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Original Article

The effect of different physical and sport activity courses on body image of Costa Rican students

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Abstract:
The purpose of this study was to determine the effect of different types of physical education sport courses on perceived and desired body image in university students from the University of Costa Rica. Volunteers were 522 students (259 females and 263 males), registered in 13 different courses of sports classes, from which two categories were built: a) sports classes, and b) fitness classes. The subjects were measured for body variables (height, weight, and waist circumference) and with the values of height and weight the body mass index (BMI) was calculated. Students answered the body image scale by Thompson and Gray (1995) the first, second and last week of classes. Results indicated that there were no significant interactions in body image regardless of sex or different sports courses. Females had higher % body fat than males ($p < 0.01$), and their waist circumference increases slight, but significantly from pre-test to post-test compared to males ($p < 0.05$). Participants with higher % body fat also had greater body dissatisfaction scores ($r = - 0.13$, $p < 0.01$). In conclusion, there is no effect of the type of sport or fitness course on body image of university students; however, special attention should be placed for those students with increased adiposity as they showed greater dissatisfaction with their body image.
Key words: Body image, body mass index, sports activity, psychology, exercise

Introduction

Body image is the mental representation and experience of one's physical body and is composed of three components. First, a *perceptual* aspect, which the way a person perceives the body size and shape. The second factor is the *cognitive-affective*, which is the set of beliefs, thoughts, images and feelings that a person has about his body. According to Salazar (2008) and Trujano, Nava, Grace, Lemon, Alatriste and Merino (2010), this aspect is useful to understand the level of body dissatisfaction, concern or satisfaction. The third component is the *behavioral*, which refers to the behavior of a person based on their own personal thinking and feelings (e.g., exhibitionism, social avoidance) (Salazar, 2008; Arroyo, Gonzalez Sanchez, Ansotegui & Rocandio, 2008; Trujano et al., 2010). Arroyo et al. (2008), summarize the concept of body image as the way in which you perceive, imagine, feel, and act about your own body. If there are negative evaluations regarding these components, it is possible that this lead to a body image disorder and body image disturbance, which implies a negative change in attitudes, behaviors and/or perceptions on the body and as with any disturbance, changes in body image may vary from mild to severe, where the minimum levels, called "body image concerns" are more frequent (Daniel & Bridges, 2010; Trujano et al., 2010).

Cash, Morrow, Hrabosky and Perry (2004), indicate that body image encompasses perceptions and self-attitudes regarding physical appearance and these attitudes can be assessed in relation to the overall body look or with respect to specific physical characteristics, such as weight or body shape. Thus, body image dissatisfaction is a common phenomenon that can adversely affect psychosocial functioning and quality of life of individuals (Cash et al., 2004). Since some disorders associated with body dissatisfaction emerge during adolescence, it is considered that the cultural pressures to have a slim figure originate in the family, as well as with peers and the media. These agents promote the internalization of norms of female attractiveness and overvaluation of appearance (Espinoza, Penelo & Raich, 2010). For young people physical appearance is very important, which is determined by the prevailing aesthetic standards encouraged by the society and supported by the media. This factor is affecting the attitude of young people as they show excessive preoccupation regarding weight and body concerns.

Salazar (2008) evaluated 594 high-school adolescents on the body appearance, which is a very important dimension of the self-esteem during adolescence. The results indicated that 33% of the study group were dissatisfied with their body image and almost 50% of the study group did not agree with their weight. The

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author concluded that the period of adolescence is important to adopt appropriate behaviors and habits necessary for good health.

Some diseases that trigger eating disorders and obesity in the youth have been associated with body dissatisfaction feelings. Research on Spanish adolescents by Espinoza et al. (2010), associated socio-cultural and individual risk factors to eating disorders and body image. This study is considered important because it contributes to the assessment of risk factors, whose modification could help prevent the development of eating disorders and body image, as well as to promote the identification of subgroups at high risk for developing these disorders. Lameiras, Draft, Rodriguez and Fernandez (2003), indicate that epidemiological research on eating behavior disorders should be directed not only to the clinical field but also the eating behaviors of adjustment and cognitive variables that are associated with body image perception to identify risk factors and to detect vulnerable subjects. The increase in the frequency of body image disorders in males and females might be explained by a failure to achieve the aesthetic standards that society imposes and by a negative body image associated with an impaired health (Borkoles, Polman & Levy, 2010).

