

Effects of Basic Psychological Needs Satisfaction in the Physical Education on Leisure-Time Physical Activity Behavior of Primary School Students: Mediating Role of Autonomous Motivation

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Abstract

Background: Recognizing the factors influencing students' participation in leisure-time physical activity is considered as an important topic concerning school health. The present study aimed to investigate the effects of basic psychological needs satisfaction in physical education (PE) classes on leisure-time physical activity behavior of primary school students, considering the role of autonomous motivation as a mediator variable. We further examined gender differences.

Methods: We made use of a descriptive-correlation approach in the present study, 2019. Participants comprised 516 primary school students from Gonbad Kavous. Research instruments included Sport Climate Questionnaire, Sport Motivation Scale, and Leisure-Time Physical Activity Behavior Scale. To analyze the data, we used the structural equation method and Mann-Whitney U test.

Results: The results of structural equation method showed significant relationships between basic psychological needs satisfaction and leisure-time physical activity and autonomous motivation (all $T > 1.96$). Furthermore, autonomous motivation had a positive association with leisure-time physical activity (all $T > 1.96$), and it mediated the relationships between basic psychological needs satisfaction and leisure-time physical activity (all $P < 0.001$). In addition, compared with girls, boys reported significantly higher satisfaction regarding competence and relatedness needs ($P = 0.040$, $P = 0.009$, respectively), higher intrinsic motivation and identified regulation ($P < 0.001$, $P = 0.001$, respectively), and higher leisure-time physical activity ($P = 0.045$).

Conclusions: Basic psychological needs satisfaction in PE classes positively influenced motivation and leisure-time physical activity in primary school children. Physical educators should encourage basic psychological needs satisfaction in students with regard to their activities in PE classes, in order to improve their participation in leisure-time physical activities.

Keywords: Basic psychological needs, Autonomous motivation, Physical activity, Primary school

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1. Introduction

Regular physical activity is considered as an essential health-promoting behavior able to prevent or delay a variety of chronic illnesses and premature deaths. There is also evidence that regular physical activity results in enhanced mental health, reduced symptoms of depression and anxiety, and improved life satisfaction and quality of life (1-4). Despite these positive effects, many school-age children and adolescents have a sedentary lifestyle. It has been shown that regular physical activity at school age can affect physical activity during adulthood and impact the public health in general (5-7). Physical education (PE) classes at school can be a potential environment for increasing students' physical activity outside school. In PE classes, it is necessary that the teachers create an appropriate motivating environment for students to satisfy their psychological needs and increase their motivation to participate in class activities (8). In this connection, the

psychological factors associated with PE classes are not properly formatted; these factors may motivate students to participate in physical activity outside school.

Self-Determination Theory (SDT) is a popular theory that has long been the theoretical underpinning of research into promoting the motivation of individuals to increase their participation in physical activity and adopt an active lifestyle (9-15). According to this theory, there are certain distinct psychological and social intentions that, if satisfied, can facilitate one's growth, integration, and well-being. In SDT, these essential satisfactions are referred to as Basic Psychological Needs (BSNs) (9-15). There are three BSNs, namely autonomy, competence, and relatedness. Autonomy refers to the integrated processing of capabilities and connecting these capabilities to emotions, needs, and limitations. In fact, autonomy or self-respect refers to the freedom to make decisions and become independent in performing different activities and tasks (15, 16). Competence is a multi-dimensional,

dynamic, and interactive concept affecting the efforts for mastery and success. According to SDT, people with high perceptions of their competence and ability put in more effort to make progress in their assigned tasks, and they have more positive experiences compared with those with lower perceptions of their capabilities (15, 16). Relatedness refers to the experience of interpersonal relationships and reflects the extent of a person's sense of belonging to society, having caring relationships, and connection with significant others. In fact, relatedness is satisfied when a person feels connected with significant others while frustration of relatedness leads to a sense of social isolation and loneliness (15, 16). These basic psychological needs (BSNs) i) indicate the movement direction of individuals, ii) help understand how humans can thrive, and iii) help parents, teachers, educators, administrators, and physicians determine which aspects of social context significantly enhance one's participation and effectiveness in the environment (9-16).

