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Examination of Personality Correlates, Exercise Preferences, and Exercise Behavior

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Abstract

Researchers have found that personality is a determinant of exercise behavior. Limited exercise studies however, have used the dominant personality framework of the Five Factor Model (FFM) which asserts that personality consists of the following 5 domains: neuroticism, extraversion, openness, agreeableness, and conscientiousness. The purposes of this study were to examine: (a) if the personality domains of the FFM are related to and predict exercise behavior, (b) if the personality domains are related to exercise preferences and barriers-efficacy, and (c) if gender moderates the relationship between personality and exercise. Participants were 507 male and female undergraduates who voluntarily completed the NEO PI-R (Costa & McCrae, 1992), the Leisure Time Exercise Questionnaire (Godin, Jobin, & Bouillon, 1986), Barriers-efficacy Scale (McAuley & Mihalko, 1998), and preferences to exercise. Results revealed that: (a) extraversion, conscientiousness, and agreeableness were positively related to exercise behavior; (b) significant differences for personality domains and preferences appeared for exercise intensity, exercise company, and gym preference; (c) barriers-efficacy was positively related to openness and conscientiousness and negatively related to neuroticism; and (d) the relationships between personality and exercise were moderated by gender. Applying the FFM to explain exercise preferences and behavior and future research directions were discussed.

Despite the positive psychological and physical benefits of exercise, only a small portion of adults are regularly active. Additionally, for those adults who start an exercise program, 60% will dropout within the first 6 months (Morgan & Dishman, 2001). Thus, sedentary behavior is a major health problem in the U.S. As a result, researchers have examined the determinants of adults' exercise behavior in an attempt to understand how to increase people's physical activity levels (Dishman, Sallis, & Orenstein, 1985; Orman & King, 1998). In fact, there are over 300 studies examining exercise determinants (Sallis & Owen, 1998).

One potential determinant of exercise is *personality*. Few studies, however, have examined the relationship between personality and exercise behavior. This is unfortunate because people's personality provides insight into their health behaviors (Marshall, Wortman, Vickers, Kusulas, & Hervig, 1994). For example, personality predicts a variety of behavioral health problems such as coronary heart disease (Costa, Stone, McCrae, Dembroski, & Williams, 1987). Of the research that has examined personality and exercise behavior, there have been inconsistencies in the operationalization and measurement of personality (Arai & Hisamichi, 1998; Hersh, 1971; Mathers & Walker, 1999; Schnurr, Vaillant, & Vaillant, 1990; Tillman, 1965; Welsh, Labbe, & Delaney, 1991). In regard to the operationalization of personality, most studies have examined only the personality dimensions of extraversion and neuroticism, and the general finding is that extraversion is positively related and neuroticism is negatively related to exercise (Arai & Hisamichi, 1998; Courneya, Bobick, & Schinke, 1999; Davis, Fox, Brewer, & Ratusny, 1995; Mathers & Walker, 1999; Schnurr, Vaillant, & Vaillant, 1990).

The current dominant framework for studying personality is the Five Factor Model (FFM; Costa & McCrae, 1992), which contains the following five domains that have appeared in the literature which explain personality the most: neuroticism, openness to experience, conscientiousness, extraversion, and agreeableness (McAdams, 1994; Marshall et al.,1994; Paunonen & Ashton, 2001; Wiggins & Trapnell, 1997). These five broad domains provide a parsimonious yet reasonably comprehensive representation of personality (Costa & McCrae). Neuroticism is the tendency to experience negative affect and emotional distress. Extraversion is the disposition towards positive emotions, sociability, and excitement. Openness to experience is characterized by a willingness to entertain new ideas and unconventional values. Agreeableness is the inclination to be agreeable and altruistic. Finally, conscientiousness is the temperament of a strong-willed, determined, and organized individual.

Within each of the five domain are six facets. These facets explain and provide insight into the composition of each domain (Costa & McCrae, 1992). That is, the neuroticism domain contains the following six facets: anxiety, angry hostility, depression, self-consciousness, impulsiveness, and vulnerability; while the extraversion facets are warmth, gregariousness, assertiveness, activity, excitement-seeking, and positive emotions. The openness to experience facets are fantasy, aesthetics, feelings, actions, ideas, and values. The agreeableness domain facets are trust, straightforwardness, altruism, compliance, modesty, and tender-mindedness. Finally, the conscientiousness domain facets are competence, order, dutifulness, achievement striving, self-discipline, and deliberation.

