

## Feel Better But Exercise Less: An Examination of Exercise Enjoyment, Personality and Physical Activity in Young Adults

Debora R Baldwin<sup>1</sup>,  
Subimal Datta<sup>1</sup>,  
David R Bassett<sup>2</sup>,  
Brittany S Overstreet<sup>2</sup> and  
Pamela Schweighart<sup>3</sup>

### Abstract

The purpose of the present study was to examine aspects of personality and exercise enjoyment on physical activity levels in young adults. Fifty-three undergraduate students (22 males and 31 females) participated in this study. Participants were asked to complete surveys assessing exercise enjoyment, personality, and physical activity level. Participants were then asked to ride a bike for 30-minutes at a moderate intensity (at 65% maximal heart rate) to assess mood. Statistical analyses revealed that physical activity was strongly correlated with enjoyment of exercise. Highly physically active participants self-reported significantly less neuroticism and greater extraversion than less active participants. After the exercise bout, there was a significant improvement in mood, with more neurotic individuals reporting the greatest improvements. The findings observed in this study emphasize the need for mental health and fitness practitioners to develop exercise programs that address individual needs and encourage the enjoyment of exercise in order to promote well-being among young adults.

**Keywords:** Affect; Personality; Health behaviors; Mood; Physical activity

**Received:** December 11, 2015; **Accepted:** January 18, 2016; **Published:** January 29, 2016

### Background

Participation in regular exercise is associated with improved health and psychological well-being [1]. Thirty minutes of moderate-to-vigorous exercise per day will reduce an individual's risk for heart disease, diabetes, osteoporosis and some cancers [2, 3]. Exercise is routinely used as a treatment for some mental health problems (e.g., mild-to-moderate anxiety and depression) because of its mood enhancing properties [4, 5]. For example, Edman and colleagues [6] reported exercise frequency, regularity, and intensity to be negatively associated with depressive symptoms in college students. In a clinical sample, Craft and colleagues [7] compared two types of exercise programs (clinic-based or home-based) on physical activity levels and depressive symptoms in 32 female outpatients with depression. Both 3-month exercise programs were associated with reduction in depressive symptoms and increased physical activity. However, changes in body composition were not impacted by the interventions. Many individuals recognize the importance of participating regularly in an exercise program, however, compliance with public health recommendations for physical activity remains low [8, 9].

- 1 Department of Psychology, University of Tennessee, Knoxville, TN, USA
- 2 Department of Kinesiology, Recreation & Sport Studies, University of Tennessee, Knoxville, TN, USA
- 3 Blue Cross BlueShield of Tennessee, Chattanooga, TN, USA

**Corresponding author:** Subimal Datta  
Debora R Baldwin

✉ sdatta@utk.edu

Professor of Psychology and Anesthesiology,  
University of Tennessee, 1404 Circle Drive,  
301-B, Knoxville, TN 37996, USA.

**Tel:** 865-974-3639

✉ sdatta@utk.edu  
dbaldwin@utk.edu

Ph.D, Associate Professor, Department of  
Psychology, University of Tennessee, 1404  
Circle Drive, 303-H, Knoxville, TN 37996,  
USA.

**Tel:** 865-974-3357

**Citation:** Baldwin DR, Datta S, Bassett DR, et al. Feel Better But Exercise Less: An Examination of Exercise Enjoyment, Personality and Physical Activity in Young Adults. *Acta Psychopathol.* 2016, 2:1.

Within the college student population, approximately half of young adults meet the aerobic activity recommendations [10]. Moreover, research shows that physical activity levels decrease with age, and the greatest decline tends to occur between adolescence and young adulthood [11]. Health behaviors established in childhood, adolescence, and young adulthood can determine one's quality of life in old age [12]. Therefore,

it is of utmost importance to encourage young adults to adopt and maintain a physically active lifestyle in order to experience enhanced well-being later in life.

Research indicates that the barriers to participating in a regular exercise program are complex and include personal, environmental, and political determinants [13]. For college students, common barriers include lack of time, other priorities, no motivation, and fatigue [14]. Moreover, exercise is often associated with physical exertion and unpleasant sensations in non-exercisers [13]. Research shows that pleasurable affect is reduced when an individual exceeds the ventilatory threshold during an exercise bout [15]. For example, Ekkekakis and Lind [16] found that overweight women who volunteered to exercise on a treadmill at a speed that was 10% higher than their self-selected speed utilized a higher percentage of their peak aerobic capacity and responded with a gradual decrease in pleasure over time compared to their normal-weight counterparts. Regardless of the mode of exercise, people typically expect the beginning of a workout to be less enjoyable and more unpleasant than the rest of the workout [17]. This perception of exercise as less than enjoyable, in general, contributes to the public health problem of physical inactivity.

Exercise enjoyment is a psychological state that refers to feelings of pleasure, liking, and fun which is directly associated with the activity itself—exercise [18, 19]. Enjoyment is viewed as a proximal and immediate reward for being active [20]. According to the hedonic theory, people are motivated to engage in behaviors that bring them joy and to avoid behaviors that are associated with pain or displeasure [21]. Indeed, research shows that the enjoyment of exercise is predictive of participation in moderate to vigorous physical activity [22, 23]. For example, Williams and colleagues [24] found that higher baseline levels of perceived enjoyment increased a participant's physical activity level compared to participants who reported lower levels of baseline enjoyment of exercise. Recently, Williams and colleagues [25] found that affective experiences during a 10-min treadmill walk predicted increase physical activity participation 6 and 12 months later. Some researchers have posited exercise enjoyment or pleasure affect as the third ingredient of the exercise prescriptions, alongside effectiveness and safety [26]. Taken together, these findings indicate the importance of enjoyment as a key factor for exercise adoption and maintenance.

