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The Development and Validation of the Physical Appearance Comparison Scale-3 (PACS-3)

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The Development and Validation of the Physical Appearance Comparison Scale-3 (PACS-3)

by

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A dissertation submitted in partial fulfillment
of the requirements for the degree of
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Date of Approval:
June 21, 2017

Keywords: appearance comparison, measurement, body image, disordered eating

Table of Contents

List of Tables

Abstract

Both theory and research implicate appearance comparison processes in the development of body image disturbance and disordered eating. Although several measures of appearance comparison exist, each has significant limitations. The Physical Appearance Comparison Scale-Revised (PACS-R) and its earlier versions are measures designed to assess the frequency of appearance comparisons among men and women. In the current study, the PACS-R was revised to (a) examine comparisons of weight/shape, muscularity, and overall physical appearance, (b) include items to assess comparisons with distal targets, (c) provide an assessment of upward versus downward comparisons, and (d) provide an assessment of the acute emotional impact of comparisons. The psychometric properties of the newly revised measure, labeled the PACS-3, were then examined in a college sample. The PACS-3 was administered to 1,533 college men and women, along with existing measures of appearance comparison, body satisfaction, eating pathology, and self-esteem. In Study 1, exploratory factor analysis was conducted to examine the factor structure of the PACS-3. In Study 2, confirmatory factor analysis was conducted to verify the resulting factor structure. In addition, the internal consistency, convergent validity, incremental validity, and two-week test-retest reliability of PACS-3 scores were examined. The final PACS-3 is comprised of 27 items and nine subscales: *Frequency: Proximal*, *Frequency: Distal*, *Frequency: Muscular*, *Direction: Proximal*, *Direction: Distal*, *Direction: Muscular*, *Effect: Proximal*, *Effect: Distal*, *Effect: Muscular*. PACS-3 subscale scores demonstrated good reliability and convergent validity. Moreover, PACS-3 subscales improved the prediction of body satisfaction and disordered eating relative to existing measures of appearance comparison,

supporting the incremental validity of the scale. Future research may seek to examine the

psychometric properties of the scale in more diverse samples, as well as associations between the

PACS-3 and additional theoretically related constructs (e.g., drive for muscularity).

Introduction

The Development and Validation of the Physical Appearance Comparison Scale-3 (PACS-3)

Consistent with sociocultural theories regarding the etiology and maintenance of body image disturbance and disordered eating, a large body of research demonstrates an association between making appearance-based comparisons (i.e., comparing one's own appearance to the appearance of others) and body dissatisfaction or eating pathology (Myers & Crowther, 2009; Thompson, Coovert, & Stormer, 1999). Although numerous measures of appearance comparison exist, each exhibits significant limitations (e.g., examination of dimensions of appearance most relevant to women, a focus on proximal comparison targets, inability to examine upward versus downward appearance comparisons, or inability to examine the immediate affective impact of the comparison). The most commonly used measure of appearance comparison, the Physical Appearance Comparison Scale (PACS; Thompson, Heinberg, & Tantleff, 1991), was recently revised to address some of the limitations of the original measure (PACS-R; Schaefer & Thompson, 2014). However, significant limitations remain. The goal of the current study is to revise the PACS-R to (1) examine dimensions of physical appearance relevant to men and women (i.e., weight/shape, muscularity, and overall physical appearance), (2) include items to assess comparisons with distal targets, (3) provide an assessment of upward versus downward comparisons, and (4) provide an assessment of the acute impact of comparisons.

Social Comparison Theory

Social comparison theory is a widely-used and well-validated sociocultural model articulating the interpersonal processes through which individuals appraise their own opinions and abilities (Festinger, 1954). The theory proposes that humans posess a strong innate drive to self-evaluate. Although evaluations based on objective standards are preferred, in the absence of objective criteria, self-evaluation will generally be sought through comparisons with others of perceived similarity. When factors increase the importance of a given personal attribute, the drive to self-evaluate and conform to social standards will be increased. Similarly, when factors increase the importance of a given comparison group for a particular attribute, the drive to compare and conform to the designated group will be increased.

Although the theory suggests that humans possess a unidirectional drive upward, seeking self-improvement informed by self-evaluation, Festinger did not articulate hypotheses regarding how the drive for self-improvement might affect the selection of targets for comparison. Later theorists have distinguished between upward comparisons in which the individual evaluates his or her self relative to someone who is considered to hold a more desirable standing with regard to the attribute of interest (Wheeler, 1966; Wheeler & Zuckerman, 1977) and downward comparisons in which the individual evaluates his or herself relative to somoene who is considered to hold a less desirable standing with regard to the attribute of interest (Wills, 1981). Research examining social comparison theory has historically assumed that comparisons in a particular direction will elicit particular emotional or affective reactions (Buunk, Collins, Taylor, VanYperen, & Dakof, 1990). Specifically, upward comparisons are theorized to lead to more negative emotional experiences (e.g., decreased self-esteem and increased negative affect), while downward comparisons are thought to lead to more positive emotional experiences (e.g.,

increased self-esteem and decreased negative affect) (Buunk et al., 1990; Gibbons, 1986; O'Brien et al., 2009; Tesser, Millar, & Moore, 1988). Many researchers have also suggested that the drive towards self-improvement should lead to comparisons with others who are slightly superior to one's self (i.e., upward comparisons), motivating behaviors aimed at narrowing the perceived discrepancy (Wheeler, 1966; Wood, 1989). Alternatively, researchers have suggested that individuals seeking self-enhancement, rather than self-improvement, may be more inclined towards downward comparisons, which may bolster one's sense of self (Hakmiller,1966; Latane, 1966; Wills, 1981)

In the years since its initial introduction, Festinger's theory has spawned an entire body of research, and the framework has been applied and supported in numerous domains including academic achievement, health behaviors, perceived quality of life, career goals and expectations, prosocial behavior, intelligence, personality, physical appearance, and psychological disorders such as social phobia, substance abuse, depression, and eating disorders (Antony, Rowa, Liss, Swallow, & Swinson, 2005; Bailey & Ricciardelli, 2010; Buunk & Brenninkmeyer, 2000; Gibbons, 1986; Gibson & Lawrence, 2010; Mahler, Kulik, Gerrard, & Gibbons, 2010; Myers & Crowther, 2009; Novak & Crawford, 2001; Shipley, 2008; White, Langer, Yariv, & Welch, 2006; Yang & Oliver, 2010; Zhu, Zhang, & Wu, 2011). Indeed, widespread empirical support for the theory has led some researchers to assert that social comparison processes may be one of the most common and impactful ways that individuals self-evaluate (Buunk & Gibbons 2007; McIntyre & Eisenstadt, 2010; Wood, 1989; Wood & Wilson, 2003).

Social Comparison, Body Image Disturbance, and Eating Pathology

Sociocultural theories of body image disturbance and disordered eating highlight the role of social comparison processes in the development and maintenance of these negative outcomes.

The tripartite influence model (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999) suggests that individuals experience both overt and subtle pressures from three main social groups (i.e., peers, family, media) to conform to socially prescribed appearance ideals. The theory proposes that individuals experiencing such pressure begin to internalize the ideal and engage in appearance-based comparisons with others (particularly those who embody the ideal). As Western appearance ideals emphasizing thinness for women and muscularity for men are often extreme and unattainable (Ahern, Bennett, Kelly, & Hetherington, 2011; Cafri, Strauss, & Thompson, 2002; Pope, Phillips, & Olivardia, 2000; Thompson & Cafri, 2007), these comparisons are hypothesized to highlight self-ideal discrepancies and lead to increased body dissatisfaction. Disordered eating is thought to follow as individuals attempt to reshape their bodies through extreme diet, exercise, and other compensatory behaviors (Thompson et al., 1999).

A great deal of research has examined the tripartite influence model as a whole, as well as the theorized association between appearance comparisons and outcomes of body dissatisfaction and disorderd eating. Findings from cross-sectional, experimental, and ecological momentary assessment studies provide strong and consistent support for the proposed impact of appearance comparisons on negative outcomes (Keery, van den Berg, & Thompson, 2004; Leahey, Crowther, & Ciesla, 2011; Leahey, Crowther, & Mickelson, 2007; Myers & Crowther, 2009; Rodgers, Chabrol, & Paxton, 2011). Most commonly, researchers have utilized experimental methods to study the acute impact of appearance comparisons on state body image and eating disorder symptoms (Myers & Crowther, 2009). These studies typically expose participants to images of same-sex others who represent the dominant appearance ideal in order to examine changes in pre-post state body dissatisfaction. When control groups are included,

they are typically exposed to images of same-sex others who do not represent the dominant appearance ideal or neutral images of inanimate objects or scenes. One early representative study exposed college women to magazine images containing either ultra-thin models, average-sized models, or images with no models. Women who were exposed to the thin ideal images (and thus presumably engaged in a comparison of their own appearance to that of the ultra-thin model) experienced greater increases in body dissatisfaction, stress, guilt, shame, insecurity, and symptoms of depression (Stice & Shaw, 1994). Similar paradigms have been implemented to examine the impact of exposure to media images on subsequent food intake. For example, one study exposed participants to images of thin models or averge-sized models and observed participant's subsequent food choices. Following the exposure, women who viewed thin models were more likely to choose diet snacks over non-diet snacks (Krahé & Kraus, 2010). Research examining the impact on the actual quantity of food consumed, indicate that women exposed to images of thin versus average-sized women consume significantly fewer calories (Strong, 2001). Further, studies have examined theorized moderators of this effect. For example, Heinberg and Thompson (1995) found that women with high pre-existing levels of body image disturbance and appearance ideal internalization experienced greater increases in body dissatisfaction following exposure to images of ideal figures than individuals with low pre-existing levels of body image disturbance and thin ideal internalization. Similarly, trait levels of self-objectification (a tendency to value one's physical appearance over other aspects of one's physicality) have been found to moderate the effect of exposure on intake (Monro & Huon, 2006). Several meta-analyses of laboratory exposure studies support the proposed negative effects of social comparisons on body image and eating disorder symptoms (Blond, 2008; Grabe, Ward, & Hyde, 2008; Groesz, Levine, & Murnen, 2002; Hausenblas, Campbell, Menzel, Doughty, Levine, &

5

Thompson, 2013; Want, 2009) and suggest that exposure (and, therefore, social comparison) effects are greatest for individuals who are at elevated risk for developing an eating disorder (i.e., those with elevated weight status, elevated thin ideal internalization, elevated self-objectification, elevated disordered eating, and decreased self-esteem) (Hausenblas et al., 2013).

Although exposure studies have generally not sought to directly manipulate or measure appearance comparison processes, a small number of laboratory investigations have attempted to more directly examine the role of appearance comparisons, with findings suggesting that appearance comparison significantly contributes to the negative impact of exposure to idealized images. For example, in one of the first studies to directly manipulate appearance comparison during exposure to images of ideal female forms, resarchers assigned college women to one of three experimental conditions; participants were either instructed to compare their appearance with the models, to attend to products being advertised in the images, or to view the images as they naturally would. Post-exposure, participants in the comparison condition reported higher levels of state comparison and body dissatisfaction than those who were instructed to attend to other aspects of the images or to view the images normally (Cattarin, Thompson, Thomas, & Williams, 2000). In a similar experiment, Tiggemann and McGill (2004) exposed women to magazine advertisements depicting varying amounts of women's bodies (i.e., full-body, body part) or images of advertised products. In addition, the experimenters varied attentional focus and social comparison. Some participants were prompted to attend to the models' appearance, some to directly compare their appearance, and some to evaluate the advertisement more globally. Following the exposure, women who were instructed to compare their appearance endorsed greater state appearance comparison and evidenced greater body dissatisfaction. Importantly, state social comparison was found to mediate the effects of the exposure on

6

subsequent chages in body dissatisfaction. Overall, experimental studies indicate a negative influence of exposure to idealized images of attractiveness on body image and suggest a strong role of appearance comparsion in this relationship.

