

# Autonomy Support, Motivation, Satisfaction and Physical Activity Level in Physical Education Class \*

## Apoyo a la autonomía, motivación, satisfacción y niveles de actividad física en clases de educación física

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GRACIELLE FIN<sup>a</sup>

Universidade do Oeste de Santa Catarina, Brasil  
ORCID: <http://orcid.org/0000-0001-7860-4451>

ELISABETH BARETTA

Universidade do Oeste de Santa Catarina, Brasil

JUAN ANTONIO MORENO-MURCIA

Universidad Miguel Hernández de Elche, España

RUDY JOSÉ NODARI JÚNIOR

Universidade do Oeste de Santa Catarina, Brasil

### ABSTRACT

The aim of this study was to identify the motivational profile and relate it to teacher autonomy support, basic psychological needs, exercise enjoyment, and level of physical activity in a sample of 615 Brazilian adolescents (327 girls and 288 boys), aged between 12 and 14 years ( $M = 13.3$ ,  $DT = .79$ ). One group was identified as more self-determined with high intrinsic motivation and introjected regulation scores, while the other showed no self-determination, with high external regulation and demotivation. Self-determined adolescents perceive greater teacher support; exhibit better fulfillment of basic psychological needs for autonomy, competence, and relatedness; show greater enjoyment in physical education classes and engage in more physical activity.

### Keywords

Motivation; self-determination; physical activity; adolescents.

### RESUMEN

El objetivo fue identificar el perfil motivacional y relacionarlo con el apoyo docente a la autonomía, a las necesidades psicológicas básicas, la satisfacción para la práctica de actividades físicas y el nivel de actividad física, en una muestra de 615 adolescentes. Se obtuvo un grupo con “perfil autodeterminado” con puntuación más alta de la motivación intrínseca y regulación introyectada; y un grupo con “perfil no autodeterminado” con puntuaciones elevadas de regulación externa y desmotivación. Los adolescentes con perfil más autodeterminado son los que perciben mayor apoyo docente a la autonomía; ; presenta más satisfacción con las necesidades psicológicas básicas de autonomía, competencia y relación con los demás; sienten mayor satisfacción para la práctica de educación física y practican más actividad física.

### Palabras clave

Motivación; autodeterminación; actividad física; adolescentes.

<sup>a</sup> Correspondance author. E-mail: [gracielle.fin@unoesc.edu.br](mailto:gracielle.fin@unoesc.edu.br)

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The relationship between physical activity, health, and better quality of life has been scientifically proven for decades (Caspersen, Powell, & Christenson, 1985). Even though the population is aware, a high percentage of children and adolescents do not meet the recommendations of regular physical activity (Trost & Loprinzi, 2008), and many of them do not do extracurricular physical activity (Centers for Disease Control and Prevention [CDC], 2010).

This negative behavior with respect to physical-sports activities may be influenced by motivational factors, which are regulated by biological, cognitive, and social factors. To help understand the influence of motivation on adhering to physical or sports activities, the Self-determination Theory ([SDT]; Deci & Ryan, 2000) has been widely used in recent years as a motivational model that considers different motivational perspectives, contextual influences on motivation, and interpersonal perceptions, analyzing whether behaviors are voluntary and autonomous. Thus, a self-determination continuum is proposed, whereby the individual may be more self-determined (intrinsic motivation and extrinsic regulations) or less self-determined (demotivation).

In this theory, human behavior is regulated by three basic psychological needs that act independently: competence, autonomy, and relatedness to others. Competence refers to the ability of a person to perform a task; autonomy is related to the level of independence and control of the choices an individual makes; and relatedness to others is linked to the perception of a sense of connection with other people (Deci & Ryan, 2000).

Satisfying these needs results in regulatory behavior, which may determine intrinsic motivation, when actions are initiated independently by people themselves, or extrinsic when actions are regulated by external factors (Deci & Ryan, 1991). In this respect, it is possible to consider three basic types of motivation, which range from the most self-determined form (intrinsic motivation) to lower

levels of self-determination (extrinsic motivation and demotivation), also characterizing different types of motivational regulators that influence human behavior.

Demotivation is the absolute lack of motivation, whereby individuals have no intention of engaging in an activity. Its behaviors are not influenced by external or internal factors and the need to perform an activity will not be valued, and will be accompanied by feelings of frustration, incompetence, and fear (Deci & Ryan, 2000).

