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Development and Validation of the Exercise Appearance Motivations Scale

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Development and Validation of the Exercise Appearance Motivations Scale

by

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A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy
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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 &
Brudzynski, 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.

Ingledew and colleagues (2009; See Figure 1) developed the only existing model of exercise behavior to include motivation. Ingledew’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 (Ingledew 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”).

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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 (5$^{th}$ 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; Crowne 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 (α = .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 (EMSTotalα = .94; muscularityα = .89; appearanceα = .93; societalpressuresα = .86; shape/weightα = .94; avoidance/shameα = .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 (Mα < 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.
All EAMS factors and total score were significantly positively correlated with the OEQ \( (EAMS_{total} r = .36, p < .01; F_1 r = .40, p < .01; F_2 r = .29, p < .01; F_3 r = .22, p < .01; F_4 r = .24, p < .01; F_5 r = .28, p < .01) \), suggesting that individuals who report higher amounts of compulsive exercise report higher levels of appearance-based motivation for exercise.

The EAMS total score and all factors except Muscularity were significantly positively correlated with the PACS \( (EAMS_{total} r = .45, p < .01; F_1 r = -.30, p = .58; F_2 r = .20, p < .01; F_3 r = .49, p < .01; F_4 r = .44, p < .01; F_5 r = .42, p < .01) \), 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.

The EAMS total score and all factors except Muscularity were significantly positively correlated with the EDDS \( (EAMS_{total} r = .22, p < .01; F_1 r = -.10, p = .06; F_2 r = .17, p < .01; F_3 r = .27, p < .01; F_4 r = .22, p < .01; F_5 r = .27, p < .01) \), 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 (EAMStotal\( r = .40, p < .01; F_1r = .44, p = .49; F_2r = .30, p < .01; F_3r = .30, p < .01; F_4r = .36, p < .01; F_5r = .42, p < .01\)), 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 (EAMStotal\( r = .30, p < .01; F_1r = .01, p = .90; F_2r = .22, p < .01; F_3r = .24, p < .01; F_4r = .26, p < .01; F_5r = .29, p < .01\)). 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 (EAMStotal\( r = .11, p = .05; F_1r = .06, p = .24; F_2r = .13, p < .05; F_3r = .01, p = .91; F_4r = .07, p = .23; F_5r = .13, p < .05\)). 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 (EAMStotal $r = .04$, $p = .48$; $F_1 r = .07$, $p = .23$; $F_2 r = .12$, $p < .05$; $F_3 r = -.02$, $p = .75$; $F_4 r = -.01$, $p = .94$; $F_5 r = -.01$, $p = .97$), 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 (EAMStotal $r = .16$, $p < .01$; $F_1 r = .17$, $p < .01$; $F_2 r = .14$, $p < .05$; $F_3 r = .02$, $p = .67$; $F_4 r = .12$, $p < .05$; $F_5 r = .20$, $p < .05$), 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 (EAMStotal $r = -.01$, $p = .82$; $F_1 r = -.01$, $p = .92$; $F_2 r = .06$, $p = .31$; $F_3 r = -.01$, $p = .81$; $F_4 r = .05$, $p = .42$; $F_5 r = .08$, $p = .14$).
**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 ($EAMSTotal r = .06, p = .31; F_1r = .09, p = .13; F_2r = .06, p = .27; F_3r = .03, p = .60; F_4r = -.01, p = .88; F_5r = .03, p = .54$).

