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Research Article

Effects of Peers on Motivation and Physical Activity Behavior of Adolescent Students: An Investigation of Trans-Contextual Model

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Abstract

Background: One of the most important issues in school health is believed to be finding factors that could affect students' participation in physical activity and sports. Thus, we conducted the present study to investigate the effects of peers on motivation and physical activity behavior of students. This study was theoretically based on the self-determination theory and trans-contextual model.
Methods: The present research was a correlational survey based on structural equations. The statistical sample included 384 male and female high school students from Azadshahr, Golestan, Iran, in 2019. Standard questionnaires including Peers Questionnaire, Relatedness Need Satisfaction Questionnaire, Intrinsic Motivation Scale, and Physical Activity Behavior Questionnaire were used for collecting the data. We utilized structural equations method to analyze the data.
Results: The results revealed a significant effect of peers on relatedness need satisfaction (β=0.65, T=21.17). Moreover, relatedness need satisfaction had a significant effect on students' intrinsic motivation in the physical education class (β=0.76, T=43.78). Furthermore, intrinsic motivation in the physical education class was found to be significantly transferred to intrinsic motivation outside school (β=0.73, T=42.44). Finally, intrinsic motivation in leisure time significantly affected students' physical activity (β=0.80, T=51.48).
Conclusions: These findings highlighted the positive role of peers in physical education class in promoting the students' motivation and physical activity behavior in leisure time.

Keywords: Peers, Motivation, Physical activity, Physical education, School

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1. Introduction

Today, the widespread development of various technologies has affected human life. Even though the mechanization of human life has brought several benefits; modern lifestyle has created many problems for individuals, particularly regarding their health (1). Evidence shows that individuals' physical activity (PA) level has dramatically decreased, which is mostly due to passive leisure programs (2). Regular PA is of great necessity for physical and mental health in all age groups, specifically in children and adolescents (3-5). In addition, several studies have shown that PA decreases after a child enters school and sedentary behavior increases almost between during the elementary and middle schools, and boys are active more than girls in all age groups (6). According to the World Health Organization, 81% of school-age children and adolescents do not follow the international guideline of 60 minutes of moderate-to-vigorous PA per day (7). Given the importance of regular PA in increasing physical and mental health, identifying the factors affecting the participation of children and adolescents in PA and sports is among the major issues to the present and future health.

School and physical education (PE) classes at school in particular could be considered as a potential environment for increasing students' motivation and participation in PA inside and outside school, which could subsequently result in healthier society (8). Research has indicated that PE programs positively affect students' PA, motor skills, and sports knowledge (9). Moreover, according to the trans-contextual model (10), PE programs can increase motivation of students to perform PA and motivate students to continue PA outside school.

A possible factor in PE class, which may influence participation of students in PA, is their peers. Previous studies have shown that students receive further social support from peers who are active in PE class,

and social support was positively associated with students' PA (11). Factors such as student's personal characteristics, acceptance between friends and the quality of friendship could increase the impact of peers on each other in PE class (12). Placing students in peer groups can lead to developing interpersonal relationships, increasing student's social dependence, and facilitating the satisfaction of student's social needs such as relatedness need (13). Accordingly, the placement of students in groups whose members have an active intention to do PA could be considered as an important factor in changing students' attitudes toward participation in PA (14). Thus, it could be assumed that children and adolescents do more PA in the presence of physically active peers.

On the other hand, according to the trans-contextual model (10), students' motivation to participate in PA inside the school is an important factor in shaping their motivation to participate in PA outside school, an important part of which is generated by social factors, peers for instance. One of the most important theories to explain the relationship between effective factors within the school with the amount of PA of students inside and outside the school is the self-determination theory (SDT; 15,16). Based on SDT, motivation is created once basic psychological needs are met. These needs included autonomy (for example, having the power of choice), competence (for example, mastering various skills), and relatedness (for example, creating meaningful relationships with influential others such as peers). These three needs explain how individuals regulate their behavior based on a motivational continuum intrinsic motivation to amotivation (17). Motivation is influenced by social factors and the perception of the basic psychological needs modulates the effect of social factors on motivation; this motivation has a series of consequences in various fields such as PA (18). Accordingly, satisfying the needs of autonomy, competence, and relatedness increases the motivation in students and leads to positive behavioral consequences; some of these consequences are related to PA outside the school. In this regard, previous studies have shown that needs support had positive effects on satisfying students' needs and intrinsic motivation, which subsequently leads to participation in PA (19-22). However, there is a lack of studies examining the effects of peers within PE class on motivating the adolescents for participating in leisure time PA, particularly based on SDT and trans-contextual model.