Extrinsic motivation is determined by four types of regulation and their regulatory processes: external regulation is characterized by the need to obtain external rewards or avoid punishment; in introjected regulation, unlike external regulation, the rewards involved in the regulatory process are internal, individuals feel that they “need” or “must” perform a certain activity, but there is no feeling or “wanting” to do it; the regulation identified is more internally regulated behavior, in this case individuals consider their participation in the activity important; integrated regulation is considered the most self-determined of the extrinsic motivations (Fernandes & Vasconcelos-Raposo, 2005).

At the highest level of self-determination is intrinsic motivation; in this case the choice is personal, characterizing total autonomy in terms of the activity, which generates interest, pleasure, and satisfaction inherent to the activity. An intrinsically motivated person exhibits feelings of competence and self-accomplishment, sustaining interest for the activity even after the goal has been achieved (Deci & Ryan, 2000).

As such, motivation would be a continuous process, varying from lack of motivation to different states of extrinsic regulation, until reaching intrinsic motivation. More self-determined styles would be associated with pleasure, the effort to perform the activities, and the perception of a context favorable to autonomy, while less self-determined styles would be associated with anxiety and discomfort in carrying out these activities.

This theory was complemented by Vallerand (2001, 2007), who presented the Hierarchical Model of Motivation, organized according to the following sequence: Social Factors (global, contextual, situational) → Mediators (autonomy, competence, and relatedness) → Motivation (intrinsic, extrinsic, and demotivation) → Consequences (affective, cognitive, and behavioral). In the context of physical education, teachers are one of the determining social factors. They can assume different attitudes during class, considering a continuum that ranges from an interpersonal style based on extreme control (offering extrinsic incentives) to maximum support of autonomy (increases the intrinsic motivation of students) (Reeve et al., 2014).

Teachers who support autonomy manage to nurture the internal motivational resources of the student, explaining essential fundamentals, using non-controlling language, exhibiting patience in order to provide students with enough time to learn at their own pace (Reeve, 2009). Thus, students become more involved in decision making, using inquiry methodology, giving more importance to the process, encouraging effort, and personal growth.

In contrast to supporting autonomy is a controlling style during the class. In this case, teachers ensure that activities are performed in line with their own way of thinking, feeling, and behaving. When teachers use a controlling style, they induce students to put aside their own internal motivational resources to perform the activities, seeking to resolve problems according to the teachers' needs (Moreno-Murcia, Conde, & Sáenz-López, 2012).

Support aimed at the student's basic psychological needs is directly related to their satisfaction, resulting in more self-determined motivation (Ntoumanis & Standage, 2009). The feeling of satisfaction in attending physical education classes results from more self-determined behavior, influenced by intrinsic motivation to engage in the activities.

Identifying and assessing motivational dimensions and their intervening factors are important tools for understanding human

behavior in terms of adhering to physical activities and may help the professionals involved, with respect to managing and applying this knowledge in schools, implement strategies that stimulate good behavior via effective health intervention measures (Jiménez-Torres, Godoy-Izquierdo, & García, 2012).

Physical education classes may be an ideal setting to acquire the knowledge, attitudes, and skills necessary to integrate physical exercise into a person's life. To that end, the teacher is the mediator of situations that determine the level of student involvement with physical education. This study is an important tool for teachers, since it enables them to understand different motivational processes found during classes, and makes students increasingly autonomous and aware of the importance of physical exercise.

The aim of this investigation was to analyze the motivational profile and its influence on physical activity in adolescents. To that end, we investigated teacher support of autonomy, fulfillment of basic psychological needs, motivational profile, satisfaction with physical activities, and the physical activity level of adolescents.

## Method

### *Participants*

The sample consisted of 615 schoolchildren, 327 girls and 288 boys, aged between 12 and 14 years ( $M = 13.3$ ,  $DT = 0.79$ ), in the final grades of elementary schooling at four public schools located in the urban zone of three municipalities in Midwest Santa Catarina state, Brazil.

### *Measurements*

Autonomy support. The Learning Climate Questionnaire (LCQ) (Williams & Deci, 1996), used to determine the students' perception of their teachers, identified a controlling style or one supporting autonomy. The short version of the questionnaire was applied in this study,

recommended by Nuñez, León, Grijalvo, and Albo (2012); the scale consists of 5 items preceded by the stem “My physical education teacher...,” which evaluate autonomy support (e.g. “Tries to understand how I feel before suggesting a new way of doing things”). Answers were scored on a Likert-type scale ranging from 1 (Completely disagree) to 7 (Completely agree). Internal consistency of the scale was calculated using Cronbach’s alpha, obtaining an alpha value of 0.81.

