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Higher Physical Fatigue Predicts Adherence to a 12-Week Exercise Intervention in Women With Elevated Blood Pressure

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Abstract

Objective—To investigate predictors of exercise adherence to a 12-week exercise intervention for sedentary women and men with elevated blood pressure (BP).

Methods—Fifty-one otherwise healthy and unmedicated adults (27 women and 24 men) with elevated BP ($\geq 120/80$ mmHg but $< 179/109$ mmHg) participated in a 12-week exercise intervention involving cardiovascular and strength training. Participants kept weekly exercise logs detailing minutes spent exercising each week. The following were assessed before and after the intervention: cardiorespiratory fitness (in mL/kg/min), body mass index (BMI), level of habitual physical activity, physical fatigue, self-efficacy for exercise habits, and social support.

Results—Regression analysis revealed that mean exercise minutes/week were predicted by higher age ($p < .05$), higher cardiorespiratory fitness ($p < .05$), and a gender by physical fatigue interaction ($p < .01$; $R^2 = 0.34$, $F < 3.248$, $p < .01$). Women who reported higher physical fatigue prior to the intervention spent more time exercising during the 12-week intervention than those with lower levels of physical fatigue. This relationship persisted after controlling for age, BMI, cardiorespiratory fitness, level of habitual physical activity prior to the intervention, self-efficacy for exercise habits, and social support ($p < .01$). The gender by physical fatigue interaction explained 13.9% of the variance in mean minutes exercised/week above and beyond the effects of covariates.

Conclusion—Both gender and fatigue should be considered when developing exercise interventions, such that more initial physical fatigue in women is associated with a tendency to devote greater amounts of time to exercising.

Keywords

exercise; adherence; gender; fatigue

Hypertension is associated with multiple cardiovascular consequences (Rosendorff et al., 2007). Lifestyle modifications such as exercise are considered a first line of defense in treating high blood pressure (BP; Chobanian et al., 2003) and numerous studies have

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illustrated that physical activity produces clinically significant reductions in BP (Wallston, Alagna, DeVellis, & DeVellis, 1983; Whelton, Chin, Xin, & He, 2002).

Exercise interventions focusing on prevention of cardiovascular disease average 50% dropout rates during the first 6 to 12 months (Burke, Dunbar-Jacob, & Hill, 1997), thus adherence is a key component to a successful intervention. The literature regarding adherence to exercise indicates that self-efficacy and social support are predictors of adherence to exercise in sedentary adults (Duncan & McAuley, 1993; Jones, Harris, Waller, & Coggins, 2005; Oka, King, & Young, 1995; Wilbur, Michaels, Miller, Chandler, & McDevitt, 2003). Fitness characteristics, including body mass index (BMI), activity level, and cardiorespiratory fitness, have also been shown to be associated with better adherence to exercise programs (Dishman, Sallis, & Orenstein, 1985). Research examining exercise adherence in individuals with prehypertension and/or hypertension is limited.

Low levels of exercise are linked to high levels of physical fatigue (Chen, 1986). However, it has not been established whether physical fatigue creates a barrier to physical activity, or whether alleviating fatigue through physical activity acts as an incentive to exercise adherence (Dishman, 1991). Women generally report more fatigue than men (Ekman & Ehrenberg, 2002; Nelson & Burke, 2002; Tang, Yu, & Yeh, 2010; Verdonk, Hooftman, van Veldhoven, Boelens, & Koppes, 2010), and it could be that such greater fatigue might differentially influence exercise adherence in women versus men. However, there is a relative paucity of studies examining physical activity interventions for cardiovascular risk reduction in women (Krummel et al., 2001). Women have been shown to have lower vigorous activity levels, as compared with men, but are more likely to participate in moderate physical activity (King et al., 1992). It has also been reported that within a 1-year period, men are slightly more likely than women to maintain moderate physical activity (Sallis et al., 1986). A study of cardiac rehabilitation patients found that the nature of the perceived barriers to physical activity differed between men and women, with women who experienced exercise as “tiring” or “painful” having a greater exercise barrier than did men (Grace et al., 2009). Further investigation into factors that influence exercise adherence across gender may aid in the process of promoting active living associated with positive health outcomes.

