LEISURE-TIME PHYSICAL ACTIVITY AND PSYCHOLOGICAL WELL-BEING IN UNIVERSITY STUDENTS

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Summary.—An analysis of psychological well-being (self-esteem and subjective vitality) of 639 Spanish university students was performed, while accounting for the amount of leisure-time physical activity. The Spanish versions of the Rosenberg Self-Esteem Scale and Subjective Vitality Scale were employed. Participants were divided into four groups (Low, Moderate, High, and Very high) depending on estimation of energy expenditure in leisure-time physical activity. Men and women having higher physical activity rated higher mean subjective vitality; however, differences in self-esteem were observed only in men, specifically between Very high and the other physical activity groups.

The beneficial effects of regular physical activity on physical and psychological health are well-known (e.g., World Health Organization, 2003; Haskell, Lee, Pate, Powell, Blair, Franklin, et al., 2007; Khan, Marlow, & Head, 2008). Several researchers have explored the psychological benefits of exercise focusing on variables such as mood, anxiety, depression, self-esteem, and cognitive functioning (Fox, 1999; Sallis & Owen, 1999; Jiménez, Martínez, Miró, & Sánchez, 2008).

The university is a critical context in which people consolidate a lifestyle that is likely to support their future health (Molina-García, Castillo, & Pablos, 2009). The majority of the studies carried out on university students have observed that an active lifestyle is an important factor for mental health (e.g., Bray & Kwan, 2006; Wang, 2008; Kai & Yamazaki, 2009). However, there are few studies that analyze the association between physical activity and psychological well-being in a Spanish university context (e.g., Jiménez, et al., 2008).

At least 150 minutes per week of moderate intensity physical activity, which corresponds to 600 METs/week, are recommended to obtain health benefits (Haskell, et al., 2007). Physical activity need not be of vigorous intensity to improve health [U.S. Department of Health and Human Services (USDHHS), 1996; Haskell, et al., 2007]. Also, health benefits seem to be proportional to volume of physical activity (USDHHS, 1996). Thus, it would be adequate to assess the overall amount of physical activity when relations between physical activity and psychological well-being are expected to be established. A common measure of physical activity volume

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is metabolic equivalent (MET) expenditure. To estimate energy expenditure in METs, it is necessary to consider each one of the dimensions of physical activity, commonly referred to by the acronym FITT (frequency, intensity, time, and type of exercise; Sallis & Owen, 1999).

The aim of the present study was to analyze the association of leisure-time physical activity and mental health among university students in Spain. Psychological well-being was measured as self-esteem and subjective vitality. It was hypothesized that students with higher leisure-time physical activity would rate their psychological well-being higher.

Method

Participants

Spanish university students, 321 men and 318 women, were recruited via convenience sampling to participate in this cross-sectional study. Their ages ranged from 18 to 29 years (M = 21.4 yr., SD = 2.8). The sample was representative of the students registered at the University of Valencia and Catholic University of Valencia during the academic year (2005–2006). The sampling error was ± 4%, with a confidence level of 95.5%.

Measures

Leisure-time physical activity.—Questions were taken from the “Health Behaviour in School-age Children study: a WHO collaborative cross-national study” (Wold, 1995; Balaguer, 2002) and had been adapted for university students in previous studies (e.g., Molina-García, Castillo, Pablos, & Queralt, 2009). Participants were asked to report usual leisure-time physical activity. Likewise, they indicated the frequency (times/week), duration (minutes/session), and intensity for each activity, using a Likert-type scale with 1: Light (“Able to speak comfortably”), 2: Moderate (“Causing breathlessness but able to speak”), 3: Intense (“Causing sufficient breathlessness to limit conversation”), and 4: Vigorous (“Not able to speak”).

Each type of leisure activity was assigned an intensity code, in units of METs, according to the Compendium of Physical Activities (Ainsworth, Haskell, Whitt, Irwin, Swartz, Strath, et al., 2000). An estimation of energy expenditure was obtained multiplying the MET score by the number of minutes per week spent in each activity. Students were divided into four groups: Low (participants who did not report any physical activities or with a score of less than 600 MET·min./wk.), Moderate (600 to < 1,200 MET·min./wk.), High (1,200 to < 3,000 MET·min./wk.), and Very high (> 3,000 MET·min./wk.). The cut-points for the categories were based on previous studies in which university students have been successfully categorized (e.g., Brown & Bauman, 2000; Musselman & Rutledge, 2010).
Self-esteem.—The Spanish version (Atienza, Moreno, & Balaguer, 2000) of the 10-item Self-Esteem Scale (Rosenberg, 1965) was employed to assess attitudes toward themselves. A sample item is, “I feel that I have a number of good qualities.” Participants reported their answers on a 4-point Likert-type scale using anchors of 1: Strongly disagree and 4: Strongly agree. This scale has been reported as reliable in previous studies carried out on adolescents (e.g., Atienza, et al., 2000) and on university students (e.g., Gotwals & Wayment, 2002) with Cronbach’s alpha values of .86 and .84, respectively. In the present study, the estimate of internal reliability was α = .81 for men and α = .82 for women.