Research on body image has been reported on college students (Kelley, Neufeld & Musher-Eizenman, 2010; Calogero et al., 2010; Daniel & Bridges, 2010; Arroyo et al., 2008; Cash et al., 2004; Lameiras et al., 2003). The focus of these studies has been on factors related to body image and the management of mental health and general welfare. For example, Kelley et al. (2010), conducted a study with 285 students, men and women, with an average age of 18.8 years, who completed online questionnaires about attitudes about food and body image. The purpose was to determine whether the pressure to be "thin" or "muscular" occurred in late adolescence and to understand how body attitudes were associated with the desire for a more muscular or lean physique. Most participants (65.4%) reported pressure to be thin, compulsive and anxiety states in self-esteem in both women and men. This findings indicates the degree to which a person strives to be thin or muscular and its influence on body attitudes. LePage and Crowther (2010), indicate that exercise is associated with lower levels of body dissatisfaction. Previously, Hausenblas and Fallon (2006), indicated that people who exercise have a better body image than their sedentary counterparts. One factor that may contribute to that feeling in active people is the psychological satisfaction that is achieved with participation in physical activity. They are emphatic in stating that exercise may be a viable method to improve people's body image.

Regarding the association between body image and exercise, other research has linked aspects of body image and physical activity. For instance, Borkoles et al. (2010), examined 564 men aged between 18 and 55 years (M = 26.24) and of different races, classified into three groups: weight trainers, active and sedentary people. These subjects completed questionnaires related to exercise and personality. The results showed that most sedentary people were classified with a type D personality, which is the interaction between high levels of negative affectivity and social inhibition, which is associated with a poor body image. However, the type of exercise was not associated with differences in body image. In this study, the score obtained by the sedentary type D was significantly lower in the satisfaction of their body areas and higher in the self-ratings of body weight of both active groups.

Similarly, Anderson, Foster, McGuigan, Seebach and Porcari (2004), designed a study to determine whether a short term exercise program (6 weeks) may improve subjective ratings of physical appearance. Twenty-five adult males (18-40 years) with a history of physical inactivity were randomly assigned to one of three training groups: cardiovascular, strength or control. The measurements performed before and after treatment were: body composition, strength and cardiovascular fitness. Also, photographs were obtained for each participant from four different angles. The photographs from each subject served to self-assess her figure and that a panel of experts also evaluate these photographs using an analogue scale. The findings of this study indicated that after six weeks of training there was no change in physical appearance.

In this context, there are still potential mediators to study, such as whether the type of sport or fitness activity could affect body image perception. Thus, the purpose of this study was to determine the effect of different types of sport courses on perceived and desired body image among students of the University of Costa Rica.

Method

Research design

The research design used in this study was pre-experimental, in which there was a previous measurement (pre-test) and after (post-test) of body image perception of the students in each group of sports activity (Campbell and Stanley, 1963).

Participants

The population were male and female regular students from the University of Costa Rica enrolled in sport courses offered by the School of Physical Education and Sports. The sample size was determined by knowing the number and type of sport courses programmed in school year 2010. This information was obtained from the Registrar´s office of the University of Costa Rica. The formula for infinite samples was used to estimate a representative sample of the population enrolled (Kish, 1965). Thus, a minimum sample of 326 students was

estimated, with a 95% confidence level and a 5% error. Before the start of the school year, permission was requested to survey students three times during the semester to each faculty responsible for the course of sports activity. Then, we performed a cluster sampling to obtain a representative sample of sport groups whose teaching staff approved the participation of students in the study. The study protocol was approved by the Scientific Ethics Committee of the University of Costa Rica.

Thus, participants were students enrolled in 13 different sport courses taught by the School of Physical Education and Sports: 1) physical training systems, 2) resistance training, 3) gymnastics, 4) dance, 5) creative movement, 6) Taekwondo, 7) futsal, 8) basketball, 9) handball, 10) self-defense, 11) football, 12) volleyball, and 13) swimming. Two categories representing faithfully the purpose of the course were made with these courses: a) sports courses and b) fitness courses. Sports courses included the following sports: basketball, handball, futsal, football, swimming, taekwondo, volleyball, baseball and softball. The emphasis of these courses is the teaching and practice of a sport. On the other hand, fitness courses included: dance, self-defense, resistance training, gymnastics, creative movement, and physical training systems. The emphasis of these courses is to promote physical activity and overall fitness.

