

June 2018

Development and Validation of the Exercise Appearance Motivations Scale

Leah S. Boepple

University of South Florida, boepple@mail.usf.edu

Follow this and additional works at: <https://scholarcommons.usf.edu/etd>



Part of the [Clinical Psychology Commons](#)

Scholar Commons Citation

Boepple, Leah S., "Development and Validation of the Exercise Appearance Motivations Scale" (2018). *Graduate Theses and Dissertations*.

<https://scholarcommons.usf.edu/etd/7266>

This Dissertation is brought to you for free and open access by the Graduate School at Scholar Commons. It has been accepted for inclusion in Graduate Theses and Dissertations by an authorized administrator of Scholar Commons. For more information, please contact scholarcommons@usf.edu.

Development and Validation of the Exercise Appearance Motivations Scale

by

Leah S. Boepple

A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
Department of Psychology
College of Arts and Sciences
University of South Florida

Co-Major Professor: J. Kevin Thompson, Ph.D.
Co-Major Professor: Diana Rancourt, Ph.D.
Robert Dedrick, Ph.D.
Jamie Goldenberg, Ph.D.
Vicky Phares, Ph.D.

Date of Approval:
September 8, 2017

Keywords: fitness, health, psychometrics, body image, disordered eating

Copyright © 2018, Leah S. Boepple

TABLE OF CONTENTS

List of Tables	iv
List of Figures	v
Abstract	vi
Introduction.....	1
Exercise Motives.....	1
General Motives.....	1
Health-Based Motives.....	2
Appearance Motives	3
Weight-Specific Motivation.....	4
Body Ideal Motives.....	5
Social Comparison Motives.....	5
Moderators of Exercise Motives.....	6
Socio-demographic Moderators.....	6
Activity-based Moderators.....	7
Existing Measures of Exercise Reasons and Motives.....	8
Obligatory Exercise Questionnaire.....	8
Compulsive Exercise Test.....	8
Exercise and Eating Disorder Questionnaire	9
Intuitive Exercise Scale.....	9
Reasons for Exercise Inventory	9
Exercise Motivations Scale/Inventory	10
Exercise Motives and Gains Inventory	11
Function of Exercise Scale.....	11
Development of the Current Scale.....	12
Focus Groups	13
Pilot Testing.....	14
The Current Study.....	14
Method.....	15
Participants.....	15
General Measures.....	16
Demographic Information.....	16
Marlowe Crowne Social Desirability Scale: Short Form	16
The Exercise Appearance Motivations Scale	16
Measures Used in Construct Validation	17
Multidimensional Body-Self Relations Questionnaire: Appearance	

Evaluation Subscale	17
Physical Appearance Comparison Scale-Revised	18
Sociocultural Attitudes Towards Appearance Questionnaire-4.....	18
Obligatory Exercise Questionnaire	19
Eating Disorder Diagnostic Scale –DSM-5 Version	19
General Belief in a Just World Scale	19
Measures Used in Incremental Validation.....	20
Exercise Motivations Scale/Inventory: Weight Management/Appearance Motives Subscales.....	20
International Physical Activity Questionnaire	20
Procedure	21
Results.....	22
Preliminary Analyses	22
Missing Data Analysis	22
Initial Item Analysis.....	22
Exploratory Factor Analysis	23
Confirmatory Factor Analysis.....	24
Analysis of Sample Characteristics	26
Reliability.....	26
Construct Validity	27
Convergent Validity.....	27
OEQ	28
PACS.....	28
EDDS	28
SATAQ Thin Internalization	29
SATAQ Media Pressures.....	29
SATAQ Family Pressures.....	29
SATAQ Peer Pressures.....	30
SATAQ Muscular Internalization.....	30
MBSRQ.....	30
Discriminant Validity	31
Incremental Validity	31
Disordered Eating	32
Compulsive Exercise	33
Appearance Evaluation.....	34
Moderate Physical Activity.....	35
Vigorous Physical Activity.....	36
Discussion.....	37
Factor Analysis	37
Muscularity (i.e., “maintain the appearance of my muscle tone”).....	38
Appearance (i.e., “Look my best”)	38
Societal Pressures: (i.e., “Keep up a body similar to those in my social group”)	39

Shape/Weight: (i.e., “Avoid looking fat”)	39
Avoidance/Shame (i.e., “Avoid Guilt about the way I look”	40
Validation.....	40
Exercise.....	40
Disordered Eating	41
Appearance	42
Internalization: Body Ideals.....	44
Internalization: Sociocultural Pressures.....	45
Reliability.....	46
Limitations and Future Directions	47
Conclusions and Implications	50
References.....	69
Appendices.....	85
Appendix A: Demographic Information.....	85
Appendix B: Marlowe Crowne Social Desirability Scale: Short Form.....	86
Appendix C: The Exercise Appearance Motivations Scale.....	87
Appendix D: Multidimensional Body-Self Relations Questionnaire- Appearance Evaluation	88
Appendix E: Physical Appearance Comparison Scale –Revised (PACS-R).....	89
Appendix F: Sociocultural Attitudes Towards Appearance Questionnaire – 4.....	90
Appendix G: Obligatory Exercise Questionnaire	92
Appendix H: Eating Disorder Diagnostic Scale	93
Appendix I: General Belief in a Just World Scale.....	94
Appendix J: Exercise Motivations Scale: Appearance and Weight Management Subscales.....	95
Appendix K: International Physical Activity Questionnaire – Recreation, Sport, & Leisure Time Subscales	96
Appendix L: Permission Statement	97

LIST OF TABLES

Table 1: Eigenvalues obtained from Exploratory Factor Analysis	52
Table 2: Item Loadings for the Exploratory Factor Analysis Five Factor Solution.....	53
Table 3: Item Loadings for the Exploratory Factor Analysis Four Factor Solution	54
Table 4: Eigenvalues Obtained from Parallel and Exploratory Factor Analyses.....	55
Table 5: Confirmatory Factor Analysis Fit Indices.....	56
Table 6: Modification Fit Solution.....	57
Table 7: Exercise Appearance Motivations Scale Item Means (<i>min</i> = 1, <i>max</i> = 7).....	58
Table 8: Exercise Appearance Motivations Scale Composite Reliabilities	59
Table 9: Correlation Matrix of EAMS Subscales and Total Score and Construct Validation Measures	60
Table 10: Questionnaire Means	61
Table 11: Summary of Hierarchical Regression Analysis Predicting Disordered Eating (<i>n</i> = 325).....	62
Table 12: Summary of Hierarchical Regression Analysis Predicting Compulsive Exercise (<i>n</i> = 325).....	63
Table 13: Summary of Hierarchical Regression Analysis Predicting Appearance Evaluation (<i>n</i> = 325)	64
Table 14: Summary of Hierarchical Regression Analysis Predicting Moderate Activity (<i>n</i> = 325).....	65
Table 15: Summary of Hierarchical Regression Analysis Predicting Vigorous Activity (<i>n</i> = 325).....	66

LIST OF FIGURES

Figure 1: The Three Level Model of Exercise Behaviors	67
Figure 2: Exercise Appearance Motivations Scale Factor Solution.....	68

ABSTRACT

Exercise rooted in changing one's appearance is associated with increased disordered eating and body image pathology. There are a limited number of scales assessing appearance-based exercise, and those that do are methodologically flawed. The aim of the current work was to develop a psychometrically sound measure of appearance-based exercise (Exercise Appearance Motivations Scale (EAMS)). Female undergraduate students ($N = 650$) completed an online survey designed to assess the EAMS' psychometric properties. Factor analysis and hierarchical regressions were used for measure development and validation. Five factors of the EAMS were identified through factor analysis: muscularity, appearance, societal pressures, shape/weight, and avoidance/shame. Pearson product moment correlations were used to examine the associations between the EAMS and scales assessing convergent validity (appearance comparison, disordered eating, appearance evaluation, internalization of body ideals) and discriminant validity (belief in a just world). Results indicated that Cronbach's alpha ($\alpha = .94$) and test-retest reliability coefficients ($r = .77$) were adequate. The EAMS demonstrated adequate construct and incremental validity. These results provide preliminary evidence that the EAMS scale is a reliable and valid measure of appearance-based motives of exercise behavior when used with undergraduate women. Implications, limitations, and future research ideas are discussed.

INTRODUCTION

Qualitative literature suggests that women define health as “maintaining a balance between food and exercise in order to maintain a thin, idealized body” (Wright, O’Flynn, & MacDonald, 2006, p. 711). That is, for women, the concept of health emphasizes eating and exercise habits and these “healthy” habits are rooted in appearance norms. This is alarming as a growing body of literature suggests that the engagement of health behaviors (i.e. eating and exercise, and not other health-based behaviors such as sleep) for appearance purposes may contribute to body image and eating concerns (Maltby & Day, 2001; Prichard & Tiggemann, 2008; Putterman & Linden, 2004; Vartanian, Wharton & Green, 2012; Vinkers, Evers, Adriaanse, & de Ridder, 2012).

This dissertation investigates a scale assessing appearance-based motives of exercise behaviors. This scale is necessary, as there are currently no measures accurately assessing this construct. Exercise motives theory and previous scale work aided in this scale’s development.

Exercise Motives

General Motives

Common motives for exercise include health, fitness, stress reduction, enjoyment, and wellness (Aalton, Rottensteiner, Kaprio, & Kujala, 2014; Ebben &

Brudzysnski, 2008). While non-motive based aspects of exercise behavior (i.e., compulsive or obligatory exercise) have been linked to negative psychological outcomes, other existing research underscores the relationship between exercise motives and body image and eating pathology. Therefore, proper assessment of exercise motives may illuminate and clarify the relationships between exercise and body image and eating concerns.

Ingledeu and colleagues (2009; See Figure 1) developed the only existing model of exercise behavior to include motivation. Ingledeu's model suggests that differential motivations may result in similar behaviors (i.e., exercise). However, there is limited support for the ability of this model to accurately predict exercise behaviors (Ingledeu et al., 2009). The current study will focus on this model's second construct, i.e., exercise motives.

Health-Based Motives

The engagement of exercise for health-based reasons is negatively associated with body image concerns and endorsement of disordered eating (compared to those who exercise for appearance-motivated reasons; Gonçalves & Gomes, 2012; Vartanian et al., 2012), suggesting that exercising for one's health may possibly be protective against some aspects of body image concerns and associated behaviors. Health-motivated exercise theoretically has no relationship with the desire to alter body shape and weight.

Appearance Motives

Engaging in any behavior for appearance-motivated reasons is associated with negative psychological symptomatology in women. Results of a 2007 study suggest that, among individuals with overweight, those who lose weight for appearance-motivated, rather than health-motivated, reasons report lower self-esteem, lower appearance satisfaction, and lower body satisfaction (O'Brien et al.). Similarly, Vartanian and colleagues (2012) reported that appearance motives for weight loss mediate the relationship between internalization of thin ideals and body image concerns, suggesting that appearance motives for weight loss may contribute to disordered mindsets.

The pathway between appearance-based exercise and negative symptomatology in women resembles the pathway between general appearance-based behaviors and body image concerns. Appearance-based exercise predicts increased eating disorder symptomatology, lower body esteem, and greater self-objectification and body dissatisfaction in young adult women (Adkins & Keel, 2005; Boone & Brausch, 2016; Gonçalves & Gomes, 2012; O'Hara, Cox, & Amorose, 2014; Prichard & Tiggemann, 2008; Strelan, Mehaffey, & Tiggemann, 2003; Vartanian, et al., 2012; Vinkers et al., 2012). Vartanian and colleagues (2012) reported an association between appearance-motivated exercise and increased body image pathology (health-based exercise was not associated with such pathology), suggesting that appearance-motivated exercise performs a unique role in body-related psychopathology. Feelings of guilt are supported as a mediator of the pathway between appearance goals for exercise and lower body satisfaction (Hurst, Dittmar, Banerjee, & Bond, 2017), suggesting that psychological mindsets may underlie the relationship between appearance-based exercise and body

image concerns. Additional research suggests that women who exercise for appearance-motivated reasons are more likely to develop disordered thought patterns and feelings (e.g., guilt), following a missed period of exercise (Homan, 2010), implying that appearance motives themselves are associated with poorer psychological health, even when the behavior (i.e., exercise) is not completed. We can conclude from a review of this research that exercise motives may be crucial to understanding the relationship between body image pathology and exercise; thus, accurate and reliable assessment of exercise motives is critical. It is further necessary to review elements relevant to appearance-based exercise (described below) in order to fully comprehend this relationship.

Weight-Specific Motivation. Maintaining or losing weight is a common exercise motive. Women more frequently report weight-based reasons for exercise than men (Grogan, Conner, & Smithson, 2006; Ingledew & Sullivan, 2002). Weight-based motives are rooted in both non-appearance themes (i.e., cardiovascular health) and appearance themes (i.e., looking thinner). Existing research has not delineated appearance-related and non-appearance-related weight-based exercise. Current studies suggest that women and girls who engage in exercise for weight-related reasons report lower levels of body satisfaction and self-esteem, and higher body anxiety and disordered eating (Furnham, Badmin, & Sneade, 2002; Homan & Tylka, 2014; Lipsey, Barton, Hulley, & Hill, 2006; Sabiston & Chandler, 2009; Silberstein, Striegel-Moore, Timko, & Rodin, 1988). Given the research linking appearance-based exercise motives and body image psychopathology, accurate assessment of the reasons (i.e., appearance

vs non-appearance) underlying weight-based exercise motives may be critical in understanding the relationship between weight-based exercise and psychopathology.

Body Ideal Motives. As compared to general appearance concerns (i.e., concerns about one's skin tone; Crane et al., 2015), "body ideals" refer to specific, desired body types (e.g., thin and/or muscular ideals). Exercise rooted in the internalization of specific body ideals is associated with poorer psychological health in women (Karr et al., 2013). Internalization of athletic body ideals predicts greater endorsement of dieting, compulsive exercise, and higher bulimic symptoms in women (Bell, Donovan, & Ramme, 2016). Thin body and athletic body ideal internalization predict increased compulsive exercise (Homan, 2010), a component of disordered eating pathology associated with intensified eating disorder (ED) symptomatology (Shroff et al., 2006), longer ED inpatient treatment (Solenberger, 2001), and increased depression in patients suffering from both anorexia and bulimia (Peñas-Lledó, Vaz Leal, & Waller, 2002). Given these relationships, proper assessment of exercise rooted in specific body ideals may clarify the relationships between appearance-based exercise motives and psychopathology.

Social Comparison Motives. Body-focused social comparison is associated with higher body image and eating pathology (Fardouly, Diedrichs, Vartanian, & Halliwell, 2015; Fitzsimmons-Craft, Harney, Brownstone, Higgins, & Bardone Cone, 2012). Women who endorse more negative appearance evaluations report lower exercise engagement on days when they engage in higher body-related social comparisons (Pila, Barlow, Wrosch, & Sabiston, 2016). Social physique anxiety, defined as the anxiety that others are judging one's body, is a construct closely related to social comparison.

Women with higher levels of social physique anxiety report thinner body ideals and greater appearance dissatisfaction (Eriksson, Baigi, Marklund, & Lindgren, 2008; Thompson & Chad, 2002). Social physique anxiety is linked to higher exercise frequency (Frederick & Morrison, 1996) and exercise for appearance-based reasons is a risk factor for social physique anxiety (Crawford & Eklund, 1994; Krane, Waldron, Stiles-ShIPLEY, & Michalenok, 2001; Sabiston & Chandler 2009). Proper measurement of exercise based in social comparison may elucidate the relationships between exercise and disordered eating and body image pathology.

Moderators of Exercise Motives

Socio-demographic Moderators

Among women and girls, common exercise motives include losing weight and improving appearance, while men endorse motives associated with getting or staying fit, having fun, unwinding, losing weight and socializing (Gillison, Sebire, & Standage, 2012; Skov-Ettrup et al., 2014). Exercise motives do not vary widely across age groups (Annesi, 2002); however, children report exercising for excitement, improving skills, and challenge (Horga & Štimac, 1999), while older adults report exercising for physician recommendations, physical health, and physical fitness (Schutzer & Graves, 2004).

There is limited support for the variation of exercise motives across racial and ethnic groups. Among African American women, common motives include health concerns, weight control, stress reduction, and social influence (Young, Gittelsohn,

Charleston, Felix-Aaron, & Appel, 2001). Kolt and colleagues (2002) reported that, among older Asian Indians, men place more emphasis on exercising for social reasons. Other socio-demographic research proposes that homosexual men report appearance-based reasons for exercise to a higher degree than heterosexual men (Grogan et al., 2006); however, there is limited work examining exercise motives in the LBGTQ population.

Activity-Based Moderators

Exercise motives do not appear to vary by sport (Maïano, Morin, Lanfranchi, & Therme, 2015); however, one study linked yoga participation to lower self-objectification, and cardio to disordered eating and increased body dissatisfaction (Prichard & Tiggemann, 2008), suggesting that perhaps individuals with higher appearance-based exercise motives may less frequently engage in yoga and more frequently engage in cardio. In contrast, runners report exercise motives of training support, mutual connection to a cause, and improved fitness and athleticism (Jeffery & Butryn, 2012). Similar to age-related findings, older marathon runners report being motivated by general health, weight concerns, life meaning and community, while younger marathon runners are motivated by personal goal achievement (Ogles & Masters, 2000). Research is needed to clarify the relationships between athlete identification and exercise motives.

Existing Measures of Exercise Reasons and Motives

There are few existing measures of exercise behaviors. Some examine constructs relevant to exercise behaviors but do not examine motives for these behaviors, while others examine exercise motives in general. There is one current measure designed to assess for weight and appearance-based exercise motives. A detailed overview of these scales is provided below.

