



Original Research

Passion for Exercise: Passion's Relationship to General Fitness Indicators and Exercise Addiction

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ABSTRACT

International Journal of Exercise Science 12(5): 122-135, 2019. Research into the Dualistic Model of Passion (DMP) has suggested that a harmonious passion for an activity is related to more positive outcomes (e.g., higher well-being and satisfaction with life), and an obsessive passion for an activity is related to negative and less adaptive outcomes (e.g., lower self-esteem and burnout; 37, 40, 43). The current study demonstrated differences between passion types (i.e., harmonious passion, obsessive passion, no passion) in terms of physical fitness, risk of exercise addiction, frequency of exercise, and perceptions of exercise. Sixty-one college students from a large, Midwestern university completed the study. A MANOVA with the self-report exercise behavior/perceptions measures ($F(8, 96) = 3.94, p < .001, \text{Wilk's } \lambda = 0.58$) was significant with post-hoc analyses revealing significant differences ($p < 0.05$) between obsessive, harmonious, and non-passionate individuals on time in vigorous activity, risk of exercise addiction, and perceptions of exercise, with no significant differences in fitness levels. Obsessive individuals spend more time in vigorous exercise and are most at risk for exercise addiction, while harmonious individuals do not differ from obsessive on time in vigorous activity and are between obsessive and non-passionate individuals for risk of exercise addiction. The MANOVA with physical fitness indicators (body fat, $\text{VO}_{2\text{max}}$, completed push-ups and curl-ups) revealed no significant differences between the passion groups, but follow-up ANOVAs examining trends indicated differences in body fat and pushups, with non-passionate individuals having higher body fat and fewer pushups than the two passion groups. The findings of this study partially support the Dualistic Model of Passion and previous research findings, and these findings demonstrate interactions between passion and performance in fitness tasks.

KEY WORDS: Fitness indicators, dualistic model of passion, harmonious passion, obsessive passion, non-passion, perceptions of exercise, time spent in physical activity, body fat percentage, $\text{VO}_{2\text{max}}$, muscle endurance

INTRODUCTION

The Dualistic Model of Passion (DMP) was first described by Vallerand (37), and it explains how individuals may develop passion for a particular activity. According to Vallerand and colleagues (37, 40), in order to be considered passionate, three criteria must be met: liking or loving the activity, valuing the activity, and spending time in the activity. Passion can be either harmonious (autonomous) or obsessive (compulsive) in nature, and each of these distinct

passion types is associated with various outcomes (40). Studies on the DMP have primarily focused on passion and psychological outcomes (e.g., well-being, motivation, affect), with research consistently indicating that harmonious passion (HP) for an activity is related to more positive and adaptive outcomes such as experiences of flow and less disappointment when unable to engage in the behavior (4, 37, 38, 40). Obsessive passion (OP) for an activity is related to more negative and less adaptive outcomes (1, 7, 11, 16, 31, 37, 40, 43). The findings that HP is related to positive outcomes and OP is related to negative outcomes have been supported in various studies (7, 8, 14, 18, 21, 25, 28, 29), and research indicates a similar relationship between passion and behavioral outcomes, such as engagement in deliberate practice and goal-setting (1, 7, 20, 41, 42).

The relationship between passion and psychological variables is strong, and there is a similar relationship between passion and behavioral outcomes. HP and OP predict engagement in deliberate practice and establishment of mastery goals in a sample of college students and high-school athletes (41). However, OP also predicts performance-approach goals, which negatively affects performance attainment (41, 42). Research conducted by Li (20) has shown that both HP and OP positively predicted self-reported sport performance. While research has shown that both passion types are related to higher levels of performance, the results of certain studies have revealed a relationship between OP and risky behaviors (31, 40). An early study conducted by Vallerand et al. (40) observed cyclists and their cycling behaviors in the winter. The researchers found that 30% of the cyclists continued cycling in the winter (when weather is not as conducive to cycling), and these individuals had higher levels of OP than HP. The researchers suggested that OP leads to a rigid persistence in the activity even when the conditions are unpleasant or even dangerous.