Subjective vitality.—To measure subjective vitality, a Spanish version (Balaguer, Castillo, García-Merita, & Mars, 2005) of the 6-item Subjective Vitality Scale (Ryan & Frederick, 1997) was used (e.g., “I feel energized”). Responses were rated on a 7-point scale using anchors of 1: Not at all true and 7: Very true. Adequate internal reliability for this scale has been reported in previous studies carried out on adolescents (e.g., Balaguer, et al., 2005) and on university students (e.g., Ryan & Frederick, 1997) with internal consistency reliability values of α = .88 and α = .84, respectively. In the present study, the estimates of internal reliability were acceptable, with Cronbach’s alpha values of .85 for men and .90 for women.

Procedure

The design of the experiment was approved by an institutional review Board. Prior to answering the questionnaire, participants were instructed to respond to the questions individually and as honestly as possible and were told that there were no right or wrong answers. Participants completed the questionnaire in about 15 min.

Analysis

Means and standard deviations were calculated for each study variable. One-way multivariate analyses of variance were conducted to test the effects of participants’ sex on leisure-time physical activity and on well-being variables (self-esteem and subjective vitality). The effects of leisure-time physical activity on well-being variables were also examined. Post hoc tests were used to compare groups.

Results

Means and standard deviations for each study variable are shown in Table 1. A multivariate analysis of variance indicated statistically significant differences between men and women on well-being variables as well as on leisure-time physical activity (Pillai’s trace = .21; $F_{1,620} = 55.26$, $p < .001$; partial $\eta^2 = .021$). No cutoff values exist for partial eta-squared, but a value above .06 is considered a moderate effect size and a value above .14 is con-
sidered a large effect size (Cohen, 1988). Men reported being more active and rated self-esteem and vitality higher than women (Table 1).

In relation to the four leisure-time physical activity groups, a multivariate analysis of variance indicated statistically significant differences on well-being variables for men (Pillai’s trace = .08; $F_{6,626} = 4.47, p < .001; \text{partial } \eta^2 = .04$). Follow-up univariate analysis showed significant differences ($p < .001$) on the two indicators of well-being (self-esteem and subjective vitality; Table 2). A post hoc Tukey test revealed that the Very high group rated self-esteem higher than the other three physical activity groups. With respect to subjective vitality, the Very high group reported higher subjective vitality than the other three physical activity groups. Furthermore, subjective vitality was significantly higher in the High group than in the Low leisure-time physical activity group.

With regard to the women, multivariate analysis of variance indicated significant differences on well-being variables (Pillai’s trace = .07; $F_{6,606} = 3.47, p < .005; \text{partial } \eta^2 = .04$). Follow-up univariate analysis showed significant differences ($p < .001$) on subjective vitality (Table 2). A post hoc

| TABLE 1 |
| MEANS, STANDARD DEVIATIONS, AND F RATIOS BY SEX AMONG VARIABLES |
|---------------------------------|---------|--------|---------|--------|
| | Range | Total ($N = 639$) | Men ($n = 321$) |
| | | $M$  | $SD$  | $M$  | $SD$  |
| Leisure-time physical activity, MET·min./wk. | 0–6,130 | 1,334.41 | 1,262.82 | 1,898.54 | 1,225.96 |
| Self-esteem | 1–4 | 3.15 | 0.45 | 3.23 | 0.44 |
| Subjective vitality | 1–7 | 4.94 | 1.09 | 5.12 | 0.99 |
| Leisure-time physical activity, MET·min./wk. | 764.95 | 1,022.15 | 156.63* | .20 |
| Self-esteem | 3.07 | 0.44 | 21.07* | .03 |
| Subjective vitality | 4.75 | 1.15 | 17.91* | .03 |

* $p < .001$.