Ecological momentary assessment (EMA) studies, in which participants report real-time information regarding pertinent aspects of their daily lives (e.g., emotional states, eating behaviors, social interactions), represent a significant advancement in the study of appearance comparisons as this methodlogy allows researchers to examine the impact of naturally-occurring appearance comparisons outside of the laboratory setting (Stone & Shiffman, 1994). Findings from EMA studies by Crowther and colleages (Leahey & Crowther, 2008; Leahey et al., 2011; Leahey et al., 2007; Myers, Ridolfi, Crowther, & Ciesla, 2012) indicate that women frequently engage in appearance-focused comparisons with a diverse array of proximal (e.g., peers) and distal (e.g., media images) comparison targets throughout their daily lives, and that these comparisons are commonly followed by changes in body image, exercise, and eating behaviors. Several factors were found to moderate the influence of appearance-based comparisons. Specifically, women reported greater negative impact of upward comparisons versus downward comparisons. Consistent with experimental findings (Heinberg & Thompson, 1995) upward comparisons were particularly detrimental when women also reported high levels of appearance ideal internalization (Myers et al., 2012). Women with high levels of trait body dissatisfaction reported higher frequency of appearance comparisons overall and were more likely to engage in upward comparisons relative to women with low levels of trait body dissatisfaction. Moreover, for body dissatisfied women, upward comparisons were associated with greater increases in body dissatisfaction, negative affect, guilt, and thoughts of dieting and exercising (Leahey et al., 2011; Leahey et al., 2007). Overall, these findings support hypotheses suggesting that upward

comparisons may produce a more negative psychological impact (Buunk et al., 1990; O'Brien et al., 2009).

When the researchers examined the influence of distal versus proximal comparison targets (i.e., media image or peer) in naturally-occuring appearance comparisons, findings indicated that while comparisons to media images and peers were associated with increases in body checking and guilt, only comparisons to media images induced broader increases in negative affect (Ridolfi, Myers, Crowther, & Ciesla, 2011). Results were consistent regardless of women's levels of trait body dissatisfaction. When the analyses were restricted to upward comparisons, findings indicated that women who engaged in upward comparisons to media images reported greater increases in state dissatisfaction than women who engaged in upward comparisons to a peer. Interestingly, women who engaged in downward comparisons to a media images evidenced greater decreases in state body dissatisfaction (i.e., a more positive impact) than women who engaged in downward comparisons to peers.

Overall, results provide support for the negative impact of appearance comparisons on body image and eating behavior as proposed by the tripartite influence model. Findings also suggest that upward comparisons may be especially damaging and that women may view media images as particularly important and meaningful comparison targets, increasing the acute effect of the comparison with these images (Leahey & Crowther, 2008). These findings are consisetent with Festinger's assertion that individuals will experience an increased drive to conform with comparison groups that are deemed particularly important, and research indicating that Western individuals experience strong social pressure to conform to appearance ideals promulgated in the media (Schaefer, Burke et al., 2015).

8

A large number of cross-sectional studies have also examined the relationships between self-reported tendencies to engage in appearance comparisons and trait levels of proposed correlates. This is contrasted with EMA and experimental research, which assesses the immediate impact of appearance comparisons on emotions, cognitions, or behaviors. Findings from cross-sectional work with females have demonstrated significant associations between higher self-reported frequency of appearance comparisons and body dissatisfaction, internalization of appearance ideals, self-esteem, friends' preoccupation with weight and dieting, sexual objectification, body surveillance, body shame, drive for thinness, bulimic symptomatology, and general eating pathology (Bamford & Halliwell, 2009; Davison & McCabe, 2005; Keery, et al., 2004; Rodgers et al., 2011; Shroff & Thompson, 2006; Thompson et al., 1999; Tiggemann & Miller, 2010; Tylka & Sabik, 2010).

As body dissatisfaction and disordered eating are more prevalent among females than males (Garner, 1997; Hoek, 1993; Leon, Fulkerson, Perry, Keel, & Klump, 1999; Vartanian, Giant, & Passino, 2001), signficiantly fewer studies have examined proposed etiological factors including appearance comparisons among males (Halliwell & Harvey, 2006; Humphries & Paxton, 2004; Ricciardelli, McCabe, & Banfield, 2000). Results from existing studies are mixed with regard to the frequency and impact of appearance comparisons among men. However, evidence generally suggests that males engage in fewer appearance comparisons overall and experience less negative impact resulting from comparisons (Davison & McCabe, 2005; Davison & McCabe, 2006; Jones, 2004; Jones, Vigfusdottir, & Lee, 2004). Findings from cross-sectional data among men indicate associations between appearance comparison frequency and body dissatisfaction, self-esteem, general anxiety symptoms, social anxiety, sexual satisfaction, drive for muscularity, obligatory exercise, and body dysmorphic disorder symptomatology (Boroughs,

9

Krawczyk, & Thompson, 2010; Cash & Smolak, 2011; Davison & McCabe, 2005; McCreary & Saucier, 2009; Shroff & Thompson, 2006; Smolak & Stein, 2006). Therefore, appearance comparison process appear to play a signifciant role in men's mental health.

Recent meta-analytic work summarizing findings from experimental, EMA, and cross-sectional data suggests a large and significant effect of engaging in appearance comparisons on body dissatisfaction ($d = 0.77$) (Myers & Crowther, 2009). The relationship was moderated by gender and age, such that females and younger samples evidenced a stronger association between appearance comparisons and body dissatisfaction compared to males and older samples. Although the authors hypothesized that comparisons to media images would be more strongly associated with body dissatisfaction than comparisons with peers, comparison target did not moderate the association. Effect sizes for comparisons with familiar peers, unfamiliar peers, and media image were not significantly different. Importantly, relatively few studies examined comparisons with unfamiliar and familiar peers, which may have reduced statistical power.

In sum, this extensive body of literature provides strong support for the proposed impact of appearance comparisons on men's and women's body image and eating behavior. In addition, research suggests that specific qualities of the comparisons may moderate this association. In particular, accruing evidence suggests that the comparison target (i.e., proximal versus distal targets), direction of the comparison (i.e., upward versus downward comparisons), and acute impact of the comparison (i.e., positive versus negative emotional impact) may influence the overall impact of the comparison.

Measurement of Appearance-Based Social Comparisons

Given research suggesting an important role of appearance comparison processes in the development and maintenance of body image and eating disturbances, careful assessment of this

construct is critical. Several scales have been developed to assess one's frequency of engaging in appearance-based social comparisons. Although each of these scales offers unique contributions to the measurement of appearance comparisons, significant limitations persist. The Body Comparison Scale (BCS; Thompson, et al., 1999) asks respondents to indicate how often they compare 25 areas of their body (e.g., ears, thighs, muscle tone of upper body) using a Likert scale ranging from 1 (never) to 5 (always). Higher scale scores indicate a greater frequency of appearance comparisons. As the BCS was developed for use with both males and females, the measure contains items to assess aspects of appearance relevant to both genders, which is a notable strength. In addition, the measure assesses frequency of comparisons across a wide range of appearance dimensions allowing researchers to examine overall appearance comparison frequency via the total score or to focus on specific dimensions of appearance at the item-level. Scores on the measure have also demonstrated strong reliability and convergent validity among male and female junior high, high school, and college students (Fisher, Dunn, & Thompson, 2002; O'Brien et al., 2009; Thompson et al., 1999). Despite these considerable strengths, the BCS is limited in several important ways. Although the scale does assess numerous aspects of appearance resonant with men's and women's body image concerns, it does not assess comparisons of one's weight or adiposity, aspects of appearance that are central to body image for both genders (Cafri et al., 2002; Dunn, Lewis, & Patrick, 2010; Striegel-Moore & Franko, 2002). Moreover, as eating pathology frequently involves an overvaluation of shape and weight (American Psychiatric Association, 2013), the omission of these important dimensions of appearance may render the scale less appropriate for investigations of disordered eating correlates. Finally, the scale is not able to provide information regarding the target of the comparison. Given research suggesting individual differences in tendencies towards proximal or

11

distal comparisons, as well as differences in the acute effects of such comparisons (Ridolfi et al., 2011; Strahan, Wilson, Cressman, & Buote, 2006), such information may be useful.

Responding to evidence regarding the potential differential impact of upward versus downward comparisons (Keery et al., 2004; Thompson et al., 1999; Tiggemann & McGill, 2004), O'Brien and colleagues developed a set of two scales to separately assess one's tendency to engage in upward (Upward Physical Appearance Comparison Scale; UPACS) and downward (Downward Appearance Comparison Scale, DACS) appearance comparisons (O'Brien et al., 2009). Example items from the UPACS and DACS include "When I see a person with a great body, I tend to wonder how I 'match-up' with them" and "When I see a person who is physically unattractive, I think about how my body compares to theirs." Respondents indicate their level of agreement with each statement using a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The ability of the scales to differentiate comparison targets representing upward and downward comparisons is an important strength. In addition, the scales include an array of proximal and distal comparisons capturing a diverse set of comparison targets, and scores on the measures have demonstrated strong psychometric properties. Nonetheless, significant limitations within the scales exist. While the scales provide an assessment of upward and downward comparisons, they are not able to capture lateral or more neutral comparisons (i.e., comparisons with individuals believed to be of similar attractiveness). Given that Festinger's social comparison theory asserts that comparisons with similar others will be most frequent, the scales may provide a somewhat limited view of appearance comparison frequency. Additionally, the scales rely significantly on assumptions and sometimes stigmatizing stereotypes regarding attractiveness when assessing upward and downward comparisons, rather than directly assessing the respondent's perception of a particular comparison being upward or

12

downward. For example, the DACS item "I think about how attractive my body is compared to overweight people," is grounded in weight bias and a stigmatizing assumption that overweight bodies are categorically unattractive. In order for the DACS item "I tend to compare my body to those who have below average bodies" to operate as intended, the respondent must evaluate his/her body as being average or better. As the majority of women and men now endorse dissatisfaction with their appearance (Pope et al., 2000; Rodin, Silberstein, & Striegel-Moore, 1984), it is quite possible that this item does not consistently capture downward comparisons. Similarly, the UPACS item "When I see good-looking people, I wonder how I compare to them" operates on the assumption that comparisons to "good-looking people" are intrinsically upward comparisons. Although these items may typically operate as intended, the reliance on stereotypes and assumptions adds ambiguity to the scales.