Obligatory Exercise Questionnaire

The Obligatory Exercise Questionnaire (OEQ; Pasman & Thompson, 1988) is a 10-item scale measuring compulsive exercise (i.e., exercise based in compulsion, guilt, and/or anxiety). The scale contains three factors: emotional element of exercise, exercise frequency or intensity, and exercise preoccupation. The OEQ has strong convergent validity, as demonstrated by its significant positive correlations with the Eating Disorder Inventory (EDI) and the Body Self Relations Questionnaire (BSRQ; Ackard, Brehm, & Steffen, 2002; Pasman & Thompson, 1988; Steffen and Brehm, 1999), but it does not measure motives of exercise behaviors.

Compulsive Exercise Test

The Compulsive Exercise Test (CET) is a 24-item scale measuring compulsive exercise (Taranis, Touyz, & Meyer, 2011). The CET has five factors: Avoidance and Rule-Driven Behavior, Weight Control Exercise, Mood Improvement, Lack of Exercise Enjoyment, and Exercise Rigidity. The CET has strong concurrent, convergent, and

predictive validity and excellent internal consistency (Swenne, 2016; Taranis, Touyz, & Meyer, 2011); however, it does not measure motives of exercise behaviors.

Exercise and Eating Disorders Questionnaire

The Exercise and Eating Disorders self-report questionnaire (EED; Danielson, Bjørnelv, & Rø, 2015) is an 18-item scale measuring aspects of compulsive exercise. The scale contains 4 factors: Compulsive Exercise, Positive and Healthy Exercise, Awareness of Bodily Signals, and Shape and Weight Exercise. The EMI has strong convergent validity and satisfactory reliability (Danielson, Bjørnelv, & Rø, 2015), but does not measure exercise motives.

Intuitive Exercise Scale

The Intuitive Exercise Scale (IES; Reel, Galli, Miyairi, Voelker, & Greenleaf, 2016) is a 14-item questionnaire assessing intuitive exercise (i.e., attending to psychological, rather than environmental, cues associated with exercise). The scale contains four subscales: Emotional Exercise, Body Trust, Exercise Rigidity, and Mindful Exercise. The IES is not yet validated and does not measure exercise motives.

Reasons for Exercise Inventory

The Reasons for Exercise Inventory (REI; Cash, Novy, & Grant, 1994) is a 24-item scale measuring motives of exercise behaviors. The scale contains four subscales: Appearance/Weight Management, Fitness/Health Management, Stress/Mood Management, and Socializing. The Appearance/Weight Management subscales contain

8 items (“to improve my appearance”, “to lose weight”, “to improve my over-all body shape”, “to be slim”, “to be attractive to members of the opposite sex”, “to be sexually desirable”, “to redistribute my weight”, and “to alter a specific area of my body”). While the REI has good convergent validity, the authors provide no support for item inclusion and other measure development decisions and there is a lack of broader psychometric support. Further, the REI conflates appearance and weight loss/management motivations, and weight loss/management and appearance are not necessarily related (i.e., losing weight to lower one’s risk of developing diabetes).

Exercise Motivations Scale/Inventory

The Exercise Motivations Scale/Inventory (EMS or EMI; referred to as “EMI” within this paper) is a 44-item scale measuring motives of exercise behaviors (Silberstein et al., 1988). The scale contains 12 factors: Stress Management, Weight Management, Recreation, Social Recognition, Enjoyment, Appearance, Personal Development, Affiliation, Ill-Health Avoidance, Competition, Fitness, and Health Pressures. The EMI has strong reliability and validity (Markland & Hardy, 1993; Markland & Ingledew, 1997) and contains a subscale assessing appearance motives (four items: “to help me look younger”, “to have a good body”, “to improve my appearance”, and “to look more attractive”). Unfortunately the scale development is flawed. To develop items, individuals were queried on the three main reasons they exercise; these reasons were then used to generate the scale items. Given the lack of specific attention and prompts regarding appearance motives, and given the limited

number of appearance items, it is likely that some constructs related to appearance are missing from the scale.

Exercise Motives and Gains Inventory

The Exercise Motives and Gains Inventory (EMGI; Strömmer, Ingledew, & Markland, 2015) is a 102-item scale assessing motives of exercise behaviors and gains. The scale contains 14 subscales: Affiliation, Appearance, Challenge, Competition, Enjoyment, Health Pressures, Ill Health Avoidance, Nimbleness, Positive Health, Revitalization, Stress Management, Social Recognition, Strength and Endurance, and Weight Management. The Appearance subscale contains four items: “to help me look younger”, “to have a good body”, “to improve my appearance”, and “to look more attractive”. The Weight Management subscale contains four items: “to stay slim”, “to lose weight”, “to help control my weight”, “because exercise helps me to burn calories”. The EMGI is not yet validated and the scale development is poor. The authors provide no support of item inclusion decisions. Further, the length of the questionnaire is burdensome.

Function of Exercise Scale

The Function of Exercise Scale (FES) is a 16-item scale measuring exercise motives (Dibartolo, Lin, Montoya, Neal, & Shaffer, 2007; Markland & Hardy, 1993; Markland & Ingledew, 1997). The scale contains two factors: Health and Enjoyment, and Weight and Appearance. The Weight and Appearance subscale contains nine items (i.e., “I exercise to work off unwanted calories”, “I exercise because I want to be thin”).

The scale has good evidence of validity and reliability; however, scale development is inadequate, as items were generated solely through a literature review. Perhaps given the lack of adequate scale development, a few of the appearance items are discordant from appearance (“I need to exercise after eating unhealthy foods”, “I feel bad about myself if I don’t exercise”). The scale further conflates “weight loss” and “appearance” (see the REI section).

Development of the Current Scale

Given the weaknesses of the scales that are intended to capture exercise reasons and motives, this project sought to develop a scale that would accurately and comprehensively examine appearance-based motives of exercise behaviors. The Exercise Appearance Motivations Scale (EAMS) was developed using procedures outlined by Crocker and Algina (1986) and DeVellis (2003). To develop this scale, first, the author examined literature on exercise behaviors and attitudes. This literature search was conducted through the University of South Florida’s “psycinfo” database, using keywords “exercise appearance”, “exercise motivations”, and “exercise motives”. A test blueprint (a tool ensuring each parameter of the scale is measured by the scale) was constructed prior to the creation of items to ensure that each topic of interest (e.g., exercise for general appearance-motivated reasons) was represented in the item sample. This process resulted in an initial sample of 100 items. Of note, the initial item pool was larger than necessary, and some of the items were repetitive.

An expert panel of three judges rated the initial pool of items. The judges were graduate students in clinical psychology, in the research area of eating and weight

disorders. Through this process, the number of items was parsed down into a reasonable set that was perceived to accurately represent the intended construct. The judges also identified problems associated with any item, such as grammar or inaccuracy of the construct. Items were removed or revised if the judges deemed there were insufficient categories for the items, or if the question did not appear that it would not produce enough variation in participant responses. This process resulted in an initial pool of 48 items.

Focus Groups

To further refine the initial pool of items, focus groups were conducted ($N = 6$) to assess young adults' ideas about exercise motivations (Monographs, 2012). Participants were 30 University of South Florida (USF) female undergraduate students. Eighty-four percent of the sample exercised at least 4 times per week. Research assistants (RAs) asked focus group participants to “think aloud” as they answered open-ended questions relevant to the construct (i.e., why do you exercise?) and took notes on general themes that emerged. Once the discussion concluded, participants were instructed to “write freely” on their motives to engage in exercise. Participants then examined the initial pool of items for issues related to wording and missing themes.

Nine exercise-motive themes emerged from the focus group discussions. Four of these motives were based in exercise/appearance themes (italicized): Being stronger/healthier, *improving general appearance*, *specific appearance-based body ideals*, *appearance-based societal pressures*, stress management, *weight*

loss/maintenance (this included both appearance and non-appearance-based weight themes), challenging oneself, eating more calories, and relieving guilt.

After examining these themes, the initial pool of items was revised to ensure that each of the appearance-based themes highlighted by the focus groups was included in the sample of items. Extraneous themes and associated items were removed from the scale.

Pilot Testing

Items were then pilot tested with another group of undergraduate females ($N = 12$). Participants were queried for item confusion, inaccuracy, or issues with scale type. This resulted in a final pool of 32 items. Finally, descriptive statistics were examined to determine whether there was appropriate variation across the responses.

The Current Study

This study explored the factor structure and validation of a scale assessing appearance-based motives of exercise behaviors. The scale was designed for use in a general (non-clinical) population. As research suggests women report appearance as an exercise motive more frequently than men (Gillison et al., 2012; Skov-Ettrup et al., 2014), this scale was validated in a female sample.

METHOD

Participants

Participants were 748 University of South Florida women recruited through the USF undergraduate participant pool (SONA). Eligible participants were between the ages of 18 and 30, female, able to give informed consent, and fluent in English. Individuals less than 18 years of age and males were ineligible to participate. SONA points were awarded to participants in exchange for their participation.

Fifty-one percent of the sample (51.4%) identified as White, 10.9% identified as Black/African American, 10.2% identified as Asian, 16.8% identified as Hispanic/Latina, 9.8% identified as 'other', .8% identified as Hawaiian Native or other Pacific Islander, and .2% identified as American Indian or Alaskan Native. The average age of participants was 20.38 ($SD = 3.09$) and the average BMI was 24.09 ($SD = 5.28$; healthy weight status). Twenty-seven percent (27.38%) identified as college Freshman, 22.30% as Sophomores, 25.85% as Juniors, 22.76% as Seniors, and 1.3% as advanced students (5th year or above).

Adequate solutions for Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) require 5 to 10 participants per variable (Floyd & Widaman, 1995; Streiner, 1994). The scale under examination contained 32 items, thus, the sample size was deemed adequate for EFA and CFA analysis.

General Measures

Demographic Information

Participants were queried on demographic information including age, gender, race/ethnicity, height, weight, athlete identification, and year in school. Body Mass Index (BMI) was calculated through participants' self-reported weight (in pounds) and height (in inches).

Marlowe Crowne Social Desirability Scale: Short Form

The Marlowe Crowne Social Desirability Scale: Short Form (MC-SDS; Crown and Marlowe, 1960) measures social desirability, and was used to assess participants' truthfulness on questionnaire items. Alpha in the current sample was .64. The scale contains 13 items (e.g., I sometimes get resentful when I don't get my own way) and employs true or false scaling. Higher scores indicate higher social desirability bias, a common error in survey development (Crowne & Marlowe, 1960). Significant correlations between the EAMS and MC-SDS would indicate that the EAMS may be susceptible to social desirability bias. The MC-SDS short form has high internal consistency reliability and convergent validity (Reynolds, 1982).

The Exercise Appearance Motivations Scale

This study investigates the factor structure and validation of the Exercise Appearance Motivations Scale. Scale items were written English, thus, the measure is best suited for native English speakers. Additionally, items were based on U.S. cultural

norms and the scale is therefore best suited for Americans and may be appropriate for individuals in other Westernized cultures.

The EAMS contains 32 items that are scored using a Likert-type scale, with responses ranging from 1 to 7, where 1 indicates *definitely disagree* and 7 indicates *definitely agree*. Higher scores indicate greater endorsement of appearance-based motives for exercise. Subscale scores are the total sum of each subscales' item scores.

Measures Used in Construct Validation

Multidimensional Body-Self Relations Questionnaire: Appearance Evaluation Subscale

The appearance evaluation subscale of the Multidimensional Body-Self Relations Questionnaire (MBSRQ; Brown, Cash, & Mikulka, 1990) was used to assess appearance evaluation (alpha in the current sample was .91); i.e., ones' happiness and satisfaction with appearance). The scale has seven items (e.g., I like my looks just the way they are) measured on a five-point Likert-type scale, where 1 indicates *definitely disagree* and 5 indicates *definitely agree*. Higher scores indicate higher body satisfaction. The MBSRQ has high internal consistency and 1-month test-retest reliability (Ackard et al., 2002).

Physical Appearance Comparison Scale-Revised

The Physical Appearance Comparison Scale Revised (PACS-R; Schaefer & Thompson, 2014) measures appearance comparison. Alpha in the current sample was .96. The PACS-R contains 11 items (e.g., When I'm out in public, I compare my physical appearance to the appearances of others) measured on a 5-point Likert-type scale, where 0 indicates *never* and 5 indicates *always*. Higher scores indicate higher levels of appearance comparison. The PACS-R has high internal consistency, and high convergent validity with other measures of body satisfaction and self-esteem (Schaefer & Thompson, 2014).

Sociocultural Attitudes Towards Appearance Questionnaire-4

The Sociocultural Attitudes Towards Appearance Questionnaire-4 (SATAQ-4; Schaefer et al., 2015) measures internalization of thin and muscular ideals. Alphas in the current sample were .81 (thin internalization); .95 (media pressure); .83 (family pressure); .89 (peer pressure); .82 (muscular internalization). The scale contains 30 items (e.g., It is important for me to look athletic) and employs a Likert-type scale with answers ranging from 1 (*Definitely Disagree*) to 5 (*Definitely Agree*). Higher scores indicate greater endorsement of body ideal internalization. The SATAQ-4 scale has high reliability, and high convergent validity with body image, eating disturbance, and self-esteem measures (Schaefer et al., 2015).

Obligatory Exercise Questionnaire

The Obligatory Exercise Questionnaire (OEQ; Thompson & Pasman, 1991) measures compulsive exercise. Alpha in the current sample was .91. The scale contains 20 items (e.g., When I don't exercise I feel guilty), and uses Likert-type scaling, with answers ranging from *Never* to *Always*. Higher Scores indicate higher endorsement of compulsive exercise. The OEQ has high internal consistency and test-retest reliability (Thompson & Pasman, 1991).

Eating Disorder Diagnostic Scale – DSM-5 Version

The Eating Disorder Diagnostic Scale (EDDS; Stice, Telch & Rizvi, 2000) assesses disordered eating symptoms. Alpha in the current sample was .78. The scale contains 22 items (e.g. How many times per week over the past three months have you made yourself vomit to prevent weight gain or counteract the effects of eating?), with varying response types, including a Likert-type scale ranging from 0 (*not at all*) to 6 (*extremely*), dichotomous responses, and filter/contingency questions. Higher scores indicate greater endorsement of disordered eating symptoms. The EDDS - DSM- 4 version has high internal consistency ($\alpha = .89$ across reported populations) and test-retest reliability (Stice et al., 2000; Stice, Fisher, & Martinez, 2004). The EDDS – DSM – 5 version is based on DSM-5 criteria and has not yet been validated.

General Belief in a Just World Scale

The General Belief in a Just World Scale (GBJW) measures general belief in a just world (Dalbert, Montada, & Schmitt, 1987). Alpha in the current sample was .79.

The scale contains 6 items (e.g., I am confident that justice always prevails over injustice) and employs a Likert-type scale with answers ranging from 1 (*Strongly Disagree*) to 6 (*Strongly Agree*). Higher scores indicate greater belief in a just world. The GBJW has strong construct validity (Dalbert, 1999).

Measures Used in Incremental Validation

Exercise Motivations Scale/Inventory: Weight Management/Appearance Motives Subscales

The Exercise Motivations Scale/Inventory (EMI; Silberstein et al., 1988) measures exercise motives. Alphas in the current sample were .81 (appearance) and .87 (weight). The weight management and appearance motives subscales were used in the incremental validation process. The scale contains 44 items and employs a Likert-type scale with answers ranging from 0 (*Not at all true for me*) to 5 (*Very true for me*). The EMI has moderate to strong reliability and validity (Markland & Hardy, 1993; Markland & Ingledew, 1997).

International Physical Activity Questionnaire

The International Physical Activity Questionnaire (IPAQ; Booth, 2000) measures physical activity over a wide range of domains, and was used to assess participant moderate and vigorous exercise level. The IPAQ contains five sections. The “Recreation, Sport, and Leisure Time Physical Activity”, which measures time spent on sport and recreation, was included in this study. Response types vary between

dichotomous responses and open-ended questions (e.g., During the last seven days on how many days did you do vigorous physical activities like aerobics, running, fast bicycling, or fast swimming in your leisure time?). Higher scores indicate more time spent on moderate and vigorous physical activities. The IPAQ has acceptable validity (Hagströmer, Oja, & Sjöström, 2007), and test-retest reliability (spearman's $p = .80$; Craig et al., 2003).

Procedure

Six-hundred and fifty participants completed the study online (i.e., in a laboratory setting) at an external survey collection website, Qualtrics. Consent was obtained electronically for these participants, after which participants completed the survey electronically.

To measure test-retest reliability, 98 participants (15% of 650) of participants completed paper-and-pencil testing in groups, in a laboratory setting. RAs reviewed informed consent with these participants, after which these participants completed the survey in paper and pencil format. Approximately two weeks later, these participants (retention rate = 93.87%) returned to the lab and completed the EAMS a second time.

Both online and in person participants were fully debriefed upon completion of the survey. All participants were given information regarding the counseling center and credited for their study participation through SONA. Analyses were conducted through MPLUS. SPSS and R were supplemented in (rare) instances where MPLUS could not perform a test (i.e., scree plot, parallel analysis).

RESULTS

Preliminary Analyses

Missing Data Analysis

Of the 650 online survey participants, 644 participants had complete data on all survey items, barring demographics and IPAQ data. Each of the 6 participants missing data was only missing one data point. Thus, missing data was minimal enough that imputation was not warranted. Listwise deletion was employed in analyses using questionnaires from which data was missing (i.e., two participants were missing data on the EDDS. These two participants were removed from analyses with the EDDS).

Initial Item Analysis

Prior to conducting validation and factor analytic strategies, the initial item structure of EAMS item responses was examined, as suggested by Clark and Watson (1995). Items were first examined for issues with skewness and kurtosis. No such items were identified as being problematic; thus no items were removed from the scale for issues related to skewness and kurtosis. Item-total correlations also were examined. All item-total correlations were above .30, suggesting that EAMS items had strong correlations with other EAMS scale items (Clarke & Watson, 1995). Finally, to rule out social desirability bias, correlations between the MC-SDS and the EAMS items and total

score were examined. These correlations were all below .3, suggesting low social desirability bias error.

