

SELF-DETERMINATION THEORY: APPLICATIONS IN THE CONTEXT OF PHYSICAL EXERCISE PRACTICES FOR ADOLESCENTS

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Abstract

Based on the Self-Determination Theory – SDT, this study aimed to verify the relationship between motivational regulation and physical exercise practices of students adolescent. Participants were 87 high school students from both genders. The Behavior Regulation in Exercise Questionnaire – 2 and the Physical Activity Evaluation for Adolescents Questionnaire were used as instruments. The exercise was related negatively with amotivation and external regulation, and positively with identified regulation and intrinsic motivation. In conclusion, adolescents that were more self-determined had more physical exercise practice than adolescents with low self-determination.

Keywords: Exercise. Motivation. Adolescent. Self-Determination Theory

Introduction

The contribution of physical exercis^{e1} for health and wellbeing is well documented today. Research shows that the practice of such activities may be associated with physical, psychological and social benefits (BOICHÉ and SARRAZIN, 2007). A major focus of studies on this theme is focused on adolescents, as a lifestyle that embraces physical and sports activities in this phase of development contributes to the same behaviors to endure throughout adulthood (AZEVEDO JUNIOR et al., 2007; PERKINS et al., 2004).

Despite the benefits of physical exercise, the number of physically inactive adolescents has increased (SEABRA et al., 2008), achieving

¹-Although the practice of “physical activities”, in a broader meaning of body movement, is related to good health, it was opted for the use of the expression “physical exercises” along the text due to the fact that they are the object of study of this research.

results of 94% of girls and 85% of boys sedentary in Niterói / RJ (SILVA and MALINA, 2000). Such data confirms the concern of the scientific community to consider physical inactivity as a major public health problem of modern societies (SEABRA et al., 2008).

Considering that the public knows the benefits of physical exercise (SIQUEIRA et al., 2009) and that a large portion does not practice them with the minimum frequency, there is the complexity of the topic. In this context, in the Psychology of Sport and Exercise, motivation has been one of the main topics researched, having in its essence the study of motivational regulations, which may be biological, cognitive and social (RYAN and DECI, 2000). The investigations conducted in this area have as main objective understanding the social and intra-individual factors that undermine or facilitate adherence to physical exercise (BLANCHARD et al., 2007).

In general, the motivation has been treated dichotomously between its intrinsic and extrinsic factors (BRICKELL and CHATZISARANTIS, 2007). Although consistent, this duality theory has made some of the research related to physical exercise to become reductionist for not adequately deepen the study of motivation (PETHERICK and WEIGAND, 2002).

Currently, the Self-Determination Theory - SDT (DECI e RYAN, 1985) has been standing out as a more detailed approach to the study of motivational aspects that involve physical exercise. SDT differs regarding the approach to the degree to which the motivation is more or less determined by the individual (VIERLING, STANDAGE and TREASURE, 2007), whereas extrinsic motivation may manifest itself in different ways (DECI and RYAN, 2000). Such variations are represented by a model study where the motivation is established within a continuum of self-determination.

More to the left of the continuum is the amotivation, which is a state characterized by a lack of intent. In this case, one does not realize the reasons for the commencement or continuation of the activity (FERNANDES and VASCONCELOS-RAPOSO, 2005).

These are followed by extrinsic motivation, external regulation wave (behavior motivated by threats, rewards, etc. - e.g.: Practicing a sport by family pressure) and introjected regulation (internal pressures to perform an activity - e.g.: Feeling guilty for not practicing physical exercises) are not self-determined. The identified regulation (perceived behavior as personally important and useful - e.g.: Practicing

physical exercise aimed at improvements in health) and integrated regulation (behavior perceived as important and consistent with other personal issues, carried out with greater choice possibilities e.g.: Practicing physical exercises to improve the physical quality of life, but without a specific purpose) have self-determining components (BOICHÉ and SARRAZIN, 2007).

To the right of the continuum is intrinsic motivation, which is a process characterized by personal choice, pleasure and satisfaction (BRICKELL and CHATZISARANTIS, 2007), and the motivational regulations are purely internal, with no purpose beyond one's own practice.

Research has found that people more self-determined to practice physical exercise and sports have greater adherence to these activities (BRICKELL and CHATZISARANTIS, 2007; EDMUNDS, NTOUMANIS and DUDA, 2006; NTOUMANIS, 2005; WILSON and RODGERS, 2004). These results confirm the assumptions of SDT, which suggests that more self-determined people are more likely to engage in certain behaviors than those with low self-determination (DECI and RYAN, 2000).