Method

Overview of the Present Study

This is a secondary analysis of a larger study that examined the effects of a 12-week exercise or exercise plus diet intervention on inflammation and cell adhesion in sedentary individuals with elevated BP. It uses data from 51 participants (24 men and 27 women) who completed the exercise intervention. We investigated potential predictors of exercise adherence to the 12-week exercise intervention in women and in men. Our first objective was to examine whether fitness characteristics, including BMI, cardiorespiratory fitness, and activity level, or psychosocial factors, including self-efficacy, social support, and physical fatigue, were associated with exercise adherence. Our second objective was to examine whether factors associated with adherence varied by gender.

Sample and Recruitment

Participants were recruited from the San Diego community. Participants were eligible if they were otherwise healthy and: (1) hypertensive (BP $\geq 140/90$ mmHg but $< 179/109$ mmHg) or prehypertensive (BP $\geq 120/80$ mmHg but $< 140/90$ mmHg), (2) not taking any BP medication, (3) between 20 to 60 years of age, (4) a BMI between 23.5 and 36 kg/m², (5) relatively inactive per initial screening by the Leisure Time Exercise Questionnaire (LTEQ;

see subsequent section on psychosocial factors, Godin & Shephard, 1985). Participants were excluded if they had any of the following conditions: abnormal echocardiogram, congestive heart failure, bronchospastic pulmonary disease, history of myocardial infarction, known secondary hypertension, angina, history of life-threatening arrhythmia, white coat hypertension, recent stroke or significant cerebral neurological impairment, diabetes, kidney damage, pregnancy, current psychiatric conditions, major depression, current drug and/or alcohol abuse, caffeine consumption exceeding 600 mg/day, current participation in regular or structured exercise classes, and inability to perform moderate to vigorous intensity exercise. Potential participants had a medical history taken, and physical examination performed by a licensed physician, at which time a normal electrocardiogram was confirmed.

Rolling recruitment took place between August 16, 2006 and July 1, 2010. Preintervention testing was scheduled approximately one to two weeks after screening. Participants were then randomized to one of two intervention arms: (i) physical activity intervention (ii) physical activity plus diet intervention. Randomization was stratified on weight (BMI ≥ 30 vs. BMI < 30) and gender (Piantadosi, 2005). Participants began the intervention within a week of being randomized to the intervention. Participants were taught to measure their BP at home and reported weekly BP measurements to the study investigators. Participants were to be dropped from the study and referred for treatment with antihypertensive pharmacotherapy if their daily average BP exceeded 179/109 mmHg, although this did not occur.

The University of California, San Diego (UCSD) Institutional Review Board approved the protocol, and written consent was obtained from all participants. Participants were compensated financially for participation.

Procedures

12-week intervention—After preintervention measures were obtained, participants were given a 12-week gym membership to a local Young Mens Christian Association along with two sessions/week with a certified personal trainer (24 sessions total). An individual training heart rate (HR) range was obtained for each participant based on HR during the 20-min steady state exercise test performed at 65–70% of the individual's estimated VO_{2peak} . Participants were provided HR monitors to use while exercising and were instructed to maintain their HR within the desired training HR range during cardiovascular activity. The personal trainers were provided each participant's target HR range for cardiovascular activity, maximum HR, and VO_{2peak} (ml/kg/min) to help design appropriate individualized fitness interventions. The personal training sessions included 20–25 min of cardiovascular activity (treadmill, elliptical, or bike), 10–25 min of resistance training (eight to 12 repetitions on machines targeting each major muscle group), and 5–10 min of cool down and stretching. Since participants were relatively sedentary at baseline, their individual recommended weekly activity level was gradually increased with the ultimate goal of performing at least 30 to 60 min of moderate-intensity cardiovascular activity for 5 days/week, as recommended by the American College of Sports Medicine (ACSM) and American Heart Association (AHA; Haskell et al., 2007). Participants were encouraged to mimic the personal training session format 1 day/week on their own and to engage in an activity of their choice on 2 other days during the week. Trainers provided recommendations for increasing their physical activity throughout the 12 weeks. Participants completed weekly training logs detailing minutes spent on cardiovascular activity and strength training. The study coordinator contacted the participants each week via phone or e-mail (with personal follow-ups to the e-mails) to ensure compliance. Participants were routinely asked about their experience with the program and were encouraged to provide feedback. Participants