In regard to the measurement of personality, the Eysenck Personality Inventory (Eysenck & Eysenck, 1964) and the Minnesota Multiphasic Personality Inventory (Hathaway & McKinley, 1943) have been the primary measures of global personality used to examine the relationship between personality and exercise behavior (Mathers & Walker, 1999; Yates, Shisslak, Allender, Crago, & Leehey, 1992). These personality measures, developed in the 1940's and 1960's, are no longer the primary assessment choice due to advances in personality research (McAdams, 1994). That is, the Minnesota Multiphasic Personality Inventory was originally used to diagnosis psychological disorders, while the Eysenck Personality Inventory assesses normal populations on only three domains (i.e., extraversion, neuroticism, and psychoticism). Currently, the dominant measure used to assess personality is the 240-item NEO-PR, which is based on the FFM, and it assesses the five personality domains of neuroticism, openness, conscientiousness, extraversion, and agreeableness. As well, the NEO-PI-R assesses the six facets within each of the five domains (Costa & McCrae, 1992). Most recently, to reduce participant burden, a 60-item version of the NEO-PI called the NEO-FFI was developed (Costa & McCrae, 1992). The NEO-FFI assesses the five broad personality domains by using one question from each facet from the original NEO-PI-R. As with many questionnaires with a short and long form, the long form allows for greater insight into each personality domain, and it is more reliable and valid than the short form (Costa & McCrae, 1992).

Recently, researchers have used the FFM as a framework for examining the relationship between personality and exercise behavior and intentions (Courneya, Bobick, & Schinke, 1999; Courneya & Hellsten, 1998; Rhodes, Courneya, & Bobick, 2001; Rhodes, Courneya, & Hayduk, 2002). These researchers have found that extroversion and conscientiousness are positively related, and neuroticism is negatively related to exercise behavior and intentions; and that

the NEO moderates the theory of planned behavior constructs for explaining and predicting exercise behavior. In one study, Courneya and Hellsten (1998) examined the relationship between personality and exercise using the NEO-FFI (60-items) and the Leisure Time Exercise Questionnaire (Godin, Jobin, & Bouillon, 1986) with female and male undergraduate students. Results revealed that openness and conscientiousness were positively related to moderate exercise. Additionally, neuroticism was negatively related, while extraversion and agreeableness were positively related to strenuous exercise. For exercise preferences, they found that all the NEO domains were related to some aspect of preferences. More specifically, individuals who scored high on extraversion preferred to exercise in a group than alone, and they also enjoyed supervised sessions rather than self-directed sessions. Additionally, individuals scoring high on openness preferred to exercise outdoors than indoors, while those scoring high on agreeableness favored aerobics versus weight-training. Those who preferred high-intensity exercise scored lower on neuroticism and higher on conscientiousness than those who preferred moderate intensity, and individuals who preferred scheduled exercise scored lower on openness and higher on conscientiousness than those who preferred spontaneous exercise. For exercise barriers, neuroticism was positively correlated and conscientiousness was negatively correlated with lack of energy, lack of motivation, and embarrassment while exercising.

There have been numerous studies that have examined the relationship between the theory of planned behavior, exercise, and personality (Courneya, Bobick, & Schinke, 1999; Rhodes, Courneya, & Bobick, 2002). In a study that investigated how personality moderates the theory of planned behavior, two significant moderating effects for intention to exercise were found (Rhodes, Courneya, & Bobick). More specifically, extraversion and conscientiousness moderated the effects of intention on behavior. Rhodes, Courneya, and Hayduck (2002) found replicated the previous study and found the same results. In another study that analyzed the relationship between exercise behavior, personality, and the theory of planned behavior it was found that extraversion and conscientiousness were positively related to exercise while neuroticism was negatively related to exercise (Courneya, Bobick, & Schinke, 1999). Additionally, it was found the relationship between extraversion and exercise were mediated by the theory of planned behavior.