The Physical Appearance Comparison Scale (PACS; Thompson et al., 1991) is one of the oldest and most widely used measures of appearance comparison. Indeed, in a recent meta-analysis examining the association between appearance comparison and body dissatisfaction, the PACS was the most commonly used validated measure of appearance comparison (Myers & Crowther, 2009). The PACS is a very brief 5-item scale assessing one's tendency to make appearance-based comparisons. Items include "At parties or other social events, I compare my physical appearance to the physical appearance of others" and "The best way for a person to know if they are overweight or underweight is to compare their figure to the figure of others." Respondents indicate how frequently they engage in appearance comparisons using a 5-point Likert scale ranging from 1 (never) to 5 (always). As one of the first published measures of appearance comparison, the PACS has reached nearly iconic status, becoming a "go-to" measure in the body image research community. However, the scale has sometimes suffered poor internal

13

consistency and test-retest reliability (Davison & McCabe, 2005; Keery et al., 2004; Thompson et al., 1991; Vander Wal, 2000) often resulting from the single reverse-scored item (item 4: "Comparing your 'looks' to the 'looks' of others is a bad way to determine if you are attractive or unattractive"). In addition, the PACS was developed for use with women and may more closely reflect female body image concerns (Thompson et al., 1999). In light of inconsistent findings regarding the frequency and impact of appearance comparisons among men, proper measurement of male appearance comparisons is critical. Finally, although research indicates that men and women engage in appearance comparisons with a wide range of people and in a wide range of contexts (Foddy & Crundall, 1993; Leahey et al., 2007; Russo, 2010), the PACS exclusively assesses comparisons at "parties or social events" or in "social situations," precluding an assessment of comparisons that may occur in other contexts. Similarly, comparison targets are limited to proximal others, rather than examining both proximal and distal targets.

Recently, Schaefer and Thompson (2014) revised the PACS to address some of the limitations of the measure. Specifically the new measure, named the Physical Appearance Comparison Scale-Revised (PACS-R), sought to improve the psychometric properties of the scale, examine numerous dimensions of physical appearance relevant to males and females, and include a broad range of contexts for appearance comparison. For the revision, the researchers convened an expert panel to generate contexts and dimensions of appearance relevant to appearance comparisons in both men and women. Group discussion led to the retention of eight contexts (i.e., in public, when meeting a new person, at work or school, when shopping for clothes, at a party, at the gym, with a group of friends, or at a restaurant) and five dimensions of appearance (i.e., body size, body fat, weight, body shape, physical appearance) to be examined in

the revised scale. Building on successful items from the original PACS, which ask respondents to indicate how often they compare a particular dimension of appearance within a given context, each of the five appearance dimensions was examined within each of the eight contexts, resulting in 40 items for examination. Exploratory and confirmatory factor analysis indicated a single factor structure, suggesting that respondents did not strongly differentiate between the examined contexts and appearance dimensions. In order to reduce redundancy and participant burden, modification indices were used to trim unnecessary items from the scale resulting in an 11-item instrument.

The final measure achieved the goals for revision, representing a significant improvement in the measure, however, important limitations remain. First, although the PACS-R attempted to examine numerous gender-neutral dimensions of appearance, it is evident that respondents did not distinguish between examined dimensions. Given evidence suggesting that women's body image concerns frequently center on weight and shape while men's body image concerns frequently reflect a desire for muscularity (Thompson & Cafri, 2007; Thompson et al., 1999), a focus on these dimensions of appearance would offer researchers a measure that specifically addresses comparisons of gender-relevant appearance dimensions. Moreover, as overvaluation of weight/shape is considered a core feature of both anorexia nervosa and bulimia nervosa (American Psychiatric Association, 2013) and a clinically meaningful specifier for binge eating disorder (Goldschmidt, Hilbert, Manwaring, Wilfley, Pike, & Fairburn, 2010; Grilo, 2013; Grilo, Hrabosky, Allison, Stunkard, & Masheb, 2008), comparisons of these appearance dimensions may have particular relevance for eating disorder research. Indeed, measures examining appearance ideal internalization, another sociocultural risk factor for disordered eating and body image disturbance, use a similar approach by assessing internalization of a thin ideal,

internalization of a muscular ideal, and a more general desire for physical attractiveness. In exploratory and confirmatory factor analyses, items addressing these unique dimensions of appearance ideal internalization formed distinct factors, which were highly correlated with measures of body satisfaction and disordered eating (Schaefer, Burke et al., 2015; Schaefer, Harriger, Heinberg, Soderberg, & Thompson, 2015). The inclusion of items to assess weight/shape comparisons and muscularity comparisons in addition to comparisons of overall appearance would provide a more targeted assessment of appearance comparisons relevant to men and women.

A second significant limitation of the PACS-R is its exclusive focus on proximal comparison targets. As research and clinical experience attest, individuals frequently engage in comparisons with distal others often in the form of comparisons to celebrities, athletes, or models in advertisements (Leahey et al., 2011; Leahey et al., 2007; Myers & Crowther, 2009; O'Brien et al., 2009; Strahan et al., 2006). As research also suggests that such comparisons are related to body dissatisfaction and disordered eating, the inclusion of these common and impactful comparison targets would likely be a valuable addition to the measure.

Third, although the PACS-R provides a psychometrically sound assessment of overall appearance comparisons, the measure is not able to distinguish between upward and downward comparisons. Given evidence suggesting that upward comparisons may be more harmful than downward comparisons (Leahey et al., 2011; Leahey et al., 2007; O'Brien et al., 2009; Rancourt, Schaefer, Bosson, & Thompson, 2015), assessment of these different forms of appearance comparison would also represent a considerable improvement to the scale. Importantly, previous measures of upward and downward comparisons have relied on common assumptions and stereotypes regarding the types of individuals who represent upward (e.g., movie stars) and

downward (e.g., individuals who are overweight) comparisons, rather than directly assessing the perceived direction of comparison. To be sure, movie stars often embody dominant appearance ideals and frequently represent upward comparisons for individuals who seek to attain a similar appearance (Myers et al., 2012; Strahan et al., 2006). However, many individuals do not subscribe to prominent media ideals (Thompson, van den Berg, Roehrig, Guarda, & Heinberg, 2004) and certainly not all celebrities embody the ideal. Therefore, the assumption that media comparisons are definitively upward in nature may not be universally true. Similarly, in Western societies that place a high value on leanness, overweight individuals are frequently deemed less attractive by those who have internalized the dominant appearance ideal (Lewis, Cash, Jacobi, & Bubb-Lewis, 1997; Schwartz, Vartanian, Nosek, & Brownell, 2006; Swami et al., 2010). Notably, however, the denigration of overweight bodies is not universal (Ali, Rizzo, & Heiland, 2013; Swami et al., 2010) and in some cultures overweight bodies are venerated (Harter, 2004). From this perspective, upward and downward comparisons are not defined by the unique characteristics of the comparison target (e.g., weight status, celebrity status). Instead, the distinction relies on one's own personal perception of the target as being more or less attractive than oneself. It follows that the inclusion of items to assess the *perceived* direction of the comparison would add a valuable element to the assessment of appearance comparisons in the PACS-R.

Finally, no existing measure of appearance comparison (including the PACS-R) provides an assessment of the acute impact of the comparison. Ecological momentary assessment studies demonstrate that negative emotions and cognitions including increased guilt, body dissatisfaction, and thoughts of dieting frequently follow appearance comparisons (especially upward comparisons) (Leahey, Crowther, & Ciesla, 2011; Leahey, Crowther, & Mickelson,

17

2007). It is quite likely that the acute impact of the comparison moderates the relationship

between comparison frequency and engagement in disordered eating behaviors. In other words,

individuals who experience more negative emotional impact associated with appearance

comparisons (e.g., body shame or dissatisfaction) may be more likely to use disordered eating

behaviors in an attempt to neutralize negative emotional experiences (Engel et al., 2013;

Goldschmidt et al., 2014; Stice, 1994) or change their physical appearance. Indeed, measures of

appearance teasing (Thompson, Cattarin, Fowler, & Fischer, 1995) and appearance commentary

(Herbozo & Thompson, 2006) that assess both the frequency and effect of such exchanges,

indicate that the acute effect predicts variance in negative outcomes beyond simple frequency

scores. Therefore, inclusion of items to assess the impact of appearance comparisons would

allow researchers to more readily examine the role of acute emotional response in appearance

comparison processes.

The Current Study

Building on the success of the PACS-R and its predecessor, the Physical Appearance

Comparison Scale-Revised was amended in order to address some of the limitations of the

measure. Specifically, the main goals for the revision were to (a) exclusively examine

comparisons of weight/shape, muscularity, and overall physical appearance, (b) include items to

assess comparisons with distal targets, (c) provide a careful assessment of upward versus

downward comparisons, and (d) provide an assessment of the acute emotional impact of

comparisons. The current set of studies seek to examine the psychometric properties of the

newly revised measure, labeled the PACS-3.

General Method

A large sample ($N = 1,533$) of college men and women completed the PACS-3, as well as existing measures of appearance comparisons, body satisfaction, disordered eating, and self-esteem. Eighty-six percent of participants responded to questionnaires online, while the remaining 14% completed paper and pencil measures in the presence of a research assistant. All participants who took part in the in-person data-collection were asked to return two weeks later to complete a small subset of the original study questionnaires. Statistical software was used to divide an overall sample into two roughly equal samples (Sample 1 = 741 and Sample 2 = 792). Two studies were then conducted to provide a comprehensive assessment of the PACS-3. Sample 1 was utilized in Study 1, while Sample 2 was utilized in Study 2. In Study 1, exploratory factor analysis (EFA) was conducted to examine the factor structure of the PACS-3. In Study 2, confirmatory factor analysis (CFA) was conducted to verify the resulting factor structure. In addition, the internal consistency, convergent validity, and two-week test-retest reliability of PACS-3 scores were examined. As evidence suggests that disordered eating declines in adulthood (Tiggemann & Lynch, 2001), all samples were restricted to individuals between the ages of 18 and 30.

Study 1: Item Generation and Identification of Scale Structure

Study 1 describes procedures for generation of PACS-3 items, as well as procedures for identification of the scale structure in college men and women.

Method

Item Generation. Consistent with published guidelines for scale development (Clark & Wilson, 1995), the goal was to generate a comprehensive and exhaustive collection of items to assess the target constructs. Throughout the process of item generation, care was taken to ensure that item wording and structure was simple and accessible to most age groups. The same item structure utilized to assess frequency of appearance comparisons in the PACS and PACS-R was again utilized for the PACS-3.

As each of the eight contexts examined in the PACS-R referenced proximal comparison targets (i.e., others in public, when meeting a new person, others at work or school, others when shopping for clothes, others at a party, others at the gym, group of friends, or others at a restaurant), eight new distal targets were generated in order to provide a comparable assessment of distal comparisons (i.e., actors/actresses on television, models in a magazine, actors/actresses in a movie, billboard or advertisement models, famous athletes, images on the internet, videogame characters, images on dating or social networking websites), yielding 16 comparison targets. Rather than examining eight highly similar dimensions of appearance as was done in the PACS-R, the current scale focuses exclusively on comparisons of three distinct dimensions of appearance with a high degree of relevance to gendered appearance ideals: weight/shape, muscularity, and overall appearance. This approach is consistent with successful measures of

appearance ideal internalization (Schaefer et al., 2015; Schaefer et al., 2017). Items were written to assess comparisons of each of the three appearance dimensions with each of the 16 comparison targets, producing a total of 48 items assessing the frequency of appearance comparisons. Example items include "When I watch television, I compare my overall appearance to the appearance of the actors/actresses" and "When I'm out in public, I compare my weight/shape to the weight/shape of others." Respondents were instructed to indicate how often they make each comparison on a Likert scale ranging from 1 (never) to 5 (almost always). Therefore, higher ratings indicate greater frequency of appearance comparisons.

