


# Determining the Relationship Between Physical Fitness, Gender, and Life Satisfaction

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## Abstract

Previous research has suggested a positive effect of physical activity on life satisfaction. Little research exists that has investigated the relationship between physical fitness and life satisfaction. For this purpose, this research was done to determine the relationship between physical fitness and life satisfaction in a sample of university men and women. Participants ( $N = 28$ ,  $M_{age} = 22.18$ ) completed multiple indicators of physical fitness including cardiovascular fitness, muscular fitness, body composition and flexibility, and life satisfaction (SWLS). Descriptive and one-way between-groups ANOVAs were performed to determine gender differences on measures of life satisfaction and measures of fitness. In addition, the relationship between the five health-related components of fitness and life satisfaction were investigated using Pearson's product-moment correlation coefficient. Analyses indicated there were no significant correlations between any of the health-related components of fitness and scores on the SWLS. There were significant gender differences on all physical fitness measures, except partial curl-ups, but no significant gender differences on life satisfaction. Our findings suggest that improved physical fitness does not have a relationship with higher life satisfaction measures. Further tests, utilizing larger sample sizes, are recommended.

## Keywords

physical fitness, life satisfaction, gender, physical activity

According to the World Health Organization (WHO; 2015), across the world, one in four adults does not get sufficient physical activity (PA) for health benefits. Insufficient PA is one of the most important modifiable risk factors for the development of non-communicable, chronic diseases (Booth & Lees, 2007). Current PA recommendations designed to promote health are based on frequency, duration, and the intensity of PA per week, and reflect a belief in a dose-response relationship between PA and health benefits. These health benefits include a reduction in all-cause mortality, chronic diseases, and health indicators (e.g., blood pressure, obesity, and heart disease).

A systematic review of the research literature by Warburton, Charlesworth, Ivey, Nettlefold, and Bredin (2010) concluded that there was a clear dose-response relationship between PA and all-cause mortality and PA and some health indicators. Although a number of studies demonstrate a relationship between PA and health indicators, the existing research suggests that improvements to physical fitness measures show the greatest reduction in certain health indicators (Rankinen, Church, Rice, Bouchard, & Blair, 2007). In fact, Williams (2001) demonstrated that, when relative risks were plotted, PA alone has a relationship to health indicators, but it is the relationship between physical fitness and health indicators which is steeper than that of PA. This

suggests that the effects of PA and physical fitness on health indicators are independent of one another, and that physical fitness has a greater effect of health indicators than that of PA, and being unfit should be considered a risk factor distinct from inactivity (Williams, 2001).

Current research literature also suggests a dose-response relationship between PA and mental health variables. The effect of PA on mental health appears to be related to a number of factors including the type of activity, the duration the activity is performed, and the intensity at which the activity is performed. Attempts have been made to clarify the interaction of these factors by suggesting guidelines to help maximize the benefits of PA and exercise on mood states and anxiety (Berger, 1996; Berger & Owen, 1988). Based on their meta-analysis of previous studies, activities that are enjoyable, which emphasize rhythmical breathing, done at a moderate intensity for approximately 30 min, on most days of the weeks have been suggested to maximize the benefits of PA on some mental health variables. The relationship

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between PA and life satisfaction is also unclear. For example, research suggests that, among adolescents, as participation in PA declines, life satisfaction declines as well (Kaplan, Lazarus, Cohen, & Leu, 1991), higher life satisfaction scores are reported in younger adults participating in PA (Tasiemski, Kennedy, Gardner, & Taylor, 2005), and older adults participating in the most leisure-time activities report the highest life satisfaction (Heo, Stebbins, Kim, & Lee, 2013). On the contrary, Guven, Ozcan, Tasgin, and Arslan (2013) found that while life satisfaction scores did improve as PA frequency or duration increased, there was no significant relationship between PA and life satisfaction. Similar results were found in a study by Eime, Harvey, and Payne (2014), who found that life satisfaction was not significantly related to the level of participation in PA.

