

นิพนธ์ต้นฉบับ (Original article)

จิตวิทยาการออกกำลังกายและกีฬา (Sports and Exercise Psychology)

ADOLESCENTS' PHYSICAL ACTIVITY AND ITS RELATIONSHIP WITH SELF-EFFICACY AND SOCIAL NORMS: STRUCTURE EQUATION MODEL

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ABSTRACT

The purposes of this study were to examine the predictions of social norms and self-efficacy on adolescents' physical activity and investigate whether self-efficacy mediates the relationship between adolescents' social norms and physical activities. Participants included 488 students enrolled in 7th to 12th grade (Male: 255, Female: 233, *Age* = 15.13, *SD* = \pm 1.56). Three Korean-version questionnaires were used to explore a possible association between self-efficacy and social norms and physical activity among adolescents. Data were analyzed using by crosstab analysis, correlation analysis and multiple regression analysis. Results indicated that only peer norms predicted physical activity rather parents or teachers' norm. Further, both self-efficacy and social norms predicted physical activity, but self-efficacy accounted more variance. Moreover, both males and females' self-efficacy fully mediated the relationship between peer norms and physical activity. The findings suggested that when initiating an exercise program for adolescents' health and fitness practitioners should foster self-efficacy and peer norms as motivational strategies to increase physical activity.

(Journal of Sports Science and Technology 2014;14(1): 227 -235)

KEYWORDS: physical activity; self-efficacy; social norms; adolescents

INTRODUCTION

It is well documented that physically inactive leads to various health risks such as hypertension, type 2 diabetes, obesity, cardiovascular disease and mental health problems (1, 2). However, US Centers for Disease Control and Prevention indicated that 66.7% adolescents were not physically active, including, 23% who never exercised (3). In addition Ministry of Culture and Tourism surveyed adolescents' physical activity

- This study was supported by the Research Program funded by the Seoul National University of Science and Technology (2014-0499)

and reported that 28% of adolescents never exercised. More seriously, among adolescents who participated in physical activity, about 17% exercised once per week, and 16% did so two to three times per month (4). It has been still paid little attention to the mechanisms associated with adolescent physical activity using comprehensive approaches. To improve our limited understanding of adolescent physical activity change, promotion, and retention, variables that affect adolescent physical activity must be understood within the psychological and social viewpoints (5). In this regard, self-efficacy, and social support (i.e. friend, teacher, and family influences) have been frequently studied in Western countries as key psychosocial variables influencing adolescent physical activity (6, 7).

Social norms refer to important others' beliefs and expectations that impose someone to do something as what others expect. Adolescents learn social norms from friends, parents, and teachers which shape their behaviors and attitudes (8). In the physical activity domain, social support from family, teacher, and friends has been found to be positively related to physical activity (9). Furthermore, social support may potentially have a stronger influence on physical activity behavior than do other psychosocial variables, particularly if the behavior is not under complete volitional control and requires assistance to enact (10).

Self-efficacy is a component of Bandura's social learning theory, which relates to one's perceived confidence in her/his ability to carry out a specific behavior (11). Those with high self-efficacy tend to expend more effort, attempt more challenging tasks, and continue to persist to achieve tasks, even when faced with obstacles. For example, in the physical activity domain, someone with high exercise self-efficacy will partake in physical activity in spite of inclement weather, whereas a person possessing low self-efficacy may only do so when the weather is pleasant.

For over a decade, a large number of studies have demonstrated the existence of a significant relationship of physical activity with self-efficacy and social norms (12, 13 and 14).

Although past research provided substantial knowledge of how social norms and self-efficacy predicting physical activity behaviour, very few studies considered examining the interplay of social norms and self-efficacy on adolescents' physical activities. Bandura social cognitive theory contends that a person's self-efficacy, social environments and purposive behavior are reciprocal, and self-efficacy mediates the environmental factors (e.g., social norms in this study) and subsequent behavior (e.g., participation in physical activity in this study) (15).

Built on above theoretical background and empirical studies, the purposes of this study were to examine the predictions of social norms and self-efficacy on adolescents' physical activity. Secondly, we intended to examine whether self-efficacy mediates the relationship between adolescents' social norms and physical activities. This study hypothesized that social norms and self-efficacy will predict adolescents' physical activity. In addition, we hypothesized that self-efficacy will mediate the relationship between adolescents' social norms and physical activity.