Exploratory Factor Analysis

Following examination of the item structure, the sample was split in half, a common procedure in scale validation (Woods & Edwards, 2008). First, an exploratory factor analysis (EFA), using Promax Oblique Rotation and principle axis factoring was conducted with approximately half of the sample. Any emerging factors were theorized to be highly correlated, and thus, an oblique, rather than orthogonal, rotation was employed.

Factor retention was based on the examination of a number of indicators. First, the scree plot was visually examined, to identify significant changes in the slope of the line (Cattell, 1966). Visual examination of the scree plot indicated a retention rate between 4 and 5 factors. The Kaiser-Guttman criterion (factors with eigenvalues equal to or greater than 1.0 are retained; Guttman, 1954; Kaiser, 1960) was then used to investigate the eigenvalues. Five of the EFA eigenvalues were above 1, indicating that five factors should be retained. These eigenvalues can be found in Table 1.

Additionally, Horn's Parallel Analysis (Horn, 1965) was conducted. In Horn's Parallel Analysis, eigenvalues are extracted from random data sets (generated through parallel analysis). These values are then judged against the original eigenvalues (i.e., from our observed data set). If an eigenvalue from the random data is lower than the eigenvalue from actual data, the factor is retained (O'Conner, 2000). The results of the parallel analysis suggested that 4 factors should be retained. Item loadings for the five-

factor and four-factor solutions can be found in Tables 2 & 3. The eigenvalues obtained from the parallel analysis are presented in Table 4.

Factor loadings within the four- and five-factor models next were inspected. In the four-factor solution, 2 items had excessive cross loadings ($>.3$), and 2 items had low factor loadings ($<.4$), indicating that these four items should be removed from the scale (Cicero, Kerns, & McCarthy, 2010; Floyd & Widaman, 1995; Ford, MacCullum, & Tait, 1986). In the five-factor solution, 3 items had excessive cross loadings and 4 had low factor loadings, indicating that seven items should be removed from the scale. The author's decision to employ the four-factor or five-factor solution is detailed in the confirmatory factor analysis section, below.

Confirmatory Factor Analysis

To further examine the factor structure identified by the EFA, a Confirmatory Factor Analysis (CFA), using maximum likelihood estimation, was estimated using the second half of the split sample. All subsequent reliability and validity analyses also used this second sample. To be conservative, a CFA with the four-factor solution (deleting the 4 suggested items from the EFA analyses) was estimated first, but the fit was not adequate and the use of modification indices did not improve the four-factor model fit. The five-factor solution next was examined, excluding 6 of the 7 items suggested in the EFA analyses. Although statistically all seven of the items were good candidates for removal, theoretically, only six could be justifiably excluded. The retained item "avoid looking bloated" loaded highly on two different factors, however, it is a unique construct

not represented by other scale items and can be supported by theory (Dibartolo et al., 2007). Removing these 6 items led to a final scale of 26 items.

Model fit was evaluated using multiple fit indices. Good fit is indicated by standardized root-mean-square residual (SRMR) values of less than .5, and root-mean-square error of approximation (RMSEA) values of less than .08 (Browne & Cudeck, 1993; Byrne, 1998). Likewise, comparative fit index (CFI) values of higher than .90 indicate good model fit (Bentler, 1990). Model fit was initially poor, $\chi^2(289) = 2258.09$, $p < .001$, CFI = .87, RMSEA = .10, SRMR = .07. In order to improve the model fit, residuals of 5 items were covaried. Item residuals were covaried only when it theoretically made sense to do so (ex: “Maintain an appearance I am proud of” with “maintain an appearance I am happy with”). Covarying these residuals produced a model with good fit, $\chi^2(284) = 1444.98$, $p < .001$, CFI = .924, RMSEA = .079, SRMR = .069. See Tables 5 & 6 for fit indices and modification fit solution.

Of note, the chi-square value was significant. Caution was used when interpreting the chi-square value, as chi-square values are disposed to be large (indicating poor model fit), when used with larger sample sizes (i.e., 400 or more cases). The current sample size is large enough that it would be difficult to obtain a non-significant chi-square, thus the current significant chi-square statistics is not a reflection of poor model fit.

The results of factor analysis indicate that the EAMS contains five supported subscales: Muscularity (“maintain the appearance of my muscle tone”); Appearance: (“Look my best”); Societal Pressures: (“Keep up a body similar to those in my social

group”); Shape/Weight: (“Avoid looking fat”); and Avoidance/Shame (“Avoid guilt about the way I look”; See Figure 2 for the EAMS’ factor solution).

Analysis of Sample Characteristics

EAMS item means ranged from 3.71 to 5.99. The average EAMS item mean was 5.26. The average total score was 136.84 ($SD = 25.18$), indicating that, on average, participants report moderate levels of appearance-based motivates for exercise. All EAMS items had all response options used. See Table 7 for EAMS item means.

Reliability

Cronbach’s alpha ($EMSTotal\alpha = .94$; $muscularity\alpha = .89$; $appearance\alpha = .93$; $societalpressures\alpha = .86$; $shape/weight\alpha = .94$; $avoidance/shame\alpha = .87$) was examined to assess for internal consistency. Alpha values of .70 indicate acceptable internal consistency reliability (Bland & Altman, 1997). Pearson correlation coefficients were calculated to examine two-week test-retest reliability ($r = .77$). Correlations of .70 or higher indicate good test-retest reliability (Terwee, Mokkink, Knol, Ostelo, Bouter, & de Vet, 2012). Retention analyses also were conducted by comparing individuals who completed the survey at both time 1 and time 2 with those who only completed the survey at time 1. The group means (those who completed only time 1, versus those who completed both time 1 and time 2), did not significantly differ at time 1 ($p = .935$). Finally, composite reliabilities ($M\alpha < \text{than } .788$), an alternative to Cronbach’s alpha, were calculated and suggested that factor composites had adequate to strong reliability. Overall, these results suggest that

the EAMS has strong internal consistency and test-retest reliability in a sample of undergraduate females. See Table 8 for composite reliabilities.

Construct Validity

Construct validity is the ability of a measurement tool, or scale, to accurately measure the concept examined by the scale. In examining the construct validity of the EAMS, observed scores were used to calculate correlation coefficients for convergent and discriminant validity (the components comprising construct validity). It should be noted that construct validity can also be computed within the CFA analysis. The construct validation method employed in this study is the most common; however, it does not take into account measurement error. Both methods, however (correlation matrix and CFA), are susceptible to method effect errors.

The results of our analyses suggest evidence of construct validity (please see the detailed description below). See Tables 9 & 10 for the correlation matrix and questionnaire means.

Convergent Validity

Convergent validity demonstrates that a scale is related to measures to which it should be related; thus, correlations were calculated between the EAMS total score and OEQ, MBSRQ, EDDS, PACS-R, and SATAQ-4 scores. Effect sizes were based on Cohen (1998): .1 = small, .3 = medium, and .5 or more = large.

OEQ

All EAMS factors and total score were significantly positively correlated with the OEQ ($EAMS_{total}r = .36, p < .01$; $F_{1r} = .40, p < .01$; $F_{2r} = .29, p < .01$; $F_{3r} = .22, p < .01$; $F_{4r} = .24, p < .01$; $F_{5r} = .28, p < .01$), suggesting that individuals who report higher amounts of compulsive exercise report higher levels of appearance-based motivation for exercise.

PACS

The EAMS total score and all factors except Muscularity were significantly positively correlated with the PACS ($EAMSTotalr = .45, p < .01$; $F_{1r} = -.30, p = .58$; $F_{2r} = .20, p < .01$; $F_{3r} = .49, p < .01$; $F_{4r} = .44, p < .01$; $F_{5r} = .42, p < .01$), indicating that individuals who report higher levels of physical appearance comparison report higher levels of appearance-based motivations for exercise, except for muscularity-appearance based reasons.

EDDS

The EAMS total score and all factors except Muscularity were significantly positively correlated with the EDDS ($EAMStotalr = .22, p < .01$; $F_{1r} = -.10, p = .06$; $F_{2r} = .17, p < .01$; $F_{3r} = .27, p < .01$; $F_{4r} = .22, p < .01$; $F_{5r} = .27, p < .01$), indicating that women who report greater disordered eating symptoms report higher levels of appearance-based motivation for exercise, except for muscularity-appearance based reasons.

SATAQ Thin Internalization

The EAMS total score and all factors except Muscularity were significantly positively correlated with the SATAQ Thin Internalization subscale ($EAMS_{total}r = .40, p < .01$; $F_{1r} = .04, p = .49$; $F_{2r} = .30, p < .01$; $F_{3r} = .30, p < .01$; $F_{4r} = .36, p < .01$; $F_{5r} = .42, p < .01$), suggesting that women who internalize the thin ideal to a greater degree report higher levels of appearance-based motivation for exercise, except for muscularity-appearance based reasons

SATAQ Media Pressures

The EAMS total score and all factors except Muscularity were significantly positively correlated with the SATAQ Media Pressures subscale ($EAMS_{total}r = .30, p < .01$; $F_{1r} = .01, p = .90$; $F_{2r} = .22, p < .01$; $F_{3r} = .24, p < .01$; $F_{4r} = .26, p < .01$; $F_{5r} = .29, p < .01$). This indicates that women who report higher levels of media-based appearance pressures report higher levels of appearance-based motivation for exercise related to their general appearance, shape/weight concerns, societal pressures, and avoidance/shame.

SATAQ Family Pressures

The EAMS Appearance and Avoidance/Shame subscale were positively significantly correlated with the SATAQ Family Pressures subscale ($EAMS_{total}r = .11, p = .05$; $F_{1r} = .06, p = .24$; $F_{2r} = .13, p < .05$; $F_{3r} = .01, p = .91$; $F_{4r} = .07, p = .23$; $F_{5r} = .13, p < .05$). This suggests that women who report family-based appearance pressures to

a higher degree report higher levels of appearance-based motivation for exercise related to general appearance and appearance-based avoidance/shame.

SATAQ Peer Pressures

The EAMS Appearance subscale was positively significantly correlated with the SATAQ Peer Pressures subscale ($EAMS_{totalr} = .04, p = .48$; $F_{1r} = .07, p = .23$; $F_{2r} = .12, p < .05$; $F_{3r} = -.02, p = .75$; $F_{4r} = -.01, p = .94$; $F_{5r} = -.01, p = .97$), suggesting that women who report peer-based appearance pressures to a higher degree report higher levels of appearance-based motivation for exercise related to general appearance.

SATAQ Muscular Internalization

The EAMS total score and all factor scores except Societal Pressures were significantly positively correlated with the SATAQ Muscular Internalization subscale ($EAMS_{totalr} = .16, p < .01$; $F_{1r} = .17, p < .01$; $F_{2r} = .14, p < .05$; $F_{3r} = .02, p = .67$; $F_{4r} = .12, p < .05$; $F_{5r} = .20, p < .05$), suggesting that women who report higher levels of muscular-based appearance motivation report higher levels of muscular appearance-based motivation for exercise, except for societal pressure-appearance based reasons.

MBSRQ

Finally, EAMS total and subscales scores were not significantly correlated with the MBSRQ ($EAMS_{totalr} = -.01, p = .82$; $F_{1r} = -.01, p = .92$; $F_{2r} = .06, p = .31$; $F_{3r} = -.01, p = .81$; $F_{4r} = .05, p = .42$; $F_{5r} = .08, p = .14$).

Discriminant Validity

Discriminant validity demonstrates that a scale is unrelated to measures to which it should not be theoretically related. To determine whether the EAMS scale has strong discriminant validity, correlations were conducted between the EAMS and a scale to which it should not be related (e.g., belief in a just world; the GBJW). EAMS subscale and total scores were not significantly correlated with the GBJW ($EAMS_{total}r = .06, p = .31$; $F_1r = .09, p = .13$; $F_2r = .06, p = .27$; $F_3r = .03, p = .60$; $F_4r = -.01, p = .88$; $F_5r = .03, p = .54$).

Incremental Validity

Incremental validity is “the gain in validity resulting from adding one or more new predictors to an existing selection system” (Sackett & Lievens, 2008, p. 424). Given that our measure may examine an aspect of exercise motives, it is critical to establish the degree to which this questionnaire adds to the predictive ability of current exercise motivation measurement (i.e., the EMI, see above). Incremental validity is measured through hierarchical multiple regression (Bergeron & Tylka, 2007; Giovannelli, Cash, Henson, & Engle, 2008). Significant changes in the R-square suggest adequate incremental validity. Incremental validity was established through the prediction of theoretically relevant constructs (i.e., compulsive exercise, disordered eating, moderate and vigorous physical activity, and appearance evaluation) from the EAMS. To assess the incremental validity of the EAMS, all regression analyses were conducted with the EMI subscales (Weight Management and Appearance) entered into the first step of the analyses and the EAMS total score entered into the second step of the regression. We

selected the outcome variables (i.e., appearance evaluation, disordered eating, and exercise) based on their existing relationships with appearance-based exercise. Prior literature links appearance-based exercise and appearance dissatisfaction, compulsive exercise, and disordered eating (Chalk, Miller, Roach, & Schultheis, 2013; Prichard & Tiggemann, 2008; Tylka & Homan, 2014; Vartanian et al., 2012; White & Halliwell, 2010).

Disordered Eating

In predicting disordered eating, all tolerance values were .29 or higher and all variance inflation factor values were 3.51 or lower. Therefore, multicollinearity was not an issue. The results of step 1 indicated that EMI Weight Management and EMI Appearance accounted for a significant amount of the variance in disordered eating, $R^2 = .03$, $F(2, 322) = 4.37$, $p < .05$. Neither of the predictors entered at step 1 was a significant predictor of disordered eating. The EAMS was entered into the regression equation at step 2. Results indicate that the EAMS accounted for a significant proportion of the variance in disordered eating after entering EMI Weight Management and EMI Appearance, R^2 change = .02, $F(3, 321) = 8.04$, $p < .01$. The EAMS was a significant predictor of disordered eating, $\beta = .20$, $p < .01$ (see Table 11 for results of the regression analysis). Comparison of the standardized regression coefficients (beta weights) in step 2 indicates that EAMS total score had the greatest predictive ability of all the variables entered into the regression equation. These results support the incremental validity of the EAMS in predicting disordered eating among college women.

It is notable that the EMI Weight Management and Appearance subscales had positive bivariate correlations with disordered eating, but received non-significant beta-weights in the regression analysis. EMI Weight Management had a positive correlation with disordered eating ($r = .16, p < .01$), but was not a significant predictor in the regression equation ($\beta = .16, p = .095$). EMI Appearance had a positive correlation with disordered eating ($r = .13, p < .01$), but was not a significant predictor in the regression equation ($\beta = -.03, p = .745$). These results indicate that exercise based in weight management and appearance (as measured by the EMI) is not related to disordered eating when controlling for exercise rooted in appearance concerns as measured by the EAMS, suggesting that after controlling for appearance-based reasons measured by the EAMS, there is no association between exercise for weight-related and appearance reasons (as measured by the EMI) and disordered eating.

Compulsive Exercise

In predicting compulsive exercise, all tolerance values were .29 or higher and all variance inflation factor values were 3.5 or lower, signifying that multicollinearity was not a problem. The results of step 1 in the analysis indicated that EMI Weight Management and EMI Appearance accounted for a significant amount of the variance in compulsive exercise, $R^2 = .13, F(2, 322) = 23.53, p < .001$. EMI Appearance was a significant predictor; however, EMI Weight Management did not significantly predict compulsive exercise. The EAMS was entered into the regression equation at step 2. Results indicate that the EAMS accounted for a significant proportion of the variance in compulsive exercise after entering EMI Weight Management and EMI Appearance, R^2

change = .06, $F(2, 321) = 22.32, p < .001$. The EAMS was a significant predictor of compulsive exercise, $\beta = .31, p < .001$ (see Table 12 for results of the regression analysis). Comparison of the standardized regression coefficients in step 2 suggested that EMI Appearance had the greatest predictive ability of all of the variables entered into the regression equation, followed closely by EAMS total score. These results support the incremental validity of the EAMS in predicting compulsive exercise among college women.

Of note, the EMI Weight Management subscale had a positive bivariate correlation with compulsive exercise, but received a non-significant beta-weight in the regression analysis. EMI Weight Management had a positive correlation with compulsive exercise ($r = .23, p < .001$), but was not a significant predictor in the regression equation ($\beta = -.16, p = .075$). These results indicate that exercise based in weight management is not related to compulsive exercise when controlling for exercise rooted in appearance concerns as measured by the EMI, suggesting that after controlling for appearance-based reasons, there is no association between exercise for weight-related reasons and compulsive exercise.

Appearance Evaluation

In predicting appearance evaluation, all tolerance values were .29 or higher, and all variance inflation factor values were 3.5 or lower, indicating that multicollinearity was not an issue. The results of step 1 in the analysis indicated that EMI Weight Management and EMI Appearance did not account for a significant amount of the

variance in appearance evaluation, $R^2 = .01$, $F(2, 322) = 1.29$, $p = .28$. EMI Appearance and EMI Weight Management were not significant predictors of appearance evaluation. The EAMS was entered into the regression equation at step 2. Results indicate that the EAMS did not account for a significant proportion of the variance in appearance evaluation after entering Weight Management and Appearance, R^2 change = .00, $F(3, 321) = .01$, $p = .46$. The EAMS was *not* a significant predictor of appearance evaluation, $\beta = -.01$, $p = .91$ (see Table 13 for results of the regression analysis).

Moderate Physical Activity

In predicting moderate physical activity over the month, all tolerance values were .29 or higher and all variance inflation factor values were 3.51 or lower, indicating that multicollinearity was not an issue. The results of step 1 in the analysis suggested that EMI Weight Management and EMI Appearance did not account for a significant amount of the variance in moderate physical activity, $R^2 = .009$, $F(2, 322) = 1.5$, $p = .22$. EMI Appearance and EMI Weight Management were not significant predictors of moderate physical activity. The EAMS was entered into the regression equation at step 2. Results indicate that the EAMS accounted for a significant proportion of the variance in moderate physical activity after entering Weight Management and Appearance, R^2 change = .02, $F(3, 321) = 4.37$, $p < .05$. The EAMS was a significant predictor of moderate physical activity, $\beta = .15$, $p < .05$ (see Table 14 for results of the regression analysis). These results further support the incremental validity of the EAMS in predicting moderate physical activity among college women.