It is understood that SDT can help to better understanding of why young people engage or not in the practice of physical exercises, which would be a facilitator for a more effective professional assistance. Considering the need for a more current approach for a better understanding of the motivations of adolescents for physical exercise, this study aimed to verify the relationship of motivational regulations with the practice of physical exercise of adolescent students.

Method

This is a cross-sectional study, descriptive, comparative and correlative. The research project was approved by the Ethics Committee on Human Research at the Santa Catarina State University under the reference number 49/08. The regulations and guidelines regulating the research involving human subjects were observed.

Participants

The choice of participants was made for convenience. Participated in the study 87 adolescents (49 boys and 38 girls) high School stu-

dents from a Government school of Technology Education located in the region of Florianópolis / SC. The average age of participants was 15.2 years (± 0.8), similar between boys and girls, 15.0 (± 0.8) and 15.3 (± 0.8) respectively ($p > 0.05$).

Instruments

For the collection of data we used a questionnaire divided into three parts: a) characterization of the participant, b) motivational regulations for the practice of physical exercises (motivation), and c) physical exercise.

The characterization of the participants was done through a specific questionnaire for the survey, containing open and closed questions. Height and weight were self-reported.

In the characterization of the instrument was added into the questionnaire for socioeconomic classification Criterion of Economic Classification Standard Brasil/2008 (ABEP, 2007).

The motivation of the participants to engage in physical exercise was assessed using the Behavioral Regulation in Exercise Questionnaire-2 - BREQ-2 (MARKLAND and TOBIN, 2004). This is a questionnaire widely used in international literature on the SDT applied to physical and sporting activities, especially in studies involving adolescents (MARKLAND and INGLEDEW, 2007).

The questionnaire consists of 19 subscales of the Likert type with five response options (0 = Not true for me, 4 = often true for me). Five constructs are assessed: amotivation (e.g.: I think exercise is a waste of time), external regulation (e.g.: I exercise because other people say I should do), introjected regulation (e.g.: I feel guilty when I do not practice exercise), identified regulation (e.g.: I value the benefits and advantages of exercise) and intrinsic motivation (e.g.: I like my exercise sessions). We also used the index of self-determination, which is the overall score obtained by the following formula: $(-3 \times \text{demotivation}) + (2 \times \text{external regulation}) + (-1 \times \text{introjected regulation}) + (2 \times \text{identified regulation}) + (3 \times \text{intrinsic regulation})$. The index can range from -24 (lower self-determination) to 20 (higher self-determination).

The BREQ-2 was translated and validated to Portuguese by Palmeira et al. (2007) in Portugal. Satisfactory results were found, with Cronbach's alpha values ranging between 0.64 and 0.81 for the different constructs. Despite the similarity of Portuguese from Portugal and

Brazil, a translation of the instrument was performed by a specialist in Brazilian Portuguese, demonstrating the need for small changes in the text, without influencing its structure. Questions regarding the clarity of the instrument were included in the questionnaire, obtaining indexes of clarity ranging from 0.84 to 1.00. The results of internal consistency (Cronbach's alpha) are presented in the descriptive analysis of results.

The questionnaire used to measure the amount of physical exercise was developed by Florindo et al. (2006). The Assessment Questionnaire of Physical Activity for Adolescents consists of 17 questions divided into two blocks: 1) sports or physical exercise (15 questions) and 2) transportation physical activity to school (two questions). It assesses physical activity weekly in blocks 1 and 2, and yearly in one block. For example, in block 1, from the aforementioned method, it is multiplied the daily length in minutes by the weekly frequency and by the months per year of practice (minutes per day x weekly frequency x 4 x months per year), where it is acquired results in minutes (min / year).

In this research we used the scores of annual practice, for having obtained more reliable results in its validation and it counts only physical exercises, which is the focus of interest of this study.

Procedures for collecting data

Data collection took place during class time and in the classroom, with the participation of four researchers, being two masters and two undergraduate academic students. Those involved with the collection had specific training to implement the instruments.

Participating students were properly informed about the objectives of the study, their possible contributions for the quality of life of adolescents and how they could participate in the research. Prior to the distribution of the questionnaires the researchers instructed the adolescents on how they should fill them out, giving instructions that the instruments were answered quietly, without interference from colleagues, and that in case of doubt, a researcher could be asked for help. All participants were aware that participation in the study was voluntary.