METHODS

Participants

Participants included 488 students enrolled in the 7th to 9th grades (males, 255; females, 233, $M_{age} = 15.13$ years, $SD = 1.53$) in Nowon-gu, Northern Seoul. In the initial stage of this study, a total of 602 students were randomly selected from 6 schools. The consent forms were then mailed to the parents or guardians of all eligible participants. Ninety-one percent (555 of 602) of the parents/guardians provided a definitive response regarding their adolescents' permission to participate. Of the 555 students with parental permission, 488 (87.9%) gave their consent and completed the survey. This study was approved by Institutional Review Board of a university ethical committee.

Measures

The Korean version of the Exercise Self-efficacy Scale was used (16). The scale consists of 18 items with a 5-point scale ranging from 1 (*cannot do*) to 5 (*certain can do*). Individuals rated their confidence that they could perform exercise routines regularly (i.e. three or more times a week) under the various circumstances described (e.g. when I am feeling depressed, during a vacation). Cronbach's coefficient α was calculated as a measure of internal consistency for the scale, and a standardized α of 0.91 was obtained. In addition, 2-week test-retest reliability was performed as a measure of instrument stability, resulting in a reliability coefficient of 0.86.

In order to access adolescents' beliefs about how much their significant others (i.e., parents, teachers, and peers) expect them to participate in physical activity, a total of 9-item physical activity social norm scale was applied in the study (17). This scale consisted of 3 sub variables and each of sub variables has 3 items (i.e., 3 items for parents, 3 items for teachers, and 3 items for peers). The participants responded to statement such as "my parents, teacher or peer expect me to exercise" on a 4-point Likert scale ranging from 1 (*completely disagree*) to 4 (*completely agree*). Cronbach's coefficient α was calculated as a measure of internal consistency for the scale, and a standardized α of 0.85 for parent norm, 0.87 for peer norm, and 0.93 for teacher norm.

The weekly Leisure-Time Exercise Questionnaire, developed by Godin and Shephard (18), was translated into Korean and used in this study to assess habitual physical activity behavior. On this measure, participants were asked to report how many times during a typical week they participated in strenuous (e.g. running, vigorous cycling), moderate (e.g. fast walking, easy swim), and mild (e.g. yoga, golf) physical activity for more than 15 minutes duration. From this, an exercise index score was calculated by multiplying each reported exercise session by its metabolic equivalent (MET) value and summing the result [i.e. (strenuous \times 9) + (moderate \times 5) + (mild \times 3)]. In the present study, 2-week test-retest reliability was performed as a measure of instrument stability, resulting in a reliability coefficient of 0.86.

Statistical Analyses

Descriptive analysis was used to describe means and standard deviations of the study participants. Then, correlation analysis was used to examine the correlations of all variables. Based on these correlations, regression analysis was carried out to test effect of self-efficacy and social norms in predicting physical activity and mediating effect of self-efficacy on relationship between social norms and physical activity. These analyses were performed by using SPSS 18.0.

RESULTS*Descriptive Statistics and Correlations Matrix*

Table 1 shows all measures with appropriate internal reliability. At the upper part, males' peer norm and teacher norm correlated with self-efficacy, and self-efficacy correlated with physical activity. Also, peer norm correlated with physical activity but not parents and teacher's norm correlated with physical activity. At the low part, females' same results were found as males' correlation but males' self-efficacy had greater coefficients ($r=0.44$) than females on physical activity ($r=0.34$). Also, from table 2 indicated, it is found that: (a) social norms predicted self-efficacy; (b) self-efficacy predicted physical activity; and (c) social norms predicted physical activity. These conditions provided qualification for subsequent analysis of the mediating effects of self-efficacy on the relationship between social norms and physical activity.

Table 1.