The examination of individual variability in the adoption and maintenance of an exercise program represents a paradigm shift within the field [26]. Personality is another variable that influences exercise behavior and may reflect systematic sources of variance that could lead to tailored interventions for enhanced exercise adherence. In the current study, we focused on personality traits that can potentially affect exercise enjoyment and physical activity levels. Based upon a host of factor-analytic and comparative studies regarding personality, one overarching taxonomy has emerged: The Big Five Model [27]. The Big Five taxonomy has been found to be robust, generalizable, and comprehensive in scope, which provides a framework to examine a host of psychological and behavioral outcomes [28-30]. The Big

Five traits of Extraversion (defined by such terms as sociable, fun-loving, friendly, and assertive), Agreeableness (defined by such terms as cooperative, polite, and trusting), Conscientiousness (defined by such terms as hardworking, ambitious, and preserving), Neuroticism (defined by such terms as insecure, self-conscious, nervous, and temperamental), and Openness to Experiences (defined by such terms as imaginative, broad interests and daring) were assessed in relation to self-reported exercise enjoyment and physical activity levels.

Out of the Big Five personality dimensions, extraversion and neuroticism are primarily associated with trait and state affect [31]. On the other hand, conscientiousness has been found to be associated with trait positive affect [32]. Among the robust findings in the literature regarding the Big Five traits are the positive associations between neuroticism and extraversion, and negative associations of conscientiousness with smoking and alcohol consumption [33]. These three personality dimensions have also been examined with respect to exercise adherence. In a meta-analysis by Rhodes and Smith [34] they found extraversion and conscientiousness to be positively related to physical activity. However, neuroticism was negatively related to physical activity. Similarly, Saklofske and colleagues [35] examined the association between the broad personality dimensions of the Big Five with attitudes towards exercise and self-reported exercise behavior in college students. In their findings, neuroticism was negatively associated with positive attitudes to exercise. However, exercise behavior was positively associated with extraversion. Collectively, these findings suggest that out-going and self-disciplined individuals are more likely to perform exercise than individuals who are predisposed to emotionally unstable and distressing tendencies.

In a study examining exercise enjoyment as a function of personality, Lochbaum and Lutz [36] found that participants who enjoyed the exercise session (30-minutes of step aerobics) self-reported less neuroticism and greater conscientiousness than those who did not enjoy the exercise bout. However in their study, the enjoyment of exercise was in relation to a specific exercise mode that may not have reflected an individual's general enjoyment for exercise. The mode of exercise can be a limiting factor that can influence the affective responses in particular. For example, Parfitt and Gledhill [37] examined the effect of exercise mode (high-preference vs low-preference) on affect and ratings of perceived exertion in adults engaged in 20 min of exercise. Compared to the high-preference condition, the low-preference exercise mode was associated with greater levels of fatigue and psychological distress. With regard to dispositional differences [38] posits that the matching of certain personality characteristics (e.g., telic dominant) would likely optimize enjoyment and competitive success in sports, while mismatching these characteristics would most likely produce frustration and failure. In the current study, participants were asked to exercise on a cycle ergometer. According to Page and colleagues [39], riding a bike is a very common form of exercise which recruits less body muscle mass and yields a more regular breathing pattern compared to treadmill work or step aerobics.

Research consistently shows that a primary benefit of physical

activity is mood enhancement [1]. Higher levels of physical activity are inversely correlated with risk of developing mood disorders [40]. In an earlier study, Russell and colleagues [41] randomly assigned college students to one of three exercise conditions: exercise while reading, exercise while watching TV or a control group. All participants exercised on a cycle ergometer for 25 min at a moderate intensity. Pre and post-test measures of mood were assessed. They found exercise improved mood from pre to post-test measures for all groups. Moreover, they concluded that the enjoyable characteristics of the distraction (reading and watching TV) were important considerations in the exercise mood enhancement relationship.

## Study Objective and Hypotheses

Although cognitive health peaks during young adulthood [42], the percentage of college students who report experiencing psychological distress, depression, and anxiety has greatly increased over the past ten years [43]. Moreover, many college students regularly engage in unhealthy behaviors, placing them at risk for developing serious health problems later in life [44]. Lee and Yuen Loke [45] examined physical and psychosocial well-being in a sample of Hong Kong university students. They defined health responsibility as the tendency to be proactive about one's health. They measured this construct in terms of the percentage of students who engaged in health related behaviors such as inspecting their bodies for physical changes/danger signs, getting a second medical opinion, or seeking information from health professionals. They found very few students (17%) reported a sense of health responsibility, and even less participated regularly in an exercise program (14%). Systematic investigations which identify the factors associated with individual variability in the adoption and maintenance of an exercise program are lacking [46]. In the current study, we examined individual differences in physical activity as a function of general enjoyment of exercise and personality. Also in the current study, participants were asked to engage in an acute exercise bout. Although there is growing recognition that exercise can influence mood states, data are limited regarding the effect of exercise on mood states as a function of personality.