Similarly, researchers have found that obsessively passionate dancers are more likely to be dependent on dance, thus displaying a maladaptive pattern of behavior (31), and are less likely to follow proper recommendations for returning to dance following an injury in comparison to harmoniously passionate dancers (1, 31). While the differences between harmoniously and obsessively passionate individuals are well established, few studies have focused on passion's influence on exercise and associated outcomes related to passion for exercise. It is clear that individuals can develop a passion for exercise and fitness, but it remains to be seen exactly how a passion for exercise influences fitness outcomes and objective performance.

Although research on passion for exercise has been relatively scarce, investigations of the DMP have studied passion for many different activities and various outcomes associated with passion. Vallerand (39) has recognized five studies in particular that observe passion for exercise and sport and how they relate to engagement in physical activity (3, 14, 15, 26, 33). Of particular interest to the current study, Parastatidou et al. (26) validated the passion scale for use with exercise and found that both types of passion for exercise were positively related to time spent in exercise and completing exercises of higher intensity. Other studies have focused on the link between passion for exercise and its relationship to exercise dependence, finding that both HP and OP were related to experiences of exercise dependence, with OP more strongly related to exercise dependence than HP (24, 27, 35). Both passion types have also been related to the

various dimensions of exercise dependence (e.g., time, withdrawal, tolerance), with a strong positive correlation between OP and the dimensions of exercise dependence (24). Obsessive passion was also related to experiencing exercise dependence symptoms and mediated the relationship between motivation to exercise and exercise dependence (27).

These studies offered interesting conclusions in regard to passion for exercise, but most of the research focuses exclusively on passion for exercise and its relationship to psychological variables (5, 13, 25, 34). Only a small number of studies have linked observed behavioral outcomes to passion for exercise (3, 15, 26). Furthermore, studies fail to paint a clear picture about the link between passion for exercise and physiological health. Based on previous research findings, Vallerand (39) made a few conclusions that are relevant to the current study. First, individuals who are passionate for exercise spend more time in vigorous exercise. Second, studies in this area have relied heavily upon self-reported data and are correlational. Finally, to improve future studies observing passion for exercise, researchers should use more objective or validated measures of assessing exercise, and use experimental designs to further understand any causal roles that passion plays in these various relationships.

The purpose of this study was to further contribute to the passion for exercise literature by comparing group differences between passion types and observing how harmonious and obsessive passion might influence the various fitness-related variables. Given previous findings on the DMP, we hypothesized: 1) passionate individuals (harmonious and obsessive) would report more time in moderate and vigorous activity than non-passionate individuals; 2) obsessive individuals would have the most positive perceptions of exercise and the highest risk of exercise addiction; 3) non-passionate individuals would have the most negative perceptions of exercise and the lowest risk of exercise addiction; and 4) passionate individuals would have better fitness indicators (i.e., lower body fat percentages, higher aerobic fitness and muscular endurance) than non-passionate individuals.

METHODS

Before data collection, the study was reviewed and accepted by the university's Institutional Review Board (IRB), and all participants completed an informed consent form. The study included two phases: an online survey and a laboratory session. The online survey was used to assess demographics, exclusion criteria, passion, risk of exercise addiction, and perceptions of exercise. The laboratory session assessed time spent in moderate and vigorous activities, push-ups and curl-ups completed, and VO_{2max} . Participants were given a \$10 gift card as compensation for completing the entirety of the study.

Participants

College students were conveniently recruited via mass email from a large, Midwestern university. Participants were excluded if they were currently on a varsity athletics roster at the institution, determined to be "high risk" for cardiovascular, pulmonary (e.g., COPD, asthma), or metabolic disease (e.g., diabetes), according to American College of Sports Medicine (ACSM) guidelines (2), or had electronic medical implants (e.g., pacemakers).