were instructed to turn in their exercise logs each week to their trainers. Participants met with the same trainer each time, except for one person who switched trainers due to a scheduling conflict. Personal trainers were blinded to the psychosocial measurements such as social support, self-efficacy, and physical fatigue, and did not in any way attempt to target these areas during the intervention. The intervention was not specifically theory based to target, for example, the development of self-efficacy or social support.

In addition to the exercise intervention, 11 women and 11 men were randomized to an exercise plus diet group and given a DASH (Dietary Approaches to Stop Hypertension) diet intervention with a combined daily calorie deficit goal of approximately 500 calories (Champagne, 2006). Diet adherence was based on 24-hr dietary recalls obtained by a registered dietitian. The method for assessing exercise adherence was the same for both DASH and non-DASH participants (Turk et al., 2009).

Measurement

All measures were performed pre- and postintervention. All equipment was calibrated regularly and operated by trained technicians blinded to the treatment arm. All fitness trainers and the research dietitian were certified by their respective professional organizations. Pretest measures were completed by masked assessors in order to reduce bias. All participants responded to questionnaires in private in a designated testing room. The primary outcome measure was mean minutes of total exercise/week.

Demographics, body composition, and blood pressure—Gender and age were assessed through self-report. BMI was calculated with height and weight measurements (to the nearest 0.1 kg and 0.1 cm) taken on a calibrated scale. BMI was computed as the ratio of body weight in kilograms divided by the square height in meters (kg/m^2). Screening BP was assessed using the average of three seated BP measurements taken with the right arm after resting for 5 min.

Cardiorespiratory fitness—To assess pre- and postintervention cardiorespiratory fitness (in $\text{mL}/\text{kg}/\text{min}$) and to assign a target HR range for training, participants underwent an expired gas analysis $\text{VO}_{2\text{peak}}$ exercise test and a steady state exercise test on a treadmill. Participants were instructed to remain hydrated, abstain from strenuous exercise for 24 hr prior to both testing days, and avoid the use of caffeine, pain relievers, or nicotine after 8:00 p.m. the evening prior to the tests. All exercise tests were performed by certified individuals trained on the protocol and overseen by a qualified UCSD physician or registered nurse. Exercise was discontinued if participants exhibited abnormal cardiac rhythms or if BP exceeded 220/110 mmHg or dropped more than 20mmHg systolic during exercise. Participants who had to terminate the stress test due to hypertension or hypotension were evaluated by a physician and not included in the study.

Peak exercise—The peak exercise test followed the standard Bruce Protocol (Bruce, 1974), with the speed and grade of the treadmill starting at 1.7 mph and 10% incline, and increasing every 3 min until the participant indicated the need to stop. Borg's 6–20 point scale rating of perceived exertion was used to measure perceived effort during exercise (Borg, 1971). BP was measured manually every 3 min during exercise.

Steady state—Within a week of completing the peak exercise test, participants performed a 20-min expired gas analysis steady state exercise test on a treadmill. Following a 2-min warm-up, exercise was performed for 20-min at 65–70% of each participant's individual estimated $\text{VO}_{2\text{peak}}$. BP was measured manually every 4 min during exercise.

Psychosocial Factors

Level of habitual physical activity—We studied relatively sedentary individuals in order to maximize the potential observable effects of the exercise intervention. The LTEQ, a self-report questionnaire designed to measure an individual's regular physical activity level, was used as an initial screening tool to identify sedentary individuals and in the regression analysis to control for differences in preintervention physical activity levels (Godin & Shephard, 1985). The total score was used and has been shown to provide a valid and reliable estimate of regular physical activity (Godin, Jobin, & Bouillon, 1986; Godin & Shephard, 1985; Miller, Freedson, & Kline, 1994; Sallis, Buono, Roby, Micale, & Nelson, 1993). Individuals scoring over 40 on the LTEQ were considered physically active based on normative data and were excluded from participation in the study (Godin & Shephard, 1985).