Statistical treatment

The data were compared with descriptive and inferential statistics. For descriptive statistics, it was used exploratory data analysis for: verification of normality by the Kolmogorov-Smirnov test, distribution of frequencies, percentages, and analysis of medians, means, minimums and maximums.

As for the inferential analysis, tests were used for comparison and correlation. Whereas the data are not normally distributed, the tests used were the Mann-Whitney (comparison of two groups) and Kruskal-Wallis test (comparing more than two groups) and Spearman correlation. It was established α of 0.05 as significance level ($p < 0.05$).

Results

Descriptive Analysis

At first, the analysis presents the characteristics of the sample investigated. The adolescent students presented mean weight of 58.5 kg (± 11.5 kg) and height of 168 cm (± 9.0 cm). Most were represented by boys, aged between 15 and 16 years, and belonging to socioeconomic classes B1 and B2 (Table 1).

Table 1: Gender, age and socioeconomic class (SC) of the participating adolescent students (n / %)

	Frequency	Valid Percentual
<i>Gender</i>		
Male	49	56.3
Female	38	43.7
<i>Age</i>		
14	15	18.8
15	40	50.0
16	21	26.2
17	4	5.0
<i>SC</i>		
A2	7	8.6
B1	30	37.0
B2	32	39.6
C1	12	14.8

Descriptive data of the central variables of the research, motivational regulations, self-determination index and amount of exercise, are presented in Table 2. It appears that the more external regulations, demotivation, external and introjected regulation, showed low levels among participants, while the more internal, identified regulation and intrinsic motivation, the results were higher, resulting in a high rate of self-determination. The results of the Crombach's α demonstrate the internal consistency of the scale used to assess the motivational regulations.

Table 2: Motivational regulations, self-determination index (SDI) and minutes of annual practice of physical exercise (PPE) of the adolescent students participating (Md / Min. / Max. / Crombach's α).

Variable	Median	Minimum	Maximum	α
Amotivation	0	0	4	0.74
External Regulation	0	0	4	0.74
Introjected Regulation	0.67	0	3	0.62
Identified Regulation	2.75	0	4	0.75
Intrinsic Motivation	3.50	0	4	0.82
SDI	12.71	-9.00	20.00	--
PPE (min./year)	5,400	0	51,840	--

Relationship between variables studied

Observing the relationship between the variables, there is a tendency that the more self-determined the student is to practice exercise, the greater the amount of practice of these activities. While external regulation and demotivation are negatively related to amount of exercise, the more self-determined regulations, identified regulation and intrinsic motivation, correlate positively (Table 3).

As for the relations between different motivational regulations (Table 3), it appears that each regulation was related positively with the closer constructs, and negatively with the more distant constructs, representing a continuum. Regarding relations with the index of self-determination with the motivational regulations, the results are consistent, because demotivation and external regulation were negatively correlated and identified regulation and intrinsic motivation were positively correlated with the index.

Table 3: Correlation (ρ) between the motivational regulations, self-determination index and annual minutes of practice of physical exercise (PPE) of adolescent students

Variable	1	2	3	4	5	6
(1) Amotivation	--					
(2) External Regulation	0.450***	--				
(3) Introjected Regulation	-0.105	0.242*	--			
(4) Identified Regulation	-0.333**	-0.315**	0.338**	--		
(5) Intrinsic Motivation	-0.361**	-0.313**	0.210	0.696***	--	
(6) SDI	-0.584***	-0.615***	0.041	0.773***	0.842***	--
(7) PPE (min./ano)	-0.411***	-0.261*	0.203	0.668***	0.477***	0.592***

* Correlation significant at level * $p < 0.05$, ** $p < 0.01$ and *** $p < 0.001$ (two-tailed).

Boys and girls differed in their levels of intrinsic motivation (Table 4) and amount of physical exercise (Table 5), while boys were more motivated and intrinsically more active. The participants of different ages and socioeconomic classes did not differ significantly in the variables investigated, although there were some tendencies in these data, as higher amount of physical exercise for students of higher age and lower socioeconomic classes (Table 5).

Table 4: Motivational regulations [†] and self-determination index (SDI) based on gender, age and socioeconomic classification (SC) of the adolescent students participating (Md / min.↔max.)