Consistent with the hedonic theoretical framework, we hypothesized the following: 1) physical activity levels (low active, moderately active & highly active) would be positively related with enjoyment of exercise, 2) the personality traits of extraversion and conscientiousness would be positively associated with levels of physical activity, 3) neuroticism would be negatively associated with physical activity levels, and the more neurotic individuals would self-report less enjoyment of exercise, and 4) the exercise bout would facilitate an increase in positive mood for all participants.

## Method

### Participants

Participants were 53 undergraduate students who were enrolled in introductory psychology classes at the university, and they all received extra credit for their service. The majority of the participants were Caucasian (77.4%), and the mean age was 21.83

( $SD=3.30$ ) years. Twenty-two participants were male (41.5%), and 31 were female (58.5%). The average body mass index (BMI) was 23.8 ( $SD=4.07$ )  $\text{kg}/\text{m}^2$  which is classified as being in the normal weight range. Based on the results of the International Physical Activity Questionnaire (IPAQ), 11 participants (20.8%) were classified as low active, 20 (37.7%) were classified as moderately active, and 22 (41.5%) of the participants were classified as highly active ([www.ipaq.ki.se](http://www.ipaq.ki.se)).

Although exclusion criteria (resting BP greater than 150/90 mm Hg, self-reported use of steroids within the past month, or answering "yes" to any item on the exercise readiness survey) were put in place to safeguard participants, they did not have to be applied in the current study. No one was excluded from participating in this study. Written informed consent was obtained, and the university's Institutional Review Board (IRB) approved the study.

## Measures

### Demographic sheet

The demographic sheet included items that asked participants about their age, gender, ethnicity, and medications.

### Exercise enjoyment

The Physical Activity Enjoyment Scale (PACES) developed by Kendzierski and DeCarlo [47] was used to measure "general" enjoyment in physical activity. It consists of 18 items (e.g. "I feel bored" or "It is very exciting"), and the responses are collected on a Likert-type scale whose score ranges between 1 (totally disagree) to 7 (totally agree). Internal consistency was found to be 0.92, and construct validity was demonstrated by Molt and colleagues [48].

### Personality

To measure the five factors of personality, the NEO-Five Factor Inventory (NEO-FFI) was used [49]. This inventory consists of 60 items rated on a scale from 0 (strongly disagree) to 4 (strongly agree). The NEO-FFI examines the five broad personality traits of *Neuroticism* (e.g. "I am not a worrier"), *Extroversion* (e.g., "I laugh easily"), *Openness to Experiences* (e.g. "I often try new and foreign foods"), *Agreeableness* (e.g., "I try to be courteous to everyone I meet") and *Conscientiousness* (e.g. "I keep my belongings clean and neat"). Each of these five personality dimensions are scored by summing 12 items. Higher scores in each category reflect an individual's tendency for that particular trait. This scale is commonly used in psychological research, and past research supports its reliability and validity as a self-report measure [50].

### Physical activity

The IPAQ was used to assess each participant's level of activity. It consists of seven items (e.g., "During the last 7 days, on how many days did you do vigorous physical activities like heavy lifting, digging, aerobics, or fast bicycling?"). The IPAQ has been validated in a study that spanned 21 countries [51]. Following the scoring instructions ([www.ipaq.ki.se](http://www.ipaq.ki.se)), participants were classified as low active ( $\leq 600$  MET-min/week), moderately active ( $\geq 600$

MET-min/week), or highly active ( $\geq 3000$  MET-min/week).

### Physical activity readiness (PAR-Q)

This instrument was used to assess the participants' ability to safely complete the exercise portion of the study [52]. It consists of seven yes/no items that determine whether or not an individual is in need of a medical exam prior to increased physical activity involvement (e.g. Do you feel pain in your chest when you do physical activity?).

### Mood

The Exercise-Induced Feeling Inventory (EFI) was used to assess mood state before and after the exercise portion [53]. It consists of 12-items that measure four distinctive mood states: revitalization, tranquility, positive engagement, and physical exhaustion. The scale was designed for use with exercise and has participants rate how strongly they are experiencing a given feeling (e.g. refreshed, calm, happy) on a scale from 0-do not feel to 4- feel very strongly. Internal consistency ranges from 0.72 to 0.91 [53].

### Exercise test

A stationary bicycle (Monark, model 818E, Varburg Sweden) was used for the exercise portion of the study. The bicycle seat height was adjusted for each participant so that there was a slight bend in the knee when the pedal was at the bottom of the pedal stroke. The work rate was kept at a moderate intensity (corresponding to 65% of the participant's maximal HR) by constantly monitoring heart rate using a Polar HR monitor. The average HR was 129.6 bpm ( $SD=10.6$ ), and all participants were able to maintain this moderate intensity throughout the exercise bout.

An automatic blood pressure (BP) monitor was used to measure each participant's BP (Omron BP monitor, Model CVSBPAUTO). An electronic HR monitor was used to obtain measurements every five minutes during the exercise portion of the study using a Polar monitor (model A1).

### Procedure

The data were collected during the morning hours, and a group setting was not employed. Participants were asked to refrain from eating, drinking, or smoking at least one hour prior to the study. They were also asked to wear exercise clothing and bring a water bottle with them. After participants arrived to the Applied Physiology Laboratory, written informed consent was obtained.