Measurement instruments

Volunteers who agreed to participate in the study were asked to sign an informed consent form to participate as subjects in the study. Then we used a stadiometer to measure body height (cm). The waist circumference (cm) was measured with a measure tape. Body weight (kg) and % body fat were measured with an electronic balance (Tanita® brand). The body mass index (BMI), a measure used in epidemiological studies to classify people according to their adiposity was computed from the body height and weight values. BMI is calculated by dividing body weight in kilograms by height in squared meters (kg/m^2).

Finally, participants filled the body image scale (Thompson & Gray, 1995). Drawings of people with different levels of adiposity are shown in this scale and participants are asked to select the human figure that currently looks alike and the figure that the person wants to look alike in the future. The application procedure of the body image scale was performed three times. The first (pre-test), during the opening session of the course presentation, the second a week later during the first practice session of the course (for reliability purposes), and finally, a week before the end of the semester (post-test).

Statistical analysis

The Statistical Package for the Social Sciences (SPSS) version 20.0 was used to analyze data. Descriptive statistics, mean (M) and standard deviation (± SD) were computed. Three-way (sex x measurement x activity type) analysis of variance (ANOVA) was used determine significant interactions on body image perception. To study the concurrent validity, scores of adiposity indices were correlated (i.e., BMI, waist circumference, %fat) to perceived current body image. The reliability of the instrument for measuring body image was estimated by means of a Pearson product moment correlation test between the scores on the scale measure twice, one week apart from each other (Pedhazur & Pedhazur-Schmelkin, 1991).

Results

The study involved 522 students (49.6% females, 50.4% males). The descriptive statistics of the variables measured before and after sports activity courses are presented in Table 1.

Table 1. Descriptive statistics of the participants (n = 522).

	Females (n = 259)		**Males (n = 263)**	
Variable	**Pre**	**Post**	**Pre**	**Post**
Age (yrs.)	18.8 ± 2.9	-	18.9 ± 2.5	-
Height (cm)	159.6 ± 5.8	159.9 ± 6.0	172.9 ± 6.3	172.9 ± 6.4
Weight (kg)	57.6 ± 11.9	58.2 ± 11.6	69.0 ± 13.1	69.2 ± 12.9
BMI (kg/m^2)	22.6 ± 4.3	22.7 ± 4.1	23.0 ± 3.8	23.1 ± 3.8
Waist circumference (cm)	70.0 ± 8.7	71.2 ± 8.9	77.3 ± 9.0	77.3 ± 9.6
Fat %	24.9 ± 8.1	25.4 ± 8.2	14.8 ± 6.4	15.1 ± 7.7
Body image				
• Current (A)	5.3 ± 1.6	5.5 ± 1.5	5.5 ± 1.2	5.6 ± 1.1
• Future (F)	4.2 ± 1.0	4.4 ± 1.1	5.4 ± 0.6	5.5 ± 0.7
• Difference (A-F)	1.1 ± 1.4	1.1 ± 1.3	0.1 ± 1.2	0.1 ± 1.0

ANOVA tests indicated that there were no significant interactions in body image regardless of sex or different sport courses. We found that although males had a higher weight than women ($p < 0.001$), did not necessarily have a greater BMI ($p > 0.05$). Females had a higher fat % than males ($p < 0.001$), and waist circumference in women increases from pre-test to post-test slightly but significantly ($p = 0.015$) compared to that of males (Figure 1).

We found a significant interaction ($p < 0.001$) in the difference of the current and desired (future) body image from pre to post. Figure 2 shows that in general, males do not want to change their body image, whereas in females the average change corresponds to a figure in the Thompson and Gray (1995) scale, both before and after participating in sport courses.