Vigorous Physical Activity

In predicting vigorous physical activity over the month, all tolerance values were .29 or higher and all variance inflation factor values were 3.51 or lower, indicating that multicollinearity was not an issue. The results of step 1 in the analysis indicated that EMI Weight Management and EMI Appearance did not account for a significant amount of the variance in vigorous activity, $R^2 = .01$, $F(2, 322) = 2.75$, $p = .07$. EMI Appearance was a significant predictor of vigorous activity, but EMI Weight Management was not. The EAMS was entered into the regression equation at step 2. Results indicate that the EAMS accounted for a significant proportion of the variance in vigorous activity after entering EMI Weight Management and EMI Appearance, R^2 change = .014, $F(3, 321) = 4.64$, $p < .005$. The EAMS was a significant predictor of vigorous activity, $\beta = .15$, $p < .005$ (see Table 15 for results of the regression analysis). Comparison of the standardized regression coefficients in step 2 indicated that EMI Appearance had the greatest predictive ability of all of the variables entered into the regression equation, followed closely by EAMS Total score. These results further support the incremental validity of the EAMS in predicting vigorous physical activity among college women.

DISCUSSION

This study evaluated and provided preliminary validation of a new scale (the Exercise Appearance Motivations Scale; EAMS) assessing appearance-based motives of exercise behaviors. Women report using appearance as an exercise motive more frequently than men (Gillison et al., 2012; Skov-Ettrup et al., 2014), therefore this scale was examined and validated within a female sample.

Factor Analysis

Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) analyses were used to examine and test the factor analytic structure of the EAMS. During factor analysis, six items deemed to be inconsistent with theory were removed from the EAMS due to either low loadings, or high loadings on two or more scales. These items were: “maintain a fit appearance”, “maintain a thin appearance”, “attract sexual/romantic partners”, “avoid looking like someone else (i.e., a family member)”, “look like a certain weight”, and “avoid negative judgment from others about my appearance”. The first two items (“maintain a fit appearance”, “maintain a thin appearance”) were removed from the final scale as these constructs were well represented by other scale items. The middle two items (“attract sexual/romantic partners”, “avoid looking like someone else (i.e., a family member)”) were produced from focus group work, and have limited theoretical support. The final two items (“look like a certain weight”, and “avoid negative judgment from others about my appearance”)

were removed due to a combination of poor wording and adequate representation by other scale items.

Employment of these factor analytic strategies produced a 26-item scale with four subscales:

Muscularity (i.e., “maintain the appearance of my muscle tone”)

The two EAMS items associated with muscularity represent unique constructs not previously assessed for in existing measures of exercise motivation. Research indicates that exercise rooted in the internalization of muscular body ideals predicts higher body-related psychopathology in women (Bell, Donovan, & Ramme, 2016), suggesting that a scale capturing this dimension may be critical to understanding the relationships between muscular body idealization and psychopathology.

Appearance (i.e., “Look my best”)

Approximately half of the items associated with the general appearance subscale are encompassed on existing scales of exercise motives (i.e., the REI, EMI, EMGI, & FES). The remaining half embody distinctive constructs not previously measured. Therefore, the EAMS Appearance subscale may be a more comprehensive measure of general appearance-based motives than existing scales, and this subscale may be crucial in understanding the existing relationships between general appearance exercise motives and higher psychopathology (Adkins & Keel, 2005; Boone & Brausch, 2016; Gonçalves & Gomes, 2012; Homan, 2010; Hurst, Dittmar, Banerjee, & Bond, 2017; O’Hara, Cox,

& Amorose, 2014; Prichard & Tiggemann, 2008; Strelan, Mehaffey, & Tiggemann, 2003; Vartanian, et al., 2012; Vinkers et al., 2012).

Societal Pressures: (i.e., “Keep up a body similar to those in my social group”)

The items comprising the EAMS Societal Pressures subscale represent unique constructs never before measured by existing scales of exercise motives. Body-related social pressures are associated with higher body and eating-related psychopathology (Fardouly, Diedrichs, Vartanian, & Halliwell, 2015; Fitzsimmons-Craft, Harney, Brownstone, Higgins, & Bardone Cone, 2012); therefore, this subscale may be essential in elucidating the relationships between exercise rooted in social pressures and psychopathology.

Shape/Weight: (i.e., “Avoid looking fat”)

One item (“lose weight to look good/better”) of the EAMS Shape/Weight subscale is established by existing measures (i.e., REI, EMI, EMGI, FES); however, the remaining items represent distinctive constructs. Approximately half of the items on this subscale represent constructs associated with “fatness”. Fat talk is associated with a broad range of body image psychopathology (Mills & Fuller-Tyszkiewicz, 2017), indicating that a scale assessing concepts related to fatness and exercise may aid in understanding the relationships between exercise motives rooted in avoiding “fatness” and psychopathology.

Avoidance/Shame (i.e., “Avoid Guilt about the way I look”)

The EAMS items associated with avoidance/shame represent a previously unmeasured construct. Body shame is a predictor of disordered eating in women (Dakanalis et al., 2014), indicating that this subscale may be critical in clarifying the relationships between exercise rooted in body shame and eating-related psychopathology.

Validation

Following factor analysis, the construct and incremental validity of the EAMS were examined. In general, our findings suggest that the EAMS has evidence of both construct and incremental validity. Our findings related to incremental validity suggest that the EAMS may be a particularly robust measure when assessing constructs relevant to disordered eating and exercise; however, other measures may be stronger tools when assessing constructs relevant to appearance.

Exercise

Results indicated that individuals who reported higher compulsive exercise also reported higher levels of exercise motives based in appearance, findings supported by previous theory. Increased compulsive exercise is associated with increased reporting of sociocultural pressure to lose weight and build muscle, and higher body image concerns and appearance investment (White & Halliwell, 2010). Compulsive exercise and moderate/vigorous physical activity were also better predicted by EAMS total score than the EMI subscales related to appearance and weight, suggesting that the EAMS may be

a more effective measure than existing measures of exercise behaviors when used in conjunction with measures relevant to exercise behaviors.

Disordered Eating

Results suggested that women who reported higher levels of disordered eating symptomatology also reported higher levels of exercise motives rooted in appearance constructs, with the exception of muscular appearance. Body dissatisfaction is widely associated with the development of disordered eating pathology in women (Stice and Shaw, 2002), supporting our association between the EAMS general appearance subscale and disordered eating. Our findings linking exercise based in appearance-oriented sociocultural pressures and disordered eating are also supported by prior theory. Appearance-based media pressure has been found to predict eating disorders in Middle Eastern women (Sanchez-Ruiz, El-Jor, Abi Kharma, Bassil, & Zeeni, 2017), and interpersonal appearance based pressure predicts disordered eating among female college athletes (Coker-Cranney, & Reel, 2015). Additionally, body shame has been identified as a predictor of disordered eating in women (Dakanalis et al., 2014), which reflects our link between disordered eating and exercise rooted in body shame/avoidance as measured by the EAMS. Finally, the lack of an association between the EAMS Muscularity subscale and disordered eating among women is supported by empirical work as well. Muscular internalization is associated with disordered eating in adolescent males, and thin internalization is associated with disordered eating among women (Juarascio et al., 2011); however there is no research yet linking muscular internalization and disordered eating in women (Flament et al., 2012). Given our findings suggesting an

association exists between muscularity and higher psychopathology, future research should examine this relationship more closely.

The EAMS total score demonstrated better predictive power of disordered eating than the EMI subscales related to appearance and weight management. This indicates that the EAMS may be a more useful tool than existing measures when examining associations between exercise based in appearance and disordered eating. Of note, the EAMS total score was a better predictor of disordered eating than the EMI subscales despite including items associated with muscularity (not associated with disordered eating), suggesting that the EAMS may be particularly robust at measuring disordered eating. Future research should be undertaken examining the predictive ability of specific EAMS subscales in assessing disordered eating, to further refine the relationships between disordered eating and specific constructs associated with appearance-based exercise.

Appearance

Our findings indicate that women who report higher levels of appearance comparison also report higher levels of exercise motives rooted in shape and weight concerns, appearance-based sociocultural pressures, and body-related avoidance/shame. In contrast, women who reported higher levels of appearance evaluation (i.e., appearance satisfaction) did not reported higher levels of exercise rooted in any appearance-related constructs. These findings suggest that differing aspects of appearance concerns (i.e., appearance comparison vs appearance evaluation) may be differentially related to appearance-based exercise.

Our findings are somewhat consistent with prior research. Engagement in appearance comparisons is associated with a myriad of body image concerns among women (Fitzsimmons-Craft, Harney, Brownstone, Higgins, & Bardone-Cone, 2014; Rancourt, Schaefer, Bosson, & Thompson, 2016), reflecting the association between the EAMS Appearance subscale and appearance comparison. In contrast, appearance evaluation did not have relationships with EAMS total or subscale scores, suggesting that exercise motivated by appearance is unrelated to appearance satisfaction, as measured by the MBSRQ. In contrast to these findings, exercise for appearance-related reasons has been found to be positively correlated to body dissatisfaction (Vartanian et al., 2012), a construct related to appearance evaluation.

Appearance comparison is associated with thin, but not muscular, body ideal internalization (Fitzsimmons et al., 2012; Lin & Soby, 2016), mirroring our findings linking appearance comparison and exercise rooted in all EAMS subscales, except muscularity. In combination, media/interpersonal pressures and appearance comparison predict disordered eating, body concerns, and body dissatisfaction in women, possibly supporting our link between appearance comparison and exercise rooted in sociocultural pressures. Finally, our association between the EAMS Avoidance/Shame subscale and appearance comparison is supported by empirical work suggesting that social comparison is positively associated with body shame (Jackson, Zheng, & Chen, 2016).

Appearance evaluation was not predicted by EMI subscales related to appearance and weight or by the EAMS total subscale, indicating that measures of exercise motives may not be robust at predicting appearance evaluation. No EAMS subscales were

correlated to appearance evaluation, suggesting that individual EAMS subscales may not be better predictors of appearance evaluation than EAMS total score.

Internalization: Body Ideals

Our findings indicate that women who reported higher internalization of thin ideals also reported higher levels of exercise motives based in appearance constructs unrelated to muscularity. Similarly, endorsement of muscular body ideals was positively correlated to all EAMS subscales, indicating that women who endorse higher muscular body internalization report higher levels of appearance-based exercise. These findings are somewhat supported by prior research. The tripartite model of body image and eating disturbance is a widely accepted model linking thin body ideal internalization, sociocultural pressures, and body image concerns (van den Berg, 2002), supporting our links between exercise rooted in general appearance, shape/weight concerns, and appearance-based sociocultural pressures and thin ideal internalization. The EAMS Avoidance/Shame subscale was also linked to thin ideal internalization, a finding supported by empirical work indicating that thin ideal internalization is associated with body shame in women (Sharpe, Naumann, Treasure, and Schmidt, 2013). Finally, our association between drive for muscularity and increased exercise rooted in appearance is supported by prior research in men, but not women. While increased desire for muscularity is associated with body dissatisfaction in men (Mayo & George, 2014), there are no published studies supporting similar mechanisms between muscularity and body dissatisfaction in women (Karazsia, Murnen, & Tylka, 2017). Our

findings related to the EAMS Muscularity subscale suggest that muscularity should be examined in conjunction with body dissatisfaction dimensions in women.

Internalization: Sociocultural Pressures

Women who reported higher internalization of media-based appearance ideals also reported higher levels of exercise motives rooted in general appearance, appearance-based societal pressures, shape and weight concerns, and appearance-based avoidance/shame, but did not report exercise motives of muscularity. These findings are somewhat supported by prior research. A recent study found an association between objectifying media and increased levels of body shame (Yang & Xu, 2016), reflecting our find associating EAMS Avoidance/Shame and media internalization. An earlier study linked increased media usage and increased drive for muscularity in women (Cramblitt & Pritchard, 2013), which somewhat contradicts the lack of a link between EAMS Muscularity and media-related pressures. Additionally, meta-analytic work indicates that thin ideal media exposure is positively correlated to body dissatisfaction (Grabe, Ward, & Hyde, 2008), and higher desire of thin body ideals in women, reflecting our finds that EAMS Shape and Weight concerns and Appearance were related to media-based appearance internalization.

Women who reported higher family and peer-based appearance internalization reported higher levels of motivation for exercise rooted in their general appearance. These findings are consistent with prior research. Increased family and peer based appearance pressure is associated with increased body dissatisfaction in women (Brown & Tiggemann, 2016; Kluck, 2010; Murray, Rieger, & Byrne, 2015; Palladino Green &

Pritchard, 2003). Women who reported higher family based appearance pressures further reported higher levels of exercise based in avoidance/shame. There is no published research examining the relationships between family based appearance pressures and body shame. Future research should explore this mechanism.

Reliability

The EAMS demonstrated good test-retest reliability and demonstrated strong internal consistency reliability. This is consistent with existing measures of exercise motivations (Dibartolo et al., 2007; Markland & Hardy, 1993; Markland & Ingledew, 1997). The EAMS was validated in a female-only population. Previous empirical work suggests that appearance is a more common exercise motive among women and girls than men. In contrast, homosexual men report using appearance as a motive for exercise more frequently than heterosexual men, suggesting that the EAMS may be less stable in a male sample.

Additionally, our sample was fairly ethnically diverse. There is little support for the notion that exercise motives vary across ethnic groups; however, given that rates of body dissatisfaction vary by race/ethnicity (Fallon, Harris, & Johnson, 2014), and given that White women scored significantly higher than Black women on the EAMS, the measure's reliability may vary across racial/ethnic groups. Further, women in our sample who did not identify as athletes scored significantly lower on the EAMS than women who strongly and somewhat identified as athletes. Exercise motives do not appear to vary by sport (Mañano et al., 2015); however, given the difference in our

sample among groups who do and do not identify as athletes, athletic identification may be a potential moderator of the EAMS' reliability.

Limitations and Future Directions

While the EAMS demonstrates good psychometric properties and adds to the existing literature, it is not flawless. First, the EAMS demonstrated sparring limitations in construct validity. Most critical was the lack of association between EAMS total and subscale scores and the MBSRQ (appearance evaluation). Approximately half of MBSRQ items are similar to EAMS items: MBSRQ: *“I like my looks just the way they are”* and EAMS: *“Maintain an appearance I am happy with”*; MBSRQ: *“I like the way I look in my clothes”* and *“I like the way my clothes fit me”* and EAMS: *“look good in my clothes”* and *“look good while naked”*; MBSRQ: *“most people would consider me good looking”* and EAMS: *“look good for other people”*. The remaining half of MBSRQ items do not have similar parallels on the EAMS: *“My body is sexually appealing”*, *“I dislike my physique”*; *“I am physically unattractive”*. The EAMS is comprised of constructs related to muscularity, societal pressures, shape and weight concerns, and avoidance/shame, and constructs related to general appearance, such as pride in general appearance. Perhaps the MBSRQ measures a broader construct of appearance satisfaction, while the EAMS is sensitive to specific constructs related to appearance concerns, such as muscularity and appearance comparison. Indeed, EAMS subscales had significant positive relationships with all other appearance-related constructs measured within our study, such as appearance comparison and SATAQ Thin Internalization. Additionally, the other subscales measuring exercise motives, EMI Appearance and EMI

Weight Management, were also uncorrelated to the MBSRQ. This may suggest that the MBSRQ is particularly unsuitable for use in conjunction with measures of appearance constructs related to exercise, a theory supported by our finding that EMI Weight Management, EMI Appearance, and the EAMS did not accurately predict appearance evaluation. The MBSRQ is a measure of appearance evaluation; it is not a measure of body dissatisfaction. Future research should examine the EAMS' relationships to constructs related to body dissatisfaction.

Another concern was the lack of an association between family/peer pressure related to appearance and exercise rooted in appearance-based societal pressures. This was unexpected, as previous literature supports the association between increased family and peer pressure and increased body image concerns (Schaefer et al., 2015). This also contradicts our media pressure-related findings, which were positively correlated to the aforementioned subscale. Media-, peer-, and family-based appearance pressures are typically positively correlated (Schaefer et al., 2015) and these constructs were positively correlated within our scale (family and peer $r = .49, p < .01$; family and media $r = .24, p < .01$; media and peer $r = .23, p < .01$). These findings may suggest that EAMS constructs are more closely aligned with appearance dimensions related to media pressures than family and peer pressures. Perhaps individuals who report exercise motivations related to societal pressures are particularly vulnerable to media pressure. Future research should explore this mechanism.

The EAMS also demonstrated limitations related to incremental validity. Of note, the EAMS did not predict appearance evaluation. Notably, EMI subscales related to appearance and weight also did not predict appearance evaluation. The EAMS did

demonstrate better predictive power of disordered eating and constructs related to exercise, indicating that the EAMS may adequately capture dimensions relevant to disordered eating and exercise, but not constructs relevant to appearance evaluation. Additional work to further refine items may help to improve the EAMS' ability to measure this construct. Additionally, the MBSRQ is a measure of appearance evaluation, as opposed to body image or body dissatisfaction. Therefore, conclusions can only be drawn regarding the EAMS predictive power of appearance evaluations. No assumptions can be made regarding its ability to predict body dissatisfaction-related constructs above and beyond existing measures. Future research should examine the EAMS' incremental validity in reference to body dissatisfaction-related constructs.

Additional limitations include possible dimensional discrepancies on the Avoidance/Shame subscale. All items on this subscale present themes relevant to avoidance/shame, except one item: "maintain the appearance of a certain body fat level". Internalized weight bias, or the internalization of stigmatizing beliefs related to "fatness", has a direct positive association with body shame in women who have both high and normal BMIs (Burmeister, Hinman, Koball, Hoffmann, & Carels, 2013; Webb & Hardin, 2016). Perhaps the loading of this item on a subscale with items related to body shame underscores the relationship between internalized weight bias and body shame.

