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Sport and Education

Tribute to Martin Lee

MOTIVATION IN PHYSICAL EDUCATION:
the differentiated effect of gender, age and sport's involvement

1. Introduction

Motivation is probably one of the most studied topics in the context of sports (Edmunds, Ntoumanis & Duda, 2006), particularly in Portugal. However, research in this domain can be characterized, to some extent, by a lack of focus which limits understanding about the relationship between motivation and participation in sport and exercise. This situation is due, on one hand, to the lack of a clear definition for motivation, and on the other hand, the multitude of theories trying to explain it. Further, much of the published research has been based on physically active groups which represent a very small percentage of the population. In the case of Portugal, only about 12% of the population is active (Fernandes, Lázaro & Vasconcelos-Raposo, 2005).

The study of motivation for sport participation has been a major research topic in sport psychology since the early 1980's (Frederick & Ryan, 1993, 1995; Harwood & Biddle, 2002; Vasconcelos-Raposo, 1996). However, much of the theory guiding this research emerged from the field of education, specifically cognitive activities (Vasconcelos-Raposo, 1996). Consequently, the results may not be clear because the nature of the motivation to participate in cognitive activities may not be the same as that to participate in physical activities.

The need to develop efficient strategies to motivate children to participate in physical activities and sports is widely recognized (World Health Organization, 1995; Strong *et al.*, 2005). Positive experiences in the context of physical education are generally assumed to influence children and youth to adopt healthy lifestyles in adulthood (Sallis & McKenzie, 1991; Shephard & Trudeau, 2000). It is also believed that such practice may promote and improve public health. Accordingly, it is suggested that programs of sport and physical activity should be specifically designed and implemented for children and young people in order to avoid the eventual development of attitudes of indifference towards physical activity at older ages (Fox, 1991).

Evaluation of the association of a variety of demographic, biological, psychological, behavioral, social and/or contextual variables with physical activity levels of children and youth shows that perceptions of competence, intention to practice sport and enjoyment

in the attending physical education emerged as positively related with physical activity (Sallis *et al.*, 2000; Trost *et al.*, 2002). In a related perspective, task orientation and higher intrinsic motivation tend to promote the most effective behavioral patterns for a higher level of persistence in sport activities and a lower occurrence of drop-out (Deci & Ryan, 1985; Markland & Hardy, 1997; Nicholls, 1984; Ntoumanis, 2001; Steinberg & Maurer, 1999; Wong & Bridges, 1995; Xiang & Lee, 2002).

Physical education is an obligatory discipline in the national educational curricula of many countries. This might be perceived as a positive measure, but it might not be so since it does not allow for the development of intrinsic motivation, given that students do not exercise the element of choice (Coakley & White, 1992). It is also suggested that the long-term benefits of this motivational form can be promoted when students have the possibility to choose the type of physical activities they prefer for their class (Coakley & White, 1992). It is also possible that some students may not have previous experience in sport activities which are relevant to the physical education context. Perceptions of incompetence might thus be one of the more important negative elements in the process of becoming physical active at older ages (Papaioannou, 1994).

One of the main characteristics of modern industrialized societies is the regular and systematic appeal that adults make for the involvement of youth in physical activity and sports. The proposed activities can be either integrated into the school curriculum or as a complement to it, and in the structure of club athletic programs (Fonseca, 2000). In order for appeals to be successful, it is important to know the motives of children and young people who would like to become involved. The knowledge of their motives allows for better planning which in turn can influence levels of the youth participation. Once motives are identified, teachers and other involved individuals may intervene in order to encourage youth to persist in sport activities. However, motivating children is not simply a process of strategically applying theories (Carvalho, 2001).

Emphasis on the sport and physical activity involvement of children and youth is based on health, fitness and behavioral benefits (Strong *et al.*, 2005). However, levels of participation on physical activity programs are very low with a high number of individuals – children, adolescents and adults – with a sedentary life style (Ryan, Frederick, Lepes, Rubio & Sheldon, 1997; Fernandes, Lazaro & Vasconcelos-Raposo, 2005). The present epidemic of obesity, with its consequences for health problems at more advanced ages, has been related to the sedentary behavioral pattern (Duda, 1996; Standage *et al.*, 2003).