In summary, the exercise and personality research has mostly examined the personality factors of extraversion and neuroticism, despite the fact that researchers have acknowledged the utility of the FFM, as operationalized by the

NEO, for explaining and predicting health behaviors (Digman, 1994; McAdams, 1994). Thus, further research is needed applying the NEO, in particular the 240-item NEO-PI-R because of its strong psychometric properties and the assessment of the facets within each domain, to examine the relationship between personality and exercise. Furthermore, the majority of the research has used unstandarized exercise measures when examining the relationship between personality and exercise (e.g., Arai, & Hisamichi, 1998; Autney, 1999; Bamber, Cockerill, & Carroll, 2000), despite the need to use standardized measure of exercise (USDHHS, 2000). Finally, gender differences are evident for both exercise behavior (Sallis & Owen, 1999) and personality (Costa & McCrae, 1992). That is, men exercise more than women (USDHHS, 2000), and women score higher on all personality domains compared to men (Costa & McCrae, 1992). Thus, further research examining the moderating effect of gender for the exercise and personality relationship is warranted.

There were three primary purposes of this study. The first primary purpose was to examine the relationship between the personality domains of the FFM and exercise behavior. Personality was assessed with the 240-item long version of the NEO (Costa & McCrae, 1992), and exercise was assessed with a standardized self-report measure (i.e., Leisure-Time Exercise Questionnaire). Based on previous research, it was hypothesized that extraversion and conscientiousness would be positively related, and neuroticism would be negatively related, to exercise; while agreeableness and openness would not be correlated with exercise (Courneya & Hellsten, 1998). The second primary purpose was to determine if preferences to exercise differed based on the personality domains. It was hypothesized that individuals high on extraversion would prefer to be in a supervised and group exercise session; that individuals high on conscientiousness would prefer high intensity exercise; and that individuals high on neuroticism would prefer low intensity exercise (Courneya & Hellsten). The third primary purpose was to examine the relationship between barriers-efficacy and personality. It was hypothesized that conscientiousness would be positively related, and neuroticism would be negatively related to barriers-efficacy (Courneya & Hellsten). The secondary purpose was to examine the moderating effect of gender for the three primary purposes. It was hypothesized that the women would score higher on all the personality domains than the men (Costa & McCrae), and the men would report more exercise than the women (USDHHS, 2000).

METHOD

Participants

Participants were 507 male and female university students (*M* age = 21.27, *SD* = 9.76; 52.3% male). Most of the participants were Caucasian (70.5%), followed by Hispanic (10.9%), African-American (8.8%), Asian (4.3%), and other (2.9%). For academic standing, 35.9% were seniors, followed by juniors (25.2%), sophomores (22.3%), freshman (11.5%), and graduate students (3.3%).

Measures

NEO-PI-R. The NEO-PI-R (Costa & McCrae, 1992) contains 240 statements representing the following five personality domains: neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness. Each of these five domains has six facets. The facets for each of the domains are: neuroticism (anxiety, angry hostility, depression, self-consciousness, impulsiveness, and vulnerability), extraversion (warmth, gregariousness, assertiveness, activity, excitement-seeking, and positive emotions), openness to experience (fantasy, aesthetics, feelings, actions, ideas, and values), agreeableness (trust, straightforwardness, altruism, compliance, modesty, and tender-mindedness), and conscientiousness (competence, order, dutifulness, achievement striving, self-discipline, and deliberation). The participants respond to each item on a 5-point scale anchored with strongly disagree (0) and strongly agree (4). The 48 items for each domain are added together to provide a total score for that personality domain. Higher scores represent more characteristics of that domain. The NEO has adequate reliability and validity (Costa & McCrae, 1992), and in this study the internal consistency reliabilities for the domains were: neuroticism (alpha = .83), extraversion (alpha = .80), openness (alpha = .74), agreeableness (alpha = .80), and conscientiousness (alpha = .82).

Leisure-Time Exercise Questionnaire (LTEQ). The LTEQ is a self-report measure that assesses the frequency of strenuous, moderate, and mild leisure-time exercise done for at least 20 minutes during a typical week (Godin, Jobin, & Bouillon, 1986). A total exercise index (weekly metabolic equivalents) is calculated by weighing the frequency of each intensity and summing for a total score using the following formula: 3(mild) + 5(moderate) +9(strenuous). The LTEQ is a reliable and valid measure of exercise behavior (Godin et al., 1986; Jacobs, Ainsworth, Hartman, & Leon, 1993).

Exercise Preferences. Similar to Courneya and Hellsten (1998), exercise preferences were assessed with nine questions pertaining to preferences related to exercise. Participants indicated their preferences for exercise intensity (high versus low), type of exercise (cardiovascular versus weight training), exercise company (alone versus in a group), rhythm of exercise (same versus continuously changing), gym preference (coed gym versus home), instruction type (directed by a fitness professional versus self-directed), and location (inside versus outside).

