

Relationship of social norms and self-efficacy with physical activity in Korean Adolescents

Soojin Kang* and Youngho Kim*

RELATIONSHIP OF SOCIAL NORMS AND SELF-EFFICACY WITH PHYSICAL ACTIVITY IN KOREAN ADOLESCENTS

KEYWORDS: Physical activity, Self-efficacy, Social norms, Adolescents.

ABSTRACT: The study identified the physical activity distribution among a random sample of Korean adolescents and investigated relationship of self-efficacy and social norms with physical activity. Participants included 488 students enrolled in 7th to 12th grade (Male: 255, Female: 233, *Age* = 15.13, *SD* = ± 1.56). Three Korean-version questionnaires were used to explore a possible association of self-efficacy and social norms with physical activity among adolescents. Crosstab analysis, correlation analysis and multiple regression analysis were performed to analyze data. Results indicated that the physical activity pattern of Korean adolescents was different by each stage of physical activity: precontemplation (15.3%), contemplation (17.7%), preparation (28.8%), action (18.4%), and maintenance (19.8%). Significant distribution emerged as a function of gender. In addition, the findings revealed that self-efficacy and peer norms were significantly correlated with physical activity and that peer norms and self-efficacy had significant effect in predicting physical activity. The findings suggested that the health promotion strategy aimed at increasing adolescents' physical activity should be designed to foster self-efficacy and peer norms relating to physical activity.

It is well documented that physically inactive lifestyle leads to various health risks such as hypertension, type 2 diabetes, obesity, cardiovascular disease and mental health problems (Annesi, Faigenbaum, Smith, Unruh and Hamilton, 2007; Spiegel and Foulk, 2006). However, US Centers for Disease Control and Prevention (2009) indicated that 66.7% adolescents were not physically active, including 23% who never exercised. In Australia between 2001 and 2005, enrollment in high school physical education classes dropped from 42% to 25% (Australian Institute of Health and Welfare, 2006). Like Western studies, Korean data related to adolescent physical inactivity demonstrate similar trends. According to one study, 19% of adolescents responded that they never exercised and 59% of the adolescents who participated in regular exercise did so for less than 1 hour (Kim, 2004). In addition, Ministry of Culture and Tourism (2009) surveyed adolescents' physical activity 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.

Nevertheless, our efforts focused on adolescents' physical inactivity have tried to provide information and education programs without fully considering the psychological and social factors associated with adolescent physical inactivity (Kim, 2004). For instance, studies have been frequently aimed at identifying the differences in physical activity levels based on demographic factors and the effects of physical activity on health

(Lee, 2001; Oh, Lee, Oh, Choi, Choe et al., 2010). However, it has been paid little attention to factors 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 psychosocial viewpoints (Rovniak, Anderson and Winett, 2002). In this regard, the transtheoretical model (TTM) has been paid much attention as an effective tool to explain physical activity changes. The TTM accounts for the dynamic nature of health behavior change, including physical activity, and recognizes that individuals often must make several attempts at behavior change before they are successful (Prochaska and Di Clemente, 1983). This model consists of five stage of physical activity change: (a) precontemplation (individuals are physically inactive and do not intend to initiate physical activity within the next 6 months), (b) contemplation (individuals are physically inactive and intend to begin regular physical activity within the next 6 months), (c) preparation (individuals are irregularly active), (d) action (individuals have been regularly active for fewer than 6 months), and (e) maintenance (individuals have sustained regular physical activity for more than 6 months) (Kim, 2004). These physical activity stages have been shown to have predictable relationships with self-efficacy and social norms (Kim and Cardinal, 2010; Titze, Stronegger and Owen, 2005).

Correspondence: Youngho Kim. 172 Gongneung dong, Nowon gu, Seoul, Korea. E-mail: yk01@seoultech.ac.kr

¹ This work was done with the sports promotion fund from Korea Institute of Sport Science, Korea Sports Promotion Foundation (KISS-13-A04004).

* Department of Sport Science, Seoul National University of Science and Technology

Fecha de recepción: 17 de Mayo de 2014. Fecha de aceptación: 6 de Enero de 2015.