Much of the existing literature has investigated the relationship of PA with life satisfaction relying upon recall or estimation of time spent in activity, and self-assessment of the intensity of an activity. Limitations of self-report data include recall bias and recollection problems. For example, individuals are most accurate when recalling sedentary behavior and high-intensity activities (Sallis & Saelens, 2000). Previous literature has suggested that a more appropriate form of research would be to use information, “with biological significance for the organism, such as the gas exchange or the lactate threshold, or the power-time asymptote” (Ekkekakis & Petruzzello, 1999, p. 357). This was in reference to positive affect, but no less appropriate for life satisfaction. Biological information provides more reliable and quantifiable evidence of any dose–response pattern related to life satisfaction and physical fitness. To our knowledge, there are no existing data concerning multiple measures of physical fitness and their relationship to life satisfaction. These could serve to elucidate the dose–response relationship between physical fitness and life satisfaction.

Of interest to the current authors is to determine the relationship between physical fitness, gender, and life satisfaction. As PA prescription guidelines for improving life satisfaction are unknown, understanding whether physical fitness relates to life satisfaction can provide more specific guidelines that can be used to prescribe exercise or PA to maximize the influence on psychological variables. Of further interest to the current authors is the issue of the interaction between gender, and physical fitness. Some studies have demonstrated that women report higher life satisfaction than men (Pedišić, Greblo, Phongsavan, Milton, & Bauman, 2015), while others have shown that men report a higher association between life satisfaction and mortality (Koivumaa-Honkanen et al., 2000). The specific guidelines to improve life satisfaction through changes to fitness levels are still unknown. After a review of the literature, the current authors can find no studies that examine physical fitness and its relationship to life satisfaction. The purpose of the current study is to address the gap in the literature and elucidate the relationship between life satisfaction, gender, and physical

fitness as identified by measures of health-related components of fitness.

The current authors had three objectives in this study: (a) to compare university students’ health-related components of fitness, and life satisfaction levels according to gender; (b) to examine the relationships among measures of health-related components of fitness and life satisfaction; and (c) to determine whether any component of health-related component of fitness predicts life satisfaction. The results of this study may be useful in determining specific components of fitness that can be used as part of an intervention strategy to increase life satisfaction.

## Method

### *Participants and Procedure*

The sample consisted of 28 student volunteers at a small, private, liberal arts university in the Southwest United States. There were 14 males (50%) and 14 females (50%). The mean age of the participants was 22.18 years, ( $SD = 6.44$ ). Participants identified as White ( $n = 19$ ), Hispanic ( $n = 4$ ), from multiple races ( $n = 4$ ), or Black or African American ( $n = 1$ ). Participants completed the questionnaires online outside of class time, with no time limit, in exchange for extra credit points in one of the researcher’s courses. The researchers introduced the study aims prior to providing the informed consent. Once students volunteered for participation and signed an informed consent, each student was given online access to the questionnaires, and an appointment time was scheduled for fitness testing in the Exercise Science Laboratory. After the online questionnaires were completed, responses were reviewed to ensure participants were healthy enough to complete the fitness testing. The researchers received ethical approval to conduct this study. The questionnaire contained the instruments listed below.

### *Instruments*

*The Physical Activity Readiness Questionnaire (PAR-Q) and Health–Medical Questionnaire.* This questionnaire is a self-guided method of health screening to be done before initiating a PA program. The PAR-Q was created by the British Columbia Ministry of Health. It was revised by an Expert Advisory Committee of the Canadian Society for Exercise Physiology in 2002. In addition to the PAR-Q, participants completed the American Heart Association (AHA)/American College of Sports Medicine (ACSM) Health/Fitness Facility Preparticipation Screening Questionnaire. This detailed questionnaire was reviewed by a clinical exercise professional to determine whether the individual meets any of the criteria for positive cardiovascular disease risk factors according the ACSM and the AHA.

**Table 1.** Correlations Among Measures of Physical Fitness and Life Satisfaction.

	Submax VO <sub>2</sub>	Body fat	Sit-and-reach	Push-ups	Partial curl-ups	SWLS
Submax VO <sub>2</sub>	1	—	—	—	—	—
Body fat	-.661**	1	—	—	—	—
Sit-and-reach	.257	-.072	1	—	—	—
Push-ups	.393*	-.408*	.588**	1	—	—
Partial curl-ups	.061	-.281	.212	.457*	1	—
SWLS	.136	-.166	.185	-.019	-.004	1

Note. SWLS = Satisfaction With Life Scale.

\*Correlation is significant at the .05 level (two-tailed). \*\*Correlation is significant at the .01 level (two-tailed).

