Original Article

Effect of compulsory PE courses on body appreciation and psychological aspects of university students.

ROBERT S.K. NG¹; VIOLETTE F.P.LIN²

¹Physical Education Unit, the Chinese University of Hong Kong, HONG KONG, CHINA

²Hong Kong Swimming Teachers' Association, HONG KONG, CHINA

Published online: November 30, 2020

(Accepted for publication: November 22, 2020)

DOI:10.7752/jpes.2020.s6433

Abstract

The purpose of this study was to examine the effect of a 13-week skill oriented required PE course participation on Body Appreciation Scale-2, self-esteem, total body dissatisfaction score, and self-rating level of skill, knowledge, fitness and enjoyment in university students. One hundred and fifty-one first year full-time students (82 males, 69 females; mean age = 18.8±1.0 years) enrolling seven PE courses of one university in Hong Kong were recruited. They completed the Chinese self-administered questionnaire before and after the completion of 13-week 2-hour/week skill-oriented course. Results of MANOVA test with repeated measures showed that there was no interaction among time, type of sports and gender in BAS-2 score $F(1, 146) = 0.58, p = .45$, Wilk's $\Lambda = 0.99$, partial $\eta^2 = .00$; self-esteem $F(1, 146) = 0.66, p = .42$, Wilk's $\Lambda = 0.99$, partial $\eta^2 = .00$; total body dissatisfaction scores $F(1, 146) = 0.12, p = .91$, Wilk's $\Lambda = 0.99$, partial $\eta^2 = .00$; the level of knowledge $F(1, 146) = 0.16, p = .69$, Wilk's $\Lambda = 0.99$, partial $\eta^2 = .00$; skill level $F(1, 146) = 0.99, p = .68$, Wilk's $\Lambda = 0.99$, partial $\eta^2 = .00$; enjoyment level $F(1, 146) = 0.70, p = .79$, Wilk's $\Lambda = 1.00$, partial $\eta^2 = .00$; fitness level $F(1, 146) = 0.36, p = .55$, Wilk's $\Lambda = 0.99$, partial $\eta^2 = .00$. Regardless of their gender and type of course participation, all participants achieved significant increase in positive body image, self-rating level of knowledge, skill, fitness, and enjoyment after the completion of 13-week skill oriented required PE course.

Key Words: required PE program, physical activity, positive body image, self-esteem

Introduction

Physical education (PE) is a vital arena for promoting physical activity (PA) participation. PE programs have introduced as an education through physical from pre-school to high-school or secondary school children. The aims of introducing PE programs to school-age children and adolescents in the curriculum are to 1) increase PA level; 2) improve health; 3) develop a positive lifetime attitude for, and participation in PA; 4) offer a variety of PA or sports to reach different interests; and 5) increase physical literacy (Choi, Sum, Leung, & Ng, 2018; Ng, 2002, 2011, Ng et al., 2016, Ng, Cheung, & Sum, 2017; Trudeau & Shephard, 2008). In tertiary level, Hong Kong is like many other places, only some colleges and universities offer compulsory, or at best elective, cognitive-affective or an activity-based health and PE courses for their students.

The immediate and longterm physiological benefits of PA participation are well documented (Bailey, 2006). PA participation also linked to improved cognitive tasks and wellbeing (Mandolesi et al., 2018), academic success in terms of increased grade point average, higher completion of credits, and persistence or graduation (Sanderson, DeRousie, & Guistwite, 2017; Vasold., Kosowski, & Pivarnik, 2019). Required PE reaches all segments of the college population including the sedentary, special needs as well as the active students. It provides the last platform before one entering the workforce to promote and maintain their PA motivation and exercise habits (Barney & McGaha, 2006; Buckworth, 2001).

Research has investigated the value of required PE (Ermler, Kovar, & Reinders, 1993). Of special importance is the long term value of required PE which provides a means for maintenance of regular exercise habits (Adams & Brynteson, 1992; Pearman et al., 1997; Sparling & Snow 2002; Trudeau & Shephard, 2008). However, research on psychological benefits of required PE participation is scanty. Ng (2013) investigated the impact of required PE courses on body shape satisfaction of 588 university students in Hong Kong. The results showed that both male and female participants from required PE programs reported higher satisfaction level than their non-PE counterparts. More work is needed to study the impact of PE courses on the other psychological aspects such as positive body image and self-esteem in these participants. Tools for the assessment of positive body image in Chinese population include the validated Body Appreciation Scale (BAS) (Ng, Barron, & Swami, 2015) and Body Appreciation Scale-2 (BAS-2) (Swami & Ng, 2015; Swami, Ng, & Barron, 2016).