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. Self-efficacy is based on the premise that people can and do self-regulate their own motivation and behavior (Bandura, 1977). 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.

Social norms refer to important others' beliefs and expectations that impose someone to do something as what others expect. The social norms are formed in various social situations (a) when adolescents adopt a new social role in groups (Brown, 1990), (b) when they are developing a stable sense of identity/self-concept around social settings (Harter, Stocker and Robinson, 1996), and (c) when they receive feedback from others which form their identities and self-evaluations (Hergovich, Sirsch and Felinger, 2002). Adolescents learn social norms from friends, parents, or teachers which shape their behaviors and attitudes (Burk, Steglich and Snijders, 2007). In the physical activity domain, social support from family, teacher, and friends has been found to be positively related to physical activity (Saunders, Motl, Dowda, Dishman and Pate, 2004). 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 (Courney and McAuley, 1995).

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 (Deforche, Bourdeaudhuij, Tanghe, Hills and Bode, 2004; Kim and Cardinal, 2010). However, these studies have mainly come from Western countries. Adolescent physical activity, especially in Korea, is recently being considered a crucial factor in the health status of Koreans, and this has fast become an important public health and social issue in Korean society. Moreover, data predicting the links of physical activity with self-efficacy and social norms are limited. Therefore, the purpose of the current study is to identify the physical activity distribution among a random sample of Korean adolescents and to examine relationship of their physical activity with self-efficacy and social norms.

Method

Participants

Participants included 488 students enrolled in the 7th to 12th grades (males, 255; females, 233, $M_{\text{age}} = 15.13$ years, $SD = 1.53$) in Nowon-gu, Northern Seoul. In the initial stage of this study, 6 schools in the Nowon-gu district were invited to participate, and all three eligible junior high schools in the district agreed to participate in the study. Within each school ($N = 3$), two classes in each grade from 7th to 12th were randomly chosen, and a total of 602 students were randomly selected from the class rosters. 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. The non-participants were not significantly different in age or sex from the students who participated. This study was approved by Institutional Review Board of a university ethical committee.

Instruments

Adolescents' gender, age, and grade were measured to explore demographic characteristics of the study participants (Ministry of Health and Welfare, 1996). In order to measure an adolescent's self-confidence to physical activity, the Korean version of the *Exercise Self-efficacy Scale* was used (Kim, 2004). 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 participate in physical activity regularly (i.e. three or more times a week) under the various circumstances described (e.g. when I am feeling depressed or during a vacation). Cronbach's coefficient α was calculated as a measure of internal consistency for the scale, and a standardized α of .91 was obtained. In addition, 2-week test-retest reliability was performed as a measure of instrument stability, resulting in a reliability coefficient of .86.

For accessing adolescents' beliefs about how much their significant others (i.e., parents, teachers, and peers) encourage them to participate in physical activity, a total of 9-item physical activity social norm scale was applied in the study (Kim and Cardinal, 2010). 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, teachers, or peers encourage 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 .85 for parent norm, .87 for peer norm, and .93 for teacher norm.

The Korean version of stages of change scale for physical activity was used in the present study to measure participant current stage of physical activity (Kim, 2004). In this scale, stage of physical activity was assessed using a five-item, dichotomous scale ("yes"/"no") related to regular physical activity and intentions. The participants were categorized into one of the five stages of physical activity: (1) precontemplation (individuals are physically inactive and do not intend to initiate exercise within the next 6 months), (2) contemplation (individuals are physically inactive and intend to begin regular exercise within the next 6 months), (3) preparation (individuals are irregularly active below a criterion level-three or more times per week for at least 30 min each time), (4) action (individuals have been regularly active for less than 6 months), and (5) maintenance (individuals have sustained regular exercise for more than 6 months after initial exercise). A two-week, test-retest reliability was conducted, resulting in a reliability coefficient of .85.

Additionally, the weekly *Leisure-Time Exercise Questionnaire*, developed by Godin and Shephard (1985), 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 .86.