Physical fatigue—The Multidimensional Fatigue Symptom Inventory—short form (MFSI-sf) is a 30-item self-report measure designed to assess a multidimensional spectrum of domains in which fatigue can manifest (Stein, Jacobsen, Blanchard, & Thors, 2004). The 30 items produce five subscales including a physical fatigue scale which was used in this study. Each of the subscale scores range from 0 to 24, with higher scores indicating more fatigue. Cronbach's alpha from this sample equals 0.85.

Social support—Social support was measured using the 9-item version of the RAND Medical Outcomes Study Social Support Survey (Sherbourne & Stewart, 1991), a self-report measure designed to identify a person's perceived availability of social support. Scores range from 9 to 45, with higher scores indicating more social support. Cronbach's alpha from this sample equals 0.93.

Self-efficacy—The Self-efficacy for Exercise Habits Survey is a 12-item self-report measure designed to identify behavioral and situational components of physical activity change (Sallis, Pinski, Grossman, Patterson, & Nader, 1988). In our analysis we used the "sticking to it" subscale, which consists of eight items and ranges from 8 to 40, with higher scores indicating more self-efficacy for exercise habits. Cronbach's alpha from this sample equals 0.92.

Exercise adherence—Exercise adherence was measured in self-reported mean minutes exercised/week. Exercise consisted of both strength training and cardiovascular activity. The mean minutes exercised/week variable was calculated by summing the minutes spent on cardiovascular and strength training throughout the entire intervention, including time spent with the personal trainer, and averaging across the 12 weeks.

Data Analysis

Baseline characteristics of women and men participants were compared using independent samples *t* tests and χ^2 tests. Potential effects of the intervention on BMI, VO_{2peak} , LTEQ, physical fatigue, self-efficacy, and social support were examined with two-way repeated measures analysis of variance (ANOVA). Gender was used as a between-subjects factor to investigate whether it influenced changes in any of the variables (i.e., did changes in BMI as a result of the intervention depend on gender).

Hierarchical regression analysis was used to investigate potential predictors of exercise adherence. Covariates of theoretical importance in a study of exercise adherence were included in significant regression analyses. Block 1 included age and gender. Block 2 included the fitness characteristics of BMI, preintervention cardiorespiratory fitness (VO_{2peak} in ml/kg/min), and preintervention level of habitual physical activity (LTEQ).

Block 3 included physical fatigue, self-efficacy for exercise habits, and social support. Block 4 included gender by physical fatigue, gender by self-efficacy, and gender by social support interaction terms in order to investigate whether observed associations were varied by gender.

To normalize skewed distributions, log transformation was performed on physical fatigue scores. Scores on the following variables were centered in order to reduce multicollinearity and enable simpler interpretation of β coefficients: age, physical fatigue, self-efficacy, social support, BMI, cardiorespiratory fitness, and level of habitual physical activity. Statistical analyses were performed using SPSS statistical software package (SPSS for Windows 17.0; SPSS Inc.; Chicago).

Results

Recruitment

One hundred twelve people passed a telephone screening and were invited to the UCSD Medical Center for an initial screening visit. Of these individuals, 31 did not enter the study due to lack of time or interest in the study, and 27 were disqualified before entering the intervention because they met exclusionary criteria. Three individuals did not complete the study because they moved away from San Diego ($n = 2$) or became ill ($n = 1$).

Demographic and Health Characteristics

The total mean age of the sample was 47 years (standard deviation [SD] = 9.38). Men were approximately five years younger than women ($p < .05$, see Table 1). The preintervention mean VO_{2peak} of the sample was 27 ml/kg/min. Men had higher preintervention VO_{2peak} than women ($p < .001$). There were no significant gender differences in the sample in terms of preintervention BMI, activity level, BP, physical fatigue, self-efficacy, or social support. There were no significant gender differences in the sample in terms of mean exercise minutes/week (p 's $> .05$, see Table 2). The 51 participants who completed the study were not significantly different on preintervention measures from the three individuals who discontinued the study.