### Physical Fitness Measures

**Queens College step test.** This is a step test used to determine aerobic fitness. It is a submaximal aerobic test that uses recovery heart rate to estimate maximal oxygen consumption. Test-retest reliability measures for recovery heart rate have been demonstrated to be .92, and correlation measures between recovery heart rate and direct measures of maximal oxygen consumption have been reported as -.75 (McArdle, Katch, Pechar, Jacobson, & Ruck, 1972). Absolute values for VO<sub>2</sub> (rate of oxygen consumption), on average, are higher for men than for women. In an effort to more accurately compare VO<sub>2</sub> measures, comparisons were made on relative VO<sub>2max</sub> measures. Oxygen consumption is expressed per kilogram of body weight and thus measures of oxygen consumption for each participant were compared after VO<sub>2max</sub> was divided by body weight in kilograms.

**Bioelectrical impedance analysis (BIA).** This technique is used to assess body composition (percentage of body fat and percentage of lean body mass). BIA is a type of body composition assessment that is used routinely in health/fitness testing settings. According to the ACSM (2013), “. . . the accuracy of BIA is similar to skinfolds, as long as stringent protocol adherence is followed” (p. 72). The mean score for body fat measurements in the current study was 21.16% (*SD* = 10.12).

**Sit-and-reach flexibility test.** Flexibility is the ability to move a joint through its complete range of motion. Flexibility measures are valid only for a specific joint. The sit-and-reach test has been commonly used to assess low back and hamstring flexibility. This test has been used extensively, and norms have been established for both men and women aged 20 to 69 years. In the current sample, the average participants sit-and-reach score was 30.35 cm (*SD* = 8.4).

**Muscular endurance.** Muscular endurance is the ability to execute muscle actions over a longer period of time. The push-up test and partial curl-up test are field-tests used to assess upper body muscles and abdominal muscles (ACSM, 2013). The push-up protocol is modified based on sex. The protocol utilizes a modified push-up position for women. These tests have been used extensively, and norms have been established for

both men and women aged 20 to 69 years. Average number of push-ups and partial curl-ups in the present study were 21.68 (*SD* = 12.12) and 25.48 (*SD* 18.1), respectively.

**Satisfaction With Life Scale (SWLS).** The SWLS was used to measure a global sense of well-being and adjustment. The SWLS has correlated adequately with interviewer estimates of life satisfaction and with several other measures of well-being (Diener, Emmons, Larse, & Griffin, 1985). Previous studies demonstrated that the SWLS highly correlates ( $r = .81, p < .05$ ) with the Life Satisfaction Index (LSI-A) as well as daily satisfaction ( $r = .51, p < .05$ ) and with peer evaluations as well such as peer SWLS ( $r = .54$ ). The SWLS demonstrated good reliability ( $\alpha = .87$ ) in the present sample.

### Data Analysis and Results

Descriptive, correlation, and one-way between-groups ANOVAs were performed in SPSS, Version 23. To explore the impact of gender on levels of the health-related components of fitness, all five dependent variables were tested: Submaximal VO<sub>2</sub>, body fat percentage, sit-and-reach, push-ups, and curl-ups, with the independent variable of gender. The relationship between the five health-related components of fitness and life satisfaction were investigated using Pearson's product-moment correlation coefficient. There were no statistically significant correlations between any of the health-related components of fitness and scores on the SWLS at an alpha level of .05 (see Table 1).

A one-way between-groups ANOVA was conducted to examine the effect of gender on reports of life satisfaction as measured by the SWLS and health-related components of fitness. There were no statistically significant gender differences in scores of life satisfaction. There was a statistically significant difference between males and females on submax VO<sub>2</sub>, push-ups, and body composition at an alpha level of .01 (see Table 2).

### Discussion

The current study extends the literature on life satisfaction and PA by examining measures of fitness related to the performance of PA. In addition, the purpose was to examine gender differences between measures of physical fitness and life

**Table 2.** Comparison of Means by Gender on Physical Fitness and Life Satisfaction Tests.

Test	Males (M)	Males (SD)	Females (M)	Females (SD)	<i>p</i>	<i>F</i>	<i>df</i>	$\eta^2$
Submax $\text{VO}_2^a$	62.60	6.13	40.58	6.26	.000**	88.33	27	.773
Body fat <sup>b</sup>	13.86	7.00	28.68	6.89	.000**	31.91	27	.551
Sit-and-reach <sup>c</sup>	30.79	9.40	28.45	8.39	.57	.34	27	.012
Push-ups <sup>d</sup>	29.71	7.47	13.64	10.51	.000**	21.76	27	.46
Partial curl-ups <sup>e</sup>	33.15	20.05	18.36	13.08	.03	5.24	27	.173
SWLS	26.21	6.35	26.36	6.20	.95	.004	27	.0001

Note. SWLS = Satisfaction With Life Scale.