Prior to the exercise bout, participants were administered the PAR-Q, and BP was also taken at this time. Participants then completed the survey packet that included the demographic sheet, PACES, IPAQ and the EFI. With regard to the PACES, we

were interested in an individual's enjoyment of exercise in general, rather than enjoyment of a specific exercise bout. After completion of the packet, participants were fitted for HR monitor and their water bottles were filled. The exercise portion of this study included a 30-minute bike ride with a 5-minute warm-up and a 5-minute cool-down. HR was recorded every five minutes. All participants were instructed to keep their HR at a moderate intensity (65% of  $HR_{max}$ ). All participants were able to complete the exercise protocol. After the completion of the exercise bout, participants rested for five minutes. Post-exercise all participants were asked to complete another EFI and the NEO-FFI. Research shows that the Big Five personality dimensions tend to be stable over time [28, 54], and therefore personality measures were administered after the exercise bout.

### Statistical Analysis

Data analyses were computed using SPSS version 21 (Cary, NC). To examine associations between variables, the data were subjected to correlational analyses. To determine differences between groups (e.g. activity levels), an analysis of variance (ANOVA) or Student's t-test was performed. Effect size was calculated to determine the meaningfulness of the results. The alpha level was set at 0.05.

### Result

#### Physical activity levels and enjoyment of exercise

The means and standard deviations (SD) for the study variables are presented in **Table 1**. As expected, there was a strong, positive correlation between physical activity levels and enjoyment of exercise ( $r=0.682$ ,  $p<0.001$ ). A one-way ANOVA revealed a significant difference between physical activity levels  $F(2, 50) = 23.23$ ,  $p<0.001$ . Turkey post hoc analysis indicated that

**Table 1** Means and standard deviations for study variables (N=53).

Variables	Mean	SD
PA (hrs/wk)	15.99	10.83
Enjoyment	97.55	16.19
Neuroticism	33.13	5.76
Extraversion	44.55	3.33
Conscientiousness	43.37	5.39
Agreeableness	44.49	5.89
Openness	38.69	6.25
Positive Engagement $\Delta$	.35	1.78
Revitalization $\Delta$	1.06	2.74
Tranquility $\Delta$	-.31	2.53
Physical Exhaustion $\Delta$	-.98	2.99

**Table 2** Means and standard deviations of physical activity levels as a function of enjoyment and personality (N=53).

Variables	Neuroticism	Extraversion	Conscientious	Enjoyment
Low Active	37.18 (8.90)	41.18 (6.78)	43.36 (10.74)	77.27 (14.65)**
Moderately Active	32.70 (10.01)	43.40 (4.79)	42.20 (8.89)	96.90 (11.96)
Highly Active	29.27 (7.10)*	46.32 (4.45)*	45.77 (5.56)	107.73 (10.82)

Note:  $p<0.05^*$ ;  $p<0.01^{**}$

low active participants enjoyed exercise less than moderately active ( $p<0.001$ ,  $d=1.47$ ) and highly active participants ( $p<0.001$ ,  $d=2.37$ ). Moderately active participants indicated that they enjoyed exercise less than highly active participants ( $p<0.015$ ,  $d=0.95$ ) (Table 2).

### Personality data analyses

The personality data were treated as a continuous variable and subjected to correlational analyses. These results are presented in Table 3. With regard to physical activity levels, we found significant relationships between neuroticism and physical activity ( $r=-0.378$ ,  $p<0.005$ ), as well as extraversion and physical activity ( $r=0.384$ ,  $p<0.004$ ). As expected, neuroticism was associated with less physical activity, while extraversion was associated with greater physical activity. With regard to the enjoyment of exercise, only extraversion was positively associated with the enjoyment of exercise ( $r=0.449$ ,  $p<0.001$ ). Therefore, individuals who scored higher on extraversion also tended to self-report greater enjoyment for exercise.

In terms of mood, personality was correlated with changes in mood scores from pre-test to post-test. We found neuroticism and revitalization ( $r=0.339$ ,  $p<0.015$ ) to be positively related, as well as a positive association between neuroticism and tranquility ( $r=0.323$ ,  $p<0.021$ ). Thus, individuals who scored higher on neuroticism tended to self-report greater improvement in mood with exercise. Also, the analysis revealed a negative association between conscientiousness and revitalization ( $r=-0.497$ ,  $p<0.000$ ). This is an unexpected finding and suggests that individuals who tend to score higher on conscientiousness also self-reported reduced energy levels with exercise.

### Acute exercise and mood

It was hypothesized that participants would show improvements in mood after the exercise bout. Dependent t-tests were performed, and the results indicated partial support for this hypothesis. Revitalization increased significantly after the bike ride,  $t(1, 50) = -2.75$ ,  $p=0.008$ ,  $d=0.43$ , indicating that participants

**Table 3** Correlations for enjoyment of exercise and physical activity level as a function of personality (N=53).

Variables	Enjoyment of Exercise	Physical Activity
Neuroticism	-0.198	-0.378**
Extraversion	0.449**	0.384**
Conscientiousness	0.139	0.064
Agreeableness	0.090	-0.134
Open to Experience	-0.087	-0.060

Note: \* $p<0.05$ ; \*\* $p<0.01$

**Table 4** Mood states means and standard deviations for exercise bout (N=53).

Variables	Pre-Exercise	Post-Exercise
Positive Engagement	7.45 (2.18)	7.80 (2.42)
Revitalization**	6.43 (2.49)	7.49 (2.40)
Tranquility	8.63 (2.47)	8.31 (2.15)
Physical Exhaustion*	4.37 (2.98)	3.39 (2.59)

Note: \* $p<0.05$ ; \*\* $p<0.01$

felt refreshed and invigorated after the exercise bout. Likewise, physical exhaustion decreased significantly from pre-exercise to post-exercise bouts  $t(1, 50) = 2.34$ ,  $p=0.023$ ,  $d=0.35$ , showing that participants felt less tired and fatigued after the bike ride (Table 4).