Intervention Effects

We performed repeated-measure ANOVAs to explore the effect of the intervention on fitness and psychosocial variables. The exercise intervention was associated with significant increases in VO_{2peak} and leisure time exercise in both women and men ($p < .001$). There was a decrease in the BMI of the women and men participants, but the reduction was only statistically significant in men ($p < .05$). BP decreased in women and men, but not significantly. None of the psychosocial variables significantly changed from pre- to postintervention (see Table 1).

Hierarchical Regression Analysis

First, we investigated whether traditional predictors of exercise adherence were predictive in our population of prehypertensive and hypertensive individuals. We also investigated whether there were significant interactions between gender and predictors of exercise adherence. Table 3 represents the results of the final adjusted model for the hierarchical regression analysis. Mean exercise minutes/week was predicted by a combination of higher age ($p < .05$), higher cardiorespiratory fitness ($p < .05$), and the gender by physical fatigue interaction term ($p < .01$, model adjusted $R^2 = 0.34$, $F = 3.248$, $p < .01$, see Figure 1). There were no significant gender differences in terms of self-efficacy or social support (data not shown). However, hierarchical regression analysis revealed a significant gender by physical fatigue interaction in predicting mean minutes exercised/week. This relationship persisted

after controlling for age, BMI, VO_{2peak} , previous level of habitual physical activity, self-efficacy, and social support. The gender by physical fatigue interaction explained 13.9% of the variance in mean minutes exercised/week above and beyond the effects of covariates ($p < .01$). Women who reported higher physical fatigue prior to the exercise intervention spent more time exercising during the 12-week intervention than men and women who reported low physical fatigue at the onset of the intervention.

We examined whether adherence to the dietary intervention influenced the observed exercise adherence findings by including a variable indicating whether a participant received the diet intervention (Yes vs. No) into the above regression model. There was no significant change in the association between exercise adherence and age ($\beta = 2.45$, standard error [SE] = 1.11, $t = 2.20$, $p = .04$) or the gender by fatigue interaction ($\beta = 196.64$, $SE = 61.21$, $t = 3.21$, $p < .01$). Controlling for the diet intervention adherence did slightly attenuate the relationship between VO_{2peak} and exercise adherence ($\beta = 3.16$, $SE = 2.15$, $t = 1.47$, $p = .15$).

Discussion

In a sample of otherwise healthy and unmedicated adults with elevated BP, we showed that mean minutes exercised/week during the 12-week exercise intervention was associated with higher age and higher preintervention cardiorespiratory fitness in both men and women. Additionally, we detected a gender interaction showing that higher preintervention physical fatigue was predictive of adherence in women, but not men. Few prior studies have specifically examined determinants of adherence to exercise interventions in men and women with elevated BP. The association between age and adherence to exercise programs did replicate findings in populations of individuals undergoing physical therapy, indicating that compliance to exercise interventions increases with age (Sluijs, Kok, & van der Zee, 1993); however, other studies have found no association between age and physical activity (Dishman, 1982; Dishman et al., 1985; Morgan, 1977). Results from our study indicate that higher cardiorespiratory fitness is associated with more weekly exercise, which similarly has been previously reported, but again this has not been a consistent finding (Dishman, 1982; Dishman et al., 1985; Oldridge, 1982). This study also included a subcohort of individuals adhering to the DASH diet. Since adherence to the diet intervention could have potentially influenced adherence to the exercise intervention (Turk et al., 2009), we also examined this possibility but found no associations with our primary exercise adherence outcomes.

Previous investigations of physical fatigue and exercise have primarily been cross-sectional and have focused on the association between fatigue and activity levels, and have not examined possible gender by physical fatigue interactions (Chen, 1986; Dishman, 1991). Studies do indicate, however, potentially relevant gender differences in fatigue. Studies of healthy individuals as well as individuals with congestive heart failure have shown that women report more fatigue than men (Ekman & Ehrenberg, 2002; Nelson & Burke, 2002; Tang et al., 2010; Verdonk, Hooftman, van Veldhoven, Boelens, & Koppes, 2010). To our knowledge this is the first study whereby women reporting high physical fatigue prior to an exercise intervention spent more time exercising during the intervention than men. One possible explanation for the observed difference between gender is that men tend to exercise at a more vigorous level, while women tend to exercise at a moderate level (King et al., 1992; Sallis et al., 1985; Schoenborn, 1986; Stephens, Jacobs, Jr, & White, 1985). With limited literature on the topic of exercise adherence according to gender, we are left to speculate about factors that may be at play. Individuals who exercise at a vigorous level would likely tire more quickly and not spend as much time exercising regardless of fatigue level. On the other hand, women might have exercised more closely within the recommended moderate intensity range. Individuals who exercised within a moderate range

would be less likely to reach fatigue earlier, and thus would be able to sustain exercise for longer periods of times.