To understand the factors affecting PA level of students, it is necessary to use models through which students can be motivated to engage in PA inside and outside school. In fact, if the purpose of PE is to increase PA throughout life, PE should motivate students to do PA. Accordingly, it is pivotal to examine the role of peers in PE class and its effects on motivation and participation in PA outside school. Thus, considering the importance of this topic and the existence of a scientific gap in this field, this study aimed to investigate a conceptual model regarding the effects of peers in PE class on intrinsic motivation and its subsequent participation in PA outside school in high-school students. This study was theoretically based on SDT and trans-contextual model (Figure 1).

2. Methods

The present study was a correlational survey based on structural equations and conducted in the field. The protocol was approved by Ethics Committee of Islamic Azad University of Aliabad Katoul (Code: IR.IAU.AK.REC.1398.001). Parents provided written consent for participation of their children.

2.1 Participants

The statistical sample size consisted of 384 male and female high-school students from Azadshahr, Golestan,

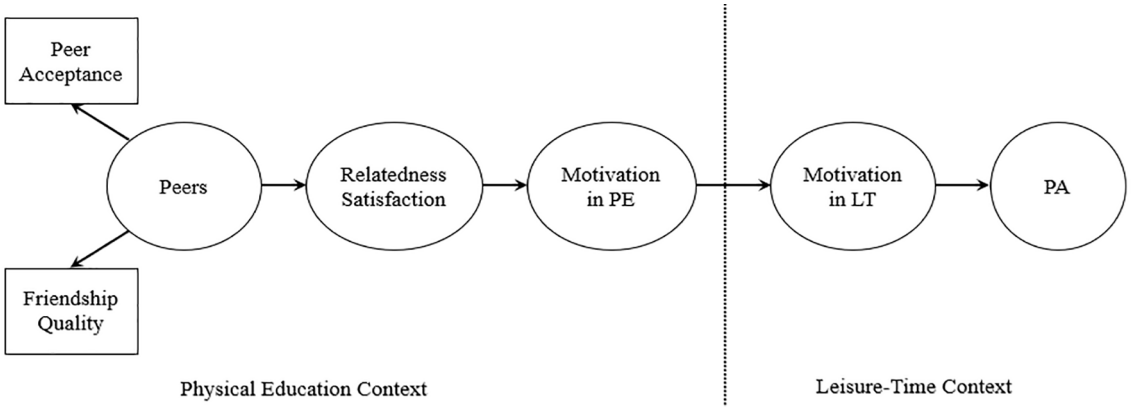

Figure 1: The figure shows the conceptual model of the present study.

Iran, in 2019 who were selected based on the guidelines of Krejcie and Morgan (23). The statistical sample was chosen with a cluster random sampling method from regular schools of Azadshahr. For this purpose, we initially divided the population (regular high schools of city) into smaller regions (clusters). Afterwards, from each region, one of the existing schools was randomly selected. Ultimately, from each school, the students were randomly selected.

2.2 Measures

2.2.1 Peers: Peers Questionnaire (24) with 21 items and two components of peer acceptance (5 items) and friendship quality (16 items) was used to measure perceived peer acceptance in PE. These items were scored from 1 to 4. We averaged all the items of this questionnaire to calculate the total score. Cox and colleagues (24) reported the reliability of this questionnaire to be 0.76 and 0.75 for peer acceptance and friendship quality, respectively. In this study, nine experts confirmed the validity of the Persian version of this questionnaire (CVI=1.00, CVR=1.00). Furthermore, we measured the reliability of this questionnaire whose Cronbach's alpha coefficients were 0.81 and 0.94 for peer acceptance and friendship quality, respectively.

2.2.2 Relatedness Need Satisfaction: The Relatedness Need Satisfaction Questionnaire (25) comprised of three items to measure relatedness need satisfaction in PE. These items were scored on a 7-point Likert scale from strongly disagree (1) to strongly agree (7). The total score of this questionnaire was obtained by averaging all the items. Baard and co-workers (25) reported the reliability of this questionnaire to be 0.89. In this study, nine experts confirmed the validity of the Persian version of this questionnaire (CVI=0.88, CVR=0.78). Furthermore, the reliability of this questionnaire was measured, whose Cronbach's alpha coefficient was 0.82.