| TABLE 2 |
| INDICATORS OF PSYCHOLOGICAL WELL-BEING BY ENERGY EXPENDITURE GROUPS |
|---------------------------------|---------|--------|---------|--------|---------|--------|
| | Leisure-time Physical Activity | Low | Moderate | High | Very High | $F_3$ | Partial $\eta^2$ |
| | $M$ | $SD$ | $M$ | $SD$ | $M$ | $SD$ | $M$ | $SD$ | $M$ | $SD$ |
| Men, $n$ | 51 | 3.15 | 0.44 | 3.16 | 0.45 | 3.20 | 0.42 | 3.44 | 0.42 | 5.56* | .05 |
| Self-esteem | 4.75 | 1.13 | 4.88 | 0.98 | 5.16 | 0.89 | 5.50 | 1.03 | 6.26* | .06 |
| Subjective Vitality | 4.54 | 1.12 | 4.97 | 1.17 | 4.94 | 1.16 | 5.57 | 0.71 | 6.01* | .06 |
| Women, $n$ | 183 | 3.05 | 0.45 | 3.06 | 0.39 | 3.05 | 0.43 | 3.30 | 0.49 | 1.57 | .02 |
| Self-esteem | 4.54 | 1.12 | 4.97 | 1.17 | 4.94 | 1.16 | 5.57 | 0.71 | 6.01* | .06 |

* $p < .001$. 
Tukey test revealed that the Very high physical activity group rated subjective vitality higher than the other three leisure-time physical activity groups.

**Discussion**

The present findings show that high leisure-time physical activity is associated with benefits on psychological well-being. In relation to self-esteem, the results were in line with the ones obtained in a study of 277 American university students by Armstrong and Oomen-Early (2009), who reported results for men and women together, and showed that athletes had significantly greater self-esteem than did nonathletes. However, the present women showed no significant differences in self-esteem associated with physical activity. Sonstroem (1997) suggested self-esteem might change, positively or negatively, or perhaps not change with physical activity depending on the development of skills for task mastery or success. Therefore, personal development reached through physical activity practice could affect self-esteem changes. In addition, several studies showed an association between women’s self-esteem and body image perceptions through exercise (Reid, Dyck, McKay, & Frisby, 2000). Therefore, some active women improve self-esteem due to appearance enhancement, mostly due to weight loss, whereas other active women do not improve self-esteem, for instance, because of failure to achieve the desired body image (e.g., Davis & Cowles, 1991; Markula, 1995; Reid, et al., 2000).

Regarding subjective vitality, the results were consistent with the idea that benefits in subjective vitality may be associated with higher physical activity. In addition, they are in line with data of longitudinal studies in which a significant and positive relation between leisure-time physical activity and subjective vitality was shown in samples of university students from other countries (e.g., Reinboth & Duda, 2006; Wang, 2008). This cross-sectional study indicates a positive influence of high physical activity on subjective vitality and self-esteem rated by university students. Apparently, high intensity of practice may not be needed to obtain beneficial effects on psychological well-being; moderate physical activity may be enough (e.g., Biddle & Mutrie, 2008). Wang (2008) concluded that Tai Chi, a moderate and whole body exercise, had positive effects on mental health of university students. In this line, in a study of 477 Spanish and Portuguese university students, beneficial effects on psychological well-being (stress and mood state) were related to regular physical exercise, independent of the intensity of practice (Jiménez, et al., 2008).

There are limitations here that should be noted, such as the cross-sectional nature which does not allow us to infer causality, but merely to identify associations among variables. This encourages prospective studies of
the relation between high physical activity and psychological well-being. Most elite athletes have very high subjective well-being on several measures, but their physical activity is far higher than is probably required. Also, questionnaires based on ratings of leisure-time physical activity provide gross estimates whose individual referents vary widely. Equal interval measures, such as MET or psychophysical measures, should be developed. In this line, accuracy of self-report of both frequency and intensity of physical activity requires more objective evaluation. Shephard (2003) stated that on questionnaires, respondents tend to over-report physical activity and underestimate sedentary activities, reflecting more of the socially desired behaviour. One other limitation may be not considering factors which mediate the relation of physical activity with psychological well-being, such as coach-created motivational climate or sport participants’ motivation (intrinsic or extrinsic; e.g., Reinboth & Duda, 2006; Balaguer, Castillo, Duda, & Tomás, 2009). Cross-cultural assessment is an important future area of exploration.

To conclude, the findings of the present study are of interest to the broad areas of physical activity and psychology. It would be of utmost importance to promote leisure-time physical activity in the university context in which lifestyles are being consolidated.

REFERENCES


*Accepted September 14, 2011.*