Each frequency item was followed by two items assessing the comparison direction and effect (described below). Importantly, respondents were instructed only to answer the follow-up questions if they indicated that they "seldom," "sometimes," "often," or "almost always" engaged in a given comparison (i.e., responded with 2 or higher on the frequency item). If respondents indicated that they never engaged in a given comparison (i.e., responded with a 1), they were instructed to advance to the next frequency item. To aid participants in this process and ensure a proper pattern of response, each cluster of three items (frequency, direction, and effect) was visually separated from the next cluster of three items.

Following assessment procedures utilized in EMA studies (Leahey et al., 2011; Leahey et al., 2007), the item "When I make these comparisons, I typically believe that I look ___ than the person to whom I am comparing myself" was used to assess the perceived direction of the comparison. Respondents were instructed to indicate the direction of the comparison using a Likert scale ranging from 1 (much better) to 5 (much worse). Therefore, higher ratings indicate upward comparisons, while lower ratings indicate downward comparisons.

Borrowing from a well-validated scale assessing the impact of appearance-related commentary (Herbozo & Thompson, 2006), the item "When you make these comparisons, how does it usually make you feel?" was used to assess the impact of appearance comparisons. Respondents were instructed to indicate the impact of the comparison using a Likert scale ranging from 1 (very positive) to 5 (very negative). Therefore, higher ratings indicate greater negative impact, while lower ratings indicate more positive impact.

Participants. Participants for Study 1 were 741 undergraduate students (523 women and 218 men) who were recruited through the online psychology research participant pool at the University of South Florida. The mean age for the sample was 20.57 ($SD = 2.57$, range from 18 to 30). Fifty-four percent of the sample identified themselves as Caucasian, 16.7% as Hispanic or Latina, 13.7% as Black or African American, 6.8% as Asian, 0.1% as American Indian or Alaskan Native, 0.1% as Native Hawaiian or Pacific Islander, and 8.7% as multiracial or other. Regarding sexual orientation, 89.9% of the sample self-identified as heterosexual, 5.4% as homosexual, and 4.7% as bisexual. The average body mass index (BMI) of the sample was 24.14 ($SD = 4.92$), which is within the normal range.

Measures.

Demographic information. Participants completed a brief demographics questionnaire in which they were asked to indicate their age, ethnicity, sexual orientation, year in school, height, and weight). Each participant's self-reported height and weight were used to calculate their body mass index (kg/m^2).

Physical Appearance Comparison Scale-3 (PACS-3). The PACS-3 was developed to measure one's tendency to compare aspects of his or her physical appearance to that of distal and proximal others others, as well as to examine the direction and effect of such comparisons (see

Appendix A). Participants were asked to indicate how often they make each kind of comparison using a 5-point Likert scale ranging from from 1 (never) to 5 (almost always). Each frequency item was followed by two items assessing the direction (upward versus downward) and emotional effect (positive versus negative) of the comparison. If participants indicated that they never engaged in a particular form of comparison (i.e., rating of one), they were instructed to skip to the next frequency item. However, if participants indicated that they had engaged in that comparison (i.e., rating of 2-5), they were instructed to answer the associated direction and effect follow-up items. Direction items were rated on a 5-point Likert scale ranging from 1 (much better) to 5 (much worse). Effect items were rated on a 5-point Likert scale ranging from from 1 (very positive) to 5 (very negative).

Procedure. Eighty-six percent of Sample 1 responded to questionnaires online through secure internet-based survey software, while the remaining 14% completed paper and pencil measures in the presence of a research assistant. Upon completion of the questionnaires, all participants were debriefed and received course credit as compensation for their participation. Participants who completed pencil and paper questionnaires were asked to return two weeks later to complete a second shorter series of questionnaires.

Statistical Analysis.

Initial Item Analysis and Reduction. Following the recommendations of Clark and Watson (1995), the response distributions of the individual PACS-3 frequency items were examined prior to more complex structural analyses. Items that were highly skewed (e.g., $\geq$ absolute value of 1) were eliminated, as such items offer little information and are likely to correlate weakly with other items in the scale. Similarly, items with low corrected item-total correlations (i.e., $\leq$ .30) were also eliminated (Clarke & Watson, 1995).

Exploratory Factor Analysis. An exploratory factor analysis using principal axis factoring and Promax oblique rotation was conducted to identify the underlying structure of the PACS-3 frequency items. An oblique rotation was preferred as underlying factors were expected to be correlated. Bartlett's test of sphericity and the Kaiser-Meyer-Olkin measure of sampling adequacy were used to assess the factorability of the items in the PACS-R. Items are considered appropriate for factor analysis when Bartlett's test is statistically significant and the Kaiser-Meyer-Olkin value is .60 or higher (Tabachnick & Fidell, 2007). The number of factors to be retained was guided by theory and a number of statistical criteria. A visual examination of the scree plot was be used to identify significant changes in the slope of the line (Cattell, 1966). Additionally, the Kaiser-Guttman criterion, which suggests retention of factors with eigenvalues equal to or greater than 1.0, was consulted (Guttman, 1954; Kaiser, 1960). Finally, Horn's parallel analysis was conducted (Horn, 1965). Parallel analysis generates a pre-determined number of random data sets (e.g., 1,000 for the current study) using the same number of variables and cases as the original data set. Eigenvalues are then extracted from these random data sets and those values are compared with the original eigenvalues obtained from the observed data set. Factors are retained if the eigenvalue from the actual data is greater than the corresponding eigenvalue from the random data (O'Conner, 2000). In examination of the pattern matrices, low primary factor loadings were defined as a primary loading of .40 or less, while cross-loading items were defined as having a secondary loading of .30 or higher (Bosworth, Espelage, & Simon, 1999; Cicero, Kerns, & McCarthy, 2010; Floyd & Widaman, 1995; Ford, MacCullum, & Tait, 1986; Schaefer et al., 2015; Schaefer et al., 2017). The EFA was conducted using SPSS Statistics version 21.0. Missing data were handled using listwise deletion.

Results

Initial Item Analysis and Reduction. A total of 13 items (items 2, 7, 23, 36, 38, 39, 40, 42, 43, 44, 45, 47, 48) exhibited skewness values greater than 1.0 and were, therefore, deleted. These items generally reflected comparisons to videogame characters and comparisons of muscularity. All deleted items were positively skewed, suggesting that the majority of participants engaged in such comparisons infrequently. All items exhibited adequate item-total correlations.

Exploratory Factor Analysis. The remaining 35 items were next submitted to EFA. Barlett's test of sphericity was significant, $\chi^2(595) = 23591.06$, $p < .001$, and the Kaiser-Meyer-Olkin value was .95 indicating that the PACS-3 frequency items were appropriate for factor analysis. The Kaiser-Guttman criterion and scree plot suggested a five-factor solution, while Horn's parallel analysis suggested a four-factor solution. Given the lack of convergence in suggested factor solutions, both were examined for statistical and theoretical soundness. Based on results from the parallel analysis, items were forced to four factors and the resulting pattern matrix was examined. Application of a priori factor loading criteria identified eight cross-loading items. Although factors one through three represented clear themes (i.e., proximal comparisons, distal comparisons, and muscularity comparisons), the fourth factor was less thematically clear and comprised of only two items. Given the lack of thematic clarity and recommendations that factors with fewer than three items be eliminated (Jöreskog & Sörbom, 1993), the final factor would be deleted, effectively reducing the scale to three factors.

Next, the five-factor solution suggested by the Kaiser-Guttman criterion and scree plot was examined. Six items exhibited significant cross-loadings. Factors one through three again reflected themes of proximal, distal, and muscularity comparisons. Factor four reflected

25

comparisons made to athletes or in gymnasium settings, but was again comprised of only two items. Factor five reflected comparisons to individuals on dating websites or social-networking sites, but was also comprised of only two items. Given the insufficient number of items on factors four and five, recommendations suggest omitting those factors, which would again result in a three-factor scale. As this solution did not require forcing of factors and resulted in fewer cross-loading items, it was preferred and utilized for subsequent analyses. Therefore, the remaining 25 items were submitted to a second EFA. This analysis resulted in a three-factor solution in which all items loaded strongly on their primary factors without significant cross-loadings (see Table 1). All factors were clearly interpretable. The first factor, labeled *Frequency: Proximal*, was comprised of 12 items reflecting comparisons of weight, shape, and overall appearance to proximal others (e.g., peers, individuals at work/school). The second factor, labeled *Frequency: Distal*, was comprised of eight items reflecting comparisons of weight, shape, and overall appearance to distal others (e.g., models, actors/actresses). The third factor, labeled *Frequency: Muscularity*, was comprised of five items reflecting comparisons of muscularity to proximal and distal others (e.g., individuals at work/school, actors/actresses).

Brief Discussion

The purpose of Study 1 was to identify the factor structure of the PACS-3 frequency items within a sample of college men and women. The EFA resulted in a 25-item scale with three subscales (Frequency: Proximal, Frequency: Distal, and Frequency: Muscularity).

Study 2: Confirmation of Factor Structure and Examination of the Reliability and

Convergent Validity of the PACS-3

In Study 2, confirmatory factor analysis was used to verify the three-factor structure of the PACS-3 frequency items within an independent mixed-gender sample. In addition, as each frequency item in the final scale will have an accompanying direction and effect item, an explicit goal of Study 2 was to minimize the number of frequency items in order to reduce participant burden, while maintaining the psychometric integrity of the subscales. Therefore, item analysis and modification indices obtained through CFA were used to guide the identification and elimination of frequency items from the final scale. Following identification of the frequency subscales, associated direction and effect subscales were calculated and each subscale's reliability was assessed within men and women separately. In addition, subscale means and intercorrelations between PACS-3 subscales were examined. Subscales were expected to be positive correlated. Next, the convergent validity of the PACS-3 frequency, direction, and effect subscales was assessed using a nomological network approach. Consistent with previous literature, it was hypothesized that:

1. The PACS-3 frequency, direction, and effect subscales would be positively correlated with eating pathology and existing measures of appearance comparison.

2. The PACS-3 frequency, direction, and effect subscales would be negatively correlated with body satisfaction and self-esteem.

In addition, the incremental validity of the PACS-3 was evaluated by examining the measure's ability to predict theorized outcome variables (i.e., body satisfaction and eating pathology) over

and above existing measures of appearance comparison and BMI. Finally, the test-retest

reliability of PACS-3 was evaluated in a subset of participants.

Method

Participants. Participants for Study 2 were 792 undergraduate students (591 women and

201 men) who were recruited through the online psychology research participant pool at the

University of South Florida. The mean age for the sample was 20.51 ($SD = 2.46$, range from 18

to 30). Fifty-three percent of the sample identified themselves as Caucasian, 13.9% as Hispanic

or Latina, 13.3% as Black or African American, 8.9% as Asian, 0.3% as American Indian or

Alaskan Native, 0.1% as Native Hawaiian or Pacific Islander, and 10.8% as multiracial or other.

Regarding sexual orientation, 92.8% of the sample self-identified as heterosexual, 3.9% as

homosexual, and 3.3% as bisexual. The average BMI of the sample was 24.06 ($SD = 5.08$),

which is within the normal range.

A subset of participants ($n = 113$) returned for a two-week follow-up to complete the

PACS-3 a second time. This sample was comprised of 90 females and 23 males. The mean age

for the sample was 19.74 ($SD = 2.42$, range from 18 to 29). Forty percent of the sample

identified themselves as Caucasian, 15.9% as Hispanic or Latina, 21.2% as Black or African

American, 8.8% as Asian, 0.9% as American Indian or Alaskan Native, and 13.3% as multiracial

or other. Regarding sexual orientation, 92.9% of the sample self-identified as heterosexual, 3.5%

as homosexual, and 3.5% as bisexual. The average BMI of the sample was 23.87 ($SD = 4.84$),

which is within the normal range.