2.2.3 Intrinsic Motivation: Intrinsic motivation in PE class and outside school were assessed with eight questions designed on the basis of Intrinsic Motivation Scale (26). The items were scored on a 7-point Likert scale from strongly disagree (1) to strongly agree (7). The total score of this questionnaire was calculated by averaging all the items. Pelletier and colleagues (26) reported the reliability of this questionnaire to be 0.90. In this study, nine experts confirmed the validity of the Persian version of this questionnaire (CVI=1.00, CVR=1.00). Moreover, we measured the reliability of this questionnaire whose Cronbach's alpha coefficient were 0.82 and 0.82 for intrinsic motivation in PE and intrinsic motivation outside school, respectively.

2.2.4 Leisure-Time PA: The Physical Activity Behavior Questionnaire (10) with three items was used to measure leisure-time PA. The items were scored on an 8-point Likert scale from zero days (0) to seven days (7). Hagger and co-workers (10) found the reliability of this questionnaire to be 0.93. In the current study, nine experts confirmed the validity of this questionnaire (CVI=0.88, CVR=1.00). In addition, we measured the reliability of this questionnaire and its Cronbach's alpha coefficient was found to be 0.80.

2.3 Data Analysis

Herein, descriptive and inferential statistics were utilized to analyze the data. Descriptive statistics included frequency, frequency percentage, and mean and standard deviation. In the inferential section, we employed the Cronbach's alpha coefficient to calculate the reliability coefficients of the questionnaires. We used Kolmogorov-Smirnov test to test normal distribution of data. Structural equation modeling was applied to test the research model. For this purpose, SPSS version 26 and Smart PLS version 3 were used. Significance level was determined at $P<0.05$.

3. Results

3.1 Descriptive Data

Mean and standard deviations of the participants' age were 16.58±0.77 and 16.79±0.83 for boys and girls, respectively. Moreover, 65 participants had one session PA per week, 128 participants had two sessions PA per week, and 191 had a history of three sessions or more PA per week. Table 1 depicts mean and standard deviation of research variables. As it could be observed, the mean of peer acceptance, friendship quality, relatedness need satisfaction, motivation in PE class, motivation in leisure time, and PA behavior were 3.67, 3.64, 3.46, 3.24, 3.40, and 3.28, respectively.

3.2 Normality of Data

We performed Kolmogorov-Smirnov test in order to determine whether our data were normally distributed. Table 2 represents the results and indicates that that all the research variables were not normally distributed (all $P<0.05$). Therefore, we used Smart PLS software to test the research model using structural equations.

Table 1: Means and standard deviations of research variables

Variable	Number	Mean	SD
Peer acceptance	384	3.67	0.68
Friendship quality	384	3.64	0.73
Relatedness need satisfaction	384	3.46	0.82
Motivation in PE class	384	3.24	0.86
Motivation in leisure time	384	3.40	0.81
Physical activity behavior	384	3.28	0.89

Table 2: Results of normality of the data

Variable	Z	Sig.
Peer acceptance	2.871	0.001
Friendship quality	3.160	0.001
Relatedness need satisfaction	2.579	0.001
Motivation in PE class	2.376	0.001
Motivation in leisure time	2.505	0.001
Physical activity behavior	2.115	0.001

3.3 Structural Equations Method

Structural equations method was employed to test the research model. To evaluate the goodness of fit of the research model, three criteria of reliability, divergent validity and convergent validity were used. In order to evaluate the reliability, three indicators of composite reliability (CR), average variance extracted (AVE) and factor load were used, which are presented in Table 3. This table shows that the composite reliability of the research variables was over 0.7, average variance extracted for each variable was over 0.5 and the factor load of each item was over 0.5. These results indicated that the reliability of the research model is appropriate and is acceptable.

Moreover, Table 4 demonstrates the results of divergent validity. According to these results, it could be said that the constructs of this study had appropriate and acceptable divergent validity. In addition, in structural equations method by Smart PLS, we used construct cross validated communality index to check the quality or goodness of fit of the research model. To examine this index, the sum of the squares of the observations for each block (SSO) of the latent variable and the sum of the squares of the prediction errors (SSE) for each block of the latent variable were considered. Positive values of this index indicated the appropriate quality of measuring instruments. According to the results in Tables 4 and 5, it could be said that the questionnaires used in the research were of good quality.

