

Extrinsic Motivations: Relevance and Significance for Exercise Adherence

Andrea J. Ednie*, Michael D. Stibor

Health, Human Performance and Recreation Program, University of Wisconsin-Whitewater, Whitewater, WI 53190, USA

*Corresponding author: edniea@uww.edu

Abstract Self-determination theory has demonstrated the importance of intrinsic motivation for exercise adherence, however, extrinsic motivations have received less research attention, and research has demonstrated that many people are extrinsically motivated for exercise. With a focus on extrinsic motivations, this study compared participant ratings of a series of common psychological, physical, health and social exercise motivations and examined how the motivations (including extrinsic and intrinsic) were associated with exercise adherence. Participants (812 college students) completed an online survey detailing their exercise patterns and motivations. Total exercise scores were calculated by assigning MET values to exercise bouts using the Leisure Time Exercise Questionnaire and the Borg measure. The Exercise Motivations Inventory-2 dimensions were used to measure exercise motivations. The top rated motivations were strength and endurance, positive health, appearance, and weight management. Linear regression analysis revealed weight management, stress management, enjoyment, and competition as predictors of exercise for the sample group. With the exception of weight management, the motivations that predicted exercise adherence were not within the most important motivations for the participant sample. Enjoyment, which by definition is an intrinsic motivation, was predictive of exercise adherence, but rated lower than other health, psychological and physical motivations. Appearance was identified as a highly rated, yet negative predictor of exercise for female participants. Participants demonstrated strong extrinsic motivations for exercise. Further research is needed to determine how those prominent extrinsic motivations can be developed into more self-determined reasons for exercise.

Keywords: *exercise motivations, extrinsic motivations, exercise adherence, self-determination theory, physical activity*

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1. Introduction

Like many other nations, the U.S. continues to struggle with high obesity, and low physical activity rates [1]. In 2014, the U.S. Center for Disease Control's State Indicator Report on Physical Activity reported that half (52%) of U.S. adults met the CDC's 2008 guidelines for aerobic activity [2]. The college demographic may be worse as compared with the national data, as the American College Health Association National College Health Assessment II (ACHA-NCHA II) found that only 47.4% of college students met the CDC's guidelines [3]. Concern over this low proportion of active citizens due to the known health risks associated with inactivity, has led to an insurgence of research related to exercise motivations.

Prominent among the exercise motivations literature is the examination and application of self-determination theory [4,5,6,7,8]. Self-determination theory grew from earlier work on intrinsic and extrinsic motivations, and posits that people are inherently self-motivated and persistent, however three major needs (competence, relatedness, and autonomy) must be met for sustained commitment

[9,10,11,12]. True intrinsic motivation, characterized by enjoyment and interest, has been demonstrated to be strongly associated with sustained exercise patterns [13,14,15]. Extrinsic motivations for exercise, which include all motivations that do not fit with the above definition of intrinsic motivation, have received less research attention and are less well understood. Some studies have found extrinsic motivations to have little to no association with, or to be negatively associated with exercise commitment [16,17]; however, recent work has brought attention to the inherent complexity of extrinsic motivations and has called for further examination [18,19,20].

Considering the nation's current low physical activity rates, it is likely that many people are not truly intrinsically motivated for exercise (i.e. that they do not associate true enjoyment with exercising, or feel competent and in control of their exercise goals); and therefore exercise for other, more extrinsic goals. Previous research has demonstrated this to be true within the college student demographic, where motives such as improving one's appearance, ill-health avoidance, and weight management have been rated higher than enjoyment [21]. Moreover, Ednie & Stibor (2016) [22] found these extrinsic motives to be rated consistently high, even within groups that

demonstrated the highest levels of fitness. Neither of these studies, however, examined the association between extrinsic motivations and exercise adherence. The purpose of this study is to compare the participant ratings of intrinsic and extrinsic exercise motives, with those that are found to be predictive of exercise adherence.

2. Materials and Methods

2.1. Participants

Participants were undergraduate students at a university of 12,000 students in the mid-western United States. Willing participants were recruited from an undergraduate general education health and fitness course during spring semester 2016, who completed the study voluntarily as an option to obtain course credit. The researchers obtained Institutional Review Board approval to conduct the study. Eight-hundred ninety-two students were asked to volunteer in the study, and 812 completed the survey providing usable data (91% response rate). Participants were split nearly equally for gender (48% male, 52% female), and ranged in age from 17 to 42 although the bulk were traditional aged college students ($M=19.08$, $SD=1.83$).