1.1. The influence of physical education in the definition of active lifestyles

Relatively little research has focused in the psychological aspects of participation in physical education. Its potential as a significant influence in promoting public health is recognized (Goudas, Biddle, Fox & Underwood, 1995; Goudas, Dermitzaki & Bagiatis, 2001; Haywood, 1991; Sallis & McKenzie, 1991). Accordingly, the school is viewed as the "... *setting with most promise for having a public health impact ... because virtually all children can be reached in school, and an existing infrastructure is devoted to physical education and health education...*" (Sallis & McKenzie, 1991, p. 131).

However, physical activity and in particular sport participation takes place in many other contexts among which sport clubs are especially relevant. Treasure (2001, p. 79) notes that *"The number of children and adolescents who regularly engage in adult organized sport outside the school system makes this activity one of the most popular achievement contexts among young people to today. Understanding and enhancing motivating in this context therefore constitutes a very meaningful topic of research for those interested in child and adolescent development."* Although it is important to study motivation for participation in sport in general, special emphasis should be placed on the context of physical education classes for several reasons. First because physical activity can be beneficial to health if associated with the promotion of proper values as in an educational setting; otherwise the risk of creating facilitative conditions for adherence to less desirable behaviors is possible (Vasconcelos-Raposo, Silva & Teixeira, 2005). It is logical, therefore, to assume that the programs of physical activity in the school context will have a positive influence when students are motivated and perceive positive benefits at the cognitive, affective and physical levels as a result of that participation. Unfortunately, many youth who do not participate in sufficient physical activity in physical education to derive obtain health benefits (Armstrong & Biddle, 1992; Papaioannou & Theodorakis, 1996). Moreover, many youngsters do not participate in physical education presenting as an excuse health problems, physical incompetence and others.

When promoting physical activity, it is necessary to consider the interests of children and adolescents to participate. Among school age youth, age, gender and student interest in physical education interact (Van Wersch *et al.*, 1992). Girls in the youngest groups demonstrated higher interest in physical education classes than boys, while boys in more advanced age groups showed higher interest than girls. However, when the boys and girls were considered together across ages, there was a decline in interest in physical education. It was suggested that physical education was a non-significant course, even though it was considered a favorite class.

Understanding motivation in the context of the school system is an important topic, in particular those interested in health and physical activity. Such study should focus on the relationship between motivation and intention to participate in sport and physical activity (Biddle, Soos & Chatzisarantis, 1999; Goudas *et al.*, 1995). The purpose of the present study is to identify perceptions of students regarding a group of motivational variables proposed by the Hierarchical Motivational Model.

1.2. Self-Determination Theory

According to Edmunds, Ntoumanis and Duda (2006, p. 2241), self-determination theory (SDT) *"...proposes that human motivation varies in the extent to which it is autonomous (self-determined) or controlling. Behaviors and actions that are autonomous are initiated freely and emanate from within oneself (...). In contrast, when behavior is controlled, it is regulated by external force. The individual in this instance feels pressured to engage in the behavior. Based on these distinctions, SDT proposes that there three forms of motivation exist; namely, intrinsic motivation, extrinsic motivation, and amotivation, which, based on the level of autonomy associated with them, lie on a continuum ranging from high to low self-esteem."*

Biddle *et al.* (1999) suggest Self-Determination Theory does not take into consideration how success is defined (Is something missing here?). According to them, success can be viewed as the means of any given behavior qualitatively regulated through the different reasons presented by the individual. This is an autonomy centered perspective. This view has been the primary theoretical paradigm applied in the motivation in the sport context, in particular intrinsic motivation (Duda, Chi, Newton, Walling & Cley, 1995). Evidence from the education and sport contexts has demonstrated the importance of the multiple roles that motivation can play in the promotion of cognitive, affective and behavioral benefits (Ntoumanis, 2001). The results also highlight the importance of choice in the development human behavioral autonomy. This approach allows for the definition of the intensity and direction of behaviors in sport and physical education contexts given that the participation of students in the choice of tasks are quite limited; variation in physical abilities is an additional factor. This can reduce levels of student self-determination, not overlooking the importance of perceived competence in the definition of different motivational levels (Ntoumanis, 2000).

Standage and Treasure (2002) suggest the use of the motivational continuum model proposed by Ryan and Deci (2000). Intrinsic motivation in a given activity varies according to the perception of personal control, choice (self-determination) and ability (competence). Further, any event or factor that influences perceptions of competence or self-determination will function to modify intrinsic motivational levels.