Finally, Table 6 and Figure 2 demonstrate the findings of the path analysis. As could be seen in Table 6, peers had a positive and significant effect on relatedness need satisfaction (β=0.65, T=21.17). Moreover, the effect of relatedness need satisfaction on motivation in PE class was positive and significant (β=0.76, T=43.78). In addition, motivation in PE class was positively and significantly transferred to motivation in leisure time (β=0.73, T=42.44). Ultimately, motivation in leisure time had a positive and significant effect on PA behavior (β=0.80, T=51.48).

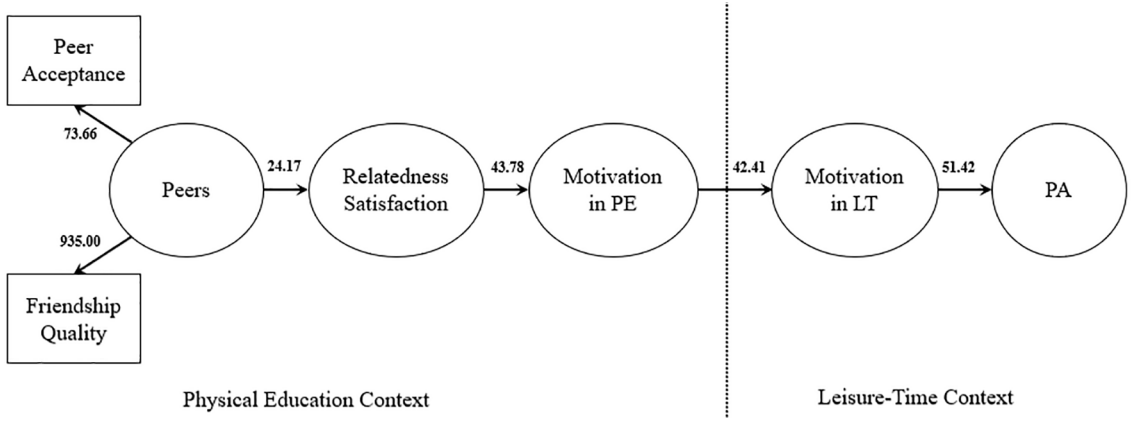

Figure 2: The figure shows the results of path analysis in the form of T-Values.

Table 3: Criteria for evaluating the reliability of the research constructs

Items	Variable	AVE	CR	Cronbach' alpha	Factor load	t
1	Peer acceptance	0.563	0.865	0.806	0.723	24.790
2					0.723	17.902
3					0.770	46.484
4					0.825	50.849
5					0.703	23.168
6	Friendship quality	0.525	0.946	0.939	0.731	22.860
7					0.706	23.369
8					0.759	25.556
9					0.754	26.930
10					0.746	33.080
11					0.783	31.075
12					0.724	20.324
13					0.866	53.225
14					0.628	15.043
15					0.704	25.143
16					0.712	28.605
17					0.717	22.099
18					0.621	19.168
19					0.673	19.248
20					0.747	34.628
21					0.685	21.765
22	Relatedness need satisfaction	0.739	0.895	0.824	0.887	86.138
23					0.831	39.935
24					0.860	58.584
25	Motivation in PE class	0.647	0.879	0.816	0.844	53.584
26					0.833	51.331
27					0.815	34.064
28					0.719	18.224
29	Motivation in leisure time	0.647	0.880	0.819	0.806	48.018
30					0.775	29.597
31					0.800	28.319
32					0.834	59.908
33	Physical activity behavior	0.718	0.883	0.799	0.919	87.199
34					0.912	101.619
35					0.691	21.842

4. Discussion

Identifying the factors that promote motivation of students to participate in PA is essential for school health. Therefore, we designed the current study to investigate a conceptual model regarding the effects of peers in PE class on intrinsic motivation and its subsequent participation in PA outside school in high-school students. The present study was theoretically based on SDT and trans-contextual model.