One hundred and twenty-four individuals began the online survey; 61 met all criteria for participation, including completing the laboratory portion of the study. The final sample of 61 participants was comprised of 23 men and 38 women with a mean age of 20.41 years ($SD= 1.76$), and the sample was mostly Caucasian ($n=50$), with African Americans ($n=3$), Asian/Pacific Islanders ($n=2$), Latinos ($n=2$), and “other” ($n=4$). The exercise passion categorization process (explained in greater detail in the protocol section) revealed 19 non-passionate (5 men and 14 women), 23 harmoniously passionate (6 men and 17 women), and 19 obsessively passionate (12 men and 7 women) individuals.

Protocol

For the survey portion of the study, a Qualtrics (Qualtrics, Provo, UT) survey beginning with the AHA/ACSM Health/Fitness Facility Pre-participation Screening Questionnaire (2) was completed. This screening questionnaire was used to determine if a participant would be excluded from the study based on certain health concerns. The demographics questionnaire was included following the fitness-screening questionnaire.

The Passion Scale, modified to assess passion for exercise, was completed following the demographics questionnaire to categorize participants as harmoniously, obsessively, or non-passionate for exercise. The Passion Scale has been used this way in previous studies (harmonious' Cronbach $\alpha= .88$, obsessive Cronbach $\alpha= .91$; 26). To categorize participants, answers to the first four questions on the Passion Scale were averaged. If the average of these four questions was five or above, the participant was categorized as passionate; if the score was less than five, the participant was categorized as non-passionate. Scores on the harmonious and obsessive subscales were totaled. The subscale scores for all participants were then standardized. For participants that averaged five or above on the first four questions, the subscale with the larger z-score was used to categorize the participant as harmoniously or obsessively passionate.

The Exercise Benefits/Barriers Scale (EBBS) was completed after the passion scale. The Exercise Benefits/Barriers Scale is a 43-item questionnaire assessing perceived benefits and barriers to exercise in adults (32). The exercise addiction inventory (EAI) was the final assessment in the initial online survey. The EAI is a six-item self-report measure for determining an individual's risk of exercise addiction (36).

Upon completing the online surveys, qualified participants scheduled a participation time in the university's exercise physiology laboratory. Body fat percentage was measured using bioelectrical impedance (Omron BF306, Hoffman Estates, IL). Participants then completed the short version of the International Physical Activity Questionnaire (IPAQ, 9) to assess time spent in physical activity (moderate and vigorous).

The body fat assessment and IPAQ were followed by the fitness assessments (YMCA test, push-ups, and curl-ups). The YMCA submaximal cycle ergometer test was used to estimate VO_{2max} (2). After completion of the YMCA test, muscle endurance was assessed using push-ups and

curl-up tests, according to ACSM guidelines (2). Participants were given the option of a rest period of up to 2 minutes following each of the physical activities. The laboratory portion of testing took approximately 25-30 minutes to complete.

Statistical Analysis

All analyses were conducted using SPSS 23 software developed by IBM. For the MANOVA analyses, the participants were categorized based upon a type of passion (harmonious, obsessive, and non-passionate) and the differences between groups on the dependent variables (VO_{2max} Estimate, push-ups, curl-ups, body fat percentage, quantity of exercise, risk of exercise addiction, and perceptions of exercise) were explored. There were two MANOVA analyses in the current study due to sample size constraints and the number dependent variables being assessed in the current study. The MANOVAs were separated based on the type of dependent variables included. The first MANOVA included Passion type (i.e., non-passionate, harmoniously passionate, and obsessively passionate) entered as the fixed factor, and the self-report measures (i.e., EAI, EBBS, IPAQ) were the dependent variables. The second MANOVA included Passion type entered as the fixed factor, and the observed fitness measures (body fat percentage, VO_{2max} , curl-ups and push-ups) were the dependent variables. The assumptions of MANOVAs were assessed before completion of the final analyses and were met. Gender was not controlled in the current study, as gender would need to be added as an additional independent variable in the analyses, thus increasing the chance for error with a small sample size and unequal distribution of males and females in the passion groups.