Barriers-efficacy Scale. The Barriers-efficacy Scale (McAuley & Mihalko, 1998) contains 12 items that assess people's level of confidence to exercise in the face of barriers on a 0% (no confidence at all) to 100% (completely confident) scale. The questionnaire was developed following Bandura's (1977) guidelines, and it assesses the ability to overcome social, personal, and environmental barriers to exercising (McAuley & Mihalko). Items include "I believe that I can exercise at least 3 times per week if I had to exercise alone" and""The instructor did not offer me any encouragement." The strength of barrier-efficacy is calculated by summing the percentages from the items and then dividing by 12. This scale has excellent psychometric properties (McAuley & Mihalko), and for this study an alpha of .85 was obtained.

Procedure

Participants were 515 volunteers from undergraduate classes at a large southeastern university in the United States. Permission was obtained from class instructors to administer the questionnaire to their students. The questionnaire took about 45 min to complete. Participants either completed the questionnaires during class or at home. Informed consent was obtained before the questionnaire was completed and extra credit was given to those who completed the questionnaire. Eight of the questionnaires were returned with missing data. The missing data were due to participants skipping an entire page of the NEO items. This resulted in more than 41 items being omitted on the NEO. Costa and McCrae (1992) recommended that participants who are missing 41 or more items on the NEO-PI-R be omitted from further analyses. Thus, based on their recommendations the eight questionnaires with partial information were not used for the data analysis. Thus, a return rate of 100% (515/515) was obtained, and a response rate of 98.84% (507/515) was obtained.

RESULTS

Gender Differences on the NEO-PI-R and Exercise Behavior

A one-way MANOVA revealed that the men and women (independent variable; IV) differed on the personality domains (dependent variable; DV) [Wilk's Lambda = .80, $F(5, 475) = 24.00$, $p < .01$]. Follow-up ANOVA's revealed that the women scored significantly higher than the men for extraversion [$F(1, 479) = 23.87$, $p < .01$], openness [$F(1, 479) = 17.93$, $p < .01$], agreeableness [$F(1, 479) = 66.57$, $p < .01$], and conscientiousness [$F(1, 479) = 5.16$, $p = .02$]. Neuroticism was nonsignificant [$F(1, 479) = 3.31$, $p = .07$]. For exercise behavior, a one-way ANOVA revealed that the men engaged in more total exercise than the women [$F(1, 484) = 12.97$, $p < .01$] (see Table 1).

Table 1

Mean and Standard Deviations for the NEO-PI-R, Leisure-Time Exercise Questionnaire (LTEQ), and Barriers-efficacy Questionnaire for the Total Sample, the Men, and the Women.

	Total Sample ($N = 471$) *M*	Men ($n = 255$) *M*	Women ($n = 237$) *M*
NEO-PI-R			
Neuroticism	81.02 ± 21.94	79.14 ± 20.56	83.02 ± 23.30
Extraversion	124.71 ± 20.69	120.19 ± 21.01	129.42 ± 19.31
Openness	116.67 ± 19.92	113.02 ± 19.23	120.77 ± 19.93
Agreeableness	116.85 ± 19.85	110.45 ± 19.12	123.75 ± 18.34
Conscientiousness	114.08 ± 19.57	112.10 ± 17.59	116.39 ± 21.35
LTEQ Total	49.94 ± 24.75	53.80 ± 27.35	45.79 ± 20.84
Barriers-efficacy	54.30 ± 16.64	55.94 ± 16.84	52.54 ± 16.27

Note: The women scored significantly higher than the men on the NEO-PI-R domains, and the men scored significantly higher than the women on the LTEQ Total.

Relationship Between the NEO-PI-R, Barrier-efficacy, and Exercise Behavior

Pearson correlations between the NEO-PI-R and the LTEQ total revealed positive relationships between extraversion and conscientiousness with exercise, and a negative relationship between agreeableness and exercise (see Table 2 and 3). Specifically, extraversion was positively related to exercise for the total sample and the women; conscientiousness was positively related to exercise for the total sample, the men, and the women; and agreeableness was negatively correlated with exercise for the total sample.