The results revealed that peers had a positive and significant effect on satisfying the relatedness need of students in PE class, which is consistent with the previous studies (11-13). Participation of students in school sports activities can satisfy their psychological needs, relatedness need for instance. According to SDT, the need for relatedness is one of the most important psychological needs that can play an important role in promoting student's intrinsic motivation (16, 17). This need can be satisfied through interaction with important others such as teachers, classmates, and peers. Student's need for communication with their peers is based on their characteristics such as personality traits, ethnicity, gender, and culture (12). Accordingly, understanding more positive commonalities with peers can encourage students to socialize with their peers. Formation of communication networks between students and their peers could result in increasing the peer acceptance, friendship quality, and perceived pleasure in PE class. Moreover, according to the degree of relatedness need satisfaction, it could affect students' social and

Table 4: Results of divergent validity of the research constructs

Construct	1	2	3	4	5	6
1. Peer acceptance	0.750					
2. Friendship quality	0.708	0.725				
3. Relatedness need satisfaction	0.602	0.645	0.860			
4. Motivation in PE class	0.575	0.683	0.764	0.804		
5. Motivation in leisure time	0.563	0.585	0.655	0.764	0.804	
6. Physical activity behavior	0.533	0.648	0.645	0.739	0.804	0.847

Table 5: Results of construct cross validated communality index of the research structures

Construct	SSO	SSE	1-SSE/SSO
Peer acceptance	1920	1157/834	0.397
Friendship quality	6144	3202/724	0.479
Relatedness need satisfaction	1152	807/337	0.299
Motivation in PE class	1536	992/993	0.354
Motivation in leisure time	1536	1034/815	0.326
Physical activity behavior	1152	647/049	0.438

Table 6: Direct effects of the latent research variables

Path	β	T	Sig.
Peers -> Relatedness need satisfaction	0.657	24.17	0.001
Relatedness need satisfaction -> Motivation in PE class	0.764	43.78	0.001
Motivation in PE class -> Motivation in leisure time	0.736	42.41	0.001
Motivation in leisure time -> PA behavior	0.804	51.42	0.001

emotional adjustments and future behaviors. Peer support will enable students to enjoy sport activities in PE class, which would subsequently increase their participation in PA outside school.

Regarding intrinsic motivation, our findings indicated that relatedness need satisfaction in PE class positively affected intrinsic motivation in PE class. Furthermore, intrinsic motivation created in PE class was positively transferred to intrinsic motivation outside school. Subsequently, intrinsic motivation outside school positively influenced participation in PA. These results are in accordance with previous findings (10, 27-29). According to SDT, intrinsic motivation increases when students' psychological needs such as need for relatedness are satisfied. This may occur through the process of internalization. Internalization is the process through which behaviors that previously existed for reasons with an external source emerge from an internal causal source (for example, intrinsic motivation) (16-19). Promoting students' intrinsic motivation in PE class would enable them to engage in PA voluntarily and without providing external motivational factors, such as being rewarded by PE teachers or parents, increasing their intention to try new challenges, learning new motor and sports skills, and encouraging them to work with their classmates in order to be more successful in PE activities.

Previous studies have suggested that PE teacher could promote intrinsic motivation and strong insistence on PA behavior in PE classes by providing guidelines and feedback focusing on making strong networks between students in PE class (24). For this purpose, PE teachers could take strategies to foster relationships between peers so that students feel a greater sense of belonging and self-determination in their PE class. The students who understand the supportive behaviors of PE teacher regarding relatedness in PE class, begin to internalize PA behaviors and could subsequently increase their intention to participate in PA.

Several limitations of this study deserve consideration in future research on PE motivation. Primarily, this study used a cross-sectional design, which creates limitations for examining causal influences of peers on motivation and participation of adolescents in sport and PA. A longitudinal approach would allow researchers to address additional questions. Additionally, social-economic status of the students was not measured in the current study and, hence, future studies should consider this variable when examining the effects

of peers on motivation and PA. Ultimately, our final limitation included the absence of a measure of actual behavior by acetometer-based devices. This limitation should be addressed in future studies.

5. Conclusion

Since most previous findings have examined the effects of PE teacher support on students' PA, the present research added to the literature by investigating the effects of peers in PE class on motivation and PA of students. Based on the obtained results herein, it could be concluded that peers in PE class positively influence relatedness need satisfaction and intrinsic motivation in PE class, which could subsequently affect intrinsic motivation and PA outside school. These results are certain significant practical implications, too. Based on our findings, PE teachers should create programs by focusing on targeting peers to increase their PA support for adolescents. To this end, PE teachers could take strategies to make strong networks between students in PE class and foster relationships between peers in PE class.

Ethical Approval

This study is part of a PhD dissertation by Mr. Mahmoud Sheikh. Ethics Committee of Islamic Azad University of Aliabad Katoul approved the protocol of the current research (IR.IAU.AK.REC.1398.001). The participants voluntarily participated in this study. Students' parents gave written informed consent.

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Conflicts of interest: None to declare.

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