Correlation matrix and descriptive statistics for all participants (Males: $n=255$ at upper part; females: $n=233$ at lower part)

	1	2	3	4	5
Parents norm(1)	1.00	.26**	.36**	.03	-.02
Peer norm(2)	.32**	1.00	.48**	.39**	.24**
Teacher norm(3)	.27**	.35**	1.00	.15*	.09
Self-efficacy(4)	.22**	.39**	.04	1.00	.44**
Physical Activity(5)	.09	.23**	.10	.34**	1.00
Mean	3.17	2.82	2.83	4.22	12.78
SD	0.74	0.77	0.82	2.10	7.45

Table 2.

Simple regression of social norms and self-efficacy on physical activity

Variables	Male		Female	
	<i>B</i>	ΔR^2	<i>B</i>	ΔR^2
Regression 1 ^a				
Parent norm	.03	-.00	.22 [*]	.04 [*]
Peer norm	.39 ^{**}	.15 ^{**}	.39 ^{**}	.15 ^{**}
Teacher norm	.15 ^{**}	.02 ^{**}	.04	-.00
Regression 2 ^b				
Parent norm	-.02	-.00	.09	.00
Peer norm	.24 [*]	.03 [*]	.23 [*]	.05 [*]
Teacher norm	.09	.01	.10	.00
Self-efficacy	.44 ^{**}	.19 ^{**}	.34 ^{**}	.11 ^{**}

^a Dependent variable is Self-efficacy; ^b dependent variable is Physical activity ;^{*} p<.05; ^{**} p<.01*Mediating Effects of Self-Efficacy on Relationship between Social Norm and Physical Activity*

As Table 3 indicates, when self-efficacy was controlled in the first step, males' peer norms predicted physical activity ($R^2=0.05$) while females peer norms also predicted physical activity ($R^2=0.05$), but when self-efficacy and peer norms put into step 2, only self-efficacy was remained as predictor both in males and females. Thus, both in males and females self-efficacy fully mediated the relationship between peer norms and physical activity. Figure 1 shows the regression coefficients and associated standard errors for the mediation.

Table 3.

Summary of mediated regression analyses: direct and indirect effects of self-efficacy on the relationship between social norm and adolescents' physical activity

Male				
Variables	Model 1		Model 2	
	β	ΔR^2	<i>B</i>	ΔR^2
Step1				
Peer norm	.24 [*]	.05 [*]	.08	
Step 2				
Self-efficacy			.41 ^{**}	.19 ^{**}

Female

Variables	Model 1		Model 2	
	β	ΔR^2	B	ΔR^2
Step1				
Peer norm	.23*	.05*	.12	
Step 2				
Self-efficacy			.30**	.12**

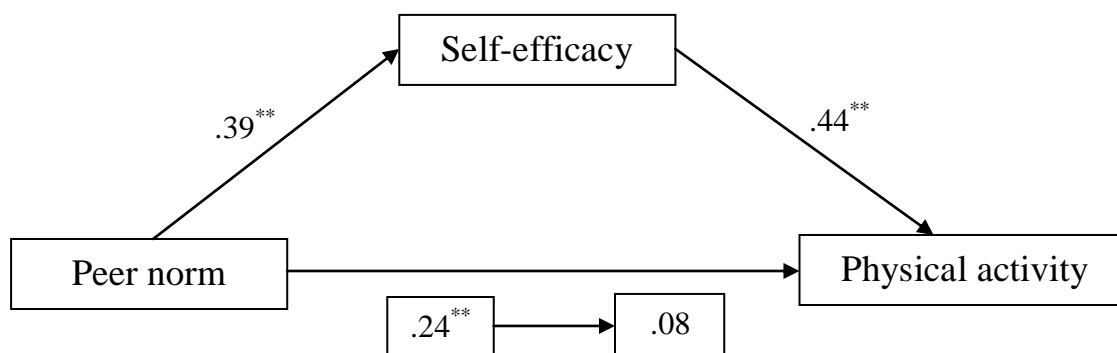


Figure 1. Meditating effect of self-efficacy on relationship between peer norm and physical activity in male adolescents