**Basic Psychological Needs.** A questionnaire was applied to assess basic psychological needs in physical education (NPBEF), adapted for Portuguese by Pires, Luís, Borrego, Alves, and Silva (2010) from the Basic Psychological Needs in Exercise Scale (BPNEsP) (Vlachopoulos & Michailidou, 2006) and validated for the Brazilian population by Lettnin (2013). The questionnaire consists of 12 items encompassing three dimensions: autonomy (e.g. “I feel I do activities the way I want to”), competence (e.g. “I feel I complete class activities successfully”), and relatedness (e.g. “I feel good with my classmates”). Items are preceded by the stem “Generally, in physical education...” and are scored on a 5-point Likert scale from 1 (Completely disagree) to 5 (Completely agree). Internal consistency was 0.70, 0.72, and 0.81, respectively.

**Motivation.** The Perceived Locus of Causality Questionnaire (PLOCQ) (Goudas & Biddle, 1994) was used, translated into Portuguese and validated for the Brazilian population (Tenório, 2014). The questionnaire contains twenty items and is subdivided into five dimensions: intrinsic motivation (e.g. “Because physical education is fun”); identified regulation (e.g. “Because I want to learn sports skills”); introjected regulation (e.g. “Because I want the teacher to think I am a good student”); external regulation (e.g. “Because I am supposed to do it”); demotivation (e.g. “But I really feel I am wasting my time”). Items are preceded by the stem “I do physical education...” and are scored on a 7-point Likert scale ranging from 1 (Completely disagree) to 5 (Completely agree). Internal consistency was 0.77, 0.74, 0.69, 0.68, and 0.76, respectively.

**Physical Activity Enjoyment Scale.** We applied the Physical Activity Enjoyment Scale (PACES) (Motl et al., 2001), translated by Montanha (2013), to measure enjoyment of physical activity. The scale consists of 16 statements preceded by the stem “When I am physically active...,” which assess enjoyment directly (e.g. “I enjoy it,” “It’s very pleasant,” “It gives me energy”) and inversely (e.g. “It makes me sad,” “I dislike it,” “It’s no fun at all”). Answers were scored on a Likert-type scale, rated from 1 (Completely disagree) to 5 (Completely agree). Internal consistency was 0.89.

**Physical Activity Level.** The Physical Activity Questionnaire for Children (PAQ-C) was used, validated by Kowalski, Crocker, and Faulkner (1997) and translated and modified by Silva and Malina (2000), who excluded only physical activities and sports not practiced in Brazil. The instrument contains nine questions about sports and games, physical activities at school and spare time, including weekends. Each question is given an activity score between 1 and 5 on a scale from very sedentary (1) to very active (5) and the final score is the mean calculated for all the items. Scores 2, 3, and 4 correspond to sedentary, moderately active, and active, respectively. The final score classifies individuals as active or sedentary, with those who score  $\geq 3$  considered active and  $< 3$  sedentary.

### *Procedure*

Since the short form of the LCQ has not yet been adapted to the Brazilian educational setting, Hambleton’s back-translation method was used (1996). To that end, the items were first translated into Portuguese and then translated back into English by a group of translators, noting similarities with the original version. Next, the battery of items was assessed by three specialists who estimated the relevance of the items in measuring the construct for which they were created as well as correct wording. The questionnaires were then applied to a small group of students to check for understanding and make any necessary corrections.

Prior authorization was requested from management staff and teachers at the schools involved in the study, as well as the parents and/or guardians of the participants. The questionnaires were answered during physical education (PE) classes under the supervision of the researcher, who explained how subjects should complete the instrument and remained available to answer any questions that might arise during the process. Completion time was approximately 35 minutes and anonymity was respected to ensure sincere answers. The project was submitted to the Human Research Ethics Committee of Unoesc/Hust and approved under protocol number 937.597 on December 19, 2014.