The EAMS was validated within a college female sample; therefore, caution should be taken when generalizing to other populations. Future research should validate the EAMS within other populations. Men report body dissatisfaction at increasingly high rates (recent review work indicates that rates of body dissatisfaction in women range

from between 11-72% of the general population, and from between 8-62% of the general population in men; Fisk, Fallon, Blissmer, & Redding, 2014), indicating that men may be a particularly salient population for the validation of the EAMS. Individuals who report higher frequencies of exercise in conjunction with increased rates of body image psychopathology, such as overweight individuals beginning an exercise plan (body dissatisfaction ranges from 28-42% of the overweight population and 59-69% of the obese population; Frederick, Peplau, & Lever, 2006), may in particular benefit from a scale assessing body-related psychopathology relevant to exercise. Thus, the EAMS should be validated within populations with both obese and overweight. In addition, the EAMS was developed for use within generalized population, but it may be relevant for a clinical population; it should therefore be validated in a population with existing eating and body image pathology. Future research could also examine the EAMS' ability to predict future eating and body image pathology. Of note, the EAMS CFA chi square was significant. While this was expected, as chi square values are inclined to be large when used with larger sample sizes, it is also a limitation. The chi square fit may be improved through validation of the scale in smaller samples. Finally, our measure of social desirability had low internal consistency reliability, therefore findings related to social desirability should be interpreted with caution.

Conclusions and Implications

The Exercise Appearance Motivations Scale (EAMS) is an adequately validated and reliable measure assessing appearance-based motives of exercise. In addition, the EAMS establishes five unique dimensions of this construct: appearance, muscularity,

societal pressures, shape/weight, and avoidance/shame. The EAMS is not the first scale to assess motives of exercise behaviors; however, it is the first measure to exclusively investigate this construct, and this scale therefore has important implications.

Appearance-based motives for behaviors (Putterman & Linden, 2004), and in particular appearance-based motives for exercise (Vartanian et al., 2012), are associated with body dissatisfaction and disordered eating. The EAMS has potential to be used to assess the risk of body image and eating pathology. These domains are risk factors for the development of eating disorders (Hilbert et al., 2014; Keel & Forney, 2013), underscoring the importance of this scale. In addition, recent literature has linked appearance-based exercise motives and non-suicidal self-injury in youth (Boone & Brausch, 2016), highlighting the importance of accurate assessment of this construct. If identified, interventions, such as mindfulness-based exercise interventions, which have been found to increase health/fitness-related motivation for exercise (no other interventions have been identified as increasing health/fitness motives for exercise; Cox, Ullrich-French, Cole, & D'Hondt-Taylor, 2016), may potentially be used to reduce appearance-based exercise, and therefore reduce the risk of developing later psychopathology.

Table 1. Eigenvalues obtained from Exploratory Factor Analysis

Factor	Eigenvalue
1	14.02
2	4.45
3	1.84
4	1.44
5	1.23

Table 2. Item Loadings for the Exploratory Factor Analysis Five Factor Solution

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
1. Maintain the appearance of my muscle tone	0.865	-0.001	0.021	-0.012	0
2. Build the appearance of my muscle tone	0.88	0.045	0.006	-0.053	0.016
5. Maintain an appearance that I am proud of	0.05	-0.128	0.859	-0.03	0.013
6. Maintain an appearance that I am happy with	-0.002	-0.01	0.915	-0.1	-0.016
7. Look good when naked	-0.017	-0.105	0.0741	0.153	0.015
8. Look good in my clothes	-0.096	0.093	0.907	-0.036	-0.04
9. Look my best	-0.004	0.05	0.918	-0.097	-0.095
12. Attract sexual/romantic partners	-0.067	-0.114	0.322	0.622	-0.01
13. Look good for other people	-0.044	-0.099	0.124	0.789	-0.018
14. Keep up a body similar to those in my social group (i.e., friends)	0.007	0.068	-0.054	0.865	-0.128
15. Meet society's (i.e., the media, my friends, my significant other) expectations	0.018	0.019	-0.111	0.819	0.038
16. Deal with the pressure to look a specific weight	-0.086	0.088	-0.153	0.687	0.21
17. Lose weight to look good/better	-0.121	0.042	0.091	0.126	0.656
18. Avoid looking bigger than I want to	0.03	-0.115	0.001	0.073	0.909
19. Minimize fear of looking bigger than I want to	0.052	0.037	-0.099	0.09	0.862
20. Avoid looking fat	0.018	-0.022	0.012	0.073	0.892
21. Minimize fear of looking fat	0.029	0.098	-0.061	-0.006	0.906
22. Avoid having a specific body part look fat (i.e., stomach)	-0.039	0.016	0.085	-0.022	0.826
23. Minimize fear of a specific body part looking fat (i.e., stomach)	-0.022	0.086	0.052	-0.039	0.816
26. Become more satisfied with my appearance	0.016	0.151	0.597	-0.007	0.138
27. Look good in a bathing suit/underwear	0.01	0.19	0.612	0.013	0.103
28. Avoid guilt about my appearance	0.038	0.801	0.068	-0.012	0.074
29. Maintain the appearance of a certain body fat level	0.043	0.47	0.051	0.248	0.055
30. Avoid looking bloated	0.004	0.401	0.102	0.05	0.343
31. Avoid guilt about the way I look	0.025	0.788	0.037	0.024	0.116
32. Avoid others' criticisms about the way I look	-0.054	0.756	-0.026	0.243	-0.043

Table 3. Item Loadings for the Exploratory Factor Analysis Four Factor Solution

	Factor 1	Factor 2	Factor 3	Factor 4
1. Maintain the appearance of my muscle tone	0.868	-0.012	0.022	0.016
2. Build the appearance of my muscle tone	0.885	0.013	0.007	0.022
5. Maintain an appearance that I am proud of	0.036	0	0.878	0.153
6. Maintain an appearance that I am happy with	-0.007	-0.001	0.929	0.137
7. Look good when naked	-0.023	-0.018	0.745	-0.065
8. Look good in my clothes	-0.089	-0.106	0.904	-0.015
9. Look my best	0.001	-0.07	0.921	0.087
10. Make my body look like someone else's (i.e., a friend, celebrity)	0.061	-0.089	-0.08	-0.753
12. Attract sexual/romantic partners	-0.085	-0.089	0.332	-0.526
13. Look good for other people	-0.071	-0.098	0.139	-0.688
14. Keep up a body similar to those in my social group (i.e., friends)	-0.014	-0.187	-0.042	-0.888
15. Meet society's (i.e., the media, my friends, my significant other) expectations	-0.007	-0.04	-0.091	-0.822
16. Deal with the pressure to look a specific weight	-0.103	0.141	-0.138	-0.767
17. Lose weight to look good/better	-0.127	0.608	0.098	-0.212
18. Avoid looking bigger than I want to	0.013	0.823	0.019	-0.06
19. Minimize fear of looking bigger than I want to	0.043	0.811	-0.091	-0.183
20. Avoid looking fat	0.007	0.827	0.023	-0.127
21. Minimize fear of looking fat	0.028	0.876	-0.06	-0.138
22. Avoid having a specific body part look fat (i.e., stomach)	-0.043	0.786	0.089	-0.056
23. Minimize fear of a specific body part looking fat (i.e., stomach)	-0.023	0.796	0.052	-0.087
24. Look like a certain weight	-0.071	0.188	0.046	-0.588
25. Avoid negative judgment from others about my appearance	0.035	0.136	-0.133	-0.808
26. Become more satisfied with my appearance	0.024	0.15	0.578	-0.112
27. Look good in a bathing suit/underwear	0.022	0.123	0.604	-0.16
28. Avoid guilt about my appearance	0.073	0.221	0.04	-0.564
29. Maintain the appearance of a certain body fat level	0.063	0.087	0.038	-0.622
31. Avoid guilt about the way I look	0.058	0.255	0.012	-0.59
32. Avoid others' criticisms about the way I look	-0.022	0.078	-0.049	-0.778

Table 4. Eigenvalues Obtained from Parallel and Exploratory Factor Analyses

Factor	Parallel Analysis Eigenvalue	EFA Eigenvalue
1	13.38	14.02
2	3.89	4.45
3	1.35	1.84
4	1.01	1.44
5	-	1.23

Table 5. Confirmatory Factor Analysis Fit Indices

Standardized Root-Mean-Square Residual	0.069
Root Mean Square Error Of Approximation	0.079
Comparative Fit Index	0.924

Table 6. Modification Fit Solution

Item Pair	Modification Index	Chi Square	CFI	RMSEA	SRMR
3,4	364.56	1907.96	0.895	0.093	0.067
21,20	235.11	1661.86	0.911	0.086	0.067
19,16	99.28	1531.77	0.919	0.082	0.068
24,26	18.86	1473.05	0.923	0.08	0.07
6,5	29.79	1444.98	0.924	0.079	0.069

Note. CFI = Comparative Fit Index; RMSEA = Root Mean Square Error Of Approximation; SRMR = Standardized Root-Mean-Square Residual

Table 7. Exercise Appearance Motivations Scale Item Means (*min* = 1, *max* = 7)

	Mean	Std. Deviation
EAMS1	4.63	1.72
EAMS2	4.77	1.7
EAMS5	5.82	1.32
EAMS6	5.91	1.22
EAMS7	5.68	1.43
EAMS8	5.97	1.23
EAMS9	5.99	1.22
EAMS10	3.71	1.79
EAMS13	4.83	1.70
EAMS14	4.05	1.72
EAMS15	4.30	1.79
EAMS16	4.54	1.77
EAMS17	5.49	1.45
EAMS18	5.67	1.33
EAMS19	5.43	1.53
EAMS20	5.63	1.40
EAMS21	5.47	1.48
EAMS22	5.62	1.41
EAMS23	5.54	1.44
EAMS26	5.98	1.07
EAMS27	5.87	1.34
EAMS28	5.51	1.48
EAMS29	4.95	1.62
EAMS30	5.18	1.55
EAMS31	5.28	1.53
EAMS32	5.01	1.69

Table 8. Exercise Appearance Motivations Scale Composite Reliabilities

Factor 1	0.864
Factor 2	0.924
Factor 3	0.886
Factor 4	0.944
Factor 5	0.788

Table 9. Correlation Matrix of EAMS Subscales and Total Score and Construct Validation Measures

	GBJW	OEQ	PACS	MBS	SATAQ Thin	SATAQ Muscular	SATAQ Family Pressures	SATAQ Peer Pressure	SATAQ Media Pressure	EDDS
Muscularity	0.09	.40**	-0.30	-.01	.04	.17**	0.06	0.07	.01	-0.10
Appearance	0.06	.29**	.58**	.06	.30**	0.14*	0.13*	0.12*	.22**	.17**
Societal Pressures	0.03	.22**	.49**	-.01	.30**	.02	.01	-.02	.24**	.27**
Shape/Weight Concerns	-0.01	.24**	.44**	.05	.36**	0.12*	.07	-.01	0.26**	.22**
Avoidance/Shame	0.03	.28**	.42**	.08	.42**	0.20*	.13*	-.01	.29**	.27**
Total Score	0.06	.36**	.45**	-.01	.40**	0.16*	.11	.04	.30**	.22**

Note. GBJW = Global Belief in a Just World Scale; OEQ = Obsessive Exercise Questionnaire; PACS = Physical Appearance Comparison Scale – Revised; MBSRQ = Multidimensional Body-Self Relations Questionnaire; SATAQ = Sociocultural Attitudes and Appearance Questionnaire; EDDS = Eating Disorder Diagnostic Scale; EAMS = Exercise Appearance Motivations Scale

** $p < .01$

* $p < .05$

Table 10. Questionnaire Means

	Mean	SD
OEQ	45.19	12.17
PACS	28.31	10.63
MBSRQ	3.31	0.89
SATAQ Thin Internalization	19.48	3.62
SATAQ Muscular Internalization	18.04	4.3
SATAQ Family Pressures	15.54	3.48
SATAQ Peer Pressure	14.74	4.04
SATAQ Media Pressure	16.7	3.24
GBJW	3.67	0.87
Weight Management	15.72	4.31
Appearance	14.75	4.24
MC	18.06	2.16
EDDS	35.61	15.76

Note. GBJW = Global Belief in a Just World Scale; OEQ = Obsessive Exercise Questionnaire; PACS = Physical Appearance Comparison Scale – Revised; MBSRQ = Multidimensional Body-Self Relations Questionnaire; SATAQ = Sociocultural Attitudes and Appearance Questionnaire; EDDS = Eating Disorder Diagnostic Scale; Weight Management = Exercise Motivations Inventory Weight Management; Appearance = Exercise Motivations Inventory Appearance; MC = Marlowe-Crowne Social Desirability Scale

Table 11. Summary of Hierarchical Regression Analysis Predicting Disordered Eating (n = 325)

Variable	Model 1			Model 2		
	B	SE B	Beta	B	SEB	Beta
Intercept	26.30	3.36		16.65	4.75	
Weight Management	.59	0.35	.16	.22	0.37	.06
Appearance Concerns	.01	0.36	.00	-0.12	0.36	-.03
EAMS Total				0.13	0.04	.20**
R2		0.03			0.233	
F for change in R2		4.37*			8.04**	

Note. Model 1 = Disordered eating predicted by EMI weight management and EMI appearance concerns. Model 2 = Disordered eating predicted by EMI weight management, EMI appearance concerns, and EAMS Total score. Weight Management = Exercise Motivations Inventory weight management subscale; Appearance Concerns = Exercise Motivations Inventory appearance concerns subscale; EAMS Total = Exercise Appearance Motivations Scale Total

* $p < .05$.

** $p < .001$.

Table 12. Summary of Hierarchical Regression Analysis Predicting Compulsive Exercise ($n = 325$)

Variable	Model 1			Model 2		
	B	SE B	Beta	B	SEB	Beta
Intercept	32.17	2.47		20.67	3.40	
Weight Management	-.46	0.26	-.16 .48**	-0.90	0.27	-0.32***
Appearance Concerns	1.38	0.26	*	1.24	0.26	.43***
EAMS Total				0.15	0.03	.31***
R2		0.13			0.19	
F for change in R2		23.53***			22.32***	

Note. Model 1 = Compulsive Exercise predicted by EMI weight management and EMI appearance concerns. Model 2 = Compulsive Exercise predicted by EMI weight management, EMI appearance concerns, and EAMS Total score. Weight Management = Exercise Motivations Inventory weight management subscale; Appearance Concerns = Exercise Motivations Inventory appearance concerns subscale; EMS Total = Exercise Appearance Motivations Scale Total
 *** $p < .001$.

Table 13. Summary of Hierarchical Regression Analysis Predicting Appearance Evaluation ($n = 325$)

Variable	Model 1			Model 2		
	B	SE B	Beta	B	SEB	Beta
Intercept	3.03	0.19		3.06	0.28	
Weight Management	0.00	0.02	.01	0.00	0.02	.01
Appearance Concerns	0.02	0.02	.09	0.02	0.02	.09
ESMS Total				0.00	0.00	-.01
R2		0.01			0.01	
F for change in R2		1.29			0.01	

Note. Model 1 = Appearance evaluation predicted by EMI weight management and EMI appearance concerns. Model 2 = Appearance evaluation predicted by EMI weight management, EMI appearance concerns, and EAMS Total score. Weight Management = Exercise Motivations Inventory weight management subscale; Appearance Concerns = Exercise Motivations Inventory appearance concerns subscale; EMS Total = Exercise Appearance Motivations Scale Total
 *** $p < .001$.

Table 14. Summary of Hierarchical Regression Analysis Predicting Moderate Activity ($n = 325$)

Variable	Model 1			Model 2		
	B	SE B	Beta	B	SEB	Beta
Intercept	2.02	0.31		1.36	0.44	
Weight Management	-0.03	0.03	-0.12	-0.07	0.03	-0.19
Appearance Concerns	0.06	0.03	.17	0.05	0.03	.14
ESMS Total				0.01	0.04	.15*
R2		0.009			0.02	
F for change in R2		1.5			4.37*	

Note. Model 1 = Vigorous physical activity predicted by EMI weight management and EMI appearance concerns. Model 2 = Vigorous physical activity predicted by EMI weight management, EMI appearance concerns, and EAMS Total score. Weight Management = Exercise Motivations Inventory weight management subscale; Appearance Concerns = Exercise Motivations Inventory appearance concerns subscale; EMS Total = Exercise Appearance Motivations Scale Total

* $p < .05$.

Table 15. Summary of Hierarchical Regression Analysis Predicting Vigorous Activity ($n = 325$)

Variable	Model 1			Model 2		
	B	SE B	Beta	B	SEB	Beta
Intercept	1.87	0.33		1.15	0.47	
Weight Management	-.05	0.03	-.13	-0.07	0.04	-0.21
Appearance Concerns	0.08	0.04	0.21*	0.07	0.04	0.89
EAMS Total				0.01	0.01	.15*
R2		0.01			0.014	
F for change in R2		2.75			4.64*	

Note. Model 1 = Moderate physical activity predicted by EMI weight management and EMI appearance concerns. Model 2 = Moderate physical activity predicted by EMI weight management, EMI appearance concerns, and EAMS Total score. Weight Management = Exercise Motivations Inventory weight management subscale; Appearance Concerns = Exercise Motivations Inventory appearance concerns subscale; EMS Total = Exercise Appearance Motivations Scale Total

* $p < .05$.