Measures. In addition to a demographics questionnaire and the PACS-3, participants

completed validated measures of appearance comparison frequency, frequency of engaging in

upward and downward comparisons, body satisfaction, disordered eating, and self-esteem.

Physical Appearance Comparison Scale (PACS). The original PACS (Thompson et al., 1991) is a brief five-item measure of general appearance comparison frequency. Example items include "The best way for a person to know if they are overweight or underweight is to compare their figure to the figure of others" and "At parties or other social events, I compare how I am dressed to how other people are dressed." Items are rated on a Likert scale ranging from 1 (never) to 5 (always). Item four of the scale is reverse coded. Scores for this measure are obtained by summing the participant's responses. Higher scores indicate higher levels of general appearance comparison. Scores on the measure have been shown to be reliable and valid in college samples (Thompson, Heinberg, & Tantleff, 1991).

Upward Appearance Comparison Scale and Downward Appearance Comparison Scale (UPACS and DACS). The UPACS and DACS (O'Brien et al., 2009) are measures to assess a respondent's tendency to engage in upward (10 items) and downward (8 items) appearance comparisons. Items to assess upward appearance comparisons include "When I see a person with a great body, I tend to wonder how I 'match-up' with them." Items to assess downward appearance comparisons include "When I see a person who is physically unattractive, I think about how my body compares to theirs. " Respondents indicate their level of agreement with each item using a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Scores for each measure are obtained by averaging the participant's responses on relevant items. Higher scores on the UPACS indicate higher levels of upward comparisons. Higher scores on the DACS indicate higher levels of downward comparisons. Scale scores have demonstrated reliability and validity in college samples (O'Brien et al., 2009).

Multidimensional Body-Self Relations Questionnaire – Appearance Evaluation Subscale (MBSRQ-AE). The Appearance Evaluation subscale of the MBSRQ was used to

assess overall body satisfaction (Cash, 2000). The AE subscale is comprised of seven items that assess the extent to which one likes his or her body. Example items are "I like my looks just the way they are" and "Most people would consider me good looking." Items are rated on a Likert scale ranging from 1 (definitely disagree) to 5 (definitely agree). Two of the seven items (items 6 and 7) are reverse coded. Scores for this measure are obtained by summing the participant's responses. Higher scores indicate greater body satisfaction. MBSRQ-AE scores have been shown to be a reliable and valid in college, community, and clinical samples (Brown, Cash, & Mikulka, 1990; Smith & Davenport, 2012).

 Eating Disorder Examination – Questionnaire (EDE-Q). The EDE-Q (Fairburn & Beglin, 2008) is a widely used 22-item measure of disordered eating symptomatology. Example items include "Have you had a definite fear that you might gain weight?" and "Have you gone for long periods of time (8 waking hours or more) without eating anything at all in order to influence your shape or weight?" The measure contains four subscales: Restraint, Eating Concern, Shape Concern, and Weight Concern. Items are rated on a 7-point scale ranging from 0 (no days/not at all) to 6 (everyday/markedly). Subscale scores are calculated as an average of the relevant items. The EDE-Q global score is calculated as an average of the subscale scores. Higher scores on the subscales or global score indicate greater levels of eating pathology. Scores on each of the subscales as well as the global score have demonstrated good reliability and convergent validity (Peterson et al., 2007).

 Rosenberg Self-Esteem Scale (RSES). The RSES (Rosenberg, 1965) is a 10-item measure of global self-esteem and general feelings of self-worth. Example items include "On the whole, I am satisfied with myself" and "I feel that I'm a person of worth, at least on an equal plane with others." Respondents indicate their agreement with each item using a Likert scale

ranging from 1 (strongly agree) to 4 (strongly disagree). Five items are reverse coded (items 2, 5, 6, 8, 9). Scores are obtained by summing the participant's responses to obtain a total score. Higher total scores indicate greater self-esteem. RSES scores have demonstrated reliability and validity (Sinclar, Blais, Gansler, Sandberg, Bistis, & LoCicero, 2010).

Procedure. Data collection procedures are described in Study 1. Eighty-six percent of Sample 2 responded to questionnaires online, while the remaining 14% completed paper and pencil measures in the presence of a research assistant.

Statistical Analysis.

Confirmatory Factor Analysis. A CFA using maximum likelihood estimation within the mixed-gender sample was conducted to evaluate the factor structure identified in the EFA. Multiple fit indices were examined to evaluate model fit. Guidelines suggest that comparative fit index (CFI) values of .90 or higher indicate good model fit (Bentler, 1990), while CFI values of .95 or higher indicate excellent fit (Hu & Bentler, 1999). Root-mean-square error of approximation (RMSEA) values of .08 or less (Browne & Cudeck, 1993) and standardized root-mean-square residual (SRMR) values of .05 or less (Byrne, 1998) indicate good fit. The chi-square value was also examined; however, the statistic is highly influenced by sample size and when using larger sample sizes (i.e., 400 or more cases) the chi-square will tend to be large, indicating poor model fit. Therefore, when multiple models were tested, the chi-square was used as an index of improved model fit. Modification indices were used to improve model fit and reduce the number of frequency items in the final scale, consistent with the goal of minimizing participant burden. Throughout the process of item elimination, theory, item-total correlations, subscale reliability, factor loadings, and item-level regressions predicting disordered eating and

31

body satisfaction were also consulted. Efforts were made to maintain high subscale reliability and predictive utility with the fewest number of items in the final scale.

Internal Consistency Reliability. Following identification of the final factor structure for the PACS-3 frequency items, internal consistency for the frequency subscales, as well as the associated direction and effect subscales, was assessed in men and women separately using Cronbach's alpha. Alpha values of .70 are generally considered to indicate acceptable reliability (Bland & Altman, 1997).

Construct Validity. Following a nomological network approach to construct validation (Cronbach & Meehl, 1955), convergent validity was assessed via Pearson product-moment correlations between the PACS-3 subscales and extant measures of appearance comparisons, body satisfaction, disordered eating, and self-esteem. Convergent validity analyses were conducted among men and women separately. A correlation of .1 was considered small, .3 was medium, and .5 or more was considered large (Cohen, 1988). The PACS-3 frequency, direction, and effect subscales were expected to demonstrate medium to large positive associations with other comparison measures and disordered eating, medium to large negative associations with body satisfaction, and small to medium negative associations with self-esteem.

Incremental Validity. Consistent with recommendations for assessing incremental validity in scale development (Sechrest, 1963), hierarchical multiple regression anlyses were performed to evaluate whether the PACS-3 is able to predict variance in disordered eating and body satisfaction above and beyond that of extant measures of appearance comparison (i.e., PACS, UPACS/DACS). Again, analyses were conducted within male and female samples separately. Analyses controlled for BMI as it is a well-established predictor of disorderd eating and body image (Ro, Reas, & Rosenvinge, 2012). BMI was entered at step 1. The PACS,

UPACS, and DACS scores were entered at step 2. PACS-3 Frequency, Direction, and Effect scores were entered at steps 3, 4, and 5, respectively. A statistically signifciant R^2 change at steps 3, 4, and 5 signals the incremental validity of the PACS-3 subscales. Problems of multicollinearity were assessed by examining tolerance and the variance inflation factor (VIF). A tolerance value of less than .10 and a VIF value of greater than 10.0 indicate extreme multivariate collinearity (Kline, 2011).

Test-Retest Reliability. The two week test-retest reliability for the PACS-3 was examined via intraclass correlation coefficients between PACS-3 scores at the first and second administration. Although few guidelines are available for evaluating test-retest coefficients, correlations of .70 or higher are generally considered to indicate good test-retest reliability (Crocker & Algina, 2008; Terwee, Mokkink, Knol, Ostelo, Bouter, & de Vet, 2012).

Results

Confirmatory Factor Analysis. Results of the CFA indicated that the 25-item, three-factor solution generally provided less than acceptable fit to the data ($\chi^2 = 19672.04$, $p < .001$, CFI = .88, RMSEA = .11, SRMR = .05). Modification indices indicated significant misfit resulting from correlated errors between items. Correlated errors respresent a source of measurement error, as they indicate shared variance between items that is not accounted for by the latent variable. This source of measurement error may either be modeled statistically or an individual item from the pair may be eliminated from the scale (Muthen & Muthen, 2010). In the current sample, the largest modification indices indicated correlated errors among pairs of items within the same subscale that shared an identical stem (e.g., "When I'm eating in a restaurant, I compare my overall appearance to the appearance of others" and "When I'm eating in a restaurant, I compare my weight/shape to the weight/shape of others"). This pattern

suggests that one item from the pair may be eliminated from the subscale in order to reduce redundancy, while maintaining adequate construct coverage. Given the overarching goal of reducing participant burden, CFA modification indices were used in an exploratory manner to identify item pairs with highly correlated errors and reduce the overall length of the scale. The procedure for item deletion was as follows: Following the CFA, the largest modification index was identified and each of the two items was carefully reviewed. Theory, item-total correlations, subscale reliability, factor loadings, and item-level regressions predicting disordered eating and body satisfaction were consulted to guide item elimination. In addition, care was taken to retain an equal number of items within each of the three frequency subscales. After each item deletion, the newly adjusted scale was reanalyzed using CFA, and the procedure was repeated. Given interest in maximizing efficiency in the scale, this procedure was used to arrive at a version of the scale containing four items per subscale (i.e., 12 total frequency items) and a version containing three items per subscale (i.e., nine total frequency items). The four-item subscale solution provided good fit to the data (χ^2 = 325.52, $p < .001$, CFI = .96, RMSEA = .08, SRMR = .03). The three-item subscale solution provided good fit according to the CFI and SRMR, and signficiantly improved fit according to the chi-square (χ^2 = 179.37, $p < .001$, CFI = .97, RMSEA = .09, SRMR = .03). Although the RMSEA value slightly exceeded cutoffs for good fit in the three-item subscale version of the scale, this fit statistic penalizes models with small degrees of freedom (i.e., fewer than 50; Kenny, Kaniskan, & McCoach, 2014). Degrees of freedom for the four-item subscale version were 51, while degrees of freedom for the three-item subscale version were 24. Therefore, the RSMEA for the three-item subscale version may provide a biased estimate of the model fit. Given this, both versions were then examined to assess the reliability, convergent validity, and predictive utility of the resulting subscales. These analyes indicated that

the three-item frequency subscales performed similarly to the four-item frequency subscales. Therefore, the version containing three items per subscale was preferred, as this would reduce the total number of items in the PACS-3 to 27 (i.e., nine frequency items, nine direction items, nine effect items), whereas the four-item subscales would result in a total of 36 items (i.e., twelve frequency items, twelve direction items, twelve effect items) within the overall scale. Subsequently, the final version of the PACS-3 is comprised of three frequency subscales containing three items each (i.e., *Frequency: Proximal*, *Frequency: Distal*, *Frequency: Muscular*), three direction subscales containing three items each (*Direction: Proximal*, *Direction: Distal*, *Direction: Muscular*), and three effect subscales containing three items each (*Effect: Proximal*, *Effect: Distal*, *Effect: Muscular*). In addition, as clinicians and researchers may be interested in examining overall frequency, direction, and effect scores, subscales reflecting *Total Frequency* (i.e., mean of *Frequency: Proximal*, *Frequency: Distal*, *Frequency: Muscular* subscales), *Total Direction* (i.e., mean of *Direction: Proximal*, *Direction: Distal*, *Direction: Muscular*), and *Total Effect* (i.e., mean of *Effect: Proximal*, *Effect: Distal*, *Effect: Muscular*) were calculated. Table 2 presents item means and corrected item-total correlations for the final PACS-3.