### Discussion

We tested the hypotheses that exercise enjoyment and The Big Five personality dimensions were associated with physical activity levels. We expected the physical activity levels to be positively related with the enjoyment of exercise and the personality dimensions of extraversion and conscientiousness. In addition, we hypothesized that more neurotic individuals would report less enjoyment of exercise and be less physically active. Our hypotheses were partially supported. Moreover, there was a strong relationship between exercise enjoyment and physical activity levels. Participants who self-reported greater enjoyment of exercise were more physically active and more extraverted than their sedentary counterparts. However, neuroticism and conscientiousness were not significantly associated with the enjoyment of exercise in the current study.

Consistent with hedonic theory, we found that individuals scoring higher on enjoyment from exercise reported the greatest levels of physical activity. Our finding is consistent with past research [23, 25, 55] that found exercise enjoyment was associated with increased physical activity levels. However, it is important to note that we found a dose-response regarding exercise enjoyment and physical activity levels. Even moderately active participants reported greater enjoyment of exercise compared to the sedentary group. According to Mochon et al [56], repeated behaviors such as religious practice and exercise provide a small boost to well-being, and can produce a cumulative positive impact over time. Frequently engaging in an exercise program can generate positive outcomes, and may lead to an increase in enjoyment of exercise. The current study does not lend itself to determining causality, and further studies are needed to tease apart this relationship.

In terms of personality, extraversion was positively related to self-reported physical activity levels and exercise enjoyment. Likewise, highly active participants tended to self-report less neuroticism. It is not surprising that extraverted individuals would report greater enjoyment of exercise and greater physical activity levels. Extraverts tend to seek out sensory stimulations, and exercise/sports provide an excellent outlet for these tendencies [34]. However, high levels of extraversion have also been linked with increased engagement in deleterious health behaviors (e.g., increased smoking, consumption of alcohol and less sleep) particularly in young adults [57]. According to Eysenck and Eysenck [58], extraverts are more impulsive and sociable and use risky behaviors to achieve a desired arousal level. It is plausible that these individuals seek out physical activity not for the health benefits, but for the social benefits (e.g., social support, need to belong, and social networking). Most social scientist agree that the social environment in which individuals live influences behavior by providing or not providing opportunities to engage in particular behaviors and placing restraints on individual choice [59]. Future studies are needed to tease apart the social

influences associated with physical activity and enjoyment of exercise as a function of personality.

Our findings are similar to Lochbaum and Lutz [36] who reported that highly physically active participants self-reported less neuroticism. It is plausible that neurotic individuals may find exercise to be too stressful, and thus avoid the activity [60]. However, unlike Lochbaum and Lutz [36], we did not find a significant relationship between exercise enjoyment and conscientiousness. Growing evidence indicates that conscientious individuals tend to be more self-disciplined, informed, and resourceful; they also tend to avoid engaging in health risk behaviors [33, 57]. It is plausible that this difference is due in part, to gender. For example, cross-cultural studies [61] examining sex differences in personality traits have found women to score higher on conscientiousness than men. Unlike the Lochbaum and Lutz [36] study, whose sample was all female, almost half of our participants (41.5%) were male. Clearly, more work is needed in this area.

In the current study, some mood changes were found post-exercise. Regardless of physical activity levels, participants generally reported improvement in positive mood states after the bike ride. This finding is well-supported in the literature [53, 62, 63]. An intriguing finding reported here is that participants scoring higher in neuroticism reported the greatest improvement in mood from pre- to post-exercise bout.

It is likely that the neurotic individuals are not used to participating in exercise and their enhanced improvement in mood, compared to extraverts, reflects this phenomenon. From a physiological perspective, highly physically active individuals (e.g. athletes) tend to have a blunted stress response compared to more sedentary individuals [64]. Similarly, neurotic individuals tend to be more psychologically reactive to emotional events compared to emotionally stable individuals [65]. Nevertheless, our finding suggests that increases in pleasant mood, as a result of a single exercise bout, may not be the catalyst for adopting a physically active lifestyle. It must be noted that the current study also found that individuals who scored higher on conscientiousness tended to self-report less energy and vigor post exercise. Future work should focus on examining the affective-arousal responses to exercise in relation to dispositional traits.