The purpose of the present research was to evaluate the changes of BAS-2, self-esteem, total body dissatisfaction score, and self-rating level of skill, knowledge, fitness and enjoyment after the completion of 13-

week skill oriented required PE course. There were two hypotheses: 1) The BAS-2, self-esteem, total body dissatisfaction score, and self-rating level of skill, knowledge, fitness and enjoyment of university students would improve after the completion of the PE course; and 2) the changes, if any, of BAS-2, self-esteem, total body dissatisfaction score, and self-rating level of skill, knowledge, fitness and enjoyment after the completion of the PE course would be the same for different genders and types of activities.

Methods

Participants

One hundred and fifty-one first year full-time university students (82 males, 69 females; mean age = 18.8 ± 1.0 years; mean BMI = 20.6 ± 2.6 kg/m²) enrolling seven PE courses from various academic subjects participated the study. They completed the self-administered questionnaire before and after the completion of 13-week 2-hour/week skill oriented courses (tennis: 25 males, 20 females; squash: 23 males, 42 females; fitness training: 14 males, 27 females).

The skill oriented required PE course is one of the graduation requirements. The students could select different activities in the course according to their own interest. None of these activities requires prior sports experiences as basic skills will be taught even though the students in each PE class may be in mixed abilities, unisex group and were taught by a male specialist physical educator. The course carries academic credits as a final assessment on written knowledge and skills examination, and marks will be deducted for students who come in late or absent from classes or final assessment.

Procedure

Body Appreciation Scale-2 (BAS-2)

Participants completed the 10-item BAS-2 (Swami & Ng, 2015). All items were rated on a 5-point scale, ranging from 1 (*Never*) to 5 (*Always*). The higher mean score of these items represented a more positive body image.

Rosenberg's Self-esteem Scale (RSES)

The RSES (Rosenberg, 1965) is widely used to assess global self-esteem, which is related to self-acceptance and self-assessment (Tafarodi & Milne, 2002). The scale comprises 10 items rated on a 4-point Likert ranging from 1 (*Strongly disagree*) to 4 (*Strongly agree*). The scale has been demonstrated appropriate validity and reliability in the literature (Sinclair et al., 2010). A Chinese version of the RSES (Kwan, Bond, & Singelis, 1997) with one item removed was adopted in the study (Tian, 2006). Higher mean scores indicated higher self-esteem. Internal consistency for the 9-item as estimated by Cronbach's α was 0.87 in this sample.

Satisfaction and Dissatisfaction with Body Parts Scale (Stice, 2001)

Total body dissatisfaction scores were calculated by summing ratings of personal dissatisfaction with nine body parts (waist, thighs, buttocks, hips, legs, height, body shape, body build and stomach) between 1 (*extremely satisfied*) and 5 (*extremely dissatisfied*). Lower mean scores represented higher total body satisfaction level. This scale is reliable, stable, and valid in Western samples (Bearman et al., 2006) and Chinese samples (Chen & Jackson, 2010). Internal consistency of the total score was 0.87 in this sample.

Statistical Analysis

The changes in BAS-2 (Swami & Ng, 2015), self-esteem (Rosenberg, 1965), total body dissatisfaction scores (Stice, 2001) and self-rating level of skill, knowledge, fitness and enjoyment on 10-point scale ranging from 1 (*low*) to 10 (*high*) were assessed with 2 (time: pre-test and post-test) X 2 (gender: male and female) X 3 (type of courses: fitness training, squash and tennis) MANOVA with repeated measures.