Table 2
Pearson Correlations Between the NEO-PI-R and Exercise Behavior for the Total Sample

Variable	1	2	3	4	5	6	7
1. Exercise	-	-.04	.09*	.05	-.1*	.13**	.42**
2. Neuroticism		-	-.34**	-.09	-.27**	-.29**	-.20**
3. Extraversion			-	.37**	.25**	.30**	.08
4. Openness				-	.18**	.02	.11*
5. Agreeableness					-	.25**	.00
6. Conscientiousness						-	.19**
7. Barriers-efficacy							-

Note: * $p < .05$; ** $p < .01$

Table 3
Pearson Correlations Between the NEO-PI-R, Barrier-efficacy, and Exercise Behavior for the Men and the Women

Variable	1	2	3	4	5	6	7
1. Exercise	-	.01	.12	.07	-.08	.13**	.34**
2. Neuroticism	-.07	-	-.43**	-.10	-.33**	-.45**	-.17**
3. Extraversion	.17**	-.32**	-	.39**	.29**	.43**	.08
4. Openness	.11	-.11	.30**	-	.18**	.12	.13*
5. Agreeableness	.01	-.30**	.07	.05	-	.28**	-.03
6. Conscientiousness	.19**	-.18**	.15*	-.12	.19**	-	.20**
7. Barriers-efficacy	.51**	-.21**	-.14**	.13*	.11	.22**	-

*Note: * $p < .05$; ** $p < .01$; The upper right portion represents the men data, and the lower left represents the women data.*

Multiple regressions for the total sample, the men, and the women were undertaken to determine if the personality domains (IV) predicted exercise behavior (DV; see Table 4). Analysis for the total sample revealed that agreeableness ($\beta = -.17$; $p < .01$) and conscientiousness ($\beta = .15$, $p = .01$) significantly predicted exercise behavior [$R^2 = .04$, $F(5, 458) = 4.14$, $p < .01$]. For the men, the personality domains did not predict exercise [$R^2 = .02$, $F(5, 235) = 1.94$, $p = .09$]. In comparison, for the women, conscientiousness ($\beta = .19$, $p < .01$) was a significant predictor of exercise [$R^2 = .07$, $F(5, 221) = 3.01$, $p = .01$].

Table 4
Predictive Ability of the NEO-PI-R for Exercise Behavior Using Hierarchical Multiple Regression

Sample	R^2	F	df	β	p
Total	.04	4.14	5, 458		.00
Neuroticism				-.02	.71
Extraversion				.06	.32
Openness				.06	.26
Agreeableness				-.17	.00
Conscientiousness				.14	.00
Men	.04	1.94	5, 235		.09
Neuroticism				.07	.40
Extraversion				.10	.24
Openness				.04	.55
Agreeableness				-.14	.06
Conscientiousness				.14	.07
Women	.07	3.01	5, 221		.01
Neuroticism				.01	.85
Extraversion				.12	.12
Openness				.11	.13
Agreeableness				-.04	.58
Conscientiousness				.19	.01

The NEO-PI-R and Exercise Preferences

For exercise intensity, a 2 (gender) x 2 (intensity: high/low) MANOVA was performed with the NEO-PI-R domains as the dependent variables. Because Box's Test of Equality of Covariance Matrices was significant ($p < .05$), Pillai's criterion was used (Tabachnick & Fidell, 2001). The MANOVA revealed a significant main effect for intensity [Pillai's trace = .07, $F(5, 471) = 7.19$, $p < .001$] and gender [Pillai's trace = .16, $F(5, 471) = 17.99$, $p < .001$], but not a significant interaction [Pillai's trace = .01, $F(5, 471) = .46$, $p = .81$]. Follow-up univariate ANOVA's revealed that the high intensity group reported more extraversion [$F(1, 475) = 19.95$, $p < .001$, $\omega^2 = .02$], openness [$F(1, 475) = 10.38$, $p = .001$, $\omega^2 = .02$], and conscientiousness [$F(1, 475) = 15.37$, $p < .001$, $\omega^2 = .03$] than the low exercise intensity group. In comparison, the low intensity group reported more neuroticism than the high intensity group [$F(1, 475) = 6.43$, $p = .01$, $\omega^2 = .01$]. For gender, the women scored higher than the men for extraversion [$F(1, 475) = 23.39$, $p < .01$, $\omega^2 = .04$], openness [$F(1, 475) = 21.00$, $p < .01$, $\omega^2 = .04$], agreeableness [$F(1, 475) = 49.80$, $p < .01$, $\omega^2 = .09$], and conscientiousness [$F(1, 475) = 5.98$, $p = .02$, $\omega^2 = .01$].