## Limitation

Overall, the current study found physical activity levels were associated with enjoyment of exercise and personality traits. Likewise, individuals who self-reported greater neuroticism also reported the most improvement in mood. However, there are limitations with regard to our findings. First, this was a cross-sectional study; one cannot make causal statements with regard to exercise enjoyment or personality constructs and physical activity level. Further studies are needed to uncover the casual determinants associated with the study variables. Second, self-report measures were used to assess levels of physical activity. It must be noted that our study relied upon self-report data which is the most basic type of inquiry aimed at examining the associations between variables. The tendency for people to present favorable images of themselves on survey instruments is well documented. Although the current study did not use a

social desirability scale to detect this bias, research shows that this bias is more of a concern when examining socially sensitive items [66]. The Five Factor rating scale used in the current study controls for acquiescence and socially desirable responding [28]. However, a social desirability measure is warranted for future studies. Moreover, the current study incorporated single-items scales in order to reduce the participant's burden associated with multiple-item scales. Although Loo [67] found that single-item scales can demonstrate meaningful reliability estimates, future studies would benefit from the use of multiple-item scales in regards to the current study variables.

Although the Exercise-Induced Feeling Inventory [53] was designed to assess mood states as a function of exercise, psychometric deficiencies have been noted [68]. However in a recent study, exercise attendance was positively related to revitalization and negatively related to exhaustion among sedentary adult women [69]. Assessing affective states during the exercise with an instrument which measures subjective experiences along a variety of dimensions is warranted. In addition, future studies should assess physical activity using objective measures (e.g. wearable activity monitors).

Thirdly, the majority of the participants in the current study were Euro-Americans. Further research is needed to determine the impact of enjoyment and personality on physical activity in a more diverse young adult sample. Finally, the data were collected in a laboratory setting, and this may have influenced our findings. Research shows that environmental setting influences affective responses to exercise with more favorable changes in affective responses associated with outdoor activity [55, 70].

## Clinical Implication

Previous studies have contributed greatly to our understanding of the importance of physical activity on health and well-being. Our findings lend support to previous research illustrating a positive relationship between physical activity level and exercise enjoyment. The novel findings from the current study suggest that neurotic and sedentary young people are more likely to experience greater improvements in mood with exercise but are less likely to adopt or participate regularly in an exercise program. These findings have clinical implications. From a mental health perspective, practitioners who frequently use exercise as an adjunctive therapy must emphasize the immediate and short-term mood enhancing properties associated with physical activity to their clients. Our findings also suggest that enjoyment is a positive affective element that will encourage participation in an exercise program, and the enjoyment of exercise itself should be a therapeutic outcome.

## Conclusion

In summary, engaging in exercise on a regular basis remains challenging for many individuals. During the college years, there are a number of barriers to establishing and maintaining a regular exercise program. In the current study, we found enjoyment of exercise and personality to be key factors associated with physical activity in this sample. Our findings demonstrate that

people vary widely in their enjoyment of exercise and personality types. Moreover, these psychological variables are correlated with physical activity. The findings from the present study should help practitioners recognize the major role that enjoyment and individual variability play in behavioral decision-making regarding the adoption and maintenance of an exercise program.

## Acknowledgement

Gratitude is expressed to Drs. Dixie Thompson and Jeffrey Fair brother for their help with the study design and also providing feedback on previous versions of this manuscript.