Results

After the 13-week skill oriented PE course, results of repeated measures MANOVA test showed that there was a statistically significant increase (pre-test vs post-test) in BAS-2 score (3.5 ± 0.5 vs 3.6 ± 0.6 ; $F(1, 150) = 9.85$, $p < .01$; Wilk's $\Lambda = 0.94$, partial $\eta^2 = .06$) and self-rating level of subject in different subscales [the level of knowledge (6.1 ± 1.6 vs 7.2 ± 1.4 ; $F(1, 150) = 58.45$, $p < .01$; Wilk's $\Lambda = 0.72$, partial $\eta^2 = .28$); skill (5.8 ± 1.7 vs 7.0 ± 1.6 ; $F(1, 150) = 63.58$, $p < .01$; Wilk's $\Lambda = 0.70$, partial $\eta^2 = .30$); fitness (5.7 ± 1.8 vs 6.4 ± 1.7 ; $F(1, 150) = 24.78$, $p < .01$; Wilk's $\Lambda = 0.86$, partial $\eta^2 = .14$); enjoyment (7.5 ± 1.4 vs 7.9 ± 1.5 ; $F(1, 150) = 13.61$, $p < .01$; Wilk's $\Lambda = 0.92$, partial $\eta^2 = .08$)] except their self-esteem (2.9 ± 0.4 vs 3.0 ± 0.4 ; $F(1, 150) = 2.22$, $p = .14$; Wilk's $\Lambda = 0.99$, partial $\eta^2 = .02$) and total body dissatisfaction scores (3.0 ± 0.8 vs 2.9 ± 0.9 ; $F(1, 150) = 1.15$, $p = .18$; Wilk's $\Lambda = 0.99$, partial $\eta^2 = .01$).

Univariate tests also indicated there was no intervention effect on gender difference, $F(1, 146) = 0.36$, $p = .55$, Wilk's $\Lambda = 0.99$, partial $\eta^2 = .00$ for BAS-2 score, $F(1, 146) = 0.89$, $p = .35$, Wilk's $\Lambda = 0.99$, partial $\eta^2 = .01$ for self-esteem, $F(1, 146) = 0.29$, $p = .59$, Wilk's $\Lambda = 1.00$, partial $\eta^2 = .00$ for total body dissatisfaction scores, $F(1, 146) = 0.06$, $p = .82$, Wilk's $\Lambda = 1.00$, partial $\eta^2 = .00$ for knowledge, $F(1, 146) = 0.11$, $p = .75$, Wilk's $\Lambda = 0.99$, partial $\eta^2 = .00$ for skill, $F(1, 146) = 0.79$, $p = .38$, Wilk's $\Lambda = 0.99$, partial $\eta^2 = .01$ for fitness, and $F(1, 146) = 1.05$, $p = .31$, Wilk's $\Lambda = 0.99$, partial $\eta^2 = .01$ for enjoyment.

Results of MANOVA test with repeated measures showed that there was no interaction among time, type of sports and gender in BAS-2 score $F(1, 146) = 0.58, p = .45$, Wilk's $\Lambda = 0.99$, partial $\eta^2 = .00$; self-esteem $F(1, 146) = 0.66, p = .42$, Wilk's $\Lambda = 0.99$, partial $\eta^2 = .00$; total body dissatisfaction scores $F(1, 146) = 0.12, p = .91$, Wilk's $\Lambda = 0.99$, partial $\eta^2 = .00$; the level of knowledge $F(1, 146) = 0.16, p = .69$, Wilk's $\Lambda = 0.99$, partial $\eta^2 = .00$; skill level $F(1, 146) = 0.99, p = .68$, Wilk's $\Lambda = 0.99$, partial $\eta^2 = .00$; enjoyment level $F(1, 146) = 0.70, p = .79$, Wilk's $\Lambda = 1.00$, partial $\eta^2 = .00$; fitness level $F(1, 146) = 0.36, p = .55$, Wilk's $\Lambda = 0.99$, partial $\eta^2 = .00$.

Discussion

The purpose of this study was to investigate the effect of 13-week skill oriented required PE course participation on positive body image and some psychological benefits of university students. The first hypothesis, that PE course participants would improve the BAS-2 and self-rating level of skill, knowledge, fitness and enjoyment after completion of 13-week required PE course, was proven except for their self-esteem and total body dissatisfaction scores.

Results showed that the positive body image, the level of sports knowledge, fitness, skill and enjoyment were significantly increased after participation in required PE courses. This positive PE experiences may influence students to establish a positive PA patterns during the college year. This may be important in maintaining regular exercise after graduation and encouraging lifelong PA habits (Sparling & Snow 2002). Some universities require their students to complete PE courses as a graduation requirement in Hong Kong, Chinese Mainland, Taiwan and the United States for many years. Despite the potential benefits of required PE courses from the public health perspective, some colleges and universities have reduced or eliminated their PE courses as their graduation requirements, such as in USA (Cardinal, Sorensen, & Cardinal, 2012; Hensley, 2000). In Hong Kong, PE is also often viewed as a marginal subject within the curriculum, some PE teachers expressed their intention to leave the profession (Ng, 1998). Although some universities offer PE classes as electives instead of compulsory, the elective course tends to attract students who are already motivated. Required PE courses are better in promoting lifelong PA habits as they can also reach those inactive and less motivated students (Kim & Cardinal, 2019).