Motivation	Amotivation	Extrinsic motivation				Intrinsic motivation
Regulatory style	Non-regulation	External	Introjection	Identified	Integration	Intrinsic
Perceived locus of causality	Impersonal	External	Somewhat external	Somewhat Internal	Internal	Internal
Behavior						
Relevant regulatory processes	Lack of:					Enjoyment
	Competence	Presence of:	Focus on approval	Activity valued	Synthesis of identified regulations to self	Pleasure
	Contingency	- External rewards	Ego involvement	Consciously pursued		Satisfaction
Intention	- Punishments					

Figure 1. The self-determination continuum

1.3. Hierarchical Motivational Model

Given the complexity of human motivation, Vallerand (1997) emphasized the need for more concrete understanding and analysis of the dimensions of motivation as they vary in type and level and called for a theoretical model in which all these aspects are integrated, the hierarchical motivational model. The proposed motivational sequence of the model can be applied to the sport and physical education contexts

(Vallerand & Losier, 1999). Social factors play a key role in the differentiation process. Cooperative learning, self-referenced improvement and perceptions of choice are several factors that increase self-determined motivational levels (Condon & Collier, 2002; Ntoumanis, 2001). Task and ego orientation are additional factors; the former is positively associated with intrinsic motivation (Standage *et al.*, 2003).

Deci and Ryan (1985) suggest that these social factors are exercised through the satisfaction of three psychological needs: *Autonomy* – the individual's perception of being the origin of his own behaviors, revealing an internal perceived locus of causality; *Competence* – accomplishing activities in an effective way, originating mastery sensations; and *Relatedness* – the individual's sense of acceptance by others, e.g., belonging to a group (social inclusion) the felt need for friendships (Ntoumanis, 2001).

In addition to the motivational types that are influenced by psychological needs (Figure 1), the last level of the model considers the consequences at a cognitive, affective and behavioral level. The theory suggests that intrinsic motivation usually predicts positive consequences, while amotivation predicts negative results (Biddle *et al.*, 1999; Hagger, Chatzisarantis & Biddle, 2002; Ntoumanis, 2001; Vallerand, 1997, 2000, 2001).

On average, interest and participation in physical activities decrease with age, beginning perhaps during the transition from childhood into adolescence (Malina, Bouchard & Bar-Or, 2004). Moreover, non-physically active individuals tend to adopt a sedentary lifestyle, ignoring the health, fitness and behavioral benefits of regular physical activity. Of relevance to the present discussion, self-determination profiles are more evident during childhood, while amotivated profiles increase during adolescence, a time when the influence of peers is perhaps highest (Ntoumanis, 2001). A major priority for sport and health policy makers is the identification, promotion and implementation of models/programs that optimize the motivation of youth to participate in a variety of physical activities. A related aspect is the evaluation of the impact of physical activity on the physical and psychological well-being of the population. Understanding of motivational processes that determine the level involvement in physical activity, including sport and physical education, may facilitate this process (Standage *et al.*, 2003).

The Self-Determination Theory (Deci & Ryan, 1985) and the Hierarchical Motivational Model (Vallerand, 1997, 2000, 2001) are the two theoretical models used to study motivation for physical activity and sport. The present study attempts to analyze several determinants of motivational processes in the context of physical education, including age, gender and sport involvement. It does not attempt a structural validation of the models. The primary focus is an understanding of the process that leads to the development of intrinsic motivation for physical activity and sport and consequently the promotion of a healthy life style.

2. Methodology

The sample consisted of 1099 adolescents (544 girls and 555 boys), 14 to 16 years (14.7 ± 0.7 years), selected from 11 schools from the northern and central regions of Portugal. The initial size was 1127; 28 students (2%) were eliminated

because the questionnaires had unanswered items or their ages did not satisfy the inclusion criteria. By whole year age groups, students were distributed as follows: 14 years, 561; 15years, 348; and 16 years, 190. Across all ages, 568 individuals did not participate in sport activities, while 405 were involved in team sports and 126 in individual sports.