RESULTS

The standardized scores for harmonious passion ranged from -2.27 to 1.35 ($M= 0.00$, $SD= 1.00$), and the standardized scores for obsessive passion ranged from -1.26 to 2.45 ($M= 0.00$, $SD= 1.00$). Descriptive statistics for the variables in this study are presented in Table 1. The Cronbach's α of the scales used in these analyses were also determined to be reliable: Passion Scale (Cronbach's $\alpha= 0.95$), the EBBS (Cronbach's $\alpha= 0.94$), and the EAI (Cronbach's $\alpha= .77$). Correlations were observed between the dependent variables in both analyses to check for high correlation that could be indicative of a multicollinearity issue. Correlations between predictors were not problematic. A logarithmic transformation was performed on the time spent in moderate activity data to address the non-normal distribution, skewness, and kurtosis of the distribution.

The first MANOVA analysis including the self-report data was statistically significant, $F(8, 96) = 3.94$, $p < .001$, Wilk's $\lambda = 0.55$, indicating differences in the mean scores among the three passion groups (approximately 45% of the variance due to passion type) on the exercise behavior/perception self-report variables.

Table 1. Descriptive statistics of dependent measures.

		N	Min	Max	Mean	SD
HarmScore		61	10	35	29.44	8.57
ObsessScore		61	6	35	15.85	7.81
EBBS						
	Harm.	23	53	97	69.7	13.59
	Obsess.	19	54	85	72.47	9.85
	Non.	19	58	118	86.32	15.24
EAI						
	Harm.	23	9	25	17.43	3.74
	Obsess.	19	16	28	20.21	3.19
	Non.	19	6	21	13.16	4.15
TimeVig (min)						
	Harm.	23	0	900	271.52	240.94
	Obsess.	19	0	945	365.53	267.71
	Non.	19	0	450	90	115.16
TimeMod (min)						
	Harm.	23	0	2.95	2.02	0.61
	Obsess.	19	0	3.32	1.72	0.99
	Non.	19	0	2.68	1.66	0.76
Bodyfat						
	Harm.	23	4.1	33.2	19.69	6.18
	Obsess.	19	11.7	37.8	20.72	6.56
	Non.	19	5.7	41.3	25.89	9.86
VO _{2max} (ml/kg/min)						
	Harm.	23	31.0	56.0	40.93	7.25
	Obsess.	19	26.5	66.1	42.43	8.51
	Non.	19	23.8	52.0	36.68	8.54
Pushups						
	Harm.	23	8	57	27	11.33
	Obsess.	19	10	58	29.47	12.15
	Non.	19	4	33	19.68	8.88
Curlups						
	Harm.	23	8	75	55.13	22.24
	Obsess.	19	13	75	48.47	23.98
	Non.	19	11	75	40.53	23.51

Note. EBBS is the Exercise Benefits/Barriers Scale, EAI is the Exercise Addiction Inventory, TimeVig is self-reported minutes spent in vigorous physical activity over the past 7 days as reported on the IPAQ, TimeMod is self-reported minutes spent in moderate physical activity over the past 7 days as reported on the IPAQ. The distribution of time spent in moderate activity was transformed for analyses. HarmScore represents scores on the harmonious subscales. ObsessScore represents scores on the obsessive subscale.

Tukey HSD post-hoc comparisons examined the differences among the three groups of the independent variable on the dependent variables. There were significant differences in terms of risk of exercise addiction, $F(2, 51) = 12.99, p < .001, \text{partial } \eta^2 = 0.34$. In particular, non-passionate participants scored significantly lower for exercise addiction ($M = 13.67, SD = 4.07$) than both harmonious ($M = 17.42, SD = 3.740$) and obsessive participants ($M = 20.50, SD = 3.39$) ($p < .05$). Also, obsessive participants scored significantly higher than harmonious participants ($p < .05$). These results indicate that non-passionate individuals were at the lowest risk of exercise

addiction, obsessive individuals were at the highest risk of exercise addiction, and harmonious individuals fell between these two groups.