We did not detect a significant reduction in BP in response to the exercise intervention. Participants may need to engage in cardiovascular exercise for more minutes/week in order to obtain significant changes in BP. The optimal exercise time for BP reduction is 150 min of cardiovascular activity/week (Petrella, 1998), however our participants averaged 109.2 min of cardiovascular activity/week. As expected, the exercise intervention did produce significant increases in VO_{2peak} . There was a decrease in the BMI of the entire sample, although the reduction was only significant in men.

This study has several limitations. First, the exercise adherence data was drawn from self-report logs, thus it is subject to the recall bias and expectancy characteristics associated with self-report data. Second, the study design did not enable us to ensure that each individual was exercising at the correct, moderate intensity during every exercise session. We employed several techniques in order to facilitate accurate adherence including exercise logs and exercising within HR specifications. Study coordinators and personal trainers kept close contact with each participant in order to ensure exercise was being performed and logged correctly. Trainers ensured that each participant exercised within his or her recommended HR range during twice weekly training sessions and also verified that participants understood their HR specifications throughout the training period. Participants were given HR monitors to use during exercise which allowed them to monitor their HR during independent exercise. Providing participants with a method to monitor their HR maximized their chances of adhering to the intervention while minimizing their burden associated with other more time intensive tracking processes (i.e., using gym equipment with memory functionality). A third limitation was that participants were not formally asked about their interactions with trainers and study coordinators. This limitation precludes the ability to assess how these interactions may have influenced such factors as social support and self-efficacy. Another limitation was that the same individual did not always conduct both entry and exit treadmill tests. An additional limitation was the lack of a control group.

A strength of this study was the dropout rate of only 6%, which is low, as compared with the typical attrition rate of 50% reported in the literature (McAuley, Courneya, Rudolph, & Lox, 1994). Although we do not have data to support this claim, the low attrition rate may have been attributable to the monetary incentive to complete the exercise program or perhaps the regular encouragement received from the personal trainers and study coordinators. It is also possible that a longer intervention closer to 6 months would have yielded a greater dropout rate.

In summary, we found in a population of sedentary individuals with elevated BP, age and cardiorespiratory fitness were predictive of exercise adherence in both men and women. These findings suggest that practitioners implementing training programs in this population should be particularly aware of the tendency for those with low entry fitness and younger age to show lower adherence to exercise programs and subsequently, gain less benefit from it. Our findings also suggest that exercise interventions may be particularly useful for women suffering from higher levels of physical fatigue. Future work investigating factors which promote adherence in younger aged and less fit individuals is an important next step in exercise adherence, as is examining the degree to which gender influences exercise intensity and how intensity affects fatigue levels and adherence to exercise interventions.

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Figure 1.

Gender by physical fatigue interaction associated with mean minutes exercised/week. Untransformed scores were used to create this graph, but logged scores were used in the regression.

Table 1

Characteristics of the Sample

Characteristics	Total (<i>N</i> = 51) Mean ($\pm$ <i>SD</i>)	
	Pre	Post
Age (years)	46.65 (9.38)	—
SBP (mmHg)	134.58 (11.45)	131.42 (10.76)
DBP (mmHg)	85.09 (10.32)	82.84 (8.97)
MAP (mmHg)	102.22 (9.78)	99.53 (8.99)
BMI (kg/m ²)	30.35 (3.71)	29.86 (3.86)*
VO _{2peak} (ml/kg/min)	27.08 (7.12)	30.01 (8.3)***
Leisure time exercise	15.80 (14.23)	55.45 (35.88)***
Physical fatigue	2.34 (2.65)	1.78 (1.65)
Self-efficacy	4.21 (0.74)	4.17 (0.66)
Social support	38.78 (7.18)	37.98 (8.52)