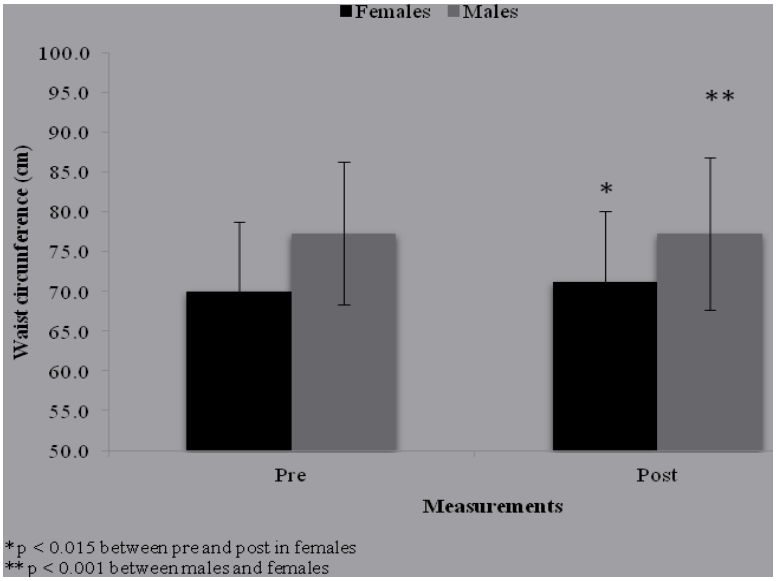

Fig. 1. Waist circumference (cm) in females and males before and after sports activity courses.

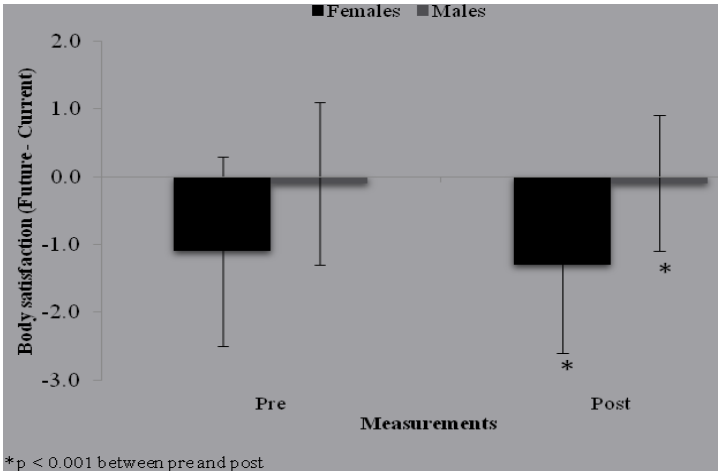

Fig. 2. Body satisfaction in college students enrolled in sports activities courses.

Pearson product moment correlations showed significant associations between pre and post BMI, waist circumference, and body fat % values (Table 2). This indicates that there is a concordance or convergent validity in the measurement of the degree of adiposity (measured by BMI, % fat and waist circumference) of people as evidenced by the coefficient of determination (r^2) (Pedhazur & Pedhazur-Schmelkin, 1991).

We also found an inverse association between baseline body fat % (i.e., pre) and desired or future body image; in other words, those with a higher body fat wanted to become thinner ($r = -0.13$, $p < 0.01$).

For the reliability analysis, we determined the stability coefficient of body image scale by the method "test" "re-test" with a week of difference between the applications of the instrument (Pedhazur & Pedhazur-Schmelkin, 1991). We found a high stability in the responses to the perceived current body image ($r = 0.93$, $p < 0.01$) and desired body image ($r = 0.84$, $p < 0.01$).

Table 2. Correlation matrix table (and coefficient of determination, r^2) between anthropometric variables used to estimate the degree of body adiposity of the participants as evidence of concurrent validity with current body image perceived by the participants.

	Waist circumference before	BMI before	Fat % before
Current body image	.66(44)	.75(56)	.57(32)
Waist circumference before		.87(76)	.44(19)
BMI before			.71(50)

** $p < 0.01$

Discussion

The purpose of the study was to determine the effect of different types of sport courses on perceived and desired body image among students at the University of Costa Rica. The main finding of this study was that the type of sports activity did not affect the body image of students; however, students who had the greatest degree of adiposity were also more dissatisfied with their body image.

There has been conducted previous studies on body image in students who enrolled in sport courses at the University of Costa Rica (Meneses & Moncada, 2008; Castillo & Moncada, 2010); yet, this is the first time that the type of sports activity as a moderator variable affecting body image is investigated.