### *Data Analysis*

Confirmatory factor analysis was performed to verify the factor structure of the LCQ. Descriptive statistics were conducted for all the variables (means and standard deviations) followed by analytical statistics with bivariate correlations. Next, the sample of 615 adolescent schoolchildren was randomly divided into two sub-samples denominated sample 1 ( $n = 308$ ) and sample 2 ( $n = 307$ ), in order to identify the different motivational profiles. To determine motivational profiles in sample 1, hierarchical clustering was conducted via Ward's method, using the variables intrinsic motivation, identified regulation, introjected regulation, external regulation, and demotivation. Next, the same variables were used in sample 2 to confirm the pattern of profiles found using K means cluster analysis. Finally, hierarchical cluster via Ward's method was applied to determine the motivational profile of the entire sample. Multivariate analysis (MANOVA) was performed to examine the characteristics of each motivational profile in terms of autonomy support, basic psychological needs, physical activity enjoyment, and level of physical activity. Analyses were conducted using SPSS statistics 20.0 software.

## **Results**

### *Psychometric Properties of the LCQ*

The independent sample consisted of 215 children, 107 girls and 108 boys, aged between 12 and 14 years ( $M = 13.5$ ,  $DT = 0.84$ ) and enrolled in elementary school. Items from each scale were submitted to descriptive analysis (mean and standard deviation) in order to maximize variance and determine whether all the items exhibited high discriminative power, high standard deviation, and mean scores of accepted answers (Nunnally & Bernstein, 1994). All the items in the present study were adjusted to the desired descriptive levels, analyzing the internal structure of the scales, and submitting data to confirmatory factor analysis. The results of descriptive data revealed similarity with the normal curve, as recommended by Curran, West, and Finch (1996). In addition, Mardia's coefficient was 11.90, establishing deviation from multivariate normality. Factor structure was evaluated by maximum likelihood estimation using bootstrapping (500 resamples) and the covariance matrix between items was used as input for data analysis. Oblique rotation was performed for one factor, with five measurements obtained.

Standardized values for factor loadings were between 0.74 and 0.82. Model fit was evaluated using a combination of absolute and relative indices. The results of confirmatory factor analysis were satisfactory:  $\chi^2(4, 615) = 4.11$   $p = .39$ ;  $\chi^2/d.f. = 1.03$ ; CFI = 0.99; NFI = 0.99; TLI = 0.99; SRMR = 0.008; RMSR = 0.007. Internal consistency of the scale was calculated using Cronbach's alpha, obtaining an alpha value of 0.81.

### *Descriptive and correlation analysis*

The total sample exhibited a mean score of 4.74 out of seven for autonomy support. With regard to psychological mediators, a mean score of 3.07 out of five was recorded for autonomy, 3.91 out

of five for competence, and 4.02 out of five for relatedness. In terms of motivational regulations for physical education classes, the highest score observed was for identified regulation, followed by intrinsic motivation, introjected regulation, and external regulation, with the lowest result recorded for demotivation. A mean score of 4.12 out of five was obtained for physical activity enjoyment. Mean physical activity level was 2.46, with a score of  $\geq 3$  representing active children and  $< 3$  sedentary ones.

The variables were positively and significantly correlated, with the exception of intrinsic motivation, which showed no association with external regulation; identified regulation, which was not related to external regulation; and external regulation and demotivation, which exhibited no correlation with level of physical activity. Intrinsic motivation and identified regulation were negatively correlated with demotivation and external regulation, and demotivation showed a negative correlation with enjoyment (Table 1).

**TABLE 1**  
*Descriptive Values and Correlations for all Variables*

	<i>M</i>	<i>DT</i>	<i>R</i>	1	2	3	4	5	6	7
1. Intrinsic motivation	5.39	1.18	1-7	-	0.74**	0.48**	0.01	-0.21**	0.59**	0.28**
2. Identified regulation	5.46	1.13	1-7	-	-	0.45**	0	-0.21**	0.54**	0.25**
3. Introjected regulation	4.01	1.31	1-7	-	-	-	0.39**	0.15**	0.29**	0.24**
4. External regulation	3.20	1.30	1-7	-	-	-	-	0.55**	-0.18**	0.06
5. Demotivation	2.47	1.29	1-7	-	-	-	-	-	-0.37**	-0.02
6. Enjoyment	4.12	0.62	1-5	-	-	-	-	-	-	0.24**
7. Physical Activity	2.46	0.66	1-3	-	-	-	-	-	-	-

Source: own work.