Motivation is another key component in SDT (9, 11, 14-16). Two kinds of motivation, namely autonomous motivation and controlled motivation, are postulated within SDT. Autonomous motivation consists of intrinsic motivation and identified regulation whereas controlled motivation is comprised of introjected regulation and external regulation. Research showed that autonomous motivation resulted in better performance in various activities (14-18). In contrast, controlled motivation had a negative correlation with the performance of different behaviors (14-18). Based on SDT, the three BSNs must be satisfied in order to promote autonomous motivation in individuals to execute particular activities (9, 11, 14-16).

Regarding to leisure-time physical activity, research demonstrated that autonomy satisfaction had a positive relationship with the participation of the youth in leisure-time physical activity (19, 20). It further increased autonomous motivation in fostering sport participation in children and adolescents (21). Some intervention studies revealed that autonomy-based exercise intervention increased autonomous motivation and physical activity in young people (22, 23). It was also shown that higher perception of competence increased the likelihood of children and adolescents' participation in physical activity and exercise (24-26). Perceived competence also had a positive association with autonomous motivation in promoting physical activity in the youth (27). Relatedness in sports and exercise has rarely been investigated, however, friendship quality directly correlated with higher motivation toward physical activity in adolescent girls (28).

The effects of BSNs satisfaction in leisure-time context on autonomous motivation and participation in physical activity has been well documented; however, there is little research on the role of BSNs satisfaction in PE classes on increasing autonomous motivation and fostering leisure-time physical activity in primary school students. For instance, some studies examined motivational climate, basic psychological needs, and intrinsic motivation and affective, cognitive and behavioral outcomes in PE (26, 29-32). Based on the existing research on middle school students, higher satisfaction of autonomy and competence in PE classes has positive effects on students' participation in PE activities (26, 29-32). However, this issue has not been properly investigated in primary school children, especially regarding the inclusion of all motivational processes (basic psychological needs and motivational regulations). Ryan and Deci (16), on the other hand, proposed that to understand human motivation the whole motivational process is to be analyzed when examining possible cognitive, affective, or behavioral outcomes generated by motivation. Therefore, to fill the gaps in the literature, we utilized the whole motivational process (all basic psychological needs and autonomous motivational regulations) proposed in SDT (9, 11, 14-16) when explaining students' motivation in PE classes and their subsequent leisure-time physical activity.

Lack of motivation to participate in physical activity in childhood may have significant negative consequences for public health. If the goal of PE is to promote physical activity throughout life, it is necessary that students have a pleasurable experience in these classes. As a result, it is important to examine BSNs satisfaction in PE classes at primary school and its effects on autonomous motivation and leisure-time physical activity outside school. Therefore, the objective of this study was to investigate the effects of BSNs satisfaction in PE classes on autonomous motivation and its subsequent leisure-time physical activity in primary school students.

2. Methods

The present study made use of a descriptive-correlation approach. The Ethics Committee of Islamic Azad University of Aliabad Katoul approved the research method (Code: IR.IAU.AK.REC.1398.001). Parents provided written informed consent.

2.1. Participants: The participants of this study included 516 students, comprising 265 boys and 251 girls in grades four, five, and six in the primary schools

of Gonbad Kavoods city, Golestan province, Iran (2019). We selected the students based on a cluster random sampling. Means and standard deviations of the boys' and girls' ages were 11.01 ± 0.83 and 11.02 ± 0.85 years, respectively.