Data analysis

Descriptive statistics (e.g., means, standard deviations, and frequencies) were used to summarize the participants’ characteristics. Crosstab analysis with Chi-square (χ^2) was carried out to examine physical activity distribution by gender. Correlation analysis was used to examine associations among

social norms, self-efficacy and physical activity. Then, multiple regression analysis was carried out to investigate the effect of social norms and self-efficacy in explaining physical activity. To test the moderating effect of self-efficacy, the cross-product terms of the self-efficacy and the social norms constructs (i.e., parent norm, peer norm, and teacher norm) were entered in a hierarchical regression (step 3), after analyzing the main effects of self-efficacy (step 1) and social norms (step 2). All statistical methods applied in this study were conducted using the SPSS 18.0.

Variables	Stage of physical activity					Total
	PC	CO	PR	AC	MA	
Male	31 (12.3)	25 (9.8)	56 (19.6)	72 (28.2)	71 (28.2)	255 (100.0)
Female	44 (18.8)	62 (26.6)	84 (36.0)	18 (7.8)	25 (10.8)	233 (100.0)
Total	75 (15.3)	87 (17.7)	140 (28.8)	90 (18.4)	96 (19.8)	488 (100.0)

PC = Precontemplation; CO = Contemplation; PR = Preparation; AC = Action; MA = Maintenance
 Parentheses are percent.

Table 1. Stages of physical activity distribution.

Results

Table 1 shows the result of the frequency analysis concerning the physical activity distribution in the adolescents. The following stages of physical activity emerged: precontemplation ($n = 75$, 15.3%), contemplation ($n = 87$, 17.7%), preparation ($n = 140$, 28.8%), action ($n = 90$, 18.4%), and maintenance ($n = 96$, 19.82%). Overall, 33.0% of the sample were totally sedentary (precontemplation or contemplation) and 28.8% participated in physical activity irregularly (preparation). Additionally, Table 1 demonstrates the stage of physical activity change distribution as

a function of gender. A significant difference among male and female adolescents for physical activity stage distribution emerged ($\chi^2 = 137.38$, $df = 4$, $p < .001$). Female adolescents were more likely to be in the precontemplation and contemplation stages, whereas males were more likely to be in the action and maintenance stages.

Table 2 shows the correlations among physical activity, self-efficacy, and the social norms constructs. Physical activity was significantly associated with peer norm ($r = .24$) and self-efficacy ($r = .44$). In addition, self-efficacy was significantly correlated with peer norm ($r = .39$) and teacher norm ($r = .15$).

	Parent norm	Peer norm	Teacher norm	Self-Efficacy	Physical Activity
Parents norm	1.00	.26*	.36*	.03	-.02
Peer norm		1.00	.48*	.39*	.24*
Teacher norm			1.00	.15*	.09
Self-efficacy				1.00	.44*
Physical activity					1.00
Mean	3.19	2.72	2.85	4.42	12.78
SD	0.64	0.67	0.84	2.21	7.45

* $p < .01$

Table 2. Correlation and descriptive statistics among the study variables.

Table 3 shows the results of the regression analysis which investigated the effects of self-efficacy and the social norm constructs on physical activity. In step 1, self-efficacy was entered as a predictor, and it accounted for 22% of the variance in physical activity (adjusted $R^2 = .22$) with a significant standardized coefficient ($\beta = .41, p < .01$). Self-efficacy and the social norm construct were entered as predictors in step 2 and these variables together explained 34% of the variance in physical activity. The

incremental increase in R^2 for this model was significant (R^2 change = .23, $p < .01$), revealing that peer norm ($\beta = .28, p < .01$) were significant predictors even after taking self-efficacy. To analyze the moderating effect of self-efficacy, cross-product terms were entered at step 3. The incremental increase in R^2 for this model was significant (R^2 change = .11), demonstrating that physical activity depended on the interaction between self-efficacy and peer norm.

Dependent variable	Step	Predictor variable	Standardized	R^2 change	Adjusted R^2
Physical activity	1	Self-efficacy	.41**	.19*	.22
		Peer norm	.28*	.23*	.34
	3	Teacher norm	.05		
		Parent norm	.09		
		Self-efficacyX peer norm	.19	.11	.43
		Self-efficacyX parent norm	.07		
		Self-efficacyX teacher norm	.03		

* $p < .05$, ** $p < .01$

Table 3. Stepwise multiple regression analysis predicting physical activity from self-efficacy and the social norm constructs.