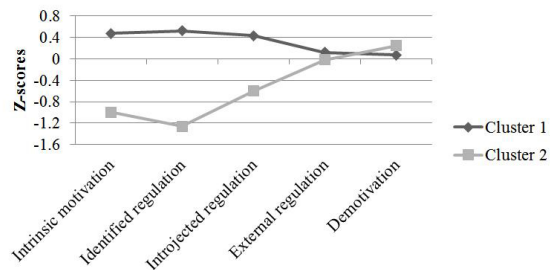
*Cluster Analysis*

Cluster analysis followed the steps proposed by Hair, Anderson, Tatham, and Black (1998). First, invalid data were identified among the variables studied and excluded from the study sample. In the second step, all the variables were standardized using Z-scores and no scores above 3 were found, implying the absence of outliers or invalid data. Subsequently, univariate distribution of all the clustered variables was examined for normality. The total sample was divided into two subsamples.

In order to determine the motivational groups in sample 1, hierarchical cluster was performed using Ward’s method. The resulting dendrogram suggested the existence of two groups (Table 2). The suitability of the groups created was evaluated based on the increase in clustering coefficients. According to Norusis (1992), low coefficients indicate significant homogeneity between cluster members, whereas high values demonstrate substantial differences between members.

Thus, two motivational profiles were obtained (Figure 1): self-determined (cluster 1), with high values for identified regulation, intrinsic motivation, and introjected regulation; and non-self-determined (cluster 2), with elevated demotivation and external regulations scores (Table 2).

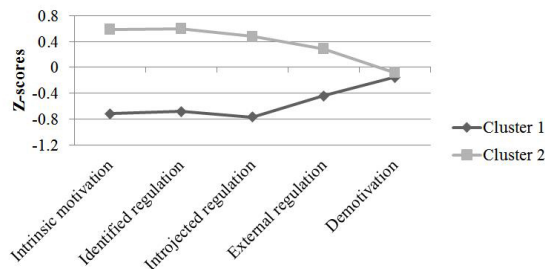
**Figure 1.**  
*Hierarchical clustering using Ward’s method in sample 1*



Source: own work.

K-means clustering was applied to identify the motivational groups in sample 2 and also established two profiles (Figure 2): self-determined (cluster 2), with high scores for identified regulation, intrinsic motivation, and introjected regulation; and non-self-determined (cluster 1), with elevated values for demotivation and external regulation (Table 2).

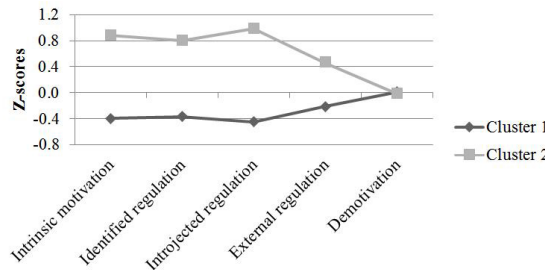
**Figure 2.**  
K-means clustering in sample 2



Source: own work.

Ward’s method was used to determine the motivational groups in the total sample, detecting two profiles (Figure 3): self-determined (cluster 2), with high scores for introjected regulation, intrinsic motivation, and identified regulation; and non-self-determined (cluster 1), with elevated values for demotivation and external regulation (Table 2).

**Figure 3.**  
Hierarchical clustering using Ward’s method in the total sample.



Source: own work.

**TABLE 2**  
Standardized Value, Means, and Standard Deviations of the Variables in each Cluster for Sample 1, 2, and the Total Sample

Variables	Sample 1					Sample 2					Total Sample							
	Cluster 1		Cluster 2			Cluster 1		Cluster 2			Cluster 1		Cluster 2					
	M	DT	Z	M	DT	Z	M	DT	Z	M	DT	Z	M	DT	Z			
IM	5.9	0.8	0.4	4.2	0.9	-1.0	4.5	1.0	-0.7	6.1	0.7	0.5	4.9	1	-0.4	6.4	0.5	0.8
IDR	6.0	0.6	0.5	4.0	0.7	-1.2	4.6	1.0	-0.6	6.1	0.6	0.6	5	1	-0.3	6.3	0.5	0.8
INR	4.5	1.2	0.4	3.2	0.9	-0.6	2.9	0.9	-0.7	4.6	1.0	0.4	3.4	0.9	-0.4	5.3	0.9	0.9
ER	3.3	1.2	0.1	3.1	1.1	0	2.6	1.1	-0.4	3.5	1.4	0.2	2.9	1.2	-0.2	3.8	1.2	0.4
DEM	2.5	1.3	0	2.7	1.1	2	2.2	1.1	-0.1	2.3	1.3	0	2.4	1.2	0	2.4	1.4	0

Note:IM = Intrinsic motivation; IDR = Identified regulation; INR = Introjected regulation; ER = External regulation; DEM = Demotivation

Source: own work.