Internal Consistency Reliability, Subscale Means, and Intercorrelations between Subscales. Cronbach's alpha, means, and intercorrelations between the PACS-3 subscales among women are presented in Table 3. Table 4 presents alphas, means, and intercorrelations among men. Internal consistency values of PACS-3 subscale scores were good at .85 or higher among women and .76 or higher among men. Subscale means ranged from 1.91 (Muscularity: Frequency) to 3.68 (Distal: Direction) within the female sample and 2.23 (Distal: Frequency) to 3.38 (Distal: Direction) within the male sample.

Correlations among the PACS-3 subscales were generally stronger within the female sample compared to the male sample. Within the female sample, associations between subscales were generally medium to large. Total Frequency demonstrated a medium positive correlation with the Total Direction and Total Effect subscales (.43 to .44), while the Total Direction subscale demonstrated a large correlation with the Total Effect subscale (.89). This suggests that engaging in more frequent appearance comparisons is moderately associated with a tendency towards upward comparisons and experiencing negative emotional reactions to comparisons. Further, a tendency towards engaging in upward comparisons is highly related to experiencing negative emotional states as a result.

Within the male sample, associations between subscales ranged from small to large. Total Frequency demonstrated a small positive correlation with the Total Direction subscale (.26) and a medium positive correlation with the Total Effect subscale (.33), while the Total Direction subscale demonstrated a large correlation with the Total Effect subscale (.83). This suggests that, for men, engaging in more frequent appearance comparisons is slightly associated with a tendency towards upward comparisons, and moderately associated with negative emotional experiences. Similar to women, a tendency towards engaging in upward comparisons is highly related to experiencing negative emotional states as a result.

Construct Validity. Correlations between the PACS-3 subscales and convergent messures were generally stronger within the female sample compared to the male sample (see Table 5). The PACS, a measure of appearance comparison frequency, generally demonstrated large associations with PACS-3 Frequency subscales in both male and female samples, supporting the convergent validity of the PACS-3 Frequency scores. The UPACS, which assesses engagement in upward comparisons, was generally strongly positively related to PACS-

36

3 Frequency subscale scores, and moderately positively related to Direction and Effect subscale scores in both men and women. The DACS, which assesses engagement in downward comparisons, demonstrated small to medium positive associations with PACS-3 Frequency scores, and small positive associations with PACS-3 Direction and Effect subscales in the female sample. It demonstrated medium to large positive associations with PACS-3 Frequency scores, and small positive associations with PACS-3 Direction and Effect subscales in the male sample.

Consistent with study hypotheses, in the female sample, PACS-3 Frequency, Direction and Effect subscales generally demonstrated medium positive associations with the EDEQ Restraint and Eating Concern subscales, while they generally demonstrated large associations with the EDEQ Weight and Shape Concern subscales. Among men, PACS-3 subscales generally demonstrated medium associations with EDEQ subscales.

In both male and female samples, the MBSRQ generally demonstrated medium to large negative associations with PACS-3 subscales, while the RSES demonstrated small to medium associations with the subscales, lending further support to the convergent validity of the measure.

Incremental Validity. Hierarchical multiple regression analyses were conducted to examine the unique variance associated with the PACS-3 Total Frequency, Total Direction, and Total Effect subscales in predicting eating pathology and body satisfaction within the female and male samples. Results for the regression analyses using the female sample can be found in Table 6. In predicting disordered eating, all tolerance values were .29 or higher and all variance inflation factor values were 3.46 or lower. In predicting body satisfaction, all tolerance values were .29 or higher and all variance inflation factor values were 3.49 or lower. Therefore, multicollinearity was judged not to be a problem. Step 3 in the analyses indicated that after accounting for the contribution of BMI and existing measures of appearance comparison

37

(i.e., PACS, UPACS, DACS), the PACS-3 Total Frequency subscale predicted unique variance in both disordered eating, R^2 change = .05, $F(1, 523) = 46.92$, $p < .001$, and body satisfaction, R^2 change = .01, $F(1, 573) = 6.83$, $p < .01$. Results from step 4 indicated that the PACS-3 Total Direction subscale predicted further unique variance in both disordered eating, R^2 change = .03, $F(1, 522) = 34.25$, $p < .001$, and body satisfaction, R^2 change = .15, $F(1, 516) = 134.97$, $p < .001$. Finally, results from step 5 indicated that the PACS-3 Total Effect subscale predicted additional unique variance in both disordered eating, R^2 change = .02, $F(1, 521) = 18.54$, $p < .001$, and body satisfaction, R^2 change = .02, $F(1, 515) = 15.09$, $p < .001$. Overall, PACS-3 subscales accounted for an additional 10% of variance in disordered eating and an additional 17% of variance in body satisfaction. Examination of the beta-weights at step 5 indicated that the PACS-3 Total Frequency and Total Effect subscales were significant predictors of disordered eating, while PACS-3 Total Direction and Total Effect subscales were significant predictors of body satisfaction.

Results for the regression analyses using the male sample can be found in Table 7. In predicting disordered eating, all tolerance values were .20 or higher and all variance inflation factor values were 5.08 or lower. In predicting body satisfaction, all tolerance values were .20 or higher and all variance inflation factor values were 5.02 or lower. Therefore, multicollinearity was judged not to be a problem. Step 3 in the analyses indicated that after accounting for the contribution of BMI and existing measures of appearance comparison (i.e., PACS, UPACS, DACS), the PACS-3 Total Frequency subscale did not predict unique variance in either disordered eating, R^2 change = .01, $F(1, 171) = 1.13$, $p = .29$, or body satisfaction, R^2 change = .01, $F(1, 168) = 49.95$, $p = .24$. Results from step 4 indicated that the PACS-3 Total Direction subscale predicted unique variance in both disordered eating, R^2 change = .06, $F(1, 170) = 13.99$,

$p < .001$, and body satisfaction, R^2 change $= .15$, $F(1, 167) = 39.02$, $p < .001$. Finally, results from step 5 indicated that the PACS-3 Total Effect subscale did not predict unique variance in disordered eating, R^2 change $= .01$, $F(1, 169) = 3.16$, $p = .08$, but did predict additional unique variance in body satisfaction, R^2 change $= .05$, $F(1, 166) = 13.50$, $p < .001$. Overall, PACS-3 subscales accounted for an additional 8% of variance in disordered eating and an additional 21% of variance in body satisfaction. Examination of the beta-weights at step 5 indicated that only BMI and the DACS were significiant predictors of disordered eating, while only BMI and the PACS-3 Total Effect subscales were significant predictors of body satisfaction.

Test-Retest Reliability. The test-retest reliability for the PACS-3 subscales was good with intraclass correlation coefficients ranging from .73 (Muscularity: Direction) to .88 (Total Direction). See Table 8 for the full reporting of intraclass correlation coefficients in the mixed gender sample.

Brief Discussion

In Study 2, the three-factor structure of PACS-3 was examined using confirmatory factor analysis. The initial CFA on the 25-item scale indicated less than acceptable fit. Modification indices for the model suggested significant misfit arising from several items pairs with highly correlated errors. Item pairs were often within the same subscale and shared the same stem (e.g., "When I'm eating in a restaurant…"). In order to reduce participant burden and unnecessary redundancy in the scale, modification indices were used to identify and eliminate superfluous items. This procedure resulted in the retention of 12 frequency items across three subscales: Frequency: Proximal (3 items), Frequency: Distal (3 items), and Frequency: Muscular (3 items). Associated subscales reflecting the direction and effect of appearance comparisons were calculated: Direction: Proximal (3 items), Direction: Distal (3 items), and Direction: Muscular (3

items), Effect: Proximal (3 items), Effect: Distal (3 items), and Effect: Muscular (3 items). Finally, subscales reflecting Total Frequency, Total Direction, and Total Effect scores were also calculated. Each of the examined subscales demonstrated good internal consistency and two-week test-retest reliability. The convergent validity of the PACS-3 was assessed within male and female samples separately. Consistent with hypotheses, PACS-3 subscales were positively correlated with existing measures of appearance comparisons and disordered eating, and negatively correlated with measures of body satisfaction and self-esteem. Further, PACS-3 subscales predicted unique variance in body satisfaction and disordered eating when controlling for BMI and other measures of appearance comparison.

General Discussion

Sociocultural theories of body image disturbance and disordered eating implicate appearance comparison processes in the development of these negative outcomes, and a growing body of research supports the proposed impact of appearance comparisons on body image and eating behaviors (Keery et al., 2004; Leahey et al., 2011; Leahey et al., 2007; Myers & Crowther, 2009; Rodgers et al., 2011). Although several measures of appearance comparison frequency exist, each has significant limitations. The most commonly used measure of appearance comparison frequency, the Physical Appearance Comparison Scale (Thompson et al., 1991), was recently revised to improve the psychometric functioning of the scale, increase gender-neutrality, and examine appearance comparisons in a variety of contexts (Schaefer & Thompson, 2014). The current study seeks to build upon the these improvements, further amending the scale to (a) examine comparisons of weight/shape, muscularity, and overall physical appearance, (b) include items to assess comparisons with distal targets, (c) provide an assessment of upward versus downward comparisons, and (d) provide an assessment of the acute emotional impact of comparisons. The psychometric properties of the newly revised measure, labeled the PACS-3, were then examined among college men and women.

Exploratory and confirmatory factor analyses using a mixed gender sample, identified a three-factor structure reflecting proximal comparisons of weight, shape, and overall appearance; distal comparisons of weight, shape, and overall appearance; and comparisons of muscularity to distal and proximal targets. Findings from the current set of studies support the reliability and validity of PACS-3 subscale scores in women and men. Internal consistency and test-retest

41

reliability were good to excellent in all samples. Further, PACS-3 subscale scores exhibited significant positive associations with established measures of disordered eating and appearance comparison frequency, and negative associations with measures of body satisfaction and self-esteem. Associations were generally somewhat weaker among men, consistent with previous literature suggesting a significant but smaller impact of appearance comparisons among males (Davison & McCabe, 2005; Davison & McCabe 2006; Jones, 2004; Jones, Vigfusdottir, & Lee, 2004). Importantly, regression analyses indicated that the PACS-3 improves the prediction of body satisfaction and disordered eating, relative to existing measures of appearance comparison.

Correlations between subscales suggest a strong positive association between the direction of comparisons and their effect for both men and women. Specifically, engaging in upward comparisons is strongly related to experiencing an acute negative emotional impact. Moreover, this association is evident regardless of the comparison target (i.e., whether comparing to peers or celebrities) or the dimension of appearance being compared (e.g., comparing weight/shape/appearance or muscularity). These results are consistent with both theory and previous research suggesting that upward comparisons may produce a more negative psychological impact (Buunk et al., 1990; Leahey et al., 2011; Leahey et al., 2007; O'Brien et al., 2009). In addition, engaging in upward comparisons to one target group (e.g., celebrities) is strongly associated with engaging in upward comparisons to other target groups (e.g., peers), suggesting that a tendency towards upward versus downward comparisons is relatively stable, occurring in multiple contexts and across an array of potential comparison targets.