**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 muscul arity. 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 muscul arity 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 &
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 (Maïano 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 sparing 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 muscul arity, 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 muscul arity 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 (Puttermann & 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>
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<th>Eigenvalue</th>
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<tr>
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<tr>
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<tr>
<td>Item</td>
<td>Factor 1</td>
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<tr>
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</tr>
<tr>
<td>Maintain the appearance of my muscle tone</td>
<td>0.865</td>
</tr>
<tr>
<td>Build the appearance of my muscle tone</td>
<td>0.88</td>
</tr>
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<td>Maintain an appearance that I am proud of</td>
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<td>Maintain an appearance that I am happy with</td>
<td>-0.002</td>
</tr>
<tr>
<td>Look good when naked</td>
<td>-0.017</td>
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<tr>
<td>Look good in my clothes</td>
<td>-0.096</td>
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<tr>
<td>Look my best</td>
<td>-0.004</td>
</tr>
<tr>
<td>Attract sexual/romantic partners</td>
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</tr>
<tr>
<td>Look good for other people</td>
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<td>Keep up a body similar to those in my social group (i.e., friends)</td>
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</tr>
<tr>
<td>Meet society’s (i.e., the media, my friends, my significant other) expectations</td>
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</tr>
<tr>
<td>Deal with the pressure to look a specific weight</td>
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<tr>
<td>Lose weight to look good/better</td>
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<tr>
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<td>Avoid having a specific body part look fat (i.e., stomach)</td>
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<tr>
<td>Become more satisfied with my appearance</td>
<td>0.016</td>
</tr>
<tr>
<td>Look good in a bathing suit/underwear</td>
<td>0.01</td>
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<tr>
<td>Avoid guilt about my appearance</td>
<td>0.038</td>
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<tr>
<td>Maintain the appearance of a certain body fat level</td>
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<td>Avoid guilt about the way I look</td>
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<td>Avoid others' criticisms about the way I look</td>
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<td>Item</td>
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<tr>
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<tr>
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<td>Maintain an appearance that I am happy with</td>
<td>-0.007</td>
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<tr>
<td>Look good when naked</td>
<td>-0.023</td>
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<tr>
<td>Look good in my clothes</td>
<td>-0.089</td>
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<tr>
<td>Look my best</td>
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<tr>
<td>Make my body look like someone else’s (i.e., a friend, celebrity)</td>
<td>0.061</td>
</tr>
<tr>
<td>Attract sexual/romantic partners</td>
<td>-0.085</td>
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<td>Look good for other people</td>
<td>-0.071</td>
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<td>Keep up a body similar to those in my social group (i.e., friends)</td>
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<td>Meet society’s (i.e., the media, my friends, my significant other)</td>
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<tr>
<td>Minimize fear of looking fat</td>
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<td>Avoid having a specific body part look fat (i.e., stomach)</td>
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<td>Minimize fear of a specific body part looking fat (i.e., stomach)</td>
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<tr>
<td>Look like a certain weight</td>
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<tr>
<td>Avoid negative judgment from others about my appearance</td>
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<tr>
<td>Become more satisfied with my appearance</td>
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<tr>
<td>Look good in a bathing suit/underwear</td>
<td>0.022</td>
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<td>Avoid guilt about my appearance</td>
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<td>Maintain the appearance of a certain body fat level</td>
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Table 5. Confirmatory Factor Analysis Fit Indices

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<tr>
<th>Metric</th>
<th>Value</th>
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<tr>
<td>Standardized Root-Mean-Square Residual</td>
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<tr>
<td>Root Mean Square Error Of Approximation</td>
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<tr>
<td>Comparative Fit Index</td>
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**Table 6. Modification Fit Solution**

<table>
<thead>
<tr>
<th>Item Pair</th>
<th>Modification Index</th>
<th>Chi Square</th>
<th>CFI</th>
<th>RMSEA</th>
<th>SRMR</th>
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<td>3,4</td>
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<td>1907.96</td>
<td>0.895</td>
<td>0.093</td>
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<td>21,20</td>
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<td>1661.86</td>
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<td>1531.77</td>
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<td>0.07</td>
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<td>6,5</td>
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<td>1444.98</td>
<td>0.924</td>
<td>0.079</td>
<td>0.069</td>
</tr>
</tbody>
</table>

*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 ($min = 1$, $max = 7$)