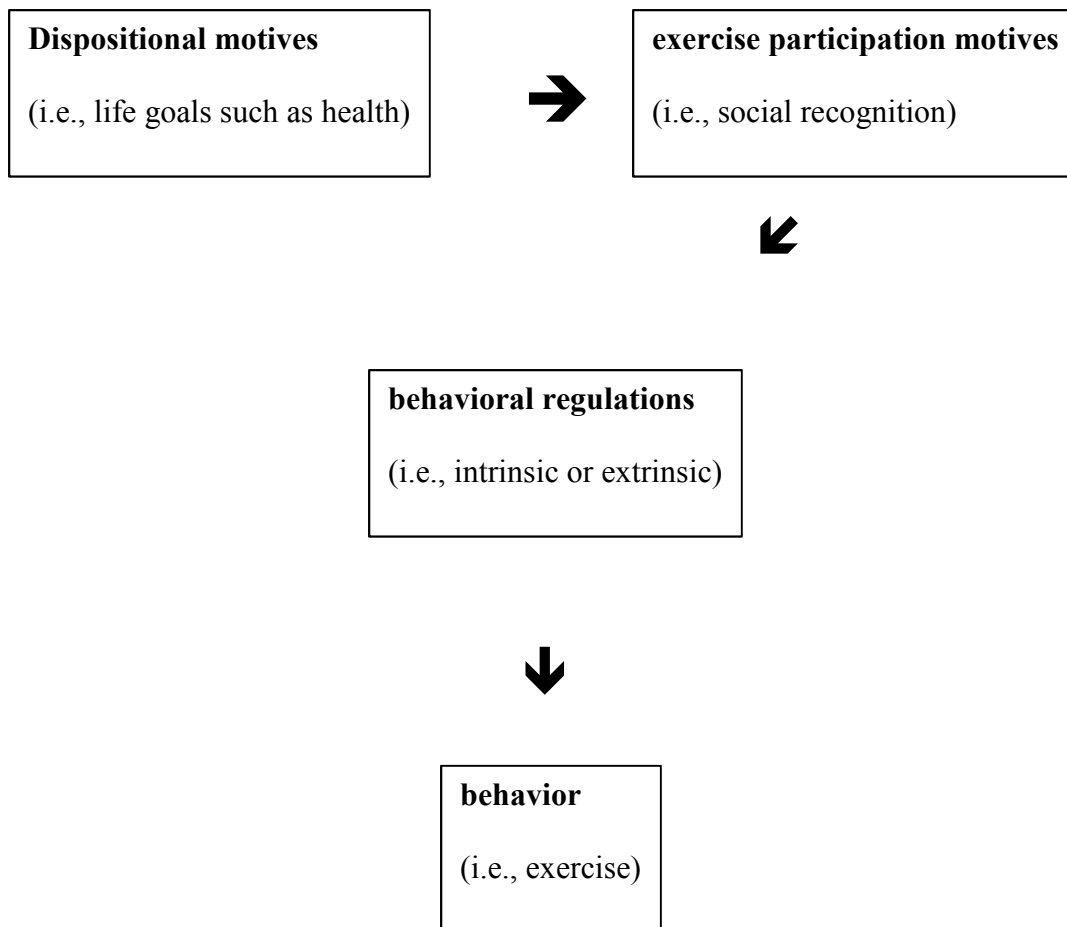


Figure 1. The Three Level Model of Exercise Behaviors. Reprinted from “Three Levels of Exercise Motivation” by Ingledew, Markland, & Ferguson, 2009, *Health and Wellbeing*, 1(3), 336-355, © 2009. Reprinted with permission.

Factor 1: Muscularity

1. Maintain the appearance of my muscle tone
2. Build the appearance of my muscle tone

Factor 2: Appearance

5. Maintain an appearance that I am proud of
6. Maintain an appearance that I am happy with
7. Look good when naked
8. Look good in my clothes
9. Look my best
26. Become more satisfied with my appearance
27. Look good in a bathing suit/underwear

Factor 3: Societal Pressures

10. Make my body look like someone else's (i.e., a friend, celebrity)
13. Look good for other people
14. Keep up a body similar to those in my social group (i.e., friends)
15. Meet society's (i.e., the media, my friends, my significant other) expectations
16. Deal with the pressure to look a specific weight

Factor 4: Shape/Weight Concerns

17. Lose weight to look good/better
18. Avoid looking bigger than I want to
19. Minimize fear of looking bigger than I want to
20. Avoid looking fat
21. Minimize fear of looking fat
22. Avoid having a specific body part look fat (i.e., stomach)
23. Minimize fear of a specific body part looking fat (i.e., stomach)

Factor 5: Avoidance/Shame

28. Avoid guilt about my appearance
29. Maintain the appearance of a certain body fat level
30. Avoid looking bloated
31. Avoid guilt about the way I look
32. Avoid others' criticisms about the way I look

Figure 2. Exercise Appearance Motivations Scale Factor Solution

REFERENCES

- Aaltonen, S., Rottensteiner, M., Kaprio, J., & Kujala, U. M. (2014). Motives for physical activity among active and inactive persons in their mid-30s. *Scandinavian Journal of Medicine & Science in Sports, 24*(4), 727-735.
- Ackard, D. M., Brehm, B. J., & Steffen, J. J. (2002). Exercise and eating disorders in college-aged women: Profiling excessive exercisers. *Eating Disorders, 10*(1), 31-47.
- Adkins, E. C., & Keel, P. K. (2005). Does “excessive” or “compulsive” best describe exercise as a symptom of bulimia nervosa? *International Journal of Eating Disorders, 38*(1), 24-29.
- Annesi, J. J. (2002). Relationship between reported motives for exercise and age of women attending a community fitness facility. *Perceptual and Motor Skills, 94*(2), 605-606.
- Bell, H., Donovan, C., & Ramme, R. (2016). Is athletic really ideal? An examination of the mediating role of body dissatisfaction in predicting disordered eating and compulsive exercise. *Eating Behaviors, 21*, 24–29.
- Bentler, P. M. (1990). Comparative fit indexes in structural models. *Psychological Bulletin, 107*(2), 238-246.
- Bergeron, D., & Tylka, T. L. (2007). Support for the uniqueness of body dissatisfaction from drive for muscularity among men. *Body Image, 4*(3), 288-295.

- Bland, J. M., & Altman, D. G. (1997). Statistics notes: Cronbach's alpha. *British Medical Journal*, *314*, 572.
- Boone, S. D., & Brausch, A. M. (2016). Physical activity, exercise motivations, depression, and nonsuicidal self-injury in youth. *Suicide and Life-Threatening Behavior*, early view.
- Booth, M. L. (2000). Assessment of physical activity: An international perspective. *Research Quarterly for Exercise and Sport*, *71*(2), 114-120.
- Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. In K. A. Bollen & J. S. Long (Eds.), *Testing structural equation models* (pp. 136–192). Newbury Park, CA: Sage.
- Brown, T. A., Cash, T. F., Mikulka, P. J. (1990). Attitudinal body image assessment: Factor analysis of the Body-Self Relations Questionnaire. *Journal of Personality Assessment*, *55*(1-2), 135-144.
- Burmeister, J. M., Hinman, N., Koball, A., Hoffmann, D. A., & Carels, R. A. (2013). Food addiction in adults seeking weight loss treatment. Implications for psychosocial health and weight loss. *Appetite*, *60*, 103-110.
- Byrne, B. M. (1998). *Structural equation modeling with LISREL, PRELIS, and SIMPLIS: Basic concepts, applications, and programming*. Mahwah, NJ: Erlbaum.
- Cash, T. F., Novy, P. L., & Grant, J. R. (1994). Why do women exercise? Factor analysis and further validation of the Reasons for Exercise Inventory. *Perceptual Motor Skills*, *78*(2), 539-544.

- Cattell, R. (1966). The scree test for the number of factors. *Multivariate Behavioural Research, 1*, 245-276.
- Chalk, H. M., Miller, S. E., Roach, M. E., & Schultheis, K. S. (2013). Predictors of obligatory exercise among undergraduates: Differential implications for counseling college men and women. *Journal Of College Counseling, 16*(2), 102-114.
- Cicero, D. C., Kerns, J. G., & McCarthy, D. M. (2010). The Aberrant Salience Inventory: A new measure of psychosis proneness. *Psychological Assessment, 22*, 688-701.
- Clark, L., & Watson, D. (1995). Constructing validity: Basic issues in objective scale development. *Psychological Assessment, 7*(3), 309-319.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Earlbaum Associates.
- Coker-Craney, A., & Reel, J. J. (2015). Coach pressure and disordered eating in female college athletes: Is the coach-athlete relationship a mediating factor? *Journal of Clinical Sport Psychology, 9*(3), 213-231.
- Craig, C. L., Marshall, A. L., Sjöström, M., Bauman, A. E., Booth, M. L., Ainsworth, B. E., Pratt, M., Ekelund, U., Yngve, A., Sallis, J. F., & Oja, P. (2003). International Physical Activity Questionnaire: 12-country reliability and validity. *Medicine & Science in Sports & Activity, 35*(8), 1381-1395.
- Cramblitt, Brooke and Pritchard, Mary. (2013). "Media's Influence on the Drive for Muscularity in Undergraduates". *Eating Behaviors, 14*(4), 441-446.
- Crane, J. D., MacNeil, L. G., Lally, J. S., Ford, R. J., Bujak, A. L., Brar, I. K., et al.

- (2015). Exercise-stimulated interleukin-15 is controlled by AMPK and regulates skin metabolism and aging. *Aging Cell*, 14(4), 625-634.
- Crawford, S., & Eklund, R. C. (1994). Social physique anxiety, reasons for exercise, and attitudes toward exercise settings. *Journal of Sport and Exercise Psychology*, 16, 70-70.
- Crocker, L. M., & Algina, J. (1986). *Introduction to classical and modern test theory*. New York: Holt, Rinehart, and Winston, 1986.
- Crowne, D. P., & Marlowe, D. (1960). A new scale of social desirability independent of psychopathology. *Journal of Consulting Psychology*, 24(4) 349-354.
- Cox, A., Ullrich-French, S., Cole, A., & D'Hondt-Taylor, M. (2016). The role of mindfulness during yoga in predicting self-objectification and reasons for exercise. *Psychology of Sport and Exercise*, 22, 321-327.
- Dakanalis, A., Clerici, M., Caslini, M., Favagrossa, L., Prunas, A., Volpato, C., Riva, G., & Zanetti, M. A. (2014). Internalization of societal standards of beauty and disordered eating behaviors: The role of body surveillance, shame, and social anxiety. *Journal of Psychopathology*, 20, 33-37.
- Dalbert, C., Montada, L., & Schmitt, M. (1987). Belief in a just world as motive: Validity correlates of two scales. *Psychologische Beiträge*, 29, 596-615.
- Dalbert, C. (1999). The world is more just for me than generally: About the personal belief in a just world scale's validity. *Social Justice Research*, 12 (2), 79-88.
- Danielson, M., Bjørnelv, S., Rø, Ø, 2015. Validation of the Exercise and Eating Disorders questionnaire. *International Journal of Eating Disorders*, 48(7), 983-993

- DeVellis R. F. (2003). *Scale development: theory and applications*. Thousand Oaks, Calif: SAGE Publications, 2003.
- DiBartolo, P. M., Lin, L., Montoya, S., Neal, H., & Shaffer, C. (2007). Are there “healthy” and “unhealthy” reasons for exercise? Examining individual differences in exercise motivations using the function of exercise scale. *Journal of Clinical Sport Psychology, 1*(2), 93-120.
- Ebben, W., & Brudzynski, L. (2008). Motivations and barriers to exercise among college students. *Journal of Exercise Physiology Online, 11*(5), 1-11.
- Eriksson, L., Baigi, A., Marklund, B., & Lindgren, E. C. (2008). Social physique anxiety and sociocultural attitudes toward appearance impact on orthorexia test in fitness participants. *Scandinavian Journal of Medicine & Science in Sports, 18*, 389-394.
- Fallon, E. A., Harris, B. S., & Johnson, P. (2014). Prevalence of body dissatisfaction among a United States sample. *Eating Behaviors, 15*(1), 151-158.
- Fardouly, J., Diedrichs, P. C., Vartanian, L. R., & Halliwell, E. (2015). Social comparisons on social media: The impact of facebook on young women's body image concerns and mood. *Body Image, 13*, 38-45.
- Fitzsimmons-Craft, E. E., Harney, M. B., Brownstone, L. M., Higgins, M., K., & Bardone-Cone, A. M. (2012). Examining social physique anxiety and disordered eating in college women. The roles of social comparison and body surveillance. *Appetite, 59*, 796-805.
- Fitzsimmons-Craft, E. E., Harney, M. B., Koehler, L. G., Danzi, L. E., Riddall, M. K., & Bardone-Cone, A. M. (2012). Explaining the relation between thin ideal

- internalization and body dissatisfaction among college women: The roles of social comparison and body surveillance. *Body Image*, 9, 43-49.
- Flament, M. F., Hill, E. M., Buchholz, A., Henderson, K., Tasca, G. A., & Goldfield, G. (2012). Internalization of the thin and muscular body ideal and disordered eating in adolescence: The mediation effects of self-esteem. *Body Image*, 9, 68-75.
- Floyd, F. J., & Widaman, K. F. (1995). Factor analysis in the development and refinement of clinical assessment instruments. *Psychological Assessment*, 7(3), 286-299.
- Ford, J. K., MacCullum, R. C., & Tait, M. (1986). The application of exploratory factor analysis in applied psychology: A critical review and analysis. *Personnel Psychology*, 39, 291-314.
- Frederick C. M. & Morrison C. S. (1996). Social physique anxiety: Personality constructs, motivations, exercise attitudes, and behaviors. *Perceptual Motor Skills*, 82(3), 963-972.
- Frederick, D. A., Peplau, L. A., & Lever, J. (2006). The swimsuit issue: Correlates of body image in a sample of 52,677 heterosexual adults. *Body Image*, 3(4), 413-419.
- Furnham, A., Badmin, N., & Sneade, I. (2002). Body image dissatisfaction: Gender differences in eating attitudes, self-esteem, and reasons for exercise. *The Journal of Psychology*, 136(6), 581-596.
- Gillison, F., Sebire, S., & Standage, M. (2012). What motivates girls to take up exercise during adolescence? Learning from those who succeed. *British Journal of Health Psychology*, 17(3), 536-550.

- Giovannelli, T. S., Cash, T. F., Henson, J. M., & Engle, E. K. (2008). The measurement of body-image dissatisfaction–satisfaction: Is rating importance important? *Body Image, 5*(2), 216-223.
- Gonçalves, S. F., & Gomes, A. R. (2012). Exercising for weight and shape reasons vs. health control reasons: The impact on eating disturbance and psychological functioning. *Eating Behaviors, 13*(2), 127-130.
- Grabe, S., Ward, M. L., & Hyde, J. S. (2008). The role of the media in body image concerns among women: A meta-analysis of experimental and correlational studies. *Psychological Bulletin, 134*(3), 460-476.
- Grogan, S., Conner, M., & Smithson, H. (2006). Sexuality and exercise motivations: Are gay men and heterosexual women most likely to be motivated by concern about weight and appearance? *Sex Roles, 55*(7-8), 567-572.
- Guttman, L. (1954). Some necessary conditions for common factor analysis. *Psychometrika, 19*, 149-161.
- Hagströmer, M., Oja, P., & Sjöström, M. (2007). Physical activity and inactivity in an adult population assessed by accelerometry. *Medicine & Science in Sports & Exercise, 39*(9), 1502-1508.
- Hilbert, A., Pike, K. M., Goldschmidt, A. B., Wilfley, D. E., Fairburn, C. G., Dohm, F., & ... Striegel Weissman, R. (2014). Risk factors across the eating disorders. *Psychiatry Research, 220*(1-2), 500-506.
- Homan, K. (2010). Athletic-ideal and thin-ideal internalization as prospective predictors of body dissatisfaction, dieting, and compulsive exercise. *Body Image, 7*(3), 240-245.

- Homan, K. J., & Tylka, T. L. (2014). Appearance-based exercise motivation moderates the relationship between exercise frequency and positive body image. *Body Image, 11*(2), 101-108.
- Horga, S., & Štimac, D. (1999). Why do children exercise? Evaluation of the motivation inventory. *Kinesiology, 31*(1), 61-67.
- Horn, J. L. (1965). A rationale and test for the number of factors in factor analysis. *Psychometrika, 30*, 179-185.
- Hurst, M., Dittmar, H., Banerjee, R., & Bond R. (2017). “I just feel so guilty”: The role of introjected regulation in linking appearance goals for exercise with women’s body image. *Body Image, 20*, 120-129.
- Ingledeu, D. K., Markland, D., & Ferguson, E. (2009). Three levels of exercise motivation. *Applied Psychology: Health and Well-being, 1*(3), 336-355.
- Ingledeu, D. K., & Sullivan, G. (2002). Effects of body mass and body image on exercise motives in adolescence. *Psychology of Sport and Exercise, 3*(4), 323-338.
- Jackson, T., Zheng, P., & Chen, H. (2016). Features of objectified body consciousness and sociocultural perspectives as predictors of eating and body image disturbances among young women and men in China. *Journal of Gender Studies, 25*(5), 599-612.
- Jeffery, K. A., & Butryn, T. M. (2012). The motivations of runners in a cause-based marathon-training program. *Journal of Sport Behavior, 35*(3), 300-319.
- Juarasico, A. S., Forman, E. M., Timko, C.A., Herbert, J. D., Butryn, M., & Lowe, M. (2011). Implicit internalization of the thin ideal as a predictor of increases in

- weight, body dissatisfaction, and disordered eating. *Eating Behaviors*, 12(3), 207-213.
- Kaiser, H. F. (1960). The application of electronic computers to factor analysis. *Educational and Psychological Measurement*, 20, 141-151.
- Karazsia, B.T., Murnen, S.K., & Tylka, T.L. (2017). Is body dissatisfaction changing across time? A cross-temporal meta-analysis. *Psychological Bulletin*, 143, 293-320.
- Keel, P. K., & Forney, K. J. (2013). Psychosocial risk factors for eating disorders. *International Journal Of Eating Disorders*, 46(5), 433-439.
- Kluck, A. S. (2010). Family influence on disordered eating: The role of body image dissatisfaction. *Body Image*, 7, 8-14.
- Kolt, G. S., Giles, L. C., Driver, R., & Chadha, N. K. (2002). Exercise participation motives in older Asian Indians. *Psychological Studies*, 47(1-3), 139-147.
- Krane, V., Waldron, J., Stiles-ShIPLEY, J. A., & Michalenok, J. (2001). Relationships among body satisfaction, social physique anxiety, and eating behaviors in female athletes and exercisers. *Journal of Sport Behavior*, 24(3), 247.
- Lin, L., & Soby, M. (2016). Appearance comparison styles and eating disordered symptoms in women. *Eating Behaviors*, 23, 7-12.
- LipseY, Z., Barton, S. B., Hulley, A., & Hill, A. J. (2006). "After a workout..." beliefs about exercise, eating and appearance in female exercisers with and without eating disorder features. *Psychology of Sport and Exercise*, 7(5), 425-436.