2.2. Research instruments: We used three questionnaires concerning BSNs satisfaction, autonomous motivation, and leisure-time physical activity. We measured BSNs satisfaction in PE classes using the Sport Climate Questionnaire (33), with 11 questions scored based on a seven-point Likert scale from completely disagree (1) to completely agree (7). The designer's pf the questionnaire assessed its reliability with a reported Cronbach's alpha coefficient of 0.89 (33). In the present study, nine experts confirmed the validity of this questionnaire (CVI=0.88, CVR=1.00); its reliability was further measured, and the Cronbach's alpha coefficient was 0.87. Sport Motivation Scale evaluated autonomous motivation was assessed by the (34) with eight questions scored based on a seven-point Likert scale from completely disagree (1) to completely agree (7). The designers of the scale corroborated its reliability with a Cronbach's alpha coefficient of 0.90 (34). In this study, nine experts confirmed the validity of this questionnaire (CVI=1.00, CVR=0.78) and measured its reliability where the Cronbach's alpha coefficient was 0.91. We measured leisure-time physical activity was assessed using the Physical Activity Behavior in Leisure-Time Scale (35), including three questions scored based on an eight-point Likert scale from zero days (0) to seven days (7). The designers of the questionnaire confirmed its reliability and reported its Cronbach's alpha coefficient to be 0.93 (35). In the current study, nine experts corroborated the validity of this questionnaire (CVI=0.88, CVR=0.78) and assessed its reliability where the Cronbach's alpha coefficient was 0.92.

2.3. Data analysis: We applied descriptive statistics such as median (IQR) to describe the research variables. We used Cronbach's alpha coefficient to specify the reliability of the research instruments. The Kolmogorov-Smirnov test examined the normal

distribution of data, and Spearman test measured the correlation between research variables. We used the structural equation method to investigate the relationships between the research variables. Finally, we employed Mann-Whitney U test to analyze gender differences. SPSS software version 23 and Smart PLS analyzed the data. Significant levels were considered at the alpha level of 0.05.

3. Results

3.1. Descriptive data and gender differences: According to Table 1, boys' and girls' medians (IQRs) of ages were both 11.00 (2.00) years. The results of descriptive statistics showed that boys had higher scores in autonomy, competence, relatedness, intrinsic motivation, identified regulation, and leisure-time physical activity in comparison with girls (Table 1). Results of Mann-Whitney U tests revealed that compared to girls, boys had significantly higher satisfaction in regard to competence ($P=0.040$) and relatedness ($P=0.009$) in PE classes. Furthermore, boys reported higher intrinsic motivation ($P<0.001$), identified regulation ($P=0.001$), and leisure-time physical activity ($P=0.045$). Ultimately, results of Kolmogorov-Smirnov tests demonstrated that the data were not normally distributed (all $P<0.05$).

3.2. Relationship between variables: Table 2 shows the results of Spearman correlation tests between research variables. As observed, there were significant relationships between BSNs satisfaction and autonomous motivation and leisure-time physical activity (all $P<0.001$). Moreover, intrinsic motivation and identified regulation had a significant association with leisure-time physical activity (all $P<0.001$).

3.3. Structural equation method: Table 3 and Figure 1 represent the results of structural equation method. The results of path analysis indicated that BSNs satisfaction in PE significantly influenced autonomous motivation and leisure-time physical activity (all $T>1.96$). In addition, intrinsic motivation and identified regulation had significant impacts on leisure-time

Table 1: Medians(IQRs) of research variables in boys and girls

	Age	Autonomy	Competence	Relatedness	Intrinsic Motivation	Identified Regulation	Physical Activity
Boys (n=265)	11.00(2.00)	4.50(1.50)	4.50(2.00)	4.00(3.33)	5.25(2.50)	5.00(3.00)	3.00(2.00)
Girls (n=251)	11.00(2.00)	4.50(1.25)	4.50(1.25)	3.33(2.67)	4.00(1.75)	3.75(2.75)	3.00(1.67)
Mann-Whitney U	33115.00	31567.50	29852.00	28912.50	27509.50	27642.50	32727.50
P value	0.929	0.299	0.040*	0.009**	<0.001***	0.001**	0.045*