Differential Analysis

Multivariate analyses of variance (MANOVA) were conducted to examine the characteristics of each motivational profile, considering clusters of the total sample as independent variables and autonomy support, basic psychological needs, physical activity enjoyment, and physical activity level as dependent variables (Table 3). The results obtained revealed differences (Wilks’s lambda = .71, F (7, 607) = 35.06, p < 0.01, η² = 0.28) always favoring self-determination.

**TABLE 3**  
Multivariate Analysis

Variables	Cluster 1 (n = 420)		Cluster 2 (n = 195)		F	η²
	M	DT	M	DT		
1. Autonomy support	4.30	1.39	5.70	1.16	149.51	0.19
2. Competence	3.75	0.64	4.24	0.51	87.63	0.12
3. Relatedness	3.93	0.76	4.23	0.66	22.13	0.03*
4. Autonomy	2.94	0.77	3.35	0.83	36.56	0.05*
5. Enjoyment	3.97	0.63	4.46	0.43	94.01	0.13
6. Physical Activity Level	2.34	0.62	2.71	0.66	44.19	0.06

\* p < 0.05

\*\* p < 0.01

Source: own work.

Discussion

Given the importance of identifying and grouping adolescents according to their motivational profile –in order to intervene more effectively by planning PE classes based on their individual needs– this study aimed to identify the motivational profile of Brazilian adolescents and relate it to teacher autonomy support, basic psychological needs, exercise enjoyment, and level of physical activity.

The adolescents under study exhibited high perception of teacher support of autonomy and greater fulfillment of the psychological need for relatedness to others, followed by autonomy, and competence. Satisfaction with physical activities was also high, but interestingly, physical activity level was below recommended values, classifying these adolescents as sedentary,

corroborating other studies carried out in the country (Hallal, Knuth, Cruz, Mendes, & Malta, 2010; Pontes, Barreto Neto, Amorim, & Lira, 2013) which reported worrisome data with respect to sedentary behavior in this age group.

Studies conducted in Brazil exhibit worrisome data in relation to sedentary behavior in this age group. In a three-year study (Garcia & Fisberg, 2011) with Brazilian teenagers, 90% reported enjoying physical activities, but less than 50% did so in their leisure time, physical education classes being the primary incentive. The lack of friend participation and venues were the external barriers reported by these individuals, and the authors observed the need for better knowledge of internal factors that can mediate the practice of physical activities.

Considering the motivational regulations of the adolescents investigated, higher values were observed for self-determined motivation, evident in the regulation identified and intrinsic motivation. It was also shown that non-self-determined motivations (external regulation and demotivation) displayed a negative correlation with satisfaction with the activity, but no correlation with physical activity level. These results are similar to those obtained in other studies, demonstrating a direct relationship between intrinsic motivation in physical education classes and the satisfaction with and desire to participate in future physical activities (Standage, Gillison, Ntoumanis, & Treasure, 2012; Teixeira, Carraça, Markland, Silva, & Ryan, 2012).

In practical terms, the findings suggest that to initiate physical activities, adolescents need to be aware of their importance for health (regulation identified), in addition to experiencing pleasure and satisfaction inherent to the activity (intrinsic motivation), without feeling obligated to participate to escape punishment or responsibilities (external regulation), or feeling frustration and fear (demotivation) related to these activities.

Educational programs that stimulate the development of intrinsic motivation and more self-determined behavior, primarily in early school grades, may lead individuals to engage in

regular physical activities. Thus, the tendency to abandon the activity after leaving school is lower (Moreno-Murcia et al., 2012).

Multivariate analysis identified two motivational profiles, showing that adolescents with a more self-determined motivational profile also exhibited greater perception of teacher support of autonomy, greater fulfillment of the three basic psychological needs, increased satisfaction in performing physical activities, and a higher level of physical activity. The results demonstrated a more self-determined profile.

Commitment to engaging in physical activities can be determined by the motivational profile that the person exhibits. Variables that may interfere in this process are the teacher's interpersonal style and psychological mediators. Deci and Ryan (1991) report that the ideal social context to favor more self-determined behavior stimulates the development of autonomy, since this is an important factor that may influence the ability of individuals to prosper, in addition to improving personal growth and satisfaction.