- Mañano, C., Morin, A. J. S., Lanfranchi, M., & Therme, P. (2015). Body-related sport and exercise motives and disturbed eating attitudes and behaviours in adolescents. *European Eating Disorders Review*, 23(4), 277-286.
- Maltby, J., & Day, L. (2001). The relationship between exercise motives and psychological well-being. *The Journal of Psychology*, 135(6), 651-660.
- Markland, D., & Hardy, L. (1993). The exercise motivations inventory: Preliminary development and validity of a measure of individuals' reasons for participation in regular physical exercise. *Personality and Individual Differences*, 15(3), 289-296.
- Markland, D., & Ingledew, D. K. (1997). The measurement of exercise motives: Factorial validity and invariance across gender of a revised exercise motivations inventory. *British Journal of Health Psychology*, 2(4), 361-376.
- Mayo, C., & George, V. (2014). Eating disorder risk and body dissatisfaction based on muscularity and body fat in male university students. *Journal Of American College Health*, 62(6), 407-415.
- Mills, J., & Fuller-Tyszkiewicz, M. (2017). Fat talk and body image disturbance: A systematic review and meta-analysis. *Psychology of Women Quarterly*, 41(1), 114-129.
- Murray, K., Rieger, E., & Byrne, D. (2015). The relationship between stress and body satisfaction in female and male adolescents. *Stress And Health: Journal Of The International Society For The Investigation Of Stress*, 31(1), 13-23.

- O'Brien, K., Venn, B. J., Perry, T., Green, T. J., Aitken, W., & Bradshaw, A. (2007).
Reasons for wanting to lose weight: Different strokes for different folks. *Eating Behaviors*, 8(1), 132-135.
- O'Conner, B. P. (2000). SPSS and SAS programs for determining the number of components using parallel analysis and Velicer's MAP test. *Behavior Research Methods, Instruments, and Computers*, 32, 396-402.
- O'Hara, S. E., Cox, A. E., & Amorose, A. J. (2014). Emphasizing appearance versus health outcomes in exercise: The influence of the instructor and participants' reasons for exercise. *Body Image*, 11(2), 109-118.
- Ogles, B., & Masters, K. (2000). Older vs. younger adult male marathon runners: Participative motives and training habits. *Journal of Sport Behavior*, 23(2), 130.
- Palladino Green, S., & Pritchard, M. (2003). Predictors of body image dissatisfaction in adult men and women. *Social Behavior and Personality: An International Journal*, 31, 215-222.
- Pasman, L., & Thompson, J.K. (1988). Body image and eating disturbance in obligatory runners, obligatory weightlifters and sedentary individuals. *International Journal of Eating Disorders*, 7(6), 759-769.
- Peñas-Lledó, E., Vaz Leal, F. J., & Waller, G. (2002). Excessive exercise in anorexia nervosa and bulimia nervosa: Relation to eating characteristics and general psychopathology. *International Journal of Eating Disorders*, 31(4), 370-375.
- Pila, E., Barlow M. A., Wrosch, C., & Sabiston C. M. (2016). Comparing the body to superior others: Associations with daily exercise and body evaluation in men and women. *Psychology of Sport and Exercise*, 27, 120-127.

- Putterman, E., & Linden, W. (2004). Appearance versus health: Does the reason for dieting affect dieting behavior? *Journal of Behavioral Medicine*, 27(2), 185-204.
- Prichard, I., & Tiggemann, M. (2008). Relations among exercise type, self-objectification, and body image in the fitness centre environment: The role of reasons for exercise. *Psychology of Sport and Exercise*, 9(6), 855-866.
- Rancourt, D., Schaefer, L. M., Bosson, J. K., & Thompson, J. K. (2016). Differential impact of upward and downward comparisons on diverse women's disordered eating behaviors and body image. *International Journal of Eating Disorders*, 49(5), 519-523.
- Reel, J. J., Galli, N., Miyairi, M., Voelker, D., & Greenleaf, C. (2016). Development and validation of the Intuitive Exercise Scale. *Eating Behaviors*, 22, 129-132.
- Reynolds, W. M. (1982). Development of reliable and valid short forms of the Marlowe-crown social desirability scale. *Journal of Clinical Psychology*, 38(1), 119-125.
- Sabiston, C. M., & Chandler, K. (2009). Effects of fitness advertising on weight and body shape dissatisfaction, social physique anxiety, and exercise motives in a sample of healthy-weight females. *Journal of Applied Biobehavioral Research*, 14(4), 165-180.
- Sanchez-Ruiz, M J., El-Jor, C., Kharma, A., Bassil, M., & Zeeni, N. (2017). Personality, emotion-related variables, and media pressure predict eating disorders via disordered eating in Lebanese university students. *Eating and Weight Disorders*.
- Sackett, P. R., & Lievens, F. (2008). Personnel selection. *Annual Review of Psychology*, 59, 419-450.

- Schaefer, L. M., Burke, N. L., Thompson, J. K., Dedrick, R. F., Heinberg, L. J., Calogero, R. M., & ... Swami, V. (2015). Development and validation of the Sociocultural Attitudes Towards Appearance Questionnaire-4 (SATAQ-4). *Psychological Assessment, 27*(1), 54-67.
- Schaefer, L. M., & Thompson, J. K. (2014). The development and validation of the Physical Appearance Comparison Scale-Revised (PACS-R). *Eating Behaviors, 15*, 209-217.
- Schutzer, K. A., & Graves, B. S. (2004). Barriers and motivations to exercise in older adults. *Preventive Medicine, 39*(5), 1056-1061.
- Sharpe, H., Naumann, U., Treasure, J. and Schmidt, U. (2013), Is fat talking a causal risk factor for body dissatisfaction? A systematic review and meta-analysis. *International Journal of Eating Disorders, 46*, 643-652.
- Shroff, H., Reba, L., Thornton, L. M., Tozzi, F., Klump, K. L., Berrettini, W. H., et al. (2006). Features associated with excessive exercise in women with eating disorders. *International Journal of Eating Disorders, 39*(6), 454-461.
- Silberstein, L. R., Striegel-Moore, R. H., Timko, C., & Rodin, J. (1988). Behavioral and psychological implications of body dissatisfaction: Do men and women differ? *Sex Roles, 19*(3-4), 219-232.
- Skov-Ettrup, L., Petersen, C. B., Curtis, T., Lykke, M., Christensen, A. I., & Tolstrup, J. S. (2014). Why do people exercise? A cross-sectional study of motives to exercise among danish adults. *Public Health, 128*(5), 482-484.
- Solenberger, S. E. (2001). Exercise and eating disorders: A 3-year inpatient hospital record analysis. *Eating Behaviors, 2*(2), 151-168.

- Steffen, J.J., & Brehm, B.J. (1999). The dimensions of obligatory exercise. *Eating Disorders*, 7, 219-226.
- Stice, E., Fisher, M., & Martinez, E. (2004). Eating Disorder Diagnostic Scale: Additional evidence of reliability and validity. *Psychological Assessment*, 16(1), 60-71.
- Stice, E., & Shaw, H. E. (2002). Role of Body Dissatisfaction in the Onset and Maintenance of Eating Pathology. *Journal of Psychosomatic Research*, 53, 985-993.
- Stice, E., Telch, C. F., & Rizvi, S. L. (2000). Development and validation of the Eating Disorder Diagnostic Scale: A brief self-report measure of anorexia, bulimia, and binge-eating disorder. *Psychological Assessment*, 12(20), 123-131.
- Streiner, D. L. (1994). Figuring out factors: The use and misuse of factor analysis. *Canadian Journal of Psychiatry*, 39, 135-140.
- Strelan, P., Mehaffey, S. J., & Tiggemann, M. (2003). Brief report: Self-objectification and esteem in young women: The mediating role of reasons for exercise. *Sex Roles*, 48(1-2), 89-95.
- Strömmer, S. T., Ingledew, D. K., & Markland, D. (2015). Development of the exercise motives and gains inventory. *Measurement in Physical Education and Exercise Science*, 19(2), 53-68.
- Swenne, I. (2016) Evaluation of the Compulsive Exercise Test (CET) in adolescents with eating disorders: Factor structure and relation to eating disordered psychopathology. *European Eating Disorders Review*, 24, 334–340.

- Taranis, L., Touyz, S. & Meyer, C. (2011). Disordered eating and exercise: Development and preliminary validation of the compulsive exercise test. *European Eating Disorders Review*, 19, 256-268.
- Terwee, C. B., Mokkink, L. B., Knol, D. L., Ostelo, R. G., Bouter, L. M., & de Vet, H. W. (2012). Rating the methodological quality in systematic reviews of studies on measurement properties: A scoring system for the COSMIN checklist. *Quality Of Life Research: An International Journal Of Quality Of Life Aspects Of Treatment, Care & Rehabilitation*, 21(4), 651-657.
- Thompson, A. M. & Chad, K. E. (2002). The relationship of social physique anxiety to risk for developing an eating disorder in younger females. *Journal of Adolescent Health*, 31(2), 183-189.
- Van den Berg, P., Thompson, J. K., Obremski-Brandon, K., & Coovert, M. (2002). The Tripartite Influence model of body image and eating disturbance: A covariance structure modeling investigation testing the mediational role of appearance comparison. *Journal of Psychosomatic Research*, 53, 1007-1020.
- Vartanian, L. R., Wharton, C. M., & Green, E. B. (2012). Appearance vs. health motives for exercise and for weight loss. *Psychology of Sport and Exercise*, 13(3), 251-256.
- Vinkers, C. D., Evers, C., Adriaanse, M. A., & de Ridder, D. T. (2012). Body esteem and eating disorder symptomatology: The mediating role of appearance-motivated exercise in a non-clinical adult female sample. *Eating Behaviors*, 13(3), 214-218.

- Webb, J. B., & Hardin, A. S. (2016). An integrative affect regulation process model of internalized weight bias and intuitive eating in college women. *Appetite, 102*, 60-69.
- Wright, J., O'Flynn, G., & Macdonald, D. (2006). Being fit and looking healthy: Young women's and men's constructions of health and fitness. *Sex Roles, 54*, 707-716.
- White, J., & Halliwell, E. (2010). Examination of a sociocultural model of excessive exercise among male and female adolescents. *Body Image, 7*(3), 227-233.
- Woods, C. M. & Edwards, M.C. (2008). Factor Analysis and Related Methods. In Rao, C. R., Miller, J. P., & Rao, D. C. (Eds), *Handbook of Statistics 27: Epidemiology and Medical Statistics* (pp. 367-395). Oxford, UK: Elsevier B.V.
- Yang, L., & Xu, H. (2016). Effects of objectifying media on women's self-objectification and body shame. *Chinese Journal Of Clinical Psychology, 24*(5), 788-794.
- Young, D. R., Gittelsohn, J., Charleston, J., Felix-Aaron, K., & Appel, L. J. (2001). Motivations for exercise and weight loss among African-American women: Focus group results and their contribution towards program development. *Ethnicity and Health, 6*(3-4), 227-245.

APPENDICES

Appendix A: Demographic Information

1. Age _____
2. Year in School (please choose one):
 - First Year
 - Second Year
 - Third Year
 - Fourth Year
 - Other: _____
3. Ethnicity (please select all that apply):
 - American Indian or Alaskan Native
 - African American or Black
 - Asian
 - Native Hawaiian or Pacific Islander
 - Hispanic or Latina
 - White
 - Some other race: _____
4. Sexual Orientation (please select the term that best fits you):
 - Homosexual
 - Heterosexual
 - Bisexual
5. What is your height and weight?
6. How frequently do you exercise?

Appendix B: Marlowe Crown Social Desirability Scale: Short Form

1. It is sometimes hard for me to go on with my work if I am not encouraged. **T F**
2. I sometimes feel resentful when I don't get my way. **T F**
3. On a few occasions, I have given up something because I thought too little of my ability. **T F**
4. There have been times when I felt like rebelling against people in authority even though I knew they were right. **T F**
5. No matter who I'm talking to, I'm always a good listener. **T F**
6. There have been occasions when I have taken advantage of someone. **T F**
7. I'm always willing to admit it when I make a mistake. **T F**
8. I sometimes try to get even rather than forgive and forget. **T F**
9. I am always courteous, even to people who are disagreeable. **T F**
10. I have never been irked when people expressed ideas very different from my own. **T F**
11. There have been times when I was quite jealous of the good fortune of others. **T F**
12. I am sometimes irritated by people who ask favors of me. **T F**
13. I have never deliberately said something that hurt someone's feelings. **T F**

Appendix C. The Exercise Appearance Motivations Scale

Directions: Please read each of the following items carefully and indicate the number that best reflects your agreement with the statement.

Definitely Disagree = 1
Disagree = 2 □
Somewhat Disagree = 3 □
Neither Agree Nor Disagree = 4
Somewhat Agree = 5
Agree = 6 □
Definitely Agree = 7

I exercise (or might exercise) to.....

1. Maintain the appearance of my muscle tone
2. Build the appearance of my muscle tone
3. Maintain a fit appearance
4. Maintain a thin appearance
5. Maintain an appearance that I am proud of
6. Maintain an appearance that I am happy with
7. Look good when naked
8. Look good in my clothes
9. Look my best
10. Make my body look like someone else's (i.e., a friend, celebrity)
11. Avoid looking like someone else (i.e., a family member)
12. Attract sexual/romantic partners
13. Look good for other people
14. Keep up a body similar to those in my social group (i.e., friends)
15. Meet society's (i.e., the media, my friends, my significant other) expectations
16. Deal with the pressure to look a specific weight
17. Lose weight to look good/better
18. Avoid looking bigger than I want to
19. Minimize fear of looking bigger than I want to
20. Avoid looking fat
21. Minimize fear of looking fat
22. Avoid having a specific body part look fat (i.e., stomach)
23. Minimize fear of a specific body part looking fat (i.e., stomach)
24. Look like a certain weight
25. Avoid negative judgment from others about my appearance
26. Become more satisfied with my appearance
27. Look good in a bathing suit/underwear
28. Avoid guilt about my appearance
29. Maintain the appearance of a certain body fat level
30. Avoid looking bloated
31. Avoid guilt about the way I look
32. Avoid others' criticisms about the way I look

Appendix D. Multidimensional Body-Self Relations Questionnaire- Appearance Evaluation

Instructions: Using the scale below, please select the number that best matches your agreement with the following statements.

	1 Definitely disagree	2 Mostly disagree	3 Neither agree nor disagree	4 Mostly agree	5 Definitely agree
1. My body is sexually appealing.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. I like my looks just the way they are.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. Most people would consider me good looking.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. I like the way I look without my clothes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. I like the way my clothes fit me.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. I dislike my physique.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. I'm physically unattractive.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Appendix E. Physical Appearance Comparison Scale-Revised (PACS-R)

People sometimes compare their physical appearance to the physical appearance of others. This can be a comparison of their weight, body size, body shape, body fat or overall appearance. Thinking about how you generally compare yourself to others, please use the following scale to rate how often you make these kinds of comparisons.

	Never 0	Seldom 1	Sometimes 2	Often 3	Always 4
			Never		Always
1. When I'm out in public, I compare my physical appearance to the appearance of others.	0	1	2	3	4
2. When I meet a new person (same sex), I compare my body size to his/her body size.	0	1	2	3	4
3. When I'm at work or school, I compare my body shape to the body shape of others.	0	1	2	3	4
4. When I'm out in public, I compare my body fat to the body fat of others.	0	1	2	3	4
5. When I'm shopping for clothes, I compare my weight to the weight of others.	0	1	2	3	4
6. When I'm at a party, I compare my body shape to the body shape of others.	0	1	2	3	4
7. When I'm with a group of friends, I compare my weight to the weight of others.	0	1	2	3	4
8. When I'm eating in a restaurant, I compare my body fat to the body fat of others.	0	1	2	3	4
9. When I'm with a group of friends, I compare my body size to the body size of others.	0	1	2	3	4
10. When I'm at the gym, I compare my physical appearance to the appearance of others.	0	1	2	3	4
11. When I'm out in public, I compare my body size to the body size of others.	0	1	2	3	4

Appendix F. Sociocultural Attitudes Towards Appearance Questionnaire – 4

Directions: Please read each of the following items carefully and indicate the number that best reflects your agreement with the statement.