*** $P<0.001$, ** $P<0.01$, * $P<0.05$

Table 2: Results of Spearman correlation tests between research variables

	1	2	3	4	5	6
1. Autonomy	-					
2. Competence	r=0.626 P<0.001	-				
3. Relatedness	r=0.574 P<0.001	r=0.764 P<0.001	-			
4. Intrinsic Motivation	r=0.500 P<0.001	r=0.608 P<0.001	r=0.679 P<0.001	-		
5. Identified Regulation	r=0.585 P<0.001	r=0.571 P<0.001	r=0.711 P<0.001	r=0.840 P<0.001	-	
6. Physical Activity	r=0.384 P<0.001	r=0.368 P<0.001	r=0.327 P<0.001	r=0.243 P<0.001	r=0.261 P<0.001	-

Table 3: Results of path analysis between research variables

	Path	β	T-value
1	Autonomy - intrinsic motivation	0.342	4.110*
2	Autonomy - identified regulation	0.423	5.151*
3	Autonomy - physical activity	0.235	3.185*
4	Competence - intrinsic motivation	0.310	4.761*
5	Competence - identified regulation	0.215	3.890*
6	Competence - physical activity	0.391	4.280*
7	Relatedness - intrinsic motivation	0.269	3.311*
8	Relatedness - identified regulation	0.264	3.418*
9	Relatedness - physical activity	0.290	3.441*
10	Intrinsic motivation - physical activity	0.382	4.196*
11	Identified regulation - physical activity	0.256	3.120*
		Z	P value
12	Autonomy - intrinsic motivation - physical activity	5.481	P<0.001**
13	Autonomy - identified regulation - physical activity	3.010	P<0.001**
14	Competence - intrinsic motivation - physical activity	3.980	P<0.001**
15	Competence - identified regulation - physical activity	3.423	P<0.001**
16	Relatedness - intrinsic motivation - physical activity	4.119	P<0.001**
17	Relatedness - identified regulation - physical activity	3.891	P<0.001**

*T>1.96, **P<0.001

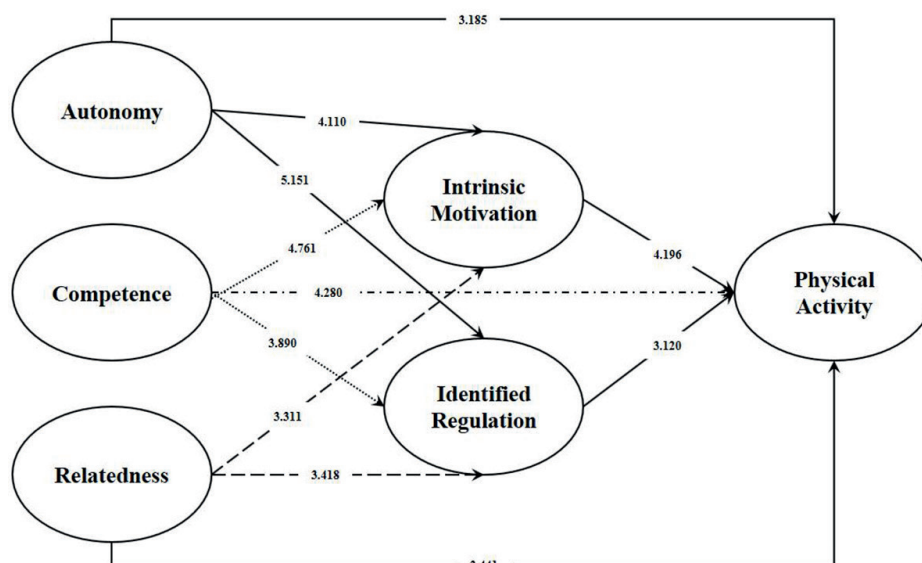


Figure 1: Research model in the form of T-values, *T>1.96

physical activity (all $T > 1.96$). Finally, autonomous motivation mediated the effects of BSNs satisfaction in PE on leisure-time physical activity (all $P < 0.001$). Based on the results of model fit, Communality was 0.734, R^2 was 0.204, and Goodness of Fit Index (GOF) was 0.387. Although R^2 was very low, GOF of 0.387 indicated a good fit for the research model.