For type of exercise, a 2 (gender) x 2 (type: cardiovascular/weight training) MANOVA revealed significant a main effect for gender [Pillai's trace = .14, $F(5, 469) = 15.35$, $p < .01$]. The main effect for type of exercise [Pillai's trace = .01, $F(5, 469) = 1.10$, $p = .36$] and the interaction [Pillai's trace = .01, $F(5, 469) = 1.32$, $p = .26$] were not significant. Follow-up univariate analysis revealed that the women scored higher than the men for extraversion [$F(1, 473) = 15.85$, $p < .01$, $\omega^2 = .03$], openness [$F(1, 473) = 13.70$, $p < .01$, $\omega^2 = .03$], and agreeableness [$F(1, 473) = 36.84$, $p < .01$, $\omega^2 = .07$].

For exercise company, a 2 (gender) x 2 (company: alone/group) MANOVA revealed significant main effects for exercise company [Pillai's trace = .06, $F(5, 470) = 6.28$, $p < .01$] and gender [Pillai's trace = .20, $F(5, 470) = 23.83$, $p < .01$]; the interaction, however was nonsignificant [Pillai's trace = .01, $F(5, 470) = .77$, $p = .57$]. Follow-up univariate analysis for exercise company found that individuals preferring to exercise alone scored higher on neuroticism [$F(1, 474) = 5.92$, $p = .02$, $\omega^2 = .01$] and lower on extraversion [$F(1, 474) = 19.99$, $p < .01$, $\omega^2 = .04$] than those who preferred to exercise in a group. For gender, the women scored higher than the men for extraversion [$F(1, 474) = 30.38$, $p < .01$, $\omega^2 = .06$], openness [$F(1, 474) = 16.16$, $p < .01$, $\omega^2 = .03$], agreeableness [$F(1, 474) = 71.84$, $p < .01$, $\omega^2 = .13$], and conscientiousness [$F(1, 474) = 6.05$, $p = .01$, $\omega^2 = .01$].

For rhythm of exercise, a 2 (gender) x 2 (rhythm: repetitive/continuously changing) MANOVA revealed a significant main effect for gender [Pillai's trace = .14, $F(5, 472) = 15.46$, $p < .01$]. The main effect for rhythm [Pillai's trace = .02, $F(5, 472) = 1.89$, $p = .10$] and the interaction [Pillai's trace < .01, $F(5, 472) = .31$, $p = .91$] were nonsignificant. Follow-up univariate analyses revealed that the women scored higher than the men for extraversion [$F(1, 476) = 17.09$, $p < .01$, $\omega^2 = .03$] and openness [$F(1, 476) = 9.53$, $p < .01$, $\omega^2 = .02$].

Gym preference was analyzed using a 2 (gender) x 2 (gym preference: coed versus home) MANOVA. Results revealed a significant main effect for gym preference [Pillai's trace = .06, $F(5, 406) = 4.86$, $p < .00$] and gender effect [Pillai's trace = .05, $F(5, 406) = .15$, $p < .00$], but the interaction was nonsignificant [Pillai's trace = .02, $F(5, 406) = 1.76$, $p = .12$]. Follow-up univariate analysis revealed significant main effects for gym preference on neuroticism [$F(1, 410) = 11.33$, $p < .01$, $\omega^2 = .02$], extraversion [$F(1, 410) = 7.51$, $p < .01$, $\omega^2 = .02$], and conscientiousness [$F(1, 410) = 8.40$, $p < .01$, $\omega^2 = .02$]. That is, individuals who scored high on extraversion and conscientiousness preferred to exercise in a coed gym versus individuals who scored high on neuroticism preferred to exercise at home. For gender, the women scored higher than the men on extraversion [$F(1, 410) = 13.77$, $p < .01$, $\omega^2 = .03$], openness [$F(1, 410) = 10.27$, $p < .01$, $\omega^2 = .02$], agreeableness [$F(1, 410) = 37.78$, $p < .01$, $\omega^2 = .08$], and conscientiousness [$F(1, 410) = 37.78$, $p < .01$, $\omega^2 = .02$].