Discussion

It is important to achieve a deeper understanding of the processes that lead to regular physical activity involvement among adolescents. This study examined the hypothesized model that self-efficacy and social norms including peer norm, parent norm, and teacher norm would consequently exert a substantial influence on predicting adolescents' physical activity.

The current study reported that more than half of adolescent were being inactive, and more seriously 33% of them were totally sedentary. This finding was supported by a wide range of previous studies indicating that a large number of children and adolescents have failed to engage in regular physical activity (Araki, Kodani, Gupta, and Gill, 2013; Korea National Youth Policy Institute, 2011). It is plausible to interpret that the high rates of physical inactivity of the Korean adolescents might be extensively caused by social and environmental limitations such as a lack of available facilities and time for exercise, a social context neglecting exercise and Physical Education, and excessive schoolwork owing to the dominance of an academic-centered curriculum. It is also found significant differences in the physical activity distribution by gender. The finding concerning gender difference was broadly supported by previous studies demonstrating that males were significantly more likely to be active compared with their female counterparts (Jago, Anderson, Baranowski and Watson, 2005; Vilhjalmsson and Kristjansdottir, 2003). It is plausible to explain that males are more active than females may be due, in part, to different family and sociocultural influences pertaining to participation in physical activity (Carron, Hausenblas and Estabrooks, 2003).

Results found that peer norm and self-efficacy were significant to predict physical activity. In the current study, self-

efficacy exerted the largest total effect on 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 (Kim, Cardinal and Lee, 2006; Rovniak et al., 2002), 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. More specifically, self-efficacy is developed through previous performance accomplishments, vicarious experiences (modeling), verbal persuasion, emotional arousal, physiological states, and imagined experiences. For example, setting physical activity goals and sticking with them would result in a sense of accomplishment, thereby raising one's efficacy expectations. Similarly, seeing others (e.g., friends) who receive recognition or rewards from significant others would increase one's efficacy expectations (Bandura, 1977).

Additionally, peer norm in social norms alone exerted a positive effect on physical activity, suggesting that close friends' attitude and perception toward physical activity can facilitate regular involvement in physical activity among Korean adolescents. For example, engaging in an after-school physical activity class with supportive friends can help sustain an active lifestyle (Duncan and Mummery, 2005). 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 (Duncan and Mummery, 2005). If this is truly an accurate depiction of the

evolving social climate in Korea, then adolescents are in the process of attempting to become independent from their parents and are strengthening their identification with their peers (Titze et al., 2005). Given these social tendencies, friends can be a powerful component and key form of social norm for physical activity.

In spite of the significance 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 norms 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 ideas and issues identified in the current study are partly consistent with the results of previous western research in the same field. The strength is that this study attempts to test the effects of self-efficacy and social norms in explaining physical activity for a relatively less studied Korean adolescents sample because most of studies mainly have been conducted in western societies. The current study provides the significance to design better physical activity programs that include psychosocial characteristics as a critical component.

RELACIONES ENTRE LAS NORMAS SOCIALES Y LA AUTO-EFICACIA CON LA ACTIVIDAD FÍSICA EN ADOLESCENTES DE COREA

PALABRAS CLAVE: Preocupación ante los Errores, Exigencias Personales, Insatisfacción Corporal, Ansiedad de Rendimiento, Depresión, Dieta, Perfeccionismo Debilitador.

Resumen: El objetivo del presente estudio fue examinar la influencia de los dos elementos principales del perfeccionismo (CM, preocupación ante los errores y PS, exigencias personales) ante los factores de riesgo de los trastornos alimentarios en bailarinas. Con apoyo en la literatura, evaluamos el rol de CM y de PS sobre la dieta y el estado de ánimo, y la función de la ansiedad de rendimiento y la insatisfacción corporal como los principales mediadores en el modelo. Doscientos ocho bailarinas ($M = 15.28$, $SD_{edad} = 2.32$) de dos conservatorios de danza españoles participaron en este estudio. Gracias a modelos estructurales, los resultados confirman la influencia de PS y de CM en la dieta, sin embargo la vinculación entre dieta, insatisfacción corporal, estado de ánimo y la ansiedad de rendimiento solo se produce a partir del CM que es la vía del perfeccionismo debilitador. En conclusión, la presencia de CM puede ser la clave para diferenciar entre bailarines con mayor riesgo para desarrollar trastornos alimentarios debido a su asociación con variables tradicionalmente relacionadas con estos.