Meneses and Moncada (2008), found that females perceived more dissatisfaction with their body image compared to males; however, while females indicated that they would like to change their body image to look a slimmer figure, males did not care about it. We found the same finding in the present study; on average, females want to reduce a figure following more than 10 weeks of sport class. In other words, females want to move from a fat figure (i.e., more obese) to one less fat (i.e., thinner). This finding should be understood cautiously. First, in general, participants did not show values of BMI or waist circumference that could be considered harmful to health so that they were not obese. According to Lameiras et al. (2003), the sense of feeling fat is one of the most frequent causes leading to the onset of eating disorders, and that most of the female university students are not satisfied with their physical looks, though they are classified as having normal weight (84.2%).

Thus, the desire to be thinner might be explained by the sociocultural pressure that has important roots in family and peers who define the social environment of the subjects. According to Cash et al. (2004), there are numerous physical and psychosocial disorders that have been associated with body image problems. In this regard, a study by Park, DiRaddo and Calogero (2009), with college students, suggests that people who feel pressured to have physical attractiveness are more afraid of being rejected because of their physical appearance than others of the same age who not suffer the pressure. Females were more sensitive to the appearance-based rejection than males and wanted to have a better physical appearance to be accepted by their peers. In addition, it was found in this research that men and women who had internalized the ideals of beauty propagated by the media had higher levels of sensitivity to appearance rejection than their peers.

Recently, Castillo and Moncada (2010), and Carpio and Araya (2010), conducted studies with groups of college students and people attending fitness facilities. Carpio and Araya (2010) studied the acute effect of aerobic dance and anaerobic exercise (i.e., resistance or weight training) on body image. The study involved 66 participants aged between 21 and 35 years of age. Participants had to answer the body image scale before and immediately after a workout. This is called the acute effect of exercise on body image and it was found that there is a significant acute effect of resistance exercises and aerobic dance on the perception of body image, in which participants perceived themselves more muscular after exercise.

Castillo and Moncada (2010), studied the effect of the frequency of participation in a resistance training program on satisfaction and body esteem in Costa Rican female college students. The study involved 56 students from the University of Costa Rica, which were assigned to experimental and control groups. Each group performed the same resistance training program of 90 min per session, but there was a difference in the frequency of participation. One group performed two sessions per week during the summer (i.e., 5 weeks), and the other a weekly session for an entire semester (i.e., 15 weeks). The results indicated that there is no effect on the frequency of participation in a resistance training program on body image and body esteem in this group of female college students. In the present study we found that waist circumference of women increased significantly after 10 weeks of school. It is likely that this group of females maintained the same eating and physical activity habits. Also, the stimulus of the sports courses was not sufficient enough to reduce this adiposity measure because the students only had to attend the class once a week. However, it is known that for females, an average waist circumference value < 80 cm is considered as low risk to health (American College of Sports Medicine, 2005). This is consistent with the average values of BMI for both males and females, which are in the considered normal range of 18.5 to 24.9 kg/m^2 (American College of Sports Medicine, 2005).

From a methodological point of view, it was found that there is evidence of convergent validity between measurements of BMI, waist circumference and body fat % with perceived current body image of participants. BMI is the variable that has the greatest association with body image, which is consistent with other studies (Evans et al., 2010; Kelley et al., 2010; Arroyo et al., 2008; Lameiras et al., 2003). Daniel and Bridges (2010), suggested the importance of BMI as a predictor of muscle finding, as the subject of their research with a lower BMI longed for a more muscular body, and thus evidenced greater body dissatisfaction. Another methodological aspect studied was the consistency in the responses of students from one week to the next in the body image scale (Thompson & Gray, 1995). Thus, participants' responses were consistent between measurements, as evidenced by the analysis of reliability by the test-retest method. Thus, we can conclude that participants responded about their perception of their body image in a consistent manner between measurements.

Conclusions

In conclusion, it was found that the type of sports activity classified as a sport or fitness activity, was not a moderator variable of the effect of sport on body image in Costa Rican college students. An important

finding was that people with greater adiposity felt that they wanted a thinner body figure, even though people were not objectively considered obese according to their BMI. Females want to change her image by a slimmer body, while males are more satisfied with it. It remains to study other moderating variables of body image for both physical exercise (e.g., frequency, intensity, duration, other modalities), and psychological (e.g., personality type), and social (e.g., family group formation).

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