Table 1. Sample characterization considering independent variables

Number of individuals n = 1099		
Male n = 555 (50.5%)		Female n = 544 (49.5%)
14 years n = 561 (51.0%)	15 years n = 348 (31.7%)	16 years n = 190 (17.3%)
Non-athletes n = 568 (51.7%)	Team sports n = 405 (36.8%)	Individual sports n = 126 (11.5%)

2.1. Instruments

A translation and linguistic adaptation of the questionnaire used by Ntoumanis (2001) was used. The questionnaire was translated by the authors and an independent translation was performed by a professional. An experienced English/Portuguese teacher evaluated the words so that youngsters would have no difficulty in comprehending what was requested in each item. The questionnaire was completed in the presence of one of the researchers and no feedback was received from the students that would raise suspicions about the interpretation of individual items.

Social factors

Students rated their perception of whether they have a choice of behaviors and tasks using three items. These items are the same found in Biddle and colleagues (1995) Perception of choice subscale of the Physical Education Class Climate Scale. The Cooperative Learning and Improvement subscales of the Perceived Motivation Climate in Sport Questionnaire-2 (Newton, Duda & Lin, 2000) was used to assess students' cooperative learning and self-referenced improvement. Each of these subscales consisted of four items that were rated on a 5-point Likert scale anchored by strongly disagree (1) and strongly agree (5).

Social factors include perception of choice, cooperative learning and self-referenced improvement. Perception of choice was evaluated with three items of the choice perception dimension of the Physical Education Class Climate Scale (Biddle *et al.*, 1995). Cooperative learning and teacher emphasis on self-referenced improvement were evaluated with the scales of Perceived Motivation Climate in Sport Questionnaire-2 (Newton *et al.*, 2000). Items were rated in a 5 point Likert scale (1=disagree and 5=agree).

Psychological mediators

The psychological factors were assessed by three subscales: perceived competence, autonomy and relatedness. Perceived competence was assessed using the five items from the perceived competence subscale of the 18-item Intrinsic Motivation Inventory (MacAuley *et al.*, 1989). Students' perception of autonomy and relatedness were assessed with four items (two items per measure) developed by Ntoumanis (2001). Responses on all scales were indicated on a 7-point Likert scale.

Psychological mediators included perception of competence, related and autonomy. Perception of competence was evaluated using five items of the Intrinsic Motivation Inventory (McAuley *et al.*, 1989). Two sets of items developed by Ntoumanis (2001) were used to estimate perceptions relatedness and autonomy.

Motivational forms

Motivational forms were measured using a questionnaire developed by Goudas and colleagues (1994) which was based on the work of Ryan and Cornell (1989). The questionnaire subdivided into four subscales measuring intrinsic motivation, identified regulation, introjected regulation and external regulation. In addition, students responded to an amotivation subscale of Goudas and colleagues (1994) instrument which it was adapted from the Academic Motivation Scale (Vallerand *et al.*, 1992). Responses were made on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). Previous work has supported the psychometric properties of the scales (Goudas *et al.*, 1994; Ntoumanis, 2001).

Different motivational forms were assessed with questionnaires used by Goudas *et al.* (1994). Four items for each of five subscales of the Self-Regulation Questionnaire (Ryan & Connell, 1989) and the Academic Motivation Scale (Vallerand & Bissonnette, 1992) were used.

Consequences

Four consequences of the motivational styles were assessed with 7-point scales: effort, enjoyment, boredom and intention. Effort was measured with three items from the Intrinsic Motivation Inventory (McAuley, Duncan, & Tammen 1989). Enjoyment and boredom 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. Finally, intention was evaluated by using a single item. Support for the internal reliability of these scales has been shown in previous physical education based research (Ntoumanis, 2001, 2002).

Cognitive, affective and behavioral consequences as suggested by the model of Vallerand (1997) were also considered. These included boredom, evaluated with three items developed by Duda *et al.* (1992); effort, based on the subscale of the Intrinsic Motivation Inventory (McAuley *et al.*, 1989); and intention of being physically active in the future, based on a single item (Ntoumanis, 2001) developed from several examples in previous studies (Biddle & Goudas, 1996; Biddle *et al.*, 1999; Goudas *et al.*, 1995).

Psychological mediators, motivational forms and consequences were rated on a 7 point Likert scale (1=disagree a lot and 7=agree a lot).

Social factors, psychological mediators, motivational forms and consequences were the dependent variables, while gender, age and extra-curricular sport involvement were the independent variables. Since the number of students practicing individual sports was small ($n = 126$, 11.5%) the two sport subgroups (team and individual sport athletes) were combined to facilitate the comparisons those involved in sport (athletes) and those not-involved in sport (non-athletes).