Significant differences were also found between the passion types in time spent in vigorous activity, $F(2, 51) = 7.38$, $p < .001$, partial $\eta^2 = 0.22$. Non-passionate individuals reported spending significantly less time in vigorous physical activity ($M = 99.00$, $SD = 121.305$) than obsessive participants ($M = 408.75$, $SD = 269.30$) ($p < .05$).

Finally, significant differences were found in perceptions of exercise, $F(2, 51) = 5.17$, $p = 0.01$, partial $\eta^2 = 0.17$. In particular, non-passionate participants scored significantly higher ($p < .05$) on the EBBS ($M = 82.13$, $SD = 12.77$) than both harmonious ($M = 69.70$, $SD = 13.59$) and obsessive participants ($M = 70.75$, $SD = 9.70$), indicating that non-passionate individuals had the most positive perceptions of exercise in this study. There was no difference between harmonious and obsessive participants on EBBS scores.

The second MANOVA, which addressed the second research question about differences in passion type on the observed physiological measures, was non-significant $F(8, 110) = 1.86$, $p = .073$, Wilk's $\lambda = .78$. As a follow-up to this MANOVA that was approaching significance, one-way ANOVA analyses were conducted with the physiological measures as dependent variables. Tukey HSD post-hoc comparisons examined the differences among the three groups of the independent variable on the dependent variables. There were no significant differences among groups for VO_{2max} , $F(2, 51) = 2.63$, $p = 0.081$ or Curlups, $F(2, 51) = 2.06$, $p = 0.136$.

For body fat, there were significant differences between groups, $F(2, 51) = 3.80$, $p = 0.028$. More specifically, there was no difference between harmonious and obsessive participants in body fat percentage, but non-passionate participants had significantly higher body fat percentage ($p < .05$; $M = 25.89$, $SD = 9.86$) than both harmonious ($M = 19.69$, $SD = 6.18$) and obsessive participants ($M = 20.72$, $SD = 6.56$). Pushups were significantly different among the groups, $F(2, 51) = 4.18$, $p = 0.020$. There were no differences between harmonious and obsessive individuals in push-ups completed, but the non-passionate individuals completed significantly fewer push-ups ($p < .05$; $M = 19.68$, $SD = 8.88$) than harmonious ($M = 27.00$, $SD = 11.33$) and obsessive ($M = 29.47$, $SD = 12.15$) individuals.

DISCUSSION

Previous studies have observed passion for exercise and how it relates to exercise dependence, finding that participants who are considered obsessive have an increased risk for exercise addiction or dependence compared to harmonious individuals (24, 27, 35). Findings from the current study provide some additional support for these research findings and the Dualistic Model of Passion as a whole. However, this study also adds a new dimension to these findings by exploring passion specifically by passion type (i.e., harmonious, obsessive, non-passionate) and investigating additional psychological factors and objective fitness indicators.

The findings offer some additional support for the Dualistic Model of Passion. As previously demonstrated, harmonious passion is positively related to two dimensions of exercise dependence while obsessive passion was positively related to all seven dimensions of this construct (24). Likewise, Stenseng and colleagues (35) established that obsessive passion was positively related to exercise dependence. Obsessively passionate individuals may develop dependence because they feel compelled to continue the activity (exercise), since this type of passion has been associated with a “rigid persistence” in the activity (1, 42). Harmoniously passionate or non-passionate individuals, on the other hand, may not experience the same compulsion. Similarly, the current study’s findings also support obsessive and harmonious passion for exercise being related to exercise dependence but also demonstrate that obsessively passionate individuals may be at a higher risk of exercise addiction over harmonious or non-passionate individuals.