For instruction type, a 2 (gender) x 2 (instruction: instructor directed/self directed) MANOVA revealed a significant main effects for instruction type [Pillai's trace = .03, $F(5, 469) = 2.58$, $p = .03$], and gender [Pillai's trace = .17, $F(5, 469) = 19.45$, $p < .01$], but not a significant interaction [Pillai's trace = .001, $F(5, 469) = .13$, $p = .99$]. Follow-up univariate analysis for gender revealed the women scored higher than the men for extraversion [$F(1,473) = 17.13$, $p < .01$, $\omega^2 = .03$], openness [$F(1, 473) = 15.85$, $p < .01$, $\omega^2 = .03$], agreeableness [$F(1, 473) = 56.83$, $p < .01$, $\omega^2 = .10$], and conscientiousness [$F(1, 473) = 5.74$, $p = .02$, $\omega^2 = .01$]. Although the MANOVA indicated a significant main effect for exercise instruction, follow-up ANOVA's were nonsignificant.

Location preference was analyzed using a 2 (gender) x 2 (location preference: inside/ outside) MANOVA. Results revealed a significant gender main effect [Pillai's trace = .21, $F(5, 470) = 24.99$, $p < .01$]. The main effect for location preference [Pillai's trace < .01, $F(5, 470) = .30$, $p = .92$] and the interaction were nonsignificant [Pillai's trace = .01, $F(5, 470) = 1.17$, $p = .32$]. Follow-up univariate analysis revealed that

the women scored higher than the men on neuroticism [$F(1,474) = 4.31, p = .04, \omega^2 = .01$], extraversion [$F(1,474) = 22.56, p < .01, \omega^2 = .04$], openness [$F(1, 474) = 16.83, p < .01, \omega^2 = .03$], agreeableness [$F(1, 474) = 69.26, p < .01, \omega^2 = .13$], and conscientiousness [$F(1, 474) = 5.19, p = .02, \omega^2 = .01$].

The NEO-PI-R and Barriers-efficacy

For the total sample, barriers-efficacy was positively related to exercise behavior ($r = .42, p < .001$), openness ($r = .11, p = .01$), and conscientiousness ($r = .19, p < .01$). In comparison, barriers-efficacy was negatively correlated with neuroticism ($r = -.20, p < .01$). For the men, openness ($r = .13, p = .03$) and conscientiousness ($r = .20, p < .01$) were positively, and neuroticism was negatively ($r = -.17, p < .01$), correlated with barriers-efficacy. For women, barriers-efficacy was positively correlated with extraversion ($r = .14, p = .03$), openness ($r = .13, p = .04$), and conscientiousness ($r = .21, p < .01$), and negatively correlated with neuroticism ($r = -.21, p < .01$).

DISCUSSION

The general purpose of this study was to examine the relationship between personality and exercise behavior, preferences, and barriers-efficacy, and to examine if gender moderates these relationship. The first purpose of this study was to examine the relationship between the personality domains of the FFM and exercise behavior. Consistent with the hypothesis, extraversion and conscientiousness were positively correlated for the total sample, and gender moderated this relationship. That is, for men, only conscientiousness was positively related to exercise, while for women, extraversion and conscientiousness were positively related to exercise. Costa and McCrae (1992) describe conscientiousness as the active process of self-control, and they state that individuals who score high on conscientiousness are purposeful, strong-willed, and determined. Thus, individuals who are conscientiousness are likely to exercise because they are cognizant of their health and physical attributes. Individuals who score high on extraversion tend to be active and enjoy excitement and stimulation. Because exercise is a form of self-control and requires activity and stimulation, it is not surprising that extraversion and conscientiousness are positively related to exercise.

In contrast to the hypothesis, neuroticism was not significantly correlated with exercise behavior. Neuroticism was hypothesized to inhibit exercise due to its

disposition to emotional instability. That is, individuals high on neuroticism possess poorer coping skills and greater emotional reactivity during stress appraisal than those low on neuroticism (Gunthert et al., 1999). The hypothesized negative relationship, albeit nonsignificant, was found between neuroticism and exercise for the total sample and the women. The nonsignificant findings may be partially related to the elevated neurotocism scores evidenced in our sample compared to neuroticism scores traditionally reported for college-aged individuals (Costa & McCrae, 1992). In contrast to the prediction, agreeableness was negatively related to exercise behavior for the total sample only. Agreeableness assesses the inclination toward interpersonal trust and consideration of others. Individuals who score low on agreeableness are often egocentric (Costa & McCrae). Egocentrism could be displayed by given a priority to exercise and believing that exercise is done for the self (versus others). Further inquiry is needed to examine this possibility.