2.2. Procedures

After obtaining permission of school authorities and informed consent from parents and students, the questionnaires were administered under the supervision of the research team. The questionnaires were completed in a calm environment and took about 10 to 15 minutes.

Descriptive statistics were calculated. The symmetry of the distribution of frequencies (normality) was evaluated via skewness and kurtosis (Maroco, 2003). When comparing two groups, the t-test for independent samples was used; when there three groups or more groups, one-way ANOVA was used, followed by the Scheffé post-hoc test. Cronbach (1951) alphas of all subscales were calculated. According to Cronbach (1951), the values obtained should vary between 0 and 1, while Nunnally (1978) defined 0.7 as the minimum for a scale to be considered acceptable. A significance level of 5% was used for all statistical procedures.

3. Results

The results are presented following the temporal sequence proposed by Vallerand's model. Descriptive statistics and the symmetry analysis are presented in Table 2. Self-referenced improvement as defined by the teacher (4.18 ± 0.68) was the most important social factor. Among psychological mediators, relatedness (4.85 ± 1.56) was followed by perceptions of competence (4.41 ± 1.44). There was some evidence for the importance of the social-affective domain and the possibility of demonstration of abilities in physical education classes. Autonomy scores were lower, suggesting that students had little possibility to participate in task choices (3.49 ± 1.50) for physical education classes.

Table 2. Preliminary analysis of dependent variables

	M	SD	Skewness	Kurtosis	Cronbach alpha
<i>Social factors:</i>					
Choice	3.16	0.95	-0.10	-0.60	0.67
Cooperative learning	3.31	0.84	-0.17	-0.44	0.71
Improvement	4.18	0.68	-1.01	1.20	0.74
<i>Psychological mediators:</i>					
Competence	4.41	1.44	-0.13	-0.65	0.86
Autonomy	3.49	1.50	0.31	-0.51	0.38

Cont.

					Cont.
Relatedness	4.85	1.56	-0.38	-0.59	0.58
<i>Motivational forms:</i>					
Intrinsic motivation	5.28	1.28	-0.74	0.33	0.82
Identified regulation	5.78	1.22	-1.29	1.67	0.83
Introjected regulation	4.26	1.53	-0.16	-0.80	0.80
External regulation	3.80	1.56	0.10	-0.77	0.69
Amotivation	2.63	1.58	0.88	-0.04	0.82
<i>Consequences:</i>					
Effort	5.38	1.32	-0.79	0.36	0.73
Boredom	2.60	1.55	0.95	0.06	0.77
Intention	4.67	2.14	-0.40	-1.21	—

NOTE: A correlation coefficient is given for autonomy and relatedness, because they both consist of only two items. No alpha value is presented for intention subscale because it's a single-item variable.

The students, in general, exhibited a self-determined motivation profile, presenting a high mean for identified regulation (5.78±1.22), a type of extrinsic motivation. There was a low score for boredom and a favorable score for the intention to practice sport in the extra-curricular context in a future situation (4.67±2.14).

Table 3. Comparative analysis of dependent variables by gender

	Male	Female	t	p
<i>Social factors:</i>				
Choice	3.18±0.96	3.14±0.93	0.59	0.554
Cooperative learning	3.39±0.84	3.23±0.84	3.31	0.001***
Improvement	4.17±0.70	4.20±0.66	-0.85	0.395
<i>Psychological mediators:</i>				
Competence	4.79±0.70	4.03±1.33	9.11	0.000***
Autonomy	3.67±1.57	3.31±1.40	4.04	0.000***
Relatedness	4.84±1.57	4.86±1.56	-0.29	0.774
<i>Motivational forms:</i>				
Intrinsic motivation	5.49±1.30	5.07±1.24	5.50	0.000***
Identified regulation	5.85±1.26	5.70±1.18	2.03	0.042*
Introjected regulation	4.48±1.59	4.04±1.44	4.83	0.000***
External regulation	3.89±1.65	3.71±1.46	1.89	0.060
Amotivation	2.79±1.74	2.47±1.38	3.35	0.001***
<i>Consequences:</i>				
Effort	5.39±1.36	5.36±1.28	0.42	0.673
Boredom	2.66±1.69	2.53±1.40	1.42	0.157
Intention	5.13±1.99	4.20±2.19	7.40	0.000***

*p<0.05; **p<0.01; ***p<0.001

Dependent variables are compared by gender in Table 3. Scores for boys and girls differed significantly for level of cooperative learning, competence, autonomy, intrinsic motivation, identified regulation, introjected regulation, amotivation and intention to become involved in sports in the future. Boys valued all of the constructs more so than girls with the exception of emphasis on improvement; however, mean scores on the latter variable did not differ significantly.