<table>
<thead>
<tr>
<th>Item</th>
<th>Mean</th>
<th>Std. Deviation</th>
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<td>EAMS7</td>
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<td>EAMS8</td>
<td>5.97</td>
<td>1.23</td>
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<tr>
<td>EAMS9</td>
<td>5.99</td>
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<tr>
<td>EAMS10</td>
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<td>1.45</td>
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<td>1.33</td>
</tr>
<tr>
<td>EAMS19</td>
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<td>1.53</td>
</tr>
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<td>Factor</td>
<td>Composite Reliability</td>
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<td>Factor 4</td>
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<tr>
<td>Factor 5</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>GBJW</td>
<td>OEQ</td>
</tr>
<tr>
<td>--------------------------</td>
<td>------</td>
<td>-------</td>
</tr>
<tr>
<td>Muscularity</td>
<td>0.09</td>
<td>.40**</td>
</tr>
<tr>
<td>Appearance</td>
<td>0.06</td>
<td>.29**</td>
</tr>
<tr>
<td>Societal Pressures</td>
<td>0.03</td>
<td>.22**</td>
</tr>
<tr>
<td>Shape/Weight Concerns</td>
<td>-.01</td>
<td>.24**</td>
</tr>
<tr>
<td>Avoidance/Shame</td>
<td>0.03</td>
<td>.28**</td>
</tr>
<tr>
<td>Total Score</td>
<td>0.06</td>
<td>.36**</td>
</tr>
</tbody>
</table>

*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>
<thead>
<tr>
<th>Questionnaire</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>OEQ</td>
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<td>12.17</td>
</tr>
<tr>
<td>PACS</td>
<td>28.31</td>
<td>10.63</td>
</tr>
<tr>
<td>MBSRQ</td>
<td>3.31</td>
<td>0.89</td>
</tr>
<tr>
<td>SATAQ Thin Internalization</td>
<td>19.48</td>
<td>3.62</td>
</tr>
<tr>
<td>SATAQ Muscular Internalization</td>
<td>18.04</td>
<td>4.3</td>
</tr>
<tr>
<td>SATAQ Family Pressures</td>
<td>15.54</td>
<td>3.48</td>
</tr>
<tr>
<td>SATAQ Peer Pressure</td>
<td>14.74</td>
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<tr>
<td>SATAQ Media Pressure</td>
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<td>GBJW</td>
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<td>Weight Management</td>
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<td>Appearance</td>
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<td>MC</td>
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<tr>
<td>EDDS</td>
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</tbody>
</table>

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)

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

*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)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1 B</th>
<th>SE B</th>
<th>Beta</th>
<th>Model 2 B</th>
<th>SEB</th>
<th>Beta</th>
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</thead>
<tbody>
<tr>
<td>Intercept</td>
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<td>2.47</td>
<td></td>
<td>20.67</td>
<td>3.40</td>
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</tr>
<tr>
<td>Weight Management</td>
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<td>-.16</td>
<td>-0.90</td>
<td>.27</td>
<td>-0.32***</td>
</tr>
<tr>
<td>Appearance Concerns</td>
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<td>.26</td>
<td>1.24</td>
<td>0.26</td>
<td>.48**</td>
<td>.43***</td>
</tr>
<tr>
<td>EAMS Total</td>
<td>0.15</td>
<td></td>
<td>0.03</td>
<td></td>
<td>0.19</td>
<td></td>
</tr>
<tr>
<td>F for change in R2</td>
<td>23.53***</td>
<td></td>
<td>22.32***</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**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>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th></th>
<th></th>
<th>Model 2</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>SE B</td>
<td>Beta</td>
<td>B</td>
<td>SEB</td>
<td>Beta</td>
</tr>
<tr>
<td>Intercept</td>
<td>3.03</td>
<td>0.19</td>
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<td>0.28</td>
<td></td>
</tr>
<tr>
<td>Weight Management</td>
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<td>.01</td>
<td>0.00</td>
<td>0.02</td>
<td>.01</td>
</tr>
<tr>
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<td>0.02</td>
<td>.09</td>
<td>0.02</td>
<td>0.02</td>
<td>.09</td>
</tr>
<tr>
<td>ESMS Total</td>
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<td>0.00</td>
<td>-.01</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>R2</td>
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<td></td>
<td></td>
<td>0.01</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F for change in R2</td>
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<td></td>
<td></td>
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<td></td>
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</tbody>
</table>