2.2. Procedures: Survey Contents and Data Preparation

2.2.1. Survey

Qualtrics Online Survey Software was used to administer the online survey which took participants 16 minutes on average to complete. Designed following techniques outlined by Dillman et al. (2009) [23], the survey inquired about student demographics, exercise patterns and experiences, and exercise motives.

2.2.2. Total Exercise Scores

A series of survey questions inquired about the participants' exercise patterns within the past week, and within an average week over the past year. Exercise frequency and duration were recorded, and the validated Leisure Time Exercise Questionnaire (LTEQ) was used to separate the participants' exercise time into moderate and strenuous minutes [24,25,26,27]. Participants also characterized their exercise bouts using the Borg measure to further ascertain exercise intensity [28,29]. A total exercise score was calculated by weighing and summing the participants' moderate and strenuous minutes by the associated MET value (metabolic equivalent of physical activity in multiples of resting oxygen consumption). Moderate and strenuous bouts of exercise lasting at least 20 minutes were multiplied by 5 (moderate) and 9

(strenuous), and added to identify a total exercise score, consistent with methods used by Wilson et al. (2004) [20]. The reported exercise patterns were also compared with the 2011 ACSM exercise recommendations for fitness to determine whether participants met the recommended activity levels [30].

2.2.3. Ratings of Exercise Motivations

The Exercise Motivations Inventory-2 dimensions were used to measure the participants' exercise motivations [31]. The EMI-2 comprises 14 motivational dimensions including psychological, social, health, and physical components. The EMI-2 has been validated, has demonstrated the ability to differentiate between motivational components, and has been applied in a variety of studies [22,32,33,34,35]. The EMI-2 measure comprises a 5-point scale (ranging from 1, not at all true for me; to 5, very true for me) where participants indicate the degree to which each motivational dimension is true for them personally.

2.3. Statistical Analyses

The data were screened for missing values, outliers, and evaluated for conformity with the assumptions associated with multiple regression analysis. Linear multiple regression analyses were used to analyze the relationships between exercise motives and total exercise scores [36]. Separate multiple regression analyses were conducted to predict the exercise behavior consequences of motives dependent on gender. One-way analyses of variance (ANOVA) tests with Tukey Honestly Significant Differences (HSD) tests for multiple comparisons were used to identify differences in motive ratings based on total exercise scores and gender. Effect size (Cohen's d and partial eta-squared) was used to better understand the magnitude of the differences between groups [37].

3. Results

3.1. Total Exercise Scores

The total exercise scores were higher for male as compared with female participants, although the Cohen's d test of effect size indicated the magnitude of difference was small (Table 1). Comparison of the participant-reported exercise patterns to the ACSM's 2011 exercise recommendations for healthy adults revealed 57% percent of the total sample maintained habits that met the guidelines [30], where male and female patterns were nearly even at 58% and 57% for male and female participants respectively.

Table 1. Total exercise scores of the complete sample, male, and female participants.

| | Item Mean | Male | Female | n | F | p | d |
|-----------------------------------|-----------|-------|--------|-----|------|-----|-----|
| Total exercise score ^a | 41.88 | 44.40 | 39.60 | 678 | 5.26 | .02 | .18 |

^aTotal exercise score was calculated by weighing and summing the participants' moderate and strenuous exercise frequency dimensions by the associated MET value, (moderate frequency dimension X 5)+(strenuous frequency dimension X 9).

3.2. Exercise Motivation Ratings

Overall, strength and endurance, positive health, and appearance were the three top-rated motives for exercise, with mean ratings above 4 on the 5-point scale (4.33, 4.28

and 4.10, respectively). Weight management, ill-health avoidance, nimbleness, and revitalization followed, with mean ratings above 3.5. The lowest-rated motives were competition, affiliation, social recognition, and health pressures, all with means below 3.0 on the 5-point scale

(Table 2). Mean ratings for the two dimensions most clearly representative of intrinsic motivation, enjoyment and revitalization, were 3.31 and 3.64, respectively.

Male and female ratings differed across 11 of the 14 motives. Female participant ratings of the health, fitness, appearance, revitalization, and stress management motives were significantly higher than male ratings. Mean male

participant ratings were higher as compared to the mean female ratings for enjoyment, challenge, competition, and social motives. Partial eta-square tests for effect size indicated that the magnitude of difference between male and female mean ratings was moderate for competition, and small across all of the other motivation dimensions.