RELAÇÕES ENTRE AS NORMAS SOCIAIS E A AUTO-EFICÁCIA COM A ACTIVIDADE FÍSICA EM ADOLESCENTES COREANOS

PALAVRAS-CHAVE: Preocupação face aos erros, Exigências pessoais, Insatisfação corporal, Ansiedade, Depressão, Dieta, Perfeccionismo debilitador. **RESUMO:** O objetivo deste estudo foi analisar a influência dos dois elementos principais do perfeccionismo (CM, preocupação face aos erros e PS, exigências pessoais) face aos factores de risco de transtornos alimentares em bailarinas. Com base na literatura, avaliámos o papel do CM e PS sobre a dieta e estado de humor, e o papel da ansiedade e da insatisfação corporal como os principais mediadores no modelo. Duzentas e oito bailarinas ($M = 15.28$, $DP_{idade} = 2.32$) de dois conservatórios de dança espanhóis participaram neste estudo. Através de modelos estruturais, os resultados confirmam a influência do PS e CM na dieta, contudo a relação entre dieta, insatisfação corporal, estado de humor e ansiedade só ocorre a partir de CM que é a via do perfeccionismo debilitador. Em conclusão, a presença de CM pode ser a chave para diferenciar entre bailarinos com maior risco de desenvolverem transtornos alimentares devido à sua associação com variáveis tradicionalmente associadas com estes.