There were also differences among the passion groups in their perceptions of exercise. For example, non-passionate individuals had the most positive perception of exercise, and there were no differences between harmonious and obsessive individuals. However, scores on the measure of exercise perceptions were generally low across all groups, indicating that perceptions of exercise were not very positive overall. Passionate individuals’ lack of positive perceptions is especially surprising, but previous research has demonstrated that college students tend to not meet physical activity requirements and lack knowledge about the health benefits of exercise (5, 17, 21). These findings may also point to college students’ overall low regard for physical activity. Coupled with the overall less positive perception of exercise, passionate individuals (obsessive and harmonious) may perceive barriers as more obstructive to their exercising than their less motivated counterparts. This, in turn, would affect their general perceptions of exercise.

Additionally, non-passionate individuals in the current study reported spending less time in vigorous activity than obsessive individuals with no differences between harmoniously passionate and non-passionate individuals. These findings only partially support the Dualistic Model of Passion, as obsessively passionate individuals spend more time participating in the activity. However, harmoniously passionate individuals did not spend significantly more time in vigorous activity in this study. Also, previous studies have shown that both passion types are positively related to engaging in more bouts of exercise and exercising at a generally higher intensity (26). It is possible that no group differences were found between harmoniously passionate individuals and non-passionate individuals because our sample was comprised entirely of students, and harmonious individuals are more likely to focus time in other aspects of their lives (e.g., studying or school work) outside of the passionate activity.

With the second research question, we explored possible differences among the passion groups on observed fitness indicators of VO_{2max} estimation, body fat percentage, push-ups, and curl-ups. We anticipated that both harmonious and obsessive individuals would possess a higher VO_{2max} , possess less body fat, and would complete a greater number of push-ups and curl-ups than individuals who were not passionate about exercise. In previous research, passionate individuals have had stronger performances in passionate activity over non-passionate

individuals (20, 21). However, the passion groups in the current study did not differ on any of these fitness variables. In considering these findings, it is important to remember that non-passionate individuals may still exercise, but participation may be driven by the associated health benefits rather than enjoyment or value in the activity. In fact, based on means of the three passion groups, all the participants performed at an above-average level in curl-ups. Further, different fitness standards for gender were not considered because of the small sample size, and men and women were unevenly distributed across the three groups. The findings from this study support the notion that men and women tend to perform at different levels in terms of the fitness measures (2). In particular, men performed at an average level in VO_{2max} , body fat percentage, and push-ups and above average in curl-ups when compared to fitness norms, while women performed below average in VO_{2max} and body fat percentage and above average in push-ups and curl-ups when compared to fitness norms. The unequal distribution of males and females could have affected the outcomes of the second analysis.

It is also possible that the acute nature of the study (participants were only required to attend one session of testing) did not truly capture the fitness levels of the participants. Performance in acute bouts of exercise is subject to factors outside of the research (e.g., illness, fatigue, stress, recent physical exercise), and it is possible such outside factors affected participants' performance during testing. Furthermore, individuals who are passionate for exercise are more likely to engage in *vigorous* activities (40). The current study did not utilize vigorous physical activities for testing in order to be inclusive for all participants. Perhaps the passionate individuals (both harmonious and obsessive) would better suited for vigorous activities rather than the more moderate intensity activities used in the current study.

While group differences were not present across the passion groups on fitness variables, relationships existed between harmonious and obsessive passion for exercise and the various fitness variables used in the study. In particular, harmonious passion was related to a lower body fat percentage, higher relative VO_{2max} , and a higher number of completed push-ups and curl-ups. Additionally, obsessive passion was found to be unrelated to all the fitness measures utilized in the current study. Given previous findings in the DMP, one might expect that harmoniously and obsessively passionate individuals might perform similarly in the passionate activity (31, 41). However, other studies have found that obsessively passionate individuals may set goals for themselves that actually hinder performance rather than aide it (42). Further research must be conducted on this topic to determine why harmonious but not obsessive passion is positively related to performance in fitness assessments.