Characteristics	Men (<i>n</i> = 24) Mean ($\pm$ <i>SD</i>)		Women (<i>n</i> = 27) Mean ($\pm$ <i>SD</i>)	
	Preexercise intervention	Postexercise intervention	Preexercise intervention	Postexercise intervention
Age (years)	43.92 (9.61)	—	49.07 (8.63)	—
SBP (mmHg)	136.23 (8.43)	133.51 (8.79)	132.94 (13.82)	129.72 (12.02)
DBP (mmHg)	87.69 (8.68)	84.44 (8.87)	82.49 (11.33)	81.55 (9.01)
MAP (mmHg)	103.26 (7.91)	100.02 (8.61)	101.18 (11.44)	99.14 (9.44)
BMI (kg/m ²)	30.76 (3.93)	30.32 (3.99)**	29.97 (3.54)	29.47 (3.78)
VO _{2peak} (ml/kg/min)	31.95 (6.68)	36.17 (7.67)***	22.74 (4.08)	24.76 (4.24)**
Leisure time exercise	14.04 (16.59)	65.57 (46.19)***	17.37 (11.85)	46.50 (20.41)***
Physical fatigue	2.43 (3.22)	1.70 (1.69)	2.26 (2.12)	1.85 (1.64)
Self-efficacy	4.09 (0.16)	4.03 (0.13)	4.31 (0.13)	4.31 (0.14)
Social support	39.63 (1.54)	37.17 (1.93)	38.04 (1.61)	38.72 (1.58)

Note. SBP = systolic blood pressure; DBP = diastolic blood pressure; MAP = mean arterial pressure; BMI = body mass index; VO_{2peak} = peak oxygen uptake.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 2

Exercise Adherence in the Sample

	Total (<i>N</i> = 51)	Men (<i>n</i> = 24)	Women (<i>n</i> = 27)	
Exercise adherence	Mean ($\pm$<i>SD</i>)	Mean ($\pm$<i>SD</i>)	Mean ($\pm$<i>SD</i>)	<i>t</i>
Total days with trainer (out of 24)	22.00 ($\pm$ 2.09)	22.38 ($\pm$ 1.77)	21.67 ($\pm$ 2.32)	1.24
Mean cardio (minutes/week)	109.17 ($\pm$ 59.18)	100.87 ($\pm$ 55.17)	116.55 ($\pm$ 62.63)	-0.95
Mean strength (minutes/week)	63.23 ($\pm$ 23.52)	60.95 ($\pm$ 14.55)	65.26 ($\pm$ 29.45)	-0.65
Mean exercise total (minutes/week)	171.90 ($\pm$ 71.15)	161.39 ($\pm$ 58.76)	181.25 ($\pm$ 80.56)	-1.01

Table 3

Hierarchical Regression of Demographics, Fitness Characteristics, and Psychosocial Measures Predicting Mean Exercise Minutes/Week

Regression blocks/significant predictors	Model adjusted R^2	Standardized β -coefficient	p value
Step 1	0.01		
Step 2	0.06		
Gender		0.49	0.02
VO _{2peak}		0.49	0.05
Step 3	0.18		
Gender		0.48	0.02
VO _{2peak}		1.93	0.06
Physical fatigue		0.31	0.03
Step 4	0.34		
Age		0.35	0.04
VO _{2peak}		0.43	0.05
Gender $\times$ Physical fatigue		1.25	0.01

Note. VO_{2peak} = peak oxygen uptake; BMI = body mass index; LTEQ = leisure time exercise questionnaire. Block 1 included age, gender; Block 2 included age, gender, BMI, VO_{2peak}, LTEQ; Block 3 included age, gender, BMI, VO_{2peak}, LTEQ; physical fatigue, self-efficacy, social support; Block 4 included age, gender, BMI, VO_{2peak}, LTEQ; physical fatigue, self-efficacy, social support; gender by physical fatigue, gender by self-efficacy, gender by social support interaction terms.