## References

- 1 Taylor SE (2012) *Health Psychology*. New York, NY: McGraw-Hill.
- 2 Physical Activity Guidelines Advisory Committee (2008) *Physical Activity Guidelines Advisory Committee Report*. Washington, DC: U.S. Department of Health and Human Services.
- 3 Warburton DER, Nicol CW, Bredin SSD (2006) Health benefits of physical activity: The evidence. *Can Med Assoc J* 174: 801-809.
- 4 Herman S, Blumenthal JA, Babyak M, Khatri P, Craighead WE, et al. (2002) Exercise therapy for depression in middle-aged and older adults: Predictors of early dropout and treatment failure. *Health Psychol* 21: 553-563.
- 5 Stathopoulou G, Powers MB, Berry AC, Smits JA, Otto MW (2006) Exercise interventions for mental health: A quantitative and qualitative review. *Clin Psychol Sci Practice* 13: 179-193.
- 6 Edman JL, Lynch WC, Yates A (2014) The impact of exercise performance dissatisfaction and physical exercise on symptoms of depression among college students: A gender comparison. *The J Psychol* 148: 23-35.
- 7 Craft LL, Freund KM, Culpepper L, Perna FM (2007) Intervention study by exercise for depressive symptoms in women. *J Women's Health* 16: 1499-1509.
- 8 Troiano RP, Berrigan D, Dodd KW, Masse LC, Tilert T, et al. (2008) Physical activity in the United States measured by accelerometer. *Med Sci Sports Exerc* 40: 181-188.
- 9 U.S. Department of Health and Human Services (2013) One in five adults meet overall physical activity guidelines. Centers for Disease Control and Prevention.
- 10 American College Health Association (2013) *American College Health Association National College Health Assessment II: Reference Group Executive Summary Spring 2013*. Hanover, MD: American College Health Association.
- 11 Sallis JF (2000) Age-related decline in physical activity: A synthesis of human and animal studies. *Med Sci Sports Exerc* 32: 1598-1600.
- 12 Buckworth J (2001) Exercise adherence in college students: Issues and preliminary results. *Quest* 53: 335-345.
- 13 Lovell GP, Ansari WE, Parker JK (2010) Perceived exercise benefits and barriers of non-exercising female university students in the United Kingdom. *Int J Environ Res Public Health* 7: 784-798.
- 14 Ebben W, Brudzynski L (2008) Motivations and barriers to exercise among college students. *J Exerc Physiol online* 11: 1-11.
- 15 Ekkekakis P, Hall EE, Petruzzello SJ (2008) The relationship between exercise intensity and affective responses demystified: To crack the 40-year-old nut, replace the 40-year-old nutcracker! *Ann Behav Med* 35: 136-149.
- 16 Ekkekakis P, Lind E (2006) Exercise does not feel the same when you are overweight: The impact of self-selected and imposed intensity on affect and exertion. *Int J Obese* 30: 652-660.
- 17 Ruby MB, Dunn EW, Perrino A, Gillis R, Viel S (2011) The invisible benefits of exercise. *Health Psychol* 3: 67-74.
- 18 Kimiecik JC, Harris T (1996) What is enjoyment? A conceptual/definitional analysis with implications for sport and exercise psychology. *J Sport Exerc Psychol* 18: 247-263.
- 19 Raedeke TD (2007) The relationship between enjoyment and affective responses to exercise. *J Appl Sport Psychol* 19: 105-115.
- 20 McArthur LH, Raedeke TD (2009) Race and sex differences in college student physical activity correlates. *Am J Health Behav* 33: 80-90.
- 21 Kahneman D (1999) *Objective happiness in well-being: The foundation of hedonic psychology*. Edited by Kahneman D, Diener E & Schwartz N. New York, NY: Russell-Sage: 4-25.
- 22 Salmon J, Owen N, Crawford D, Bauman A, Sallis JF (2003) Physical activity and sedentary behavior: A population-based study of barriers, enjoyment, and preference. *Health Psychol* 22: 178-188.
- 23 Vallerand JR, Young BW (2014) Are adult sportspersons and exercisers that different? Exploring how motives predict commitment and lapses. *Int J Sport Exerc Psychol* 12: 339-356.
- 24 Williams DM, Papandonatos GD, Napolitano MA, Lewis BA, Whiteley JA, et al. (2006) Perceived enjoyment moderates the efficacy of an individually tailored physical activity intervention. *J Sport Exerc Psychol* 28: 300-309.
- 25 Williams DM, Dunsiger S, Jennings EG, Marcus BH (2012) Does affective valence during and immediately following a 10-min walk predict concurrent and future physical activity? *Ann Behav Med* 44: 43-51.
- 26 Ekkekakis P, Hargreaves EA, Parfitt G (2013) Invited Guest Editorial: Envisioning the next fifty years of research on the exercise-affect relationship. *Psychol Sport Exerc* 14: 751-758.
- 27 Lounsbury JW, Saudargas RS, Gibson LW (2004) An investigation of personality traits in relation to intention to withdraw from college. *J Coll Student Dev* 45: 517-534.
- 28 Costa PT, McCrae RR (1988) Personality in adulthood: A six-year longitudinal study of self-reports and spouse ratings on the NEO Personality Inventory. *J Pers Soc Psychol* 54: 853-886.
- 29 De Raad B (2000) The Big Five personality factors: The psycholexical approach to personality. Seattle, WA: Hogrefe & Huber.
- 30 Digman JM (1990) Personality structure: Emergence of the five-factor model. *Annu Rev Psychol*. 41: 417-40.
- 31 Costa PT Jr, McCrae RR (1980) Influence of extraversion and neuroticism on subjective well-being: Happy and unhappy people. *J Pers Soc Psychol* 38: 668-678.
- 32 Watson D, David J, Suls J (1999) Personality, affectivity, and coping. In C.R. Snyder (Ed), *Coping: The psychology of what works*. New York, NY: Oxford University Press: 119-140.
- 33 Vollrath M, Torgersen S (2002) Who takes health risks? A probe into eight personality types. *Pers Individ Dif* 32: 1185-1197.
- 34 Rhodes RE, Smith NEI (2006) Personality correlates of physical activity: A review and meta-analysis. *Br J Sports Med* 40: 958-965.
- 35 Saklofske DH, Austin EJ, Rohr BA, Andrews JJW (2007) Personality, emotional intelligence and exercise. *J Health Psychol* 12: 937-948.
- 36 Lochbaum MR, Lutz R (2005) Exercise enjoyment and psychological responses to acute exercise: The role of personality and goal cognitions. *Individ Dif Res* 3: 153-161.
- 37 Parfitt G, Gledhill C (2004) The effect of choice of exercise mode on psychological responses. *Psychol Sport Exerc* 5: 111-117.
- 38 Svebak S (1999) Links between motivational and biological factors in sport: A review. In J.H. Kerr (Ed.), *Experiencing sport: Reversal theory*. Wiley: Chichester.
- 39 Page E, Cohen-Solal A, Jondeau G, Douard H, Roul G, et al. (1994) Comparison of treadmill and bicycle exercise in patients with chronic heart failure. *Chest* 106: 1002-1006.