Comparisons by age are summarized in Table 4. Only three variables differed significantly by age group: cooperative learning -14 > 16 (3.37 ± 0.85 and 3.16 ± 0.86); improvement -14 > 15 (4.24 ± 0.68 and 4.09 ± 0.70); intention to become active in physical activity -16 > 14 (4.96 ± 2.02 and 4.50 ± 2.15).

Table 4. Comparative analysis of dependent variables by age

	14 years	15 years	16 years	F	p
<i>Social factors:</i>					
Choice	3.18±0.94	3.10±0.96	3.22±0.95	1.30	0.27
Cooperative learning	3.37±0.85	3.30±0.81	3.16±0.86	4.30	0.01
Improvement	4.24±0.68	4.09±0.70	4.19±0.65	5.08	0.01
<i>Psychological mediators:</i>					
Competence	4.39±1.48	4.43±1.39	4.43±1.40	0.12	0.89
Autonomy	3.50±1.51	3.52±1.48	3.41±1.51	0.37	0.69
Relatedness	4.84±1.58	4.80±1.58	4.96±1.48	0.61	0.54
<i>Motivational forms:</i>					
Intrinsic motivation	5.28±1.25	5.25±1.35	5.35±1.27	0.40	0.67
Identified regulation	5.82±1.17	5.69±1.35	5.81±1.15	1.36	0.26
Introjected regulation	4.25±1.54	4.30±1.53	4.19±1.52	0.34	0.71
External regulation	3.80±1.52	3.89±1.62	3.64±1.54	1.53	0.22
Amotivation	2.55±1.62	2.73±1.54	2.68±1.52	1.52	0.22
<i>Consequences:</i>					
Effort	5.43±1.31	5.31±1.34	5.36±1.32	0.85	0.43
Boredom	2.57±1.55	2.65±1.59	2.59±1.51	0.33	0.72
Intention	4.50±2.15	4.78±2.18	4.96±2.02	4.00	0.02

*p<0.05; **p<0.01

Athletes and non-athletes differed significantly in 10 of the 14 variables. Athletes scored significantly higher in cooperative learning; perceptions of competence, autonomy and relatedness, intrinsic motivation, identified regulation, introjected regulation, effort, and intention, while non-athletes scored significantly higher in boredom. Choice, improvement, external regulation and amotivation did not differ between athletes and non-athletes.

Table 5. Comparative analysis of dependent variables by sport involvement

	Non-athletes	Athletes	t	p
<i>Social factors:</i>				
Choice	3.15±0.95	3.18±0.94	-0.52	0.604
Cooperative learning	3.25±0.85	3.37±0.82	-2.47	0.014*
Improvement	4.15±0.66	4.22±0.71	-1.51	0.132
<i>Psychological mediators:</i>				
Competence	4.07±1.37	4.78±1.42	-8.39	0.000***
Autonomy	3.39±1.47	3.59±1.52	-2.19	0.029*
Relatedness	4.67±1.59	5.04±1.52	-3.93	0.000***
<i>Motivational forms:</i>				
Intrinsic motivation	4.97±1.33	5.62±1.14	-8.76	0.000***
Identified regulation	5.58±1.33	5.98±1.06	-5.53	0.000***
Introjected regulation	4.08±1.50	4.45±1.54	-3.96	0.000***
External regulation	3.82±1.54	3.78±1.59	0.43	0.665
Amotivation	2.68±1.49	2.58±1.67	0.99	0.320
<i>Consequences:</i>				
Effort	5.22±1.36	5.54±1.26	-4.02	0.000***
Boredom	2.69±1.55	2.50±1.56	2.11	0.035*
Intention	4.08±2.19	5.30±1.90	-9.82	0.000***

*p<0.05; **p<0.01

4. Discussion

The present study contributes to our understanding of motivational processes that define the intention of being physically active. Boys perceived higher levels of cooperative learning, competence, autonomy, intrinsic motivation, identified regulation, introjected regulation, amotivation and physical activity intention than girls. This would suggest that boys should work in groups in physical education settings so that they could learn from peers. Accordingly, this type of experience promotes higher levels of self-perceived competence which, in turn, will enhance intrinsic motivation and consequently the intention to participate in physical activity and sport in the future.