Table 2. Mean exercise motivation ratings for the total sample, male and female participants.

| | Item Mean ^a | Male | Female | df | F | n | η ² |
|----------------------|------------------------|------|--------|----|----------|-----|----------------|
| Strength & endurance | 4.33 | 4.24 | 4.41 | 1 | 6.81** | 803 | .01 |
| Positive health | 4.28 | 4.13 | 4.42 | 1 | 20.84*** | 801 | .03 |
| Appearance | 4.10 | 3.99 | 4.20 | 1 | 6.60* | 803 | .01 |
| Weight management | 3.89 | 3.65 | 4.12 | 1 | 26.67*** | 802 | .03 |
| Ill-health avoidance | 3.78 | 3.75 | 3.81 | 1 | 0.50 | 804 | .00 |
| Nimbleness | 3.67 | 3.59 | 3.75 | 1 | 3.23 | 802 | .00 |
| Revitalization | 3.64 | 3.57 | 3.70 | 1 | 2.39 | 802 | .00 |
| Stress management | 3.63 | 3.45 | 3.80 | 1 | 16.02*** | 803 | .02 |
| Enjoyment | 3.31 | 3.48 | 3.14 | 1 | 13.70*** | 804 | .02 |
| Challenge | 3.19 | 3.42 | 2.98 | 1 | 20.80*** | 790 | .03 |
| Competition | 2.93 | 3.39 | 2.49 | 1 | 76.78*** | 801 | .09 |
| Affiliation | 2.91 | 3.11 | 2.72 | 1 | 16.89*** | 800 | .02 |
| Social recognition | 2.47 | 2.76 | 2.20 | 1 | 34.48*** | 802 | .04 |
| Health pressures | 2.19 | 2.46 | 1.93 | 1 | 32.81*** | 803 | .04 |

*p<.05, **p<.01, ***p<.001.

^aExercise motivation ratings were based on a scale of 1, not at all true for me; to 5, very true for me.

3.3. Exercise Motivations and Total Exercise Scores

The multiple regression model with all motives as predictors of total exercise scores was completed for the whole sample, and repeated for males and females, separately (Table 3). The total sample regression model produced $R^2 = 0.12$, $F(14, 647) = 6.15$, $p < .001$, and the stress management, enjoyment, competition, and weight

management dimensions had significant positive regression weights. For male participants, stress management scale had a significant positive regression weight; and the revitalization, weight management, and fitness scales had significant positive weights for females. Female ratings of the appearance motive had significant negative weight, indicating that after accounting for the other motive rating scores, female participants with higher appearance rating scores were expected to have lower total exercise scores.

Table 3. Multiple regression results with motives as predictors of total exercise scores.

| Variable | Total | | | Male | | | Female | | |
|----------------------|-------|------|-------|-------|------|-------|--------|------|--------|
| | B | SE B | β | B | SE B | β | B | SE B | β |
| Strength & endurance | 2.21 | 1.64 | .07 | .63 | 2.88 | .02 | 4.52 | 2.18 | .16* |
| Positive health | -2.25 | 1.63 | -.08 | -2.6 | 2.83 | -.07 | -1.16 | 1.78 | .04 |
| Appearance | -2.00 | 1.24 | -.08 | -.21 | 2.07 | -.01 | -4.28 | 1.61 | -.20** |
| Weight management | 2.55 | 1.02 | .12* | 1.79 | 1.66 | .07 | 5.29 | 1.49 | .26*** |
| Ill-health avoidance | -.60 | 1.15 | -.03 | .56 | 2.39 | .02 | -1.78 | 1.20 | -.09 |
| Nimbleness | -1.04 | 1.14 | -.05 | -1.26 | 2.20 | -.04 | -.90 | 1.35 | -.04 |
| Revitalization | .59 | 1.23 | .02 | -1.67 | 2.25 | -.06 | 2.95 | 1.50 | .14* |
| Stress management | 3.17 | 1.08 | .14** | 6.24 | 2.07 | .23** | 1.97 | 1.30 | .10 |
| Enjoyment | 3.24 | 1.19 | .15** | 3.61 | 2.40 | .13 | 2.30 | 1.36 | .12 |
| Challenge | -.25 | 1.13 | -.01 | -1.43 | 2.16 | -.05 | .78 | 1.30 | .04 |
| Competition | 2.26 | .94 | .13* | 1.71 | 1.74 | .07 | 1.78 | 1.12 | .11 |
| Affiliation | .04 | .92 | .00 | 1.31 | 1.85 | .05 | -.46 | 1.05 | -.03 |
| Social recognition | .89 | .91 | .05 | .06 | 1.67 | .00 | 1.48 | 1.11 | .08 |
| Health pressures | -.49 | .94 | -.02 | -.86 | 1.73 | -.03 | .31 | 1.17 | .02 |

*p<.05. **p<.01. ***p<.001.