In the present study, the required PE participants showed no effect on self-esteem improvement. This was in line with other studies that showed no significant relationship between PA participation and self-esteem in older adults (McAuley, Blissmer, Katula, Duncan, & Mihalko, 2000) and school children (Walters & Martin, 2000). The present finding was inconsistent with findings of systematic review conducted by Ekland, Heian and Hagen (2005) that exercise interventions can improve self-esteem among children and young people. Tafarodi and Milne (2002) consider self-esteem as intrinsic values of self-competence and self-liking. The present skill-based PE course might have more impacts on self-competence than self-liking of the participants which represents the abilities, skills, and talents of the participants (Tafarodi & Milne, 2002). The non-significant findings in the present study might be due to the high baseline of their self-esteem scores.

The required PE participants reported that there was no significant improvement of their total body dissatisfaction scores. This finding was inconsistent with the findings of Depcik and Williams (2004) that body-image-disturbed college women participated in the thirteen-week weight training class reported a greater increase in body satisfaction than those who did not participate in the weight-training program. This inconsistent observation also echoed by Ng (2013) that male and female required PE participants stated higher satisfaction level than their non-PE counterparts. The mode of the exercise intervention such as PA intensity, type of activities, age and gender also had influence on body satisfaction level and self-esteem level (Ekland, Heian, & Hagen, 2005; Frost & McKelvie, 2005). It is an area worth further exploration as on the type and mode of activities that could have more benefits to the self-esteem and body satisfaction level of required PE participants.

The second hypothesis, that participants would have the same changes of BAS-2, self-esteem, total body dissatisfaction score, and self-rating level of skill, knowledge, fitness and enjoyment after completion of 13-week required PE course regardless their gender and type of activities, was proven.

For students enjoying non-competition activity or not yet found the type of activity to enjoy in pre-tertiary education, required PE courses provide a non-traditional sports and lifelong activities that meet their needs with diverse ability levels and interests. This can help them to find enjoyment, challenge and satisfaction in participating PA (Kretchmar, 2001). This could make some impacts in getting sedentary students active and sustaining that level of PA beyond graduation. Longitudinal research may help to find out whether the completion of PE programs changed their attitude towards PE as well as their PA level after graduation.

Making reference to the classifications from research (Barney, Pleban, Wilkinson, & Prusak, 2015; Hensley, 2000), there are six groups of activities, namely dance, mind-body, fitness, lifetime sports, team sports and outdoor activities. In the present study, students attended PE classes in single sex groups and the activities were limited to lifelong sports and fitness only. Further studies to explore the association between gender of physical educators with same sex as themselves and classes with mixed sex groups as well as the different type of activities such as dance, mind-body, team sports and outdoor activities are recommended. In addition, an alternative research design such as adding control group and mid-point data collection can be used to evaluate the changing process of the behavior (Quartiroli & Maeda, 2016). Some limitations in the present study have to

be noted in interpreting the findings. The self-reporting data might have limited the accuracy of the results like social desirability bias. Moreover, it may have unreliable responses with the use of one-item instruments to assess subjective self-rated level of achievements and feelings such as skill, knowledge, fitness and enjoyment.

In conclusion, this study supports the finding of other research that PA participation has not only physiological advantages but also psychological benefits. Those PE course participants improved the BAS-2 and self-rating level of skill, knowledge, fitness and enjoyment after completion of 13-week required PE course. The changes of BAS-2, self-esteem, total body dissatisfaction score, and self-rating level of skill, knowledge, fitness and enjoyment are the same in both genders for all types of activities. We recommend that compulsory skill oriented required PE courses to be provided to colleges and universities in Hong Kong for their potential psychological benefits such as a better positive body image and enjoyment.

Acknowledgements

The authors would like to thank every participant for their effort and time.

Funding - No sources of funding were received in the preparation of this manuscript.