Among the social factors, only cooperative learning differed significantly between boys and girls. Ames (1992) has suggested that contexts that stimulate cooperative learning, allow students to interact and help themselves in the mutual learning and improvement processed. Further, cooperation turns a sport into an inherently more interesting and entertaining activity, while competition among students can reduce the intrinsic motivation in the same activity. In the Ames study, boys gave more importance to the relatedness among friends as a way of promoting learning and improvement. However, the present research seems to contradict what is presented in the literature.

Teacher feedback during group activities can sustain cooperative learning experiences in the physical activity; traditional practices associated with gender socialization are a related factor in cooperation (Deci & Ryan, 1985). Awareness of contrasting situations may better reveal discrepancies between competences and abilities (Papaioannou, 1994). Such situations may lead girls to perceive teacher feedback as more controlling and, consequently, reduce intrinsic motivation. It has been argued that feedback under such situations operates as a source of control for girls (Deci, 1975). On the other hand, in team sport situations, the impact of feedback on cooperative learning loses its effect. Further, team sports tend to be labeled as "masculine" and activities such as dance and gymnastics are labeled as "feminine" (Lee *et al.*, 1999). Such stereotypes influence the perceptions and thoughts concerning sport activities practiced in physical education, and may limit the effort and persistence of girls to be successful in activities labeled as "masculine" (Clifton & Gill, 1994; Csizma *et al.*, 1988).

Available evidence tends to show that boys generally reveal higher scores in the psychological factors considered (Papaioannou, 1994). It is also argued that physically active youth perceive themselves as more competent and tend to be more easily accepted by their peers (Weiss & Duncan, 1992). And, boys, on average, tend to be more active and to perform better in a variety of sport-related activities than girls (Malina *et al.*, 2004). This may explain why boys, who perceive themselves more competent, also tend to present higher abilities that appeal for cooperative learning. On the other hand, girls may try to avoid activities in which they may demonstrate low levels of competence or ability to be successful. However, when activities fall into the "feminine" type, girls generally reveal higher levels of competence than boys (Lenney, 1977). By inference, it is important that physical education classes consider student participation in the selection of the activities (Wang *et al.*, 2002).

The higher level of autonomy in boys compared to girls is consistent with the premises of Deci and Ryan (1985). It is also argued that the teacher is the most important factor in shaping the environment of the class and in the development of an internal perceived locus of causality among students (Ferrer-Caja & Weiss, 2000; Vallerand *et al.*, 1987). Greater autonomy, in turn, may facilitate development of higher levels of perceived competence. On the other hand, a class environment that does not promote normative evaluation may maximize student self-determination and lead to higher perceptions of autonomy (Ntoumanis, 2000). Given these arguments, boys may develop positive opinions about their behaviors in particular in situations where they perceive themselves as being the initiating source of the activities in question (de Charms, 1968).

Boys who perceive themselves as competent and autonomous show higher levels of intrinsic motivation since intrinsically motivated activities tend to be freely chosen and involve self-determination (Deci & Ryan, 1985). Students who perceive themselves as more competent also consider physical education interesting and enjoyable and show higher levels of intentions to participate in classes where they can develop their physical abilities (Ntoumanis, 2000).

There does not appear to be a consensus on the validity of the other constructs considered in this study, specifically identified regulation, introjected regulation and amotivation. Deci and Ryan (1985) suggest that identified regulation consists in the acceptance of the regulation of a behavior so that it allows the perception of control

and the possibility of individual choice, even if that choice is based on extrinsic reasons. It is thus argued that identified regulation is a self-determined, though extrinsic, form of motivation and can be influenced by autonomy and perceptions of competence, as is the case for intrinsic motivation.

Observations dealing with introjected regulation and amotivation are controversial and not consistent with Self-Determination Theory (Deci & Ryan, 1985). According to the theory, individuals who perceive themselves as being more competent and autonomous will show higher levels of intrinsic motivation and lower levels of external regulation and amotivation. This relationship was not confirmed in the present study.