Finally, the results of the multiple regressions revealed that agreeableness and conscientiousness were significant predictors of exercise for the total sample, and these variables approached significance for the male sample. For the women, only conscientiousness was a significant predictor of exercise. Examination of the betas for these regressions revealed that conscientiousness was a positive predictor, while agreeableness was a negative predictor, of exercise behavior. A possible explanation for this finding is scoring high on conscientiousness would indicate an individual to be fastidious, punctual, and reliable (Costa & McCrae).

The second primary purpose of this study was to examine the relationship between exercise preferences and personality. For exercise intensity, it was found that individuals who scored high on extraversion, openness, and conscientiousness preferred to exercise at a high vs. a low exercise intensity. In comparison, those who scored high on neuroticism preferred low compared to high intensity exercise. Individuals high on openness prefer variety and they are open to novel ideas and unconventional values (Costa & McCrae, 1992). The preference for variety may lend an individual to attempt high intensity exercise. On the other hand, the preference for low intensity exercise for individuals scoring high on neuroticism may be due to the disruptive emotions they experience on a daily basis (Costa & McCrae), and the potential conflict of further emotions encountered with adding exercise.

For exercise company, those who scored high on neuroticism and low on extraversion preferred to exercise alone than in a group. Costa and McCrae (1992) stated that individuals who scored high on extraversion prefer large groups

compared to those scoring high on neuroticism. Individuals with high scores on neuroticism often experience negative affect, such as embarrassment and fear, which could be provoked when surrounded by other individuals. For gym preference, it was found that those who scored high on extroversion and conscientiousness preferred to exercise in a coed gym than at home. In comparison, those who scored high on neuroticism preferred to exercise at home than at a coed gym. No significant personality differences where found for type (cardiovascular vs. weight training), instruction (directed vs self-directed), and rhythm (same vs. continuous) preferences. Finally, gender did not moderate any of the preferences results.

The information gained about preferences and personality domains can be used in exercise prescription to increase the likelihood of participation and therefore adherence. For example, developing an exercise prescription for an individual who scores high on extraversion would include assigning them to exercise in a group and a high intensity workout. Additionally, investigating specific facets rather than only the domain may be helpful to pinpoint certain personality traits that may be effective to increase and understand exercise participation.

The third primary purpose was to examine the relationship between barriers-efficacy and personality. Consistent with the hypothesis, conscientiousness was positively related and neuroticism was negatively related to barriers-efficacy. Additionally, openness was also positively correlated to barriers-efficacy. Individuals who scored high on openness and conscientiousness have a greater self-efficacy to surmount barriers to exercise. In contrast, individuals who score high on neuroticism are less likely to exercise because of a low self-efficacy to overcome barriers to exercise. Thus, exercise interventions and prescriptions should consider the low exercise self-efficacy individuals who score high on neuroticism will have and compensate by assigning easy tasks to help increase self-efficacy.

The secondary purpose of this study was to examine the moderating effect of gender. Consistent with the hypothesis, the women reported higher scores on the personality domains than the men, and the men reported more exercise behavior than the women. An explanation for women scoring higher on the agreeableness domain than men may be that women are known to be more sympathetic and eager to help each other than men (Danko, 1992). In general, men are considered to be competitive which would lead to a low score on the agreeableness domain (Gill, 1998). Gender moderated the effect for the relationship between the NEO and exercise and barriers-efficacy. Further research is needed examining the effects that gender has on the personality and exercise

behavior. Gender, however, did not moderate the relationship between exercise preferences and the personality.

A few limitations of this research warrant mention and necessitate future research and replication. First, caution is warranted when generalizing these results to other populations besides university students. Second, the exercise measures used were self-report which can create a response bias (Krosnick, 1999). Third, the preferences assessed were not exhaustive (i.e., not all exercise preferences were assessed), and they were assessed dichotomously. For example, for exercise intensity preference participants selected between either high or low exercise intensity. This dichotomous choice excludes people's preference for moderate intensity level exercise. Lastly, due to the cross-sectional design cause and effect can not be established. Future research should use a prospective design to examine personality and exercise behavior and preferences. Furthermore, interventions could be tested to determine if the adherence rates improve based on personality-centered prescriptions. In conclusion, the FFM of personality provides useful information for exercise behavior, exercise preferences, and self-efficacy and can be useful in prescribing exercise prescriptions.

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