In the context of physical education teachers are a determining social factor, given that their interpersonal style during class may directly influence the motivational profile of students. In the case of this study, the group of adolescents with the greatest perception of teacher support of autonomy also exhibits a more self-determined profile.

The relationship between the interpersonal style offered by teachers during physical education classes and the self-determined motivation of students proves that a teaching style aimed at encouraging autonomy favors the development of a more self-determined profile, improving learning, emotions, commitment, and feelings of satisfaction, making students more prone to participate in the tasks proposed and exhibiting greater commitment to their activities, in addition to displaying more perception of competence (Moreno-Murcia, Ruiz, & Vera, 2015).

The use of pedagogic proposals in which teachers show an interpersonal style in their support of autonomy is essential, since when students that participate in classes characterized



by a controlling teaching style are compared to those who attend classes based on support of autonomy, the latter exhibit better results in terms of greater participation during class, display more positive emotions, greater creativity, better information processing and conceptual understanding, and more persistence in the face of difficulties, among others (Cai, Reeve, & Robinson, 2002; Guay, Boggiano, & Vallerand, 2001).

Increased teacher support of autonomy is also related to greater fulfillment of the basic psychological needs during the activity, which leads to a more self-determined profile in adolescents (Moreno-Murcia et al., 2015). This fact is confirmed by the results of this study, given that the teenagers who received more support for autonomy also obtained higher satisfaction scores in relation to basic psychological needs, with greater perception of competence and autonomy to perform physical education class activities when compared to those with a less self-determined profile.

The results of the present study demonstrate that relatedness to others may also be linked to improved intrinsic motivation in adolescents. According to the model proposed by Vallerand (1997), the perception of students regarding their relationship with colleagues and teachers could also be related to an intrinsically motivated profile. In general, students in environments that promote the fulfillment of the three basic psychological needs show greater satisfaction with the proposed activities, predicting more self-determined motivation (Standage, Duda, & Ntoumanis, 2005). Thus, the reasons that lead adolescents to engage in physical-sports activities are determined by their perception of competence and social acceptance, linked to self-esteem, as well as aspects related to entertainment and satisfaction, both a consequence of the activity (Weiss & Ferrer-Caja, 2002).

With the hierarchy model of motivation as a model (Vallerand, 1997, 2001), the findings of this study prove that the relationship between social factors, in this case the interpersonal style of the teacher and fulfillment of basic

psychological needs, has a positive effect on the more self-determined forms of motivation, resulting in positive affective, cognitive, and behavioral consequences for physical education classes and physical activity levels.

The general implications of these concepts are that it is not enough to encourage simply physical activities. However, it is important that these experiences are significant and enjoyable, reinforcing feelings of competence during the activity, favoring autonomy, and involving socially positive relationships. These attitudes could lead to greater participation in activities during physical education classes or leisure moments, underscoring the fact that the success or failure of adolescents depends on effective teaching and learning processes received and perceived during their lifetime.

In conclusion, the data obtained in this investigation demonstrate that more self-determined teenagers perceive greater teacher support of autonomy; are more fulfilled in terms of the basic psychological needs of autonomy, competence and relatedness to others; are more satisfied with physical education classes, and consequently engage in more physical activity.

The results found here reinforce the contribution of physical education in adolescents' acquiring physical activity habits, requiring pedagogic proposals that enable adolescents to adhere to classes, making them stimulus tools for an active lifestyle even outside the school environment. As such, the organization and application of activities that stimulate the support of adolescent autonomy, as well as a more self-determined profile and increased satisfaction in attending physical education classes, should be promoted by the teachers of this discipline.

It is suggested that other studies be conducted to assess the implementation of motivational strategies during physical education classes, and their effects on meeting basic psychological needs, motivational profile, and satisfaction with physical activities.

The possible limitations of this study are the need for more investigations of this issue, considering different age groups and intersex

differences, in order to clarify possible differences found at other levels of physical education.

Finally, this investigation supplies data that may lead to changes and improvements in the lives of adolescents by serving as a tool for teachers in terms of management and applying this knowledge at school, as well as adding it to the body of information on phenomena involving motivational factors, their guidelines, and physical activity in adolescents.

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## Notes

- \* Research article.