Interestingly, appearance comparison frequency was consistently weakly related to direction scores among men, whereas these relations were moderate (i.e., proximal and muscularity comparisons) to strong (i.e., distal comparisons) among women. This suggests that

42

women who engage in frequent appearance comparisons are likely to exhibit a tendency towards upward comparisons, particularly when comparing to idealized media images. In contrast, men who engage in frequent appearance comparisons may be more likely to choose comparison targets across a spectrum of perceived attractiveness. One possible interpretation of this finding is that women who engage in frequent comparisons may exhibit a bias towards selecting highly attractive comparison targets, rather than engaging in a balance of upward and downward comparisons. Indeed, cognitive behavioral interventions for body image disturbance highlight this potential bias and attempt to correct it (Cash, 2008; Fairburn, 2008; McCabe, McFarlane, & Omstead, 2003). An alternative interpretation is that women who engage in higher levels of comparisons, may be more body dissatisfied and, therefore, more likely to judge themselves as looking worse than the comparison target. This interpretation is supported by ecological momentary assessment work suggesting that body dissatisfied women engage in more frequent comparisons and exhibit a greater tendency towards upward comparisons relative to women with low levels of body dissatisfaction (Leahey et al., 2011; Leahey et al., 2007). Indeed, in the current study, body satisfaction was inversely related to comparison frequency, suggesting that body dissatisfied women were more likely to engage in appearance comparisons than women who experience greater comfort with their appearance.

Among both men and women, frequently engaging in distal comparisons was more strongly related to experiencing a negative emotional reaction than frequently engaging in proximal or muscularity comparisons. This is consistent with previous work indicating that comparisons to media images may be more impactful than comparisons to peers (Ridolfi, Myers, Crowther, & Ciesla, 2011). Consistent with Festinger's theory, celebrities and models, who personify current appearance ideals for a large proportion of men and women (Thompson, van

43

den Berg, Roehrig, Guarda, & Heinberg, 2004), may epitomize objective standards of beauty and therefore represent a particularly salient comparison target group. As the appearance ideals promoted in popular media are typically unattainable, upward comparisons and body dissatisfaction are likely to follow.

Similar to the intercorrelations between PACS-3 subscales, associations between PACS-3 scores and convergent measures were generally slightly weaker among men. PACS-3 frequency subscales were typically strongly correlated with the PACS and UPACS, although among women, muscularity comparisons were only moderately associated with the PACS and UPACS. This suggests that women's appearance comparisons are more likely to involve weight, shape, or overall appearance, rather than muscularity. This finding is consistent with research suggesting that muscularity is more strongly implicated in male appearance ideals, than female appearance ideals (Thompson & Cafri, 2007).

Consistent with study hypotheses, UPACS and DACS scores were moderately to strongly associated with PACS-3 frequency subscale scores. In other words, engaging in more frequent comparisons overall is associated with engaging in more upward comparisons *and* more downward comparisons. The PACS-3 direction subscales exhibited medium associations with UPACS scores and small associations with DACS scores. Thus, the tendency to engage in upward rather than downward comparisons (assessed by the PACS-3) was moderately associated with increased frequency of upward comparisons (assessed by the UPACS) and weakly associated with increased frequency of downward comparisons (assessed by the DACS). This highlights an important distinction between the PACS-3 direction subscales and the UPACS/DACS. While the UPACS and DACS asks the question "How often does an individual engage in upward and downward comparisons?," the PACS-3 asks the question "When an

individual engages in a comparison, does it tend to be upward or downward in nature?" As upward comparisons are typically associated with poorer outcomes (Leahey & Crowther, 2008), understanding an individual's tendency towards upward versus downward comparisons is likely to be clinically useful.

PACS-3 subscale scores generally demonstrated strong associations with EDEQ weight and shape concern subcales, which quantify problematic preoccupation and distress regarding one's weight or shape, and medium associations with EDEQ restraint and eating concern subscales, which reflect pathological eating behaviors and dietary restriction. This suggests that while appearance comparison processes may be most closely related to the body image components of disordered eating, they also significantly relate to a dangerous pattern of eating behaviors aimed at impacting one's appearance. Somewhat surprisingly, muscularity comparisons were more strongly related to EDEQ subscale scores for women than for men. One possible interpretation relates to the contrast between the disordered eating attitudes and behaviors captured by the EDEQ (i.e., dietary restraint and pursuit of a thinner physique) and dominant appearance ideals for men, which emphasize increased bulk and muscularity (Thompson & Cafri, 2007). Men who engage in more frequent comparisons of their muscularity are likely to have internalized a desire for a larger, more built physique (Thompson et al., 2004), which may be in opposition to the desire for low weight and fear of increased body size indexed by the EDEQ. In contrast, women with elevated levels of disordered eating frequently experience a preoccupation with both low weight and muscle tone (Tod, Edwards, & Hall, 2013), which may motivate increased comparisons of both aspects of their appearance. Notably, as recent research suggests the importance of investigating muscularity-oriented manifestations of disordered eating, which may be the predominant presentation in males (Lavender, Brown, &

Murray, 2017), it is likely that muscularity comparisons would strongly relate to disordered eating patterns organized around these body image concerns.

Overall body satisfaction assessed by the MBSRQ was most strongly associated with the direction and effect subscales of the PACS-3, and weakly correlated with the frequency subscales of the PACS-3. This suggests that a tendency towards upward comparisons and experiencing negative emotions after comparisons may be more strongly implicated in the maintenance of body dissatisfaction than simply engaging in frequent comparisons. Indeed, it is likely that individuals who are highly body dissatisfied and judge themselves to be unattractive, are more likely to interpret comparisons as upward in nature and to experience negative emotions as a result, further compounding their dissatisfaction.

PACS-3 subscale scores were weakly to moderately associated with the RSES, such that individuals experiencing more negative global self-evaluation were also more likely to engage in appearance comparisons, to evaluate their relative appearance negatively, and to experience negative emotions as a result. These associations were typically stronger for comparisons of weight, shape, and overall appearance, and were less pronounced for comparisons of muscularity. Thus, appraisals of weight, shape, and overall appearance may have a larger impact on one's global sense of self-worth than appraisals of muscularity.

Finally, multiple regression analyses among women indicated that PACS-3 subscales accounted for an additional 18% of variance in body satisfaction and an additional 10% of variance in disordered eating, over and above BMI and three existing measures of appearance comparison. Among men, PACS-3 subscales accounted for an additional 21% of variance in body satisfaction and an additional 8% of variance in disordered eating. These results suggest

that the PACS-3 is able to tap aspects of appearance comparison with relevance to both body image and eating pathology that have not been adequately represented in existing measures.

Overall, the PACS-3 forwards the measurement of appearance comparison in several important ways. While previous scales have generally focused on broad comparisons of one's "looks" or physical appearance, the PACS-3 is the first measure to differentially assess comparisons of weight, shape, and overall physical appearance, as well as comparisons of muscularity. Thus the PACS-3 captures aspects of physical appearance directly implicated in dominant Western appearance ideals (Thompson & Cafri, 2007; Thompson et al., 1999) and with relevance to both men's and women's appearance concerns. In addition, the PACS-3 differentially assesses comparisons with proximal and distal targets. As research has produced mixed findings with regard to the potential moderating influence of comparison target on body image and eating behavior (Myers & Crowther, 2009), the inclusion of distal and proximal subscales may help facilitate further work in this area. The PACS-3 also offers a more careful and person-centered approach towards measuring upward and downward comparison tendencies. That is, the PACS-3 direction subscales capture the respondent's interpretation of the comparison as upward or downward, rather than relying on stereotypes of attractiveness (e.g., overweight bodies are less attractive) or assumptions about the respondent's own weight status (i.e., that the respondent is of normal weight). Further, the PACS-3 is able to capture lateral or neutral comparisons, a feature that is not available using the UPACS or DACS. Finally, the PACS-3 offers a unique ability to assess the acute emotional impact of comparisons. Indeed, examination of the beta-weights in the final regression models, highlight the importance of the immediate emotional effect of comparisons as a predictor of harmful outcomes. Although measures of other psychological constructs with relevance to body image have incorporated

effect scales (Herbozo & Thompson, 2006; Thompson, Cattarin, Fowler, & Fischer, 1995), the PACS-3 is the first comparison measure to directly assess this process.

Limitations and Future Directions

Limitations of the current investigation indicate several avenues for future research. Although the PACS-3 muscularity subscales are expected to correlate strongly with drive for muscularity (McCreary & Sasse, 2000; McCreary & Saucier, 2009) and muscle dysmorphia, the current study is not able to assess associations with these constructs. Therefore, future work may seek to examine these relationships to further assess the convergent validity of the PACS-3. Similarly, the current study does not include measures to assess the discriminant validity of the PACS-3. Future work may seek to address this issue by examining associations between PACS-3 subscales and measures of theoretically unrelated constructs. In addition, the current study is limited by the demographic characteristics of the samples. Although body satisfaction appears to be relatively stable across adulthood (Tiggemann, 2004), future investigations may seek to examine the PACS-3 and associations with theorized correlates in older and younger samples. In addition, as research suggests that the relationships between appearance comparisons and eating or body image disturbances may be moderated by ethnicity (Rancourt et al., 2016; Schaefer, Thibodaux, Krenik, Arnold, & Thompson, 2015), future work may seek to examine the PACS-3 in ethnically diverse samples. Finally, as the current study is cross-sectional in design, causal inferences cannot be drawn. Future work may seek to examine the prospective association between PACS-3 subscales and theorized downstream effects on eating and body image.

Implications

Given the wealth of evidence supporting the role of appearance comparisons in the development and maintenance of body image and eating disturbance (Keery et al., 2004; Leahey

et al., 2011; Leahey et al., 2007; Myers & Crowther, 2009; Rodgers et al., 2011), cognitive

behavioral interventions recommend addressing these harmful processes within treatment.

Therefore, the PACS-3 could be utilized to quantify baseline appearance comparisons levels. If

elevated comparisons are noted, patient feedback regarding elevated levels of appearance

comparsions, as well as psychoeducation regarding the harmful effects of comparisons may be

provided. As research suggests that brief monitoring of appearance comparisons leads to

reductions in comparison frequency (Leahey et al., 2011), patients may be asked to log their

comparisons in order to raise awareness of this often automatic behavior. Patient responses to

PACS-3 direction subscales may also be used to address unhelpful tendencies towards upward

comparisons, if present. Current CBT interventions suggest that patients with a greater tendency

towards upward comparisons experiment with making balanced comparisons (i.e., engaging in

downward appearance comparisons with other targets, or identifying other attributes of the

comparison target on which the patient compares more favorably) in order to counteract this

cognitive bias. Alternatively, strategies from dialectical behavior therapy including mindfulness

and emotion regulation strategies may be used to reduce judgments inherent in the comparison

process and mitigate the negative emotional response that frequently follows unfavorable

appearance comparisons (Linehan, 2015). Patient progress may then be monitored at regular

intervals across treatment to assess the effectiveness of intervention strategies.

Conclusions

The PACS-3 offers several advantages over previous versions of the scale, providing

researchers and clinicians with a comprehensive assessment of appearance comparison behaviors

and the ability to examine aspects of comparisons with theorized or demonstrated relevance to

body image and eating outcomes. The current investigation provides preliminary evidence for

the reliability and validity of PACS-3 subscale scores in college men and women. Continued

examination of the scale, including psychometric testing in diverse samples and prospective

studies represent important avenues for future work.