For the behavioral consequences considered, boys and girls differed in the intention to become physical active; boys scored higher than girls. It is postulated that more positive consequences are related enhanced intrinsic motivation and perceptions of competence (Deci & Ryan, 1985). Consistent with this view, boys in the present study were more capable and had higher intrinsic motivational levels. They also had higher intention of demonstrating their capacities in an extra-curricular sport context. These results are generally in agreement with other studies (Markland & Hardy, 1997; Ntoumanis, 2001; Vallerand, 1997, 2000, 2001).

Age variation in the present sample was relatively limited (Table 4). One of the variables that varied with age was level of cooperation, which was higher in 14 compared to 16 year old youth. The result is consistent with the observations of others (Chaumeton & Duda, 1988; Xiang & Lee, 2002) and with the suggestion that contexts which promote cooperative learning, allow students to interact and help each other in the learning and improvement processes (Ames, 1992). On the other hand, when students participate in the same physical activities but with a competitive emphasis, there is a tendency for reduce intrinsic motivation for involvement.

In contrast, 16 year old youth (16 years) show a higher level of intention to become physically active in sport in extra-curricular contexts compared to 14 year olds. Older youth likely have greater possibilities to exert a choice and thus have a higher sense of autonomy. Higher levels of perceptions of competence and intrinsic motivation are predictive variables of the intention of becoming physically active (Biddle *et al.*, 1999; Ntoumanis, 2001; Pelletier *et al.*, 1995; Standage *et al.*, 2003).

Participants (athletes) and non-participants (non-athletes) in sport differed in 11 of the 14 variables considered, with athletes scoring higher (Table 5). Non-athletes obtained higher values in external regulation, amotivation and boredom.

Athletes reported higher perceptions of choice, cooperative learning and emphasis on self-referenced improvement which is consistent with limited evidence that sports participation enhances the motivation to participate in physical education. In general, students with more sport experience demonstrate more favorable attitudes towards physical education than those with less sport experience (Anderssen, 1993). The beneficial effects of these social factors are reflected in higher perceptions of competence, autonomy and relatedness demonstrated by athletes.

Extra-curricular sports practice also allows the development of physical abilities and self-referenced comparisons of capacities, and promotes a learning process based on the interactions between peers (Ames, 1992). The perception of exercising the choice to participate is another consideration, which may explain the high levels of

autonomy observed among athletes (Ferrer-Caja & Weiss, 2000, 2002). It should be noted that 405 students were involved in team sports. These students also attribute a high level of importance to the interactions and relationships in physical education classes. Of relevance, individuals who are physically more competent also tend to be more easily accepted by their peers (Weiss & Duncan, 1992).

Students with higher perception of competence are those who also show a self-determined motivational pattern (intrinsic motivation and identified regulation). These students consider physical education classes more interesting and intend to participate as form of developing their physical abilities (Ntoumanis, 2000). Adherence to physical education classes also tends to be associated with a more positive attitude towards physical activity (Goudas *et al.*, 1995, 2001; Papaioannou & Theodorakis, 1996).

Students who present higher levels of intrinsic motivation and perceived competence demonstrate a more positive outlook on the consequences of participation in physical activities (Deci & Ryan, 1985; Vallerand, 1997, 2000, 2001). They also have higher effort and lower boredom with participation in sport activities offered in physical education classes. They express higher levels of intention to become involved in physical activities, which may be associated with higher probability of continuation in sport. This argument is consistent with several studies that have concluded that intention to become involved in sport is the most important determinant for future participation physical activities (Biddle & Goudas, 1996; Chatzisarantis *et al.*, 1997; Ntoumanis, 2001; Papaioannou & Theodorakis, 1996; Standage *et al.*, 2003).

5. Conclusions

Adolescent boys perceived higher levels of cooperative learning, competence, autonomy, intrinsic motivation, identified regulation, introjected regulation, amotivation and intentions to become physically active in the future than adolescent girls. The results are consistent with observations that boys are more physically active than girls due likely to the culturally prescribed norms.

Younger students preferred cooperative learning activities, self-referenced improvements and the possibility to participate in the process of choosing the physical education activities.

Based on the results obtained, it is recommended that physical education teachers should plan and provide feedback designed to promote perceptions of competence and intrinsic motivation. It is believed that such a practice will enhance the likelihood of persisting in a physically active lifestyle into adulthood.

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