	SM	EXR	INR	IDR	IM	IS
	M _d	M _d	M _d	M _d	M _d	M _d
	min.↔max.	min.↔max.	min.↔max.	min.↔max.	min.↔max.	min.↔max.
<i>Gender</i>						
Male	0	0	0.67	2.75	3.50*	15.08
	0↔3	0↔2	0↔3	0↔4	1↔4	-3↔20
Female	0.00	0.25	1.00	2.50	3.00*	10.00
	0↔4	0↔4	0↔3	0↔4	0↔4	-9↔18
<i>Age</i>						
14	0	0	0.67	2.75	3.50	15.00
	0↔1	0↔2	0↔3	0↔4	3↔4	6↔17
15	0	0	0.67	2.63	3.50	12.25
	0↔4	0↔4	0↔3	0↔4	0↔4	-9↔20
16	0	0	1.00	2.50	3.00	11.59
	0↔1	0↔2	0↔2	0↔4	1↔4	-3↔18
17	0	0	0.34	2.75	3.50	18.17
	0↔0	0↔0	0↔1	1↔4	1↔4	7↔20
<i>SC</i>						
A2	0	0	1.33	2.50	3.00	10.13
	0↔0	0↔4	0↔2	0↔4	2↔4	0↔18
B1	0	0.25	0.67	2.50	3.50	12.21
	0↔3	0↔3	0↔3	0↔4	0↔4	-3↔20
B2	0	0	0.67	2.75	3.50	15.67
	0↔1	0↔2	0↔3	0↔4	0↔4	0↔18
C1	0	0	0.67	3.13	3.00	15.00
	0↔4	0↔1	0↔2	0↔4	0↔4	-9↔18

[†] Amotivation (AM); External Reg. (EXR); Introjected Reg. (INR), Identified Reg. (IDR), Intrinsic Motivation (IM).

* Significant difference between genders at $p < 0.05$ / $U = 637.50$ (two-tailed).

Table 5: Annual minutes of practice of physical exercise (PPE) by gender, age and socioeconomic classification (SC) of the adolescent students participating (Md / min. / max.)

	PPE (min./year)		
	Median	Minimum	Maximum
<i>Gender</i>			
Male	7,320*	0	46,800
Female	3,840*	0	51,840
<i>Age</i>			
14	4,800	0	30,960
15	5,400	0	47,520
16	6,120	0	51,840
17	12,240	0	28,800
<i>SC</i>			
A2	4,800	1,800	16,080
B1	4,680	0	21,600
B2	6,660	0	47,520
C1	8,460	0	51,840

* Significant difference between sexes at $p < 0.05$ / $U = 630.50$ (two-tailed)

Discussion

This study aimed to verify the relationship of motivational regulations with the practice of physical exercise of adolescent students. We tried to apply for the Brazilian reality a new approach to the study of motivation for practice of physical exercise, supported by the SDT. Most studies published in the country on the subject were written by Portuguese and Spanish authors who investigated the European populations (MURCIA et al., 2007; MURCIA and COLL, 2006; FERNANDES and VASCONCELOS-RAPOSO, 2005). Thus, despite the important contribution to the dissemination of TSD in Brazil, these studies are limited to the reality of other countries.

According to SDT, there are different faces of extrinsic motivation, from less to more self-determined, which reflected the extent to which

the adjustment to a behavior has become internalized and integrated to the point that the individual believed to be autonomous in his choice of behavior (MARKLAND and INGLEDEW, 2007). The correlations verified between the motivational regulations have confirmed the assumptions which indicate that there is a continuum of self-determination (RYAN and DECI, 2000), as also observed by Fernandes et al. (2004) study in Portuguese adolescent students. Within the continuum the variables correlate positively with the closest constructs (e.g.: intrinsic motivation x identified regulation, $r = 0.696$) and negatively with the more distant constructs (e.g.: intrinsic motivation x external regulation, $r = -0.313$). These relations show that, in general, when the external demands for practice of physical exercise are high, the pleasure by the practice tends to be lower, although it is not possible to establish a cause-effect relationship with the method used in this study.

Students appeared to be self-determined for the practice of physical exercise, as they usually had high intrinsic motivation and identified regulation, and low levels for demotivation, external and introjected regulation. These results suggest that students enjoy practicing physical exercise and realize the benefits of such practice, and that external factors have little influence on this behavior. This profile of self-determination is similar to the one presented by Murcia, Gimeno and Coll (2007b), which, according to the authors, it is more positive and related to greater orientation to the task.

In the study by Markland and Ingledew (2007), where British adolescents were investigated also using BREQ-2, the external regulations were higher and the internal regulations were lower than those presented in the present study, showing greater self-determination for students adolescents investigated here. Another discordant result occurred in the comparison between the genders. While the British study found differences between boys and girls identified only in the identified regulation, with higher results for boys, the present study observed higher levels for boys in the index of intrinsic motivation and index of self-determination, showing more autonomous motivations for males in both studies.