While there were significant findings in this study, it is important to note that there were limitations. In particular, there was a small sample utilized in this study, and gender differences were not controlled. Further, the results from one week of the study could have had an influence on the results because some of the data was collected the week following the university's spring break. This could have affected how the participants completed the IPAQ. Furthermore, when observing group differences between harmonious, obsessive, and non-passionate individuals, possible gender differences were not accounted for in the distribution, as men and women were not evenly split. There were more women than men in the non-passionate and the harmonious

groups, and there were more men than women in the obsessively passionate group. As described by Marsh and colleagues (22), there is a tendency for women to be more harmoniously passionate than men, and this could explain the different distributions in this group. Both males and females were included in these analyses because this was an initial observation of fitness indicators across passion type, and an inclusive sample was preferred. Finally, the dependent variables in this study (VO_{2max} , body fat percentage, curl-ups, push-ups, and time spent in physical activity) do not fully capture fitness and health; they are merely indicators of fitness (2).

There are some practical implications related to the findings in the current study. The information from this study, in combination with previous research on passion for exercise, would be most useful for exercisers, personal trainers, and exercise psychologists. Obsessive individuals might be at an increased risk of exercise addiction or dependence (35, 38), and they might also perform poorly in comparison to the harmoniously passionate individual. Importantly, both harmonious and obsessive passion for exercise was related to a higher risk of exercise addiction, and it may be useful to further assess passionate individuals for exercise addiction or dependence. While the proportion of individuals who are actually at risk of exercise addiction in the population is very low (estimated at .3 to .5% of exercisers), exercise addiction is still a potentially dangerous behavioral pattern that can cause serious psychological and physiological impairments (6, 16, 19, 23). Further, obsessive individuals are already likely to continue engaging in an activity despite limitations or injuries (1, 31, 40). Recognizing obsessive tendencies and behavioral patterns can help both exercisers and professionals working with exercisers to be more mindful of the potential for the formation of an addiction or dependence on exercise.

Vigorous physical activity has been shown to have a number of health benefits for young adults such as decreased stress levels, less depressive symptoms, better sleep, healthy BMI, and a reduction in smoking (10, 12). The United State department of Health and Human Services has also reported moderate/vigorous activity can help lower risk of heart disease, stroke, high blood pressure, various cancers, and early death in adult populations (30). So, while obsessive individuals may be at a greater risk of exercise addiction, burnout (8), injury complications (31), or lower self-esteem (40), they may also be more likely to be gaining important benefits from exercise. It is important for obsessively passionate exercisers to find a healthy balance in their exercise behaviors.

Further studies observing passion for exercise could take steps to determine genuine differences between passionate and non-passionate individuals. In particular, studies could measure performance on physiological measures at various time points by using a repeated measures design. Studies could also better control for possible gender differences between groups. Such a study would also benefit from a larger sample size. The current study was not an experimental design and there were no manipulations of variables. Future studies should explore the use of experimental manipulations to determine physiological differences in passionate and non-passionate individuals. As research on passion for exercise continues, these characterizations of the harmonious, obsessive, and non-passionate exercisers may continue to grow and evolve.

Vallerand (38) has recognized the importance of harmonious passion in a meaningful life, and it is clear in the passion literature that harmonious passion is associated with the most positive outcomes. Therefore, it would be worthwhile to identify methods of fostering harmonious passion for exercise in the population. Fostering a harmonious passion for exercise would help individuals maintain exercise behaviors, and they would be more likely to encounter the positive benefits of exercise as well as harmonious passion.

The current study was an initial exploration of exercise passion and psychological and physiological measures related to exercise, with differences between harmonious, obsessive, and non-passionate individuals in their perceptions of exercise, time spent in vigorous physical activity, and risk of exercise addiction, but no differences between the three groups in the observed physiological variables. Future studies should investigate other possible differences between these groups on physiological measures to determine if there are, in fact, no differences between these groups on fitness measures. Practically, the identification of passion for exercise could help determine outcomes and relationships to be expected based on specific motivations for exercise. Ultimately, the findings of this study partially support the Dualistic Model of Passion and previous research findings, and these findings demonstrate interesting interactions between passion and performance in fitness tasks. However, further research must be conducted to determine differences in fitness between harmonious, obsessive, and non-passionate individuals.

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