4. Discussion

The study provided insight about the relationship between various exercise motivations and exercise adherence, and justification for further research focused on extrinsic exercise motivations. The study provided an opportunity to identify which of the highly rated extrinsic exercise motivations were associated with exercise

adherence. Differences in how male and female participants were motivated for exercise were also identified.

The study results demonstrated interesting, if concerning, context for enjoyment as an exercise motive. Enjoyment, by definition is an intrinsic motive, and was expected to be associated with sustained exercise patterns based on previous research [13,14,15]. The regression analysis revealed enjoyment as a predictor of total exercise scores for the whole sample, but not a significant predictor for male or female groups, independently. The mean rating

for enjoyment was 3.3 on the 5-point scale and was higher for male than female participants. Enjoyment was rated lower than most other health, psychological, and physical motivation dimensions.

Aside from enjoyment, the motivation dimensions found to predict exercise adherence across the whole sample, were weight management, stress management, and competition. Of these, weight management was the highest rated, with a mean rating of 3.89 on the 5-point scale and stress management and competition were rated lower at 3.6 and below. The top-rated motivations (strength & endurance, positive health, and appearance) were not found to be associated with exercise adherence for the sample as a whole. This disconnect in participant ratings of motivations, and those motivations actually associated with exercise adherence is important to consider for initiatives designed to increase exercise participation. Gaining strength/fitness, maintaining good health, and improving appearance were very important for the college student sample, yet those motivations were not effective for sustaining exercise participation. Stress management and competition, on the other hand, were positively associated with exercise participation, yet were rated fairly low by the participants. Weight management was the only motivation dimension that was relatively highly rated, and also predictive of exercise adherence.

Differences were found between how male and female participants were motivated for exercise. Stress management was the only motivation dimension associated with exercise adherence for male participants. However, even though competition was not found to be a predictor of exercise adherence for the male-only group, it was for the whole sample and the mean male rating was significantly higher as compared to the mean female rating.

Analysis of the female-only group identified strength and endurance, weight management, and revitalization as predictors of exercise adherence. Strength and endurance, and weight management were both within the top-rated motivation dimensions for the female-only sample population, suggesting that these interests do indeed translate into actions. However, appearance was found to be a negative predictor of exercise adherence within the female-only group yet was also within the top-rated motivation dimensions. Previous research into the association between exercise motives and adherence has combined the weight management and appearance motives and found them together to either not predict, or to be a negative predictor of exercise participation [16]-[18], however the current study demonstrates how these two motives represent unique meanings for female college students in particular. It is feasible that appearance and weight management are interpreted differently dependent on an individual's stage of motivational readiness for exercise [18], and that these complex meanings associate with different behavior regulations. The contrasting associations found between the weight management and appearance motives are important considering both were highly rated motives and worthy of further research.

5. Conclusions

This study has examined how the EMI-2 motivation dimensions were perceived, and which of the motivations

predicted exercise adherence, among a sample of college students. This study identified disconnects between the highest rated exercise motivations, and those associated with exercise adherence. With the exception of weight management for the total sample, and also strength and endurance for female participants, the motives identified by participants as being influential for exercise did not associate with their exercise patterns. For female participants, appearance was within the top-rated motivations, and was found to be a negative predictor of exercise for females.

One limitation of this research was the voluntary participant recruitment process. The student participants were given several alternative options to earn the course credit associated with the survey. A concern was that students most committed to exercise would choose to participate, however, a 91% response rate was achieved from all students enrolled in the participating course sections. A second study limitation was the use of an online survey to collect the data pertaining to exercise patterns and motivations. The researchers do not know for certain whether the respondents represented themselves accurately [38].

The study identifies the need to better understand extrinsic, in addition to intrinsic, exercise motivations. Self-determination theory research has demonstrated that extrinsic motivations are often not strong predictors of sustained exercise habits, however, studies have documented exceptions and discussed complexities that warrant further research. Participants in this sample demonstrated strong extrinsic motivations for exercise. Some were not predictive of exercise adherence, however, they reflect the values of the participants. Further research is needed to determine how those prominent extrinsic motivations can be developed into more self-determined reasons for exercise.

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Statement of Competing Interests

The authors have no competing interests.

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