Definitely Disagree = 1
Mostly Disagree = 2
Neither Agree Nor Disagree = 3
Mostly Agree = 4
Definitely Agree = 5

	Definitely Disagree				Definitely Agree
1. It is important for me to look athletic.	1	2	3	4	5
2. I think a lot about looking muscular.	1	2	3	4	5
3. I want my body to look very thin.	1	2	3	4	5
4. I want my body to look like it has little fat.	1	2	3	4	5
5. I think a lot about looking thin.	1	2	3	4	5
6. I spend a lot of time doing things to look more athletic.	1	2	3	4	5
7. I think a lot about looking athletic.	1	2	3	4	5
8. I want my body to look very lean.	1	2	3	4	5
9. I think a lot about having very little body fat.	1	2	3	4	5
10. I spend a lot of time doing things to look more muscular.	1	2	3	4	5

Answer the following questions with relevance to your Family (include: parents, brothers, sisters, relatives):

11. I feel pressure from family members to look thinner.	1	2	3	4	5
12. I feel pressure from family members to improve my appearance.	1	2	3	4	5
13. Family members encourage me to decrease my level of body fat.	1	2	3	4	5
14. Family members encourage me to get in better shape.	1	2	3	4	5

Answer the following questions with relevance to your Peers (include: close friends, classmates, other social contacts):

15. My peers encourage me to get thinner.	1	2	3	4	5
16. I feel pressure from my peers to improve my appearance.	1	2	3	4	5
17. I feel pressure from my peers to look in better shape.	1	2	3	4	5
18. I get pressure from my peers to decrease my level of body fat.	1	2	3	4	5

Answer the following questions with relevance to the Media (include: television, magazines, the Internet, movies, billboards, and advertisements):

19. I feel pressure from the media to look in better shape.	1	2	3	4	5
20. I feel pressure from the media to look thinner.	1	2	3	4	5
21. I feel pressure from the media to improve my appearance.	1	2	3	4	5
22. I feel pressure from the media to decrease my level of body fat.	1	2	3	4	5

Appendix G: Obligatory Exercise Questionnaire

Directions: Listed below are a series of statements about people's exercise habits. Please circle the number that reflects how often you could make the following statements:

- | | NEVER | SOMETIMES | USUALLY | ALWAYS |
|--|-------|-----------|---------|--------|
| | 1 | 2 | 3 | 4 |
1. I engage in physical exercise on a daily basis.
 2. I engage in one/more of the following forms of exercise: walking, jogging/running or weightlifting.
 3. I exercise more than three days per week.
 4. When I don't exercise I feel guilty.
 5. I sometimes feel like I don't want to exercise, but I go ahead and push myself anyway.
 6. My best friend likes to exercise.
 7. When I miss an exercise session, I feel concerned about my body possibly getting out of shape.
 8. If I have planned to exercise at a particular time and something unexpected comes up (like an old friend comes to visit or I have some work to do that needs immediate attention) I will usually skip my exercise for that day.
 9. If I miss a planned workout, I attempt to make up for it the next day.
 10. I may miss a day of exercise for no good reason.
 11. Sometimes, I feel a need to exercise twice in one day, even though I may feel a little tired.
 12. If I feel I have overeaten, I will try to make up for it by increasing the amount I exercise.
 13. When I miss a scheduled exercise session I may feel tense, irritable or depressed.
 14. Sometimes, I find that my mind wanders to thoughts about exercising.
 15. I have had daydreams about exercising.
 16. I keep a record of my exercise performance, such as how long I work out, how far or fast I run.
 17. I have experienced a feeling of euphoria or a high during or after an exercise session.
 18. I frequently push myself to the limits.
 19. I have exercised when advised against such activity (i.e. by a doctor, friend, etc.)
 20. I will engage in other forms of exercise if I am unable to engage in my usual form of exercise.

Appendix H: Eating Disorder Diagnostic Scale

Please carefully complete all questions.

Over the past 3 months . . .	Not at all		Slightly		Moderately		Extremely
1. Have you felt fat?	0	1	2	3	4	5	6
2. Have you had a definite fear that you might gain weight or become fat?	0	1	2	3	4	5	6
3. Has your weight influenced how you think about (judge) yourself as a person?	0	1	2	3	4	5	6
4. Has your shape influenced how you think about (judge) yourself as a person?	0	1	2	3	4	5	6
5. During the past 6 months have there been times when you felt you have eaten what other people would regard as an unusually large amount of food (e.g., a quart of ice cream) given the circumstances? YES NO							
6. During the times when you ate an unusually large amount of food, did you experience a loss of control (feel you couldn't stop eating or control what or how much you were eating)? YES NO							
7. How many DAYS per week on average over the past 6 MONTHS have you eaten an unusually large amount of food and experienced a loss of control? 0 1 2 3 4 5 6 7							
8. How many TIMES per week on average over the past 3 MONTHS have you eaten an unusually large amount of food and experienced a loss of control? 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14							
During these episodes of overeating and loss of control did you . . .							
9. Eat much more rapidly than normal? YES NO							
10. Eat until you felt uncomfortably full? YES NO							
11. Eat large amounts of food when you didn't feel physically hungry? YES NO							
12. Eat alone because you were embarrassed by how much you were eating? YES NO							
13. Feel disgusted with yourself, depressed, or very guilty after overeating? YES NO							
14. Feel very upset about your uncontrollable overeating or resulting weight gain? YES NO							
15. How many times per week on average over the past 3 months have you made yourself vomit to prevent weight gain or counteract the effects of eating? 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14							
16. How many times per week on average over the past 3 months have you used laxatives or diuretics to prevent weight gain or counteract the effects of eating? 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14							
17. How many times per week on average over the past 3 months have you fasted (skipped at least 2 meals in a row) to prevent weight gain or counteract the effects of eating? 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14							
18. How many times per week on average over the past 3 months have you engaged in excessive exercise specifically to counteract the effects of overeating episodes? 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14							
19. How much do you weigh? If uncertain, please give your best estimate. ___lb							
20. How tall are you? ___ft ___in.							
21. Over the past 3 months, how many menstrual periods have you missed? 1 2 3 4 na							
22. Have you been taking birth control pills during the past 3 months? YES NO							

Appendix I: General Belief in a Just World Scale

1. I think basically the world is a just place.	0	1	2	3	4	5	6
2. I believe that, by and large, people get what they deserve.	0	1	2	3	4	5	6
3. I am confident that justice always prevails over injustice.	0	1	2	3	4	5	6
4. I am convinced that in the long run people will be compensated for injustices.	0	1	2	3	4	5	6
5. I firmly believe that injustices in all areas of life (e.g., professional, family, politic) are the exception rather than the rule.	0	1	2	3	4	5	6
6. I think people try to be fair when making important decisions.	0	1	2	3	4	5	6

Appendix J: Exercise Motivations Scale: Appearance and Weight Management Subscales

Personally, I exercise (or might exercise) ...	Not at all					Very true						
	true for me					for me						
1. To stay slim	0	1	2	3	4	5						
2. To help me look younger	0	1	2	3	4	5						
3. To lose weight	0	1	2	3	4	5						
4. To have a good body	0	1	2	3	4	5						
5. To help control my weight	0	1	2	3	4	5						
6. To improve my appearance	0	1	2	3	4	5						
7. Because exercise helps me to burn calories	0	1	2	3	4	5						
8. To look more attractive	0	1	2	3	4	5						

Appendix K: International Physical Activity Questionnaire – Recreation, Sport, & Leisure Time Subscales

This section is about all the physical activities that you did in the last 7 days solely for recreation, sport, exercise or leisure. Please do not include any activities you have already mentioned.

Not counting any walking you have already mentioned, during the last 7 days, on how many days did you walk for at least 10 minutes at a time in your leisure time?

_____ days per week

How much time did you usually spend on one of those days walking in your leisure time?

_____ hours per day _____ minutes per day

Think about only those physical activities that you did for at least 10 minutes at a time. During the last 7 days, on how many days did you do vigorous physical activities like aerobics, running, fast bicycling, or fast swimming in your leisure time?

_____ days per week

How much time did you usually spend on one of those days doing vigorous physical activities in your leisure time?

_____ hours per day _____ minutes per day

Again, think about only those physical activities that you did for at least 10 minutes at a time. During the last 7 days, on how many days did you do moderate physical activities like bicycling at a regular pace, swimming at a regular pace, and doubles tennis in your leisure time?

_____ days per week

How much time did you usually spend on one of those days doing moderate physical activities in your leisure time?

_____ hours per day _____ minutes per day

Appendix L: Permission Statement

JOHN WILEY AND SONS LICENSE TERMS AND CONDITIONS

May 30, 2018

This Agreement between Leah Boepple ("You") and John Wiley and Sons ("John Wiley and Sons") consists of your license details and the terms and conditions provided by John Wiley and Sons and Copyright Clearance Center.

License Number	4355510886167
License date	May 24, 2018
Licensed Content Publisher	John Wiley and Sons
Licensed Content Publication	Applied Psychology: Health and Well-Being
Licensed Content Title	Three Levels of Exercise Motivation
Licensed Content Author	David K. Ingledew, David Markland, Eamonn Ferguson
Licensed Content Date	Sep 15, 2009
Licensed Content Volume	1
Licensed Content Issue	3
Licensed Content Pages	20
Type of use	Dissertation/Thesis
Requestor type	University/Academic
Format	Electronic
Portion	Figure/table
Number of figures/tables	1
Original Wiley figure/table number(s)	Figure 1
Will you be translating?	No
Title of your thesis / dissertation	Development and Validation of the Exercise Appearance Motivations Scale
Expected completion date	Aug 2018
Expected size (number of pages)	107
Requestor Location	Leah Boepple 107 Line Street Apt B CHARLESTON, SC 29403 United States Attn: Leah Boepple
Publisher Tax ID	EU826007151
Total	0.00 USD
Terms and Conditions	

TERMS AND CONDITIONS

This copyrighted material is owned by or exclusively licensed to John Wiley & Sons, Inc. or one of its group companies (each a "Wiley Company") or handled on behalf of a society with which a Wiley Company has exclusive publishing rights in relation to a particular work (collectively "WILEY"). By clicking "accept" in connection with completing this licensing transaction, you agree that the following terms and conditions apply to this transaction (along with the billing and payment terms and conditions established by the Copyright Clearance Center Inc., ("CCC's Billing and Payment terms and conditions"), at the time that you opened your RightsLink account (these are available at any time at <http://myaccount.copyright.com>).

Terms and Conditions

- The materials you have requested permission to reproduce or reuse (the "Wiley Materials") are protected by copyright.
- You are hereby granted a personal, non-exclusive, non-sub licensable (on a stand-alone basis), non-transferable, worldwide, limited license to reproduce the Wiley Materials for the purpose specified in the licensing process. This license, and any **CONTENT (PDF or image file) purchased as part of your order**, is for a one-time use only and limited to any maximum distribution number specified in the license. The first instance of republication or reuse granted by this license must be completed within two years of the date of the grant of this license (although copies prepared before the end date may be distributed thereafter). The Wiley Materials shall not be used in any other manner or for any other purpose, beyond what is granted in the license. Permission is granted subject to an appropriate acknowledgement given to the author, title of the material/book/journal and the publisher. You shall also duplicate the copyright notice that appears in the Wiley publication in your use of the Wiley Material. Permission is also granted on the understanding that nowhere in the text is a previously published source acknowledged for all or part of this Wiley Material. Any third party content is expressly excluded from this permission.
- With respect to the Wiley Materials, all rights are reserved. Except as expressly granted by the terms of the license, no part of the Wiley Materials may be copied, modified, adapted (except for minor reformatting required by the new Publication), translated, reproduced, transferred or distributed, in any form or by any means, and no derivative works may be made based on the Wiley Materials without the prior permission of the respective copyright owner. **For STM Signatory Publishers clearing permission under the terms of the STM Permissions Guidelines only, the terms of the license are extended to include subsequent editions and for editions in other languages, provided such editions are for the work as a whole in situ and does not involve the separate exploitation of the permitted figures or extracts**, You may not alter, remove or suppress in any manner any copyright, trademark or other notices displayed by the Wiley Materials. You may not license, rent, sell, loan, lease, pledge, offer as security, transfer or assign the Wiley Materials on a stand-alone basis, or any of the rights granted to you hereunder to any other person.
- The Wiley Materials and all of the intellectual property rights therein shall at all times remain the exclusive property of John Wiley & Sons Inc, the Wiley Companies, or their respective licensors, and your interest therein is only that of having possession of and the right to reproduce the Wiley Materials pursuant to Section 2 herein during the continuance of this Agreement. You agree that you own no right, title or interest in or to the Wiley Materials or any of the intellectual property rights therein. You shall have no rights hereunder other than the license as provided for above in Section 2. No right, license or interest to any trademark, trade name, service mark or other branding ("Marks") of WILEY or its licensors is granted hereunder, and you agree that you shall not assert any such right, license or interest with respect thereto
- NEITHER WILEY NOR ITS LICENSORS MAKES ANY WARRANTY OR REPRESENTATION OF ANY KIND TO YOU OR ANY THIRD PARTY, EXPRESS, IMPLIED OR STATUTORY, WITH RESPECT TO THE MATERIALS OR THE ACCURACY OF ANY INFORMATION CONTAINED IN THE MATERIALS, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTY OF MERCHANTABILITY, ACCURACY, SATISFACTORY QUALITY, FITNESS FOR A PARTICULAR PURPOSE, USABILITY, INTEGRATION OR NON-INFRINGEMENT AND ALL SUCH WARRANTIES ARE HEREBY EXCLUDED BY WILEY AND ITS LICENSORS AND WAIVED BY YOU.
- WILEY shall have the right to terminate this Agreement immediately upon breach of this Agreement by you.
- You shall indemnify, defend and hold harmless WILEY, its Licensors and their respective directors, officers, agents and employees, from and against any actual or threatened claims, demands, causes of action or proceedings arising from any breach of this Agreement by you.
- IN NO EVENT SHALL WILEY OR ITS LICENSORS BE LIABLE TO YOU OR ANY OTHER PARTY OR ANY OTHER PERSON OR ENTITY FOR ANY SPECIAL, CONSEQUENTIAL, INCIDENTAL, INDIRECT, EXEMPLARY OR PUNITIVE DAMAGES, HOWEVER CAUSED, ARISING OUT OF OR IN CONNECTION WITH THE DOWNLOADING, PROVISIONING, VIEWING OR USE OF THE MATERIALS REGARDLESS OF THE FORM OF ACTION, WHETHER FOR BREACH OF CONTRACT, BREACH OF WARRANTY, TORT, NEGLIGENCE, INFRINGEMENT OR OTHERWISE (INCLUDING, WITHOUT LIMITATION, DAMAGES BASED ON LOSS OF PROFITS, DATA, FILES, USE, BUSINESS OPPORTUNITY OR CLAIMS OF THIRD PARTIES), AND WHETHER OR NOT THE PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. THIS LIMITATION SHALL APPLY NOTWITHSTANDING ANY FAILURE OF ESSENTIAL PURPOSE OF ANY LIMITED REMEDY PROVIDED HEREIN.
- Should any provision of this Agreement be held by a court of competent jurisdiction to be illegal, invalid, or unenforceable, that provision shall be deemed amended to achieve as nearly as possible the same economic effect as the original provision, and the legality, validity and enforceability of the remaining provisions of this Agreement shall not be affected or impaired thereby.
- The failure of either party to enforce any term or condition of this Agreement shall not constitute a waiver of either party's right to enforce each and every term and condition of this Agreement. No breach under this agreement shall be deemed waived or excused by either party unless such waiver or consent is in writing signed by the party granting such waiver or consent. The waiver by or consent of a party to a breach of any provision of this Agreement shall not operate or be construed as a waiver of or consent to any other or subsequent breach by such other party.

- This Agreement may not be assigned (including by operation of law or otherwise) by you without WILEY's prior written consent.
- Any fee required for this permission shall be non-refundable after thirty (30) days from receipt by the CCC.
- These terms and conditions together with CCC's Billing and Payment terms and conditions (which are incorporated herein) form the entire agreement between you and WILEY concerning this licensing transaction and (in the absence of fraud) supersedes all prior agreements and representations of the parties, oral or written. This Agreement may not be amended except in writing signed by both parties. This Agreement shall be binding upon and inure to the benefit of the parties' successors, legal representatives, and authorized assigns.
- In the event of any conflict between your obligations established by these terms and conditions and those established by CCC's Billing and Payment terms and conditions, these terms and conditions shall prevail.
- WILEY expressly reserves all rights not specifically granted in the combination of (i) the license details provided by you and accepted in the course of this licensing transaction, (ii) these terms and conditions and (iii) CCC's Billing and Payment terms and conditions.
- This Agreement will be void if the Type of Use, Format, Circulation, or Requestor Type was misrepresented during the licensing process.
- This Agreement shall be governed by and construed in accordance with the laws of the State of New York, USA, without regards to such state's conflict of law rules. Any legal action, suit or proceeding arising out of or relating to these Terms and Conditions or the breach thereof shall be instituted in a court of competent jurisdiction in New York County in the State of New York in the United States of America and each party hereby consents and submits to the personal jurisdiction of such court, waives any objection to venue in such court and consents to service of process by registered or certified mail, return receipt requested, at the last known address of such party.

WILEY OPEN ACCESS TERMS AND CONDITIONS

Wiley Publishes Open Access Articles in fully Open Access Journals and in Subscription journals offering Online Open. Although most of the fully Open Access journals publish open access articles under the terms of the Creative Commons Attribution (CC BY) License only, the subscription journals and a few of the Open Access Journals offer a choice of Creative Commons Licenses. The license type is clearly identified on the article.

The Creative Commons Attribution License

The Creative Commons Attribution License (CC-BY) allows users to copy, distribute and transmit an article, adapt the article and make commercial use of the article. The CC-BY license permits commercial and non-

Creative Commons Attribution Non-Commercial License

The Creative Commons Attribution Non-Commercial (CC-BY-NC) License permits use, distribution and reproduction in any medium, provided the original work is properly cited and is not used for commercial purposes. (see below)

Creative Commons Attribution-Non-Commercial-NoDerivs License

The Creative Commons Attribution Non-Commercial-NoDerivs License (CC-BY-NC-ND) permits use, distribution and reproduction in any medium, provided the original work is properly cited, is not used for commercial purposes and no modifications or adaptations are made. (see below)

Use by commercial "for-profit" organizations

Use of Wiley Open Access articles for commercial, promotional, or marketing purposes requires further explicit permission from Wiley and will be subject to a fee.

Further details can be found on Wiley Online Library <http://olabout.wiley.com/WileyCDA/Section/id-410895.html>

Other Terms and Conditions:

v1.10 Last updated September 2015

Questions? customercare@copyright.com or +1-855-239-3415 (toll free in the US) or +1-978-646-2777.