- 40 Pasco JA, Williams LJ, Jacka FN, Henry MJ, et al. (2011) Habitual physical activity and the risk for depressive and anxiety disorders among older men and women. *Int Psychogeriatr* 23: 292-298.
- 41 Russell W, Pritschet B, Frost B, Emmett J, Pelley TJ, et al. (2003) Comparison of post-exercise mood enhancement across common exercise distraction activity. *J Sport Behav* 26: 368-383.
- 42 Salthouse TA, Davis HP (2006) Organization of cognitive abilities and neuropsychological variables across the lifespan. *Develop. Rev.* 26: 31-54.
- 43 Roberts KC, Danoff-Burg S (2010) Mindfulness and health behaviors: Is paying attention good for you? *J. Am Coll Health* 59: 165-17.
- 44 Lowry R, Galuska DA, Fulton JE, Wechsler H, Kann LM, et al. (2000) Physical activity, food choice, and weight management goals, and practices among US college students. *Am J Prev Med* 18: 18-27.
- 45 Lee RLT, Yuen Loke AJT (2005) Health-promoting behaviors and psychosocial well-being of university students in Hong Kong. *Pub Health Nurs* 22: 209-220.
- 46 De Geus EJC, de Moor MHM (2008) A genetic perspective on the association between exercise and mental health. *Ment Health Phys Act* 1: 53-61.
- 47 Kendzierski D, DeCarlo K (1991) Physical activity enjoyment scale: Two validation studies. *J Sport Exerc Psychol* 13: 50-64.
- 48 Motl RW, Dishman RK, Saunders RP, Dowada M, Felton G, et al. (2001) Measuring enjoyment of physical activity in adolescent girls. *Am J Prev Med* 21: 110-117.
- 49 Costa PT, Jr, McCrae RR (1992) Revised NEO personality inventory and NEO five-factor inventory; Professional manual. Odessa, FL: Psychological Assessment Resources.
- 50 McCrae RR, Terracciano A (2005) Personality Profiles of Cultures Project: Universal features of personality traits from the observer's perspective: Data from 50 cultures. *J Pers Soc Psychol* 88: 547-61.
- 51 Craig CL, Marshall AL, Sjostrom M, Bauman AE, Booth ML, et al. (2003) International physical activity questionnaire: 12-country reliability and validity. *Med Sci Sports Exerc* 35: 1381-1395.
- 52 Thomas S, Reading J, Shephard RJ (1992) Revision of the physical activity readiness questionnaire (PAR-Q). *Can J Sport Sci.* 17: 338-345.
- 53 Gauvin L, Rejeski WJ (1993) The exercise-induced feeling inventory: Development and initial validation. *J Sports Exerc Psychol* 15: 403-423.
- 54 Soldz S, Vaillant GE (1999) The Big Five personality traits and the life course: A 45-year longitudinal study. *J Res Pers* 33: 208-232.
- 55 Focht BC (2009) Brief walks in outdoor and laboratory environments: Effects on affective responses, enjoyment, and intentions to walk for exercise. *Res Q Exerc Sport* 80: 611-620.
- 56 Mochon D, Norton MI, Ariely D (2008) Getting off the hedonic treadmill, one step at a time: The impact of regular religious practice and exercise on well-being. *J Econ Psychol* 29: 632-642.
- 57 Raynor DA, Levine H (2009) Associations between the five factor model of personality and health behaviors among college students. *J Am Coll Health* 58: 73-81.
- 58 Eysenck HJ, Eysenck MW (1985) Personality and individual differences. New York: Plenum Press.
- 59 McNeill LH, Kreuter MW, Subramanian SV (2006) Social environment and physical activity: A review of concepts and evidence. *Soc Sci Med* 63: 1011-1022.
- 60 Courneya KS, Hellsten LM (1998) Personality correlates of exercise behavior, motives barriers, and preferences: An application of the five-actor model. *Pers Individ Dif* 24: 625-633.
- 61 Schmitt DP, Realo A, Voracek M, Allik J (2008) Why can't a man be more like a woman? Sex differences in Big Five personality traits across 55 cultures. *J Pers Soc Psychol* 94: 168-182.
- 62 Hansen CJ, Stevens LC, Coast JR (2001) Exercise duration and mood state: How much is enough to feel better? *Health Psychol* 20: 267-275.
- 63 Privitera GJ, Antonelli DE, Szal AL (2014) An enjoyable distraction during exercise augments the positive effects of exercise on mood. *J Sports Sci Med* 13: 266-270.
- 64 Stults-Kolehmainen M, Sinha R (2014) The effects of stress on physical activity and exercise. *Sports Med* 44: 81-121.
- 65 Norris CJ, Larsen JT, Caciopo JT (2007) Neuroticism is associated with larger and more prolonged electrodermal responses to emotionally evocative pictures. *Psychophysiol* 44: 823-826.
- 66 Van de Mortel TF (2008) Faking it: Social desirability response bias in self-report research. *Aust J Advance Nurs* 25: 40-48.
- 67 Loo R (2002) A caveat on using single-item versus multiple-item scales. *J Managerial Psychol* 17: 68-75.
- 68 Ekkekakis P, Petruzzello SJ (2001) Analysis of the affect measurement conundrum in exercise psychology: II. A conceptual and methodological critique of the Exercise-induced Feeling inventory. *Psychol Sport Exerc* 2: 1-26.
- 69 Annessi J (2006) Relations of self-motivation, perceived physical condition, and exercise-induced changes in revitalization and exhaustion with attendance in women initiating a moderate cardiovascular exercise regimen. *Women Health* 42: 77-93.
- 70 Coon JT, Boddy K, Stein K, Whear R, Barton J, et al. (2011) Does participating in physical activity in outdoor natural environments have a greater effect on physical and mental well-being than physical activity indoors? A systematic review. *Environ Sci Tech* 45: 1761-1772.