Conflicts of interest - The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

References:

- Adams, T.M., II, & Brynteson, P. (1992). A comparison of attitudes and exercise behaviors of alumni from universities with varying degrees of physical education activity programs. *Research Quarterly for Exercise and Sport*, 63(2), 148-152. DOI: 10.1080/02701367.1992.10607574.
- Bailey, R. (2006). Physical education and sport in schools: A review of benefits and outcomes. *Journal of School Health*, 76(8), 397-401. doi:10.1111/j.1746-1561.2006.00132.x.
- Barney, D., & McGaha, P. (2006). College students' perspective and lifetime participation in basketball and tennis classes. *Journal of the International Council for Health, Physical Education, Recreation, Sport and Dance*, XLII, (3), 23-26.
- Barney, D. & Pleban, F., Wilkinson, C., & Prusak, K. (2015). Identifying high school physical education physical activity patterns after high school. *The Physical Educator*, 72, 278-293.
- Bearman, S., Presnell, K., Martinez, E., & Stice, E. (2006). The skinny on body dissatisfaction: A longitudinal study of adolescent girls and boys. *Journal of Youth and Adolescence*, 35, 229-241. doi:10.1007/s10964-005-9010-9.
- Buckworth, J. (2001). Exercise adherence in college students: Issues and preliminary results. *Quest*, 53, 335-345. doi: 10.1080/00336297.2001.10491750
- Cardinal, B.J., Sorensen, S.D., & Cardinal, M.K. (2012). Historical perspective and current status of the physical education graduation requirement at American 4-year colleges and universities. *Research Quarterly for Exercise and Sport*, 83, 503-512.
- Chen, H. & Jackson, T. (2010). Gender and age group differences in mass media and interpersonal influences on body dissatisfaction among Chinese adolescents. *Sex Roles*, 66, 3-20. doi: 10.1007/s11199-011-0056-8
- Choi, S.M., Sum, R.K.W., Leung, E.F.L., Ng, R.S.K. (2018). Relationship between perceived physical literacy and physical activity levels among Hong Kong adolescents. *PLoS ONE*, 13(8), art. no. e0203105. doi: 10.1371/journal.pone.0203105
- Depcik, E. & Williams, L. (2004). Weight Training and Body Satisfaction of Body-Image-Disturbed College Women. *Journal of Applied Sport Psychology*, 16(3), 287-299, DOI: 10.1080/10413200490498375
- Ekeland, E., Heian, F., Hagen, K.B. (2005). Can exercise improve self-esteem in children and young people? A systematic review of randomised controlled trials. *British Journal of Sports Medicine*, 39, 792-798.
- Ermiler, K.L., Kovar, S.K., & Reinders, S.M. (1993). The effect of three different lifetime fitness class structures on the various fitness parameters of college students. *Physical Educator*, 50, 52-56.
- Frost, J., & McKelvie, S.J. (2005). The relationship of self-esteem and body satisfaction to exercise activity for male and female elementary school, high school, and university students. *Athletic Insight*, 7(4), 36-48.
- Hensley, L.D. (2000). Current status of basic instruction program in physical education at American colleges and universities. *Journal of Physical Education, Recreation and Dance*, 71(9), 30-36. doi:10.1080/07303084.2000.10605719
- Kim, M.S., & Cardinal, B.J. (2019). Differences in university students' motivation between a required and an elective physical education policy. *Journal of American College Health*, 67(3), 207-214, DOI: 10.1080/07448481.2018.1469501
- Kretchmar, R.S. (2001). Duty, habit, and meaning: Different faces of adherence. *Quest*, 53, 318-25.
- Kwan, V.S.Y., Bond, M.H., & Singelis, T.M. (1997). Pancultural explanations for life-satisfaction: Adding relationship harmony to self-esteem. *Journal of Personality and Social Psychology*, 73(5), 1038-1051. <https://doi.org/10.1037/0022-3514.73.5.1038>
- Mandolesi, L., Polverino, A., Montuori, S., Foti, F., Ferraioli, G., Sorrentino, P., & Sorrentino, G. (2018). Effects of physical exercise on cognitive functioning and wellbeing: Biological and psychological benefits. *Frontiers in psychology*, 9, 509. <https://doi.org/10.3389/fpsyg.2018.00509>