4. Discussion

Physical activity is critically involved in the long-term well-being of students; therefore, the present study aimed to examine the effects of BSNs satisfaction concerning autonomy, competence, and relatedness in PE on autonomous motivation and leisure-time physical activity behavior of primary school students. We further reported the gender differences. The conceptual model of this research was based on the theoretical foundations of SDT (9-15); according to this theory, people with more satisfied BSNs in regard to autonomy, competence, and relatedness in one activity are more likely to have higher motivation to perform that activity.

Based on the results, BSNs satisfaction in PE classes at school had a positive association with leisure-time physical activity behavior in primary school children. These results were among the most important results in the research model of the present study and were consistent with the findings of previous research (29-32). These results also support the assumptions of SDT (9-15). Based on SDT, satisfaction of BSNs for autonomy, competence, and relatedness is important for the implementation of a behavior in a desirable way. Based on the present results, higher sense of satisfactions in BSNs during PE classes at school might increase the participation of primary school students in leisure-time physical activity. Early childhood research showed that children with a higher satisfaction in autonomy, competence, and relatedness were more involved in physical activities compared to those who had a lower sense of satisfaction. Autonomous motivation was also a determining factor in children's participation in physical activity (19-28). The findings further revealed a significant association between BSNs satisfaction and autonomous motivation (including intrinsic motivation and identified regulation) in primary school students. Furthermore, autonomous motivation positively correlated with leisure-time physical activity along with mediating the relationship between BSNs satisfaction in PE and leisure-time physical activity, supporting SDT (9, 11, 14-16). According to this theory, higher perceived satisfactions in an activity

is associated with higher autonomous motivation to perform that activity. The present results indicate the importance of PE in fostering leisure-time physical activity in primary school students. These findings can also be highly conducive to school physical educators, enabling them to increase the physical activity of their students through augmenting their perceived satisfaction in BSNs for autonomy, competence, and relatedness during PE classes. In so doing, PE teachers can support the need for autonomy through creating opportunities for choosing activities, emphasizing a sense of agency in PE classes, and using non-controlling language and feedback. They can also satisfy the need for competence in PE classes by providing learning goals that are optimally challenging, providing structure for class, stating the clear expectations of learning goals, and offering guidance when performing activities. The need for relatedness can further be met in PE classes by creating situations where teacher and peers of students show interest, affection and care and demonstrate satisfaction and appreciation of the time spent together in learning situations (16, 30, 36-38). Ultimately, to create autonomous motivation, PE teachers may elucidate importance of participation in PE activities and its subsequent benefits and acknowledge students' feelings and perspectives (16, 30, 36-38).

Consistent with the results of previous research on school students (26, 39, 40), the findings of the present study revealed that boys had significantly higher perceived satisfaction of BSNs in PE classes, higher autonomous motivation, and higher leisure-time physical activity. Girls had less BSNs satisfaction in PE classes possibly because male and female schools differ in the structure of PE classes. Social and cultural limitations regarding the physical activities of girls outside home and school might be a key reasons for their lower participation in physical activity (26, 39, 40).

5. Conclusion

The perceived satisfaction of BSNs in PE classes strongly correlated with leisure-time physical activity among students in primary school. Moreover, autonomous motivation had a positive relationship with leisure-time physical activity; This factor also mediated the relationships between BSNs satisfaction in PE and leisure-time physical activity in primary school students. Finally, boys reported higher perceived satisfactions of BSNs in PE classes along with higher autonomous motivation and physical activity. These findings can be conducive to PE teachers. To improve students' participation in leisure-time

physical activities, primary school PE teachers should apply particular settings within PE classes so as to encourage the perceived satisfactions of students in BSNs. Moreover, PE teachers should organize more autonomous sport programs in their PE classes.

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Ethical Approval

This study is part of a PhD thesis written by the first author. The Ethics Committee of Islamic Azad University of Aliabad Katoul (IR.IAU.AK.REC.1398.001) approved the study. The participants voluntarily participated in the present study, and the subjects and their parents signed written informed consent.

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