*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 ($n = 325$)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
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<tbody>
<tr>
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<td>SE B</td>
<td>Beta</td>
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<td>SEB</td>
<td>Beta</td>
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<tr>
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<td>0.03</td>
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<tr>
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<td></td>
<td>4.37*</td>
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</tr>
</tbody>
</table>

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)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
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<th>Model 2</th>
<th></th>
<th></th>
</tr>
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<tbody>
<tr>
<td></td>
<td>B</td>
<td>SE B</td>
<td>Beta</td>
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<td>Beta</td>
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<td>-.13</td>
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<td>0.04</td>
<td>-0.21</td>
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<tr>
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<td>0.07</td>
<td>0.04</td>
<td>0.89</td>
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<tr>
<td>EAMS Total</td>
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<td></td>
<td></td>
<td>0.01</td>
<td></td>
<td>.15*</td>
</tr>
<tr>
<td>R2</td>
<td>0.01</td>
<td></td>
<td></td>
<td>0.014</td>
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<tr>
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<td></td>
<td></td>
<td>4.64*</td>
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<td></td>
</tr>
</tbody>
</table>

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; EAMS Total = Exercise Appearance Motivations Scale Total

* p < .05.
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


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.


internalization and body dissatisfaction among college women: The roles of social comparison and body surveillance. *Body Image*, 9, 43-49.


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.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. My body is sexually appealing.</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>2. I like my looks just the way they are.</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>3. Most people would consider me good looking.</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>4. I like the way I look without my clothes.</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>5. I like the way my clothes fit me.</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>6. I dislike my physique.</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
<tr>
<td>7. I’m physically unattractive.</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
</tr>
</tbody>
</table>
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.

<table>
<thead>
<tr>
<th>Never</th>
<th>Seldom</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

1. When I’m out in public, I compare my physical appearance to the appearance of others.

2. When I meet a new person (same sex), I compare my body size to his/her body size.

3. When I’m at work or school, I compare my body shape to the body shape of others.

4. When I’m out in public, I compare my body fat to the body fat of others.

5. When I’m shopping for clothes, I compare my weight to the weight of others.

6. When I’m at a party, I compare my body shape to the body shape of others.

7. When I’m with a group of friends, I compare my weight to the weight of others.

8. When I’m eating in a restaurant, I compare my body fat to the body fat of others.

9. When I’m with a group of friends, I compare my body size to the body size of others.

10. When I’m at the gym, I compare my physical appearance to the appearance of others.

11. When I’m out in public, I compare my body size to the body size of others.
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

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):
<table>
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<th></th>
<th>Description</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
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<td>19.</td>
<td>I feel pressure from the media to look in better shape.</td>
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<tr>
<td>20.</td>
<td>I feel pressure from the media to look thinner.</td>
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<tr>
<td>21.</td>
<td>I feel pressure from the media to improve my appearance.</td>
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<td></td>
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<tr>
<td>22.</td>
<td>I feel pressure from the media to decrease my level of body fat.</td>
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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.
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

<table>
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<tr>
<th>Question</th>
<th>Not at all</th>
<th>Slightly</th>
<th>Moderately</th>
<th>Extremely</th>
</tr>
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<tbody>
<tr>
<td>1. Have you felt fat?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>2. Have you had a definite fear that you might gain weight or become fat?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
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<td>3. Has your weight influenced how you think about (judge) yourself as a person?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
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<td>4. Have you been taking weight loss pills during the past 3 months?</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
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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 no

22. Have you been taking birth control pills during the past 3 months? YES NO

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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 True for me Very true 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
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