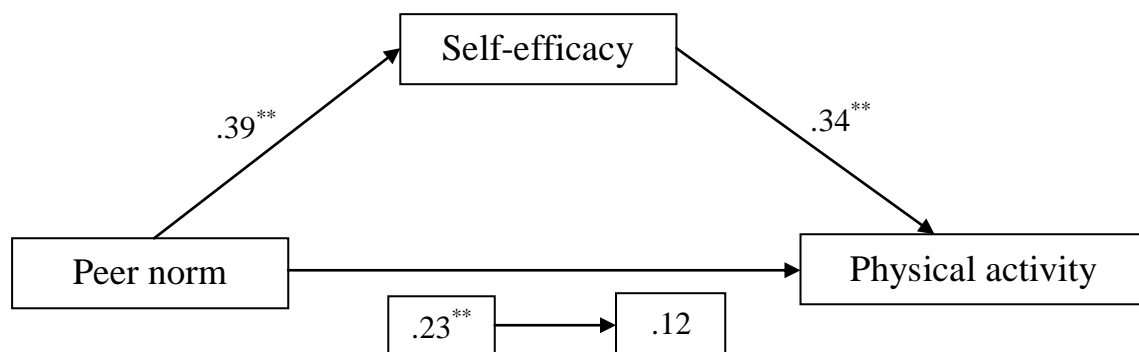


Figure 2. Meditating effect of self-efficacy on relationship between peer norm and physical activity in female adolescents

Note: the numbers in the first block are Model A path coefficients while numbers in the second block are Model B path coefficients

DISCUSSION

It is important to achieve a deeper understanding of the processes that lead to regular physical activity involvement among Korean adolescents. Results found that only peer norms, along with self-efficacy, predicted physical activity rather than parents' or teachers' norm. Subsequent analyses found self-efficacy mediated the relationship between social norms and physical activity. Results supported our hypotheses that both peer norms and self-efficacy are significant predictors of adolescents' physical activity which also support previous research (19, 20 and 21).

This finding provides several theoretical implications for health practitioners in planning promotional strategies for adolescents' physical activity. First, it is confirmed that peer norms facilitate adolescents' physical activity. Adolescents spend much time with peers so what peers expect influencing their behaviours in physical activity. Also, compare to other sources of normative perceptions (i.e., parents and teachers), it seems peer norms are more influential. Recent literature suggests that when children are growing older peer may outperform their behavior choices than parents or teachers (17, 22). Specifically, this was in spite of the strong emphasis on the family bond in Korean culture. Though culture exerts a potent and enduring influence on people's way of living, including physical activity, Korean society has been radically changed and westernized in many sectors. At least in this set of observations, it appears that among Korean adolescents, family-centered tendencies have shifted toward more individualism or interdependence with peers (14). Given these social tendencies, friends can be powerful component and key form of social norm for physical activity.

Further, in the current study, self-efficacy exerted the largest total effect on Korean adolescents' physical activity. It is plausible to interpret that adolescents with high self-efficacy were more likely to participate in physical activity compared to those with lower levels of self-efficacy. This finding has been supported by several studies (23, 24), and is consistent with Bandura's theory, which hypothesizes that an individual's level of confidence to engage in a specific behavior is related to their actual behavior (11). More specifically, vicarious experiences (modeling) are one of the key components in self-efficacy. For example, seeing others (e.g. friends, siblings) receive recognition or rewards from significant others would increase one's efficacy expectations (25).

In spite of significances of the current findings, there are several limitations that should be considered for further research. This study did not focus on obtaining data from the rural or out-of-school adolescents. Therefore, data obtained from the school adolescents in Seoul cannot be considered representative of the eligible population of all Korean adolescents. This study applied a cross-sectional design and therefore caution must be drawn when making causal inferences. The measures used in the study underwent a systematic translation and validation procedure. However, they relied on self-report format, which may result in some bias from item interpretation, recall, and social desirability.

The current study provides the significance evidence of an association of physical activity with self-efficacy and social norms in Korean adolescents. The findings demonstrate that peer norm and self-efficacy have significant influence on adolescents' physical activity. Therefore, adolescents should be encouraged to increase and maintain their confidence to engage in physical activity and to spend much time with peers in participating in physical activity. The current study provides starting points for interventions aimed at increasing physical activity levels, and a baseline level from which to evaluate these interventions.

Acknowledgements

This study was supported by the Research Program funded by the Seoul National University of Science and Technology (2014-0499).

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