- McAuley, E., Blissmer, B., Katula, J., Duncan, T.E., & Mihalko, S.L. (2000). Physical activity, self-esteem, and self-efficacy relationships in older adults: A randomized controlled trial. *Annals of Behavioral Medicine*, 22, 131-139.
- Ng, S.K. (1998). A profile of job satisfaction among physical education teachers in Hong Kong and their intention to change jobs, *Journal of Physical Education and Recreation*, 4(1), 29-37.
- Ng, S.K. (2002). A discussion on the role conflict between Hong Kong physical education teachers and coaches. *Journal of Physical Education and Recreation (Hong Kong)*, 8(1), 59-63.
- Ng, S.K. (2011). Understanding sport participation motivation and barriers in adolescent 11-17: An introduction of rowing activity in schools. *Asian Journal of Physical Education and Recreation*, 17(2), 66-74.
- Ng, S.K. (2013). Impact of required physical education courses on body shape satisfaction of university students in Hong Kong. Conference proceeding – *Universiade Kazan 2013 FISU Conference*, 349.
- Ng, S.K., Barron, D., & Swami, V. (2015). Factor structure and psychometric properties of the Body Appreciation Scale among adults in Hong Kong. *Body Image*, 13, 1-8. <http://dx.doi.org/10.1016/j.bodyim.2014.10.009>
- Ng, S.K., Cheung, C.W., & Sum, K.W.R., (2017, March). Effects of 6-week agility ladder drills during recess intervention on dynamic balance performance. *Journal of Physical Education and Sport*, 17(1), 306-311. doi:10.7752/jpes.2017.01046
- Ng, S.K. Sum, K.W.R., Ng, C.K., Ho, S.C., Lam, W., & Tang, W.M. (2016). Parents' and pupils' perceptions towards the implementation of physical education homework in a Hong Kong primary school. *Asian Journal of Physical Education and Recreation*, 22(1), 40-52.
- Pearman, S.N., Valois, R.F., Sargent, R.G., Saunders, R. P., Drane, J.W., & Macera, C.A. (1997). The impact of a required college health and physical education course on the health status of alumni. *Journal of American College Health*, 46, 77-85. doi:10.1080/07448489 709595591
- Quartiroli, A., & Maeda, H. (2016). The effects of a Lifetime Physical Fitness (LPF) course on college students' health behaviors. *International Journal of Exercise Science*, 9(2), 136-148.
- Rosenberg, M. (1965). Society and the adolescent self-image. Princeton University Press, Princeton, NJ.
- Sanderson, H., & DeRousie, J., & Guistwite, N. (2017). Impact of collegiate recreation on academic success. *Journal of Student Affairs Research and Practice*, 55,1-14. 10.1080/19496591.2017.1357566
- Sinclair, S.J., Blais, M.A., Gansler, D.A., Sandberg, E., Bistis, K., & LoCicero, A. (2010). Psychometric properties of the Rosenberg Self-Esteem Scale: Overall and across demographic groups living within the United States. *Evaluation & the Health Professions*, 33(1), 56-80. <https://doi.org/10.1177/0163278709356187>
- Sparling, P.B., & Snow, T.K. (2002). Physical activity patterns in recent college alumni. *Research Quarterly for Exercise and Sport*, 73, 200-205.
- Stice, E. (2001). A prospective test of the dual pathway model of bulimic pathology: Mediating effects of dieting and negative affect. *Journal of Abnormal Psychology*, 110(1), 124-135. doi:10.1037/0021-843x.110.1.124
- Swami, V., & Ng, S.K. (2015). Factor structure and psychometric properties of the Body Appreciation Scale-2 in university students in Hong Kong. *Body Image*, 15, 68-71. <http://dx.doi.org/10.1016/j.bodyim.2015.06.004>
- Swami, V., Ng, S.K., & Barron, D. (2016). **Translation and psychometric evaluation of a Standard Chinese version of the Body Appreciation Scale-2.** *Body Image*, 18, 23-26. doi:10.1016/j.bodyim.2016.04.005
- Tafarodi, R., & Milne, A. (2002). Decomposing global self-esteem. *Journal of Personality*, 70, 443-483. <https://doi.org/10.1111/1467-6494.05017>
- Tian, L.M. (2006). Shortcomings and merits of the Chinese version of the Rosenberg (1965) Self-Esteem Scale. *Psychological Exploration*, 26, 88-91.
- Trudeau, F., & Shephard, R.J. (2008). Physical education, school physical activity, school sports and academic performance. *International Journal of Behavioral Nutrition and Physical Activity*, 5, 10-22. <https://doi.org/10.1186/1479-5868-5-10>
- Walters, S.T., & Martin, J.E. (2000). Does aerobic exercise really enhance self-esteem in children? A prospective evaluation in 3rd-5th graders. *Journal of Sport Behavior*, 23, 51-60.
- Vasold, K.L., Kosowski, L.E., & Pivarnik, J.M. (2019). Academic success and 1 year of intramural sports participation by freshmen students. *Journal of College Student Retention: Research, Theory & Practice*, 0(0), 1-10. <https://doi.org/10.1177/1521025119833000>