<sup>a</sup> $\text{VO}_2$  expressed in milliliters of oxygen per kilogram of body mass.

<sup>b</sup>Body fat expressed as a percentage.

<sup>c</sup>Sit-and-reach expressed in centimeters.

<sup>d</sup>Push-ups expressed as number completed.

<sup>e</sup>Partial curl-ups expressed as number completed.

\*Significant at the .05 level. \*\*Significant at the .01 level.

satisfaction. The results of this study suggest that there are no gender differences in measures of life satisfaction. In addition, results suggest that components of health-related fitness do not have an association with measures of life satisfaction. Finally, on all measures of health-related fitness, except for partial curl-ups and flexibility, there were significant differences between men and women in this study. These gender differences in measures of physical fitness are related to physiological characteristics and are observed across all age groups.

The results of the relationship between gender and life satisfaction are consistent with previous studies reflecting no differences between genders and life satisfaction (Bahadir, 2013). This is in contrast with previous authors who have demonstrated that boys have higher general and health-related life satisfaction than girls (Goldbeck, Schmitz, Besier, Herschbach, & Henrich, 2007; Moksnes & Espnes, 2013). In contrast, other studies have demonstrated higher life satisfaction measures among females when compared with males (Pedišić et al., 2015).

The current study is one of the first to examine the relationship between measures of physical fitness and life satisfaction. Physical fitness is influenced most by exercise intensity (Williams, 2001), and the results of this study add to the equivocal nature of the existing literature examining the effect of PA intensity on measures of life satisfaction. Although some of the previous research found no relationship between the total amount and the intensity of PA and life satisfaction (Hawker, 2012), other studies have shown a significant relationship between life satisfaction and vigorous intensity activities, but only within specific domains (Pedišić et al., 2015). Previous literature that used biological markers to identify intensity of PA (Ekkekakis, Hall, & Petruzzello, 2008) has found lines of demarcation for when certain psychological variables are maximized. No such patterns were visible in the current study.

Measurements of physical fitness provide evidence of the long-term effects of lifestyle. Once achieved, physical fitness levels can be maintained with continued PA or exercise, and the impact of fitness levels on reducing things like all-cause mortality can be quantified. Currently using biological markers to determine intensity of activity provides more reliable and

quantifiable evidence of dose-response patterns, but does not provide evidence of the long-term effect of PA on psychological variables. Knowing the minimum levels of physical fitness, which would lead to an improvement in life satisfaction, would allow practitioners to create more specific prescriptions of PA or exercise to create enduring changes.

The major strengths of the study were as follows: (a) Measuring physical fitness levels directly eliminates the random error associated with self-reports of physical activity, and has not been done in previous studies; and (b) measures of physical fitness reflect physical activity over a longer period of time, which extends the literature on the influence of daily physical activity and life satisfaction.

This study also has several limitations, however. First, the sample size of the current study is relatively small. This is a frequent limitation to studies directly measuring physiological variables, but further research needs to be done with a larger sample. Second, separate analysis of the participants was only done based on gender. No separate analyses were done based on academic discipline or degree, and thus the results of the current study can only be generalized to an overall population of students. Also, the sample used was a convenience sample, which limited the variability of the respondents and may have biased our results. Further studies need to be done with greater variety of participants. Lastly, the current research used fitness testing but did not identify ventilatory threshold or lactate threshold points for the participants. Previous literature evaluating other psychological variables has used these biological measures to more clearly identify a dose-response pattern. Future research should incorporate more specific biological markers to determine whether a dose-response pattern related to life satisfaction becomes more apparent.

## Conclusion

The current study indicated no relationship between measures of physical fitness and life satisfaction. The study also indicated that there were no differences in life satisfaction between men and women. The current sample was limited



and underscores the importance of increasing the sample size. In addition, the current study utilized only a university population, and further study should be done with various-aged individuals.

### Declaration of Conflicting Interests

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