of students and how these might be related to the teaching/learning climate. Lastly, the results may have implications for the successful promotion of physical activity programmes in PE and the goal of creating positive attitudes toward physical activity. These initiatives are likely to have a stronger impact when students view PE activities as interesting and fun or important for the accomplishment of personally valued goals, and not when they feel that they must participate in PE, or even more, when they regard it as a pointless activity.

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