Despite these results, the relationship between gender and self-determination for the practice of physical exercise is still unclear, since in literature there are studies such as Murcia, Gimeno and Coll (2007a) who found higher levels of self-determination for the girls, or that still found no association between gender and self-determination

(BOICHÉ and SARRAZIN, 2007). In reviewing research with populations of varying ages, Viana (2009) indicates that there is a tendency for boys to be more self-determined than girls in youth, while in adulthood, there is evidence that women were more self-determined than men. It is noteworthy that to establish a more consistent relationship within our reality, we need more studies involving Brazilian populations.

By comparing the amount of exercise practice for boys and girls, it was found that boys are more physically active. These data confirm other studies that indicate that the population of male adolescents are more active than females (VASQUES and LOPES, 2009; SILVA et al., 2008; SOUZA and DUARTE, 2005). However, when considering specific physical activity environments, these differences may not exist or be reversed, as observed by Del Duca et al. (2009), where women were more sedentary than men in leisure and work environments, but exercised more in household chores. Therefore, these gender differences reflect not only biological but also socio-cultural issues.

According to Ryan and Deci (2000), the SDT has been able to identify the different types of motivation, each of which has different consequences for adherence, learning, performance and welfare. The positive relations of the amount of physical training with the identified regulation ($r = 0.668$), intrinsic motivation ($r = 0.477$) and the index of self-determination ($r = 0.592$) and negative with demotivation ($r = -0.411$) and external regulation ($r = -0.261$) confirm the assumptions of SDT and validate previous studies showing that people more self-determined for physical exercise are more likely to engage in these activities and remain in them for a longer period than those more influenced by external regulations (EDMUNDS, NTOUMANIS and DUDA, 2006; WILSON and RODGERS, 2004; MULLAN and MARKLAND, 1997).

Considering the limitations of cross-sectional studies, which show evidence but have difficulty in establishing cause-effect relationships, it is suggested to carry out experimental and longitudinal studies to monitor the self-determination of exercise practitioners at different stages of adhesion, comparing individuals with different profiles of self-determination, for example.

Our results also relate to studies that have shown higher relationship of physical exercise practice with identified regulation than with intrinsic motivation (BRICKELL and CHATZISARANTIS,

2007; EDMUNDS, NTOUMANIS and DUDA, 2006; WILSON and RODGERS, 2004). These findings suggest that not always the pleasure for the practice of physical exercise, related to intrinsic motivation is crucial for adherence regardless of other external regulations. In today's society, pleasurable activities in some cases are left in the background, due to obligations at school, work, family, etc. In the case of teenagers this question is even more problematic due to the increase in their responsibilities and lack of experience to handle the new demands. The existence of some regulation with external components, as in the case of identified regulation, can make exercise a priority for issues relating to health, quality of life, socialization, etc.

Actually, considering the SDT, the present results suggest that for a adolescent to join the practice of physical exercise it is important to appreciate its importance for health, quality of life, etc. (identified regulation), and / or the activity is carried out with pleasure (intrinsic motivation) and it does not represent an obligation to achieve a reward or escape punishment, either external (external regulation) or internal (introjected regulation).

This has strong implications for teaching physical education professionals who work with adolescents and for parents who seek to encourage such practices, such as: a) do not push adolescents to practice any sort of physical activity; b) allow adolescents to choose the activities that they perceive as more pleasurable; c) make them aware of the importance of physical and sports practices; d) not to establish rewards for good performance or winnings, or punishment when the results are negative.

As for age and socioeconomic classification, the groups did not differ significantly in their motivational regulations and amount of physical exercise. Studies with amplified samples and that focus specifically on some of these variables can succeed in establishing meaningful associations between them, considering that we observed some tendencies in this study, as higher amount of physical exercise for students from lower socioeconomic classes, which can be related to differentiated motivation by different classes.

Conclusion

The most internal motivational regulations are positively correlated

and the most external regulations are more negatively correlated with the annual amount of physical exercise. More self-determining adolescents practice more physical exercise than those with low self-determination.

Acknowledgments

The authors acknowledge the collaboration of the coordination of the school involved in the study and the voluntary participation of students.

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Recebido em: 20/02/2010

Revisado em: 01/04/2010

Aprovado em: 04/05/2010

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