References

- Annesi, J. J., Faigenbaum, A. D., Smith, A. E., Unruh, J. L. and Hamilton, F. G. (2007). Effects of the youth fit for life protocol on physiological, mood, self-appraisal, and voluntary physical activity changes in African American preadolescents: Contrasting after-school care and physical education formats. *International Journal of Clinical and Health Psychology*, 7, 641-645.
- Araki, K., Kodani, I., Gupta, N. and Gill, D. L. (2013). Experiences in Sport, Physical Activity, and Physical Education Among Christian, Buddhist, and Hindu Asian Adolescent Girls. *Journal of Preventive Medicine and Public Health*, 46(Suppl. 1), S43-S49.
- Australian Institute of Health and Welfare (2006). *Australia's Health*. Canberra: Australian Government Publishing Services.
- Bandura, A. (1977). Self-efficacy: Toward a unifying theory of behavioral change. *Psychology Review*, 84, 191-215.
- Brown, B. B. (1990). Peer groups and peer cultures. In S. S. Feldman and G. R. Elliott (Eds.), *At the threshold: The developing adolescent* (pp. 171-196). Cambridge, MA: Harvard University Press.
- Burk, W. J., Steglich, C. E. G. and Snijders, T. A. B. (2007). Beyond dyadic interdependence: Actor-oriented models for co-evolving social networks and individuals behaviors. *International Journal of Behavioral Development*, 31, 397-404.
- Carron, A. V., Hausenblas, H. A. and Estabrooks, P. A. (2003). *The psychology of physical activity* (pp. 87). New York: McGraw Hill.
- Courney, K. S. and McAuley, E. (1995). Reliability and discriminant validity of subjective norm, social support, and cohesion in an exercise setting. *Journal of Sport and Exercise Psychology*, 17, 325-337.
- Deforche, B., Bourdeaudhuij, I. D., Tanghe, A., Hills, A. and Bode, P. D. (2004). Changes in physical activity and psychosocial determinants of physical activity in children and adolescents treated for obesity. *Patient Education and Counseling*, 55, 407-415.
- Duncan, M. and Mummery, K. (2005). Psychosocial and environmental factors associated with physical activity among city dwellers in regional Queensland. *Preventive Medicine*, 40, 363-372.
- Godin, G. and Shephard, R. J. (1985). A simple method to assess exercise behavior in the community. *Canadian Journal of Applied Sport Science*, 10, 141-146.
- Jago, R., Anderson, C. B., Baranowski, T. and Watson, K. (2005). Adolescent patterns of physical activity differences by gender, day, and time of day. *American Journal of Preventive Medicine*, 28, 447-452.
- Hardman, C. A., Horne, P. J. and Lowe, C. F. (2009). A home-based intervention to increase physical activity in girls: the Fit 'n' Fun Dudes program. *Journal of Exercise Science and Fitness*, 7, 1-8.
- Harter, S., Stocker, C. and Robinson, N. S. (1996). The perceived directionality of the link between approval and self-worth: The liabilities of a looking glass self-orientation among young adolescents. *Journal of Research in Adolescence*, 6, 285-308.
- Hergovich, A., Sirsch, U. and Felinger, M. (2002). Self-appraisal, actual appraisals and reflected appraisals of preadolescent children. *Social Behavior and Personality*, 30, 603-612.
- Kim, Y. H. (2004). Korean adolescents' exercise behavior and its relationship with psychological variables based on stage change model. *Journal of Adolescent Health*, 34, 523-530.
- Kim, Y. H. and Cardinal, J. B. (2010). Psychosocial correlates of Korean adolescents' physical activity behavior. *Journal of Exercise Science and Fitness*, 8, 97-104.
- Kim, Y. H., Cardinal, B. J. and Lee, J. Y. (2006). Understanding exercise behavior among Korean adults: a test of the transtheoretical model. *International Journal of Behavioral Medicine*, 13, 295-303.
- Korea National Youth Policy Institute. (2011). *Korean adolescent health survey*. Seoul: Korea National Youth Policy Institute.
- Lee, J. G. (2001). Analysis on the types and determinants of fun in sport participation among adolescents. *Korea Journal of Sport Sociology*, 14, 37-54.
- Ministry of Culture and Tourism (2009). *The Participation Pattern of Physical Activity: National-Wide Survey*. Ministry of Culture and Tourism.
- Ministry of Health and Welfare. (1996). *An annual report for health statistics*. Seoul, Korea: Ministry of Health and Welfare.
- Oh, H., Lee, G., Oh, C. M., Choi, K. S., Choe, B. K., Choi, J. M. and Yoon, T. Y. (2010). Association between the physical activity of Korean adolescents and socioeconomic status. *Journal of Preventive and Medicine in Public Health*, 42, 305-314.
- Prochaska, J. O. and DiClemente, C. C. (1983). Stages and processes of self-change of smoking: Toward an integrative model. *Journal of Consulting and Clinical Psychology*, 51, 390-395.
- Rovniak, L. S., Anderson, E. S., Winett, R. A. and Stephens, R. S. (2002). Social cognitive determinants of physical activity in young adults: a prospective structural equation analysis. *Annals of Behavioral Medicine*, 24, 149-156.
- Sallis, J. F., Prochaska, J. J. and Taylor, W. C. (2000). A review of correlates of physical activity of children and adolescents. *Medicine and Science in Sports and Exercise*, 32, 963-975.
- Saunders, P., Motl, R. W., Dowda, M., Dishman, R. K. and Pate, R. R. (2004). Comparison of social variables for understanding physical activity in adolescent girls. *American Journal of Health Behavior*, 28, 426-436.
- Spiegel, S. A. and Foulk, D. (2006). Reducing overweight through a multidisciplinary school-based intervention. *Obesity*, 14, 88-96.
- Titze, S., Stronge, W. and Owen, N. (2005). Prospective study of individual, social and environmental predictors of physical activity: women's leisure running. *Psychology of Sport and Exercise*, 6, 363-376.
- U.S. Centers for Disease Control and Prevention (2009). Youth Risk Behavior Surveillance-2009. *MMWR Surveillance Summary*, 59 (No. SS-5), 1-142.
- Vilhjalmsson, R. and Kristjansdottir, G. (2003). Gender differences in physical activity in older children and adolescents: the central role of organized sport. *Social Science and Medicine*, 56, 363-374.