Table 1

Pattern Coefficients, Eigenvalues, and Percent Variance for the Preliminary PACS-3 Frequency Items in Men and Women

Item	Frequency: Proximal	Frequency: Distal	Frequency: Muscularity
1) When I watch television, I compare my overall appearance to the appearance of the actors/actresses.	.10	**.80**	-.08
3) When I watch a movie, I compare my overall appearance to the appearance of the actors/actresses.	.10	**.84**	-.06
4) When I see a billboard or advertisement, I compare my overall appearance to the appearance of the models in the billboard or advertisement.	-.04	**.80**	.08
6) When I'm surfing the Internet, I compare my overall appearance to the overall appearance of same-sex others that I see.	.25	**.55**	-.00
9) When I'm out in public, I compare my overall appearance to the appearance of others.	**.81**	.02	-.02
10) When I meet a new person (same sex), I compare my overall appearance to his/her appearance.	**.84**	-.05	.01
11) When I'm at work or school, I compare my overall appearance to the appearance of others.	**.89**	-.10	.02
13) When I'm at a party or social gathering, I compare my overall appearance to the appearance of others.	**.80**	.01	-.04
15) When I'm with a group of friends, I compare my overall appearance to the appearance of others.	**.75**	.09	-.02
16) When I'm eating in a restaurant, I compare my overall appearance to the appearance of others.	**.52**	.15	.14
17) When I watch television, I compare my weight/shape to the weight/shape of the actors/actresses.	.17	**.79**	-.08
18) When I see a model in a magazine, I compare my weight/shape to his/her weight/shape.	.07	**.80**	-.01

Table 1 Continued

Pattern Coefficients, Eigenvalues, and Percent Variance for the Preliminary PACS-3 Frequency Items in Men and Women

Item	Frequency: Proximal	Frequency: Distal	Frequency: Muscularity
19) When I watch a movie, I compare my weight/shape to the weight/shape of the actors/actresses.	.12	**.80**	.00
20) When I see a billboard or advertisement, I compare my weight/shape to the weight/shape of the models in the billboard or advertisement.	-.01	**.72**	.13
25) When I'm out in public, I compare my weight/shape to the weight/shape of others.	**.73**	.17	-.03
26) When I meet a new person (same sex), I compare my weight/shape to his/her weight/shape.	**.76**	.14	-.02
27) When I'm at work or school, I compare my weight/shape to the weight/shape of others.	**.78**	.04	.03
29) When I'm at a party or social gathering, I compare my weight/shape to the weight/shape of others.	**.71**	.14	-.01
31) When I'm with a group of friends, I compare my weight/shape to the weight/shape of others.	**.75**	.11	-.01
32) When I'm eating in a restaurant, I compare my weight/shape to the weight/shape of others.	**.48**	.16	.21
33) When I watch television, I compare my muscularity to the muscularity of the actors/actresses.	-.05	.09	**.88**
34) When I see a model in a magazine, I compare my muscularity to his/her muscularity.	-.12	.18	**.85**
35) When I watch a movie, I compare my muscularity to the muscularity of the actors/actresses.	-.06	.04	**.94**
37) When I see a famous athlete or watch an athletic event, I compare my muscularity to the muscularity of the athlete.	.10	-.14	**.77**

Table 1 Continued

Pattern Coefficients, Eigenvalues, and Percent Variance for the Preliminary PACS-3 Frequency Items in Men and Women

Item	Frequency: Proximal	Frequency: Distal	Frequency: Muscularity
41) When I'm out in public, I compare my muscularity to the muscularity of others.	.16	-.17	**.84**
Eigenvalues	13.99	2.78	1.36
Percent Variance	55.97	11.12	5.46

Note. Factor loadings and eigenvalues obtained using principal axis factoring with promax oblique rotation. Factor loadings .40 in boldface.

Table 2

Item Descriptive Statistics and Corrected Item-Total Correlations for the Final PACS-3 in Men and Women

Item	*M*	*SD*	Item-Total Correlation
13) When I'm at a party or social gathering, I compare my overall appearance to the appearance of others.	3.00	1.25	.71
13a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	3.03	0.93	.71
13b) When you make these comparisons, how does it usually make you feel?	3.00	0.96	.72
25) When I'm out in public, I compare my weight/shape to the weight/shape of others.	2.85	1.18	.79
25a) When you make these comparisons, how does it usually make you feel?	2.96	0.91	.77
25b) When you make these comparisons, how does it usually make you feel?	2.95	0.94	.79
26) When I meet a new person (same sex), I compare my weight/shape to his/her weight/shape.	2.72	1.25	.78
26a) When you make these comparisons, how does it usually make you feel?	3.00	0.83	.79
26b) When you make these comparisons, how does it usually make you feel?	2.94	0.89	.81
3) When I watch a movie, I compare my overall appearance to the appearance of the actors/actresses.	2.78	1.23	.75
3a) When you make these comparisons, how does it usually make you feel?	3.66	0.78	.72
3b) When you make these comparisons, how does it usually make you feel?	3.38	0.84	.78

Table 2 Continued

Item Descriptive Statistics and Corrected Item-Total Correlations for the Final PACS-3 in Men and Women

Item	M	SD	Item-Total Correlation
17) When I watch television, I compare my weight/shape to the weight/shape of the actors/actresses.	2.66	1.30	.83
17a) When you make these comparisons, how does it usually make you feel?	3.57	0.82	.76
17b) When you make these comparisons, how does it usually make you feel?	3.38	0.87	.80
18) When I see a model in a magazine, I compare my weight/shape to his/her weight/shape.	2.63	1.34	.77
18a) When you make these comparisons, how does it usually make you feel?	3.67	0.89	.68
18b) When you make these comparisons, how does it usually make you feel?	3.46	0.94	.75
34) When I see a model in a magazine, I compare my muscularity to his/her muscularity.	1.99	1.22	.80
34a) When you make these comparisons, how does it usually make you feel?	3.39	0.95	.73
34b) When you make these comparisons, how does it usually make you feel?	3.16	0.92	.78
35) When I watch a movie, I compare my muscularity to the muscularity of the actors/actresses.	2.07	1.26	.84
35a) When you make these comparisons, how does it usually make you feel?	3.45	0.84	.74
35b) When you make these comparisons, how does it usually make you feel?	3.20	0.87	.77

Table 2 Continued

Item Descriptive Statistics and Corrected Item-Total Correlations for the Final PACS-3 in Men and Women

Item	*M*	*SD*	Item-Total Correlation
41) When I'm out in public, I compare my muscularity to the muscularity of others.	2.02	1.16	.77
41a) When you make these comparisons, how does it usually make you feel?	2.99	0.82	.59
41b) When you make these comparisons, how does it usually make you feel?	2.90	0.79	.64

Table 3

Cronbach's Alpha, Means, and Correlations among the PACS-3 Subscales for Women

	Alpha	Mean (SD)	Proximal Frequency	Proximal Direction	Proximal Effect	Distal Frequency	Distal Direction	Distal Effect	Muscularity Frequency	Muscularity Direction	Muscularity Effect	Frequency Total	Direction Total
Proximal Frequency	.87	2.96 (1.08)	1										
Proximal Direction	.87	3.05 (0.81)	.36**	1									
Proximal Effect	.89	3.03 (0.84)	.32**	.90**	1								
Distal Frequency	.89	2.85 (1.16)	.72**	.36**	.35**	1							
Distal Direction	.85	3.68 (0.72)	.43**	.62**	.60**	.52**	1						
Distal Effect	.88	3.47 (0.77)	.45**	.61**	.68**	.61**	.82**	1					
Muscularity Frequency	.91	1.91 (1.08)	.48**	.15**	.18**	.51**	.17**	.20**	1				
Muscularity Direction	.85	3.28 (0.78)	.31**	.56**	.57**	.36**	.64**	.58**	.37**	1			
Muscularity Effect	.86	3.12 (0.75)	.34**	.55**	.61**	.42**	.64**	.67**	.40**	.85**	1		
Frequency Total	.91	2.58 (0.94)	.87**	.35**	.34**	.89**	.45**	.50**	.78**	.41**	.45**	1	
Direction Total	.93	3.32 (0.69)	.39**	.88**	.82**	.46**	.87**	.77**	.21**	.85**	.78**	.43**	1
Effect Total	.94	3.20 (0.71)	.38**	.82**	.90**	.49**	.77**	.89**	.22**	.75**	.86**	.44**	.89**

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

Table 4

Cronbach's Alpha, Means, and Correlations among the PACS-3 Subscales for Men

	Alpha	Mean (SD)	Proximal Frequency	Proximal Direction	Proximal Effect	Distal Frequency	Distal Direction	Distal Effect	Muscularity Frequency	Muscularity Direction	Muscularity Effect	Frequency Total	Direction Total
Proximal Frequency	.88	2.53 (1.08)	1										
Proximal Direction	.88	2.76 (0.77)	.23**	1									
Proximal Effect	.86	2.73 (0.80)	.26**	.85**	1								
Distal Frequency	.87	2.23 (1.07)	.71**	.21**	.26**	1							
Distal Direction	.82	3.38 (0.74)	.23**	.56**	.50**	.26**	1						
Distal Effect	.89	3.05 (0.78)	.34**	.60**	.64**	.41**	.78**	1					
Muscularity Frequency	.88	2.39 (1.10)	.71**	0.14	0.10	.77**	0.14	.21**	1				
Muscularity Direction	.76	3.25 (0.76)	.16*	.49**	.41**	.19*	.69**	.59**	.19*	1			
Muscularity Effect	.83	2.95 (0.78)	.25**	.57**	.61**	.28**	.62**	.79**	.28**	.72**	1		
Frequency Total	.94	2.39 (0.98)	.89**	.22**	.24**	.91**	.23**	.36**	.92**	.20**	.30**	1	
Direction Total	.91	3.11 (0.66)	.23**	.82**	.71**	.27**	.88**	.76**	.18**	.87**	.75**	.26**	1
Effect Total	.93	2.89 (0.70)	.32**	.77**	.86**	.35**	.71**	.91**	.21**	.64**	.90**	.33**	.83**

$^{*}p < .05.$ $^{**}p < .01.$

Table 5

Correlations between the PACS-3 Subscales and Convergent Measures for Men and Women

	Proximal Frequency	Proximal Direction	Proximal Effect	Distal Frequency	Distal Direction	Distal Effect	Muscularity Frequency	Muscularity Direction	Muscularity Effect	Total Frequency	Total Direction	Total Effect
PACS	.73**/.71**	.09/.22**	.12/.19**	.54**/.59**	.15/.34**	.25**/.35**	.57**/.35**	.18*/.28**	.25**/.32**	.67**/.65**	.16*/.28**	.23**/.28**
UPACS	.65**/.64**	.22**/.38**	.21**/.37**	.62**/.70**	.34**/.47**	.45**/.50**	.62**/.34**	.30**/.36**	.37**/.39**	.70**/.66**	.34**/.45**	.39**/.47**
DACS	.50**/.37**	.16*/.06	.14/.05	.40**/.35**	.08/.19**	.22**/.18**	.44**/.26**	.10/.15**	.13/.11*	.49**/.39**	.15*/.15**	.18*/.12**
EDEQ-Restraint	.27**/.31**	.10/.26**	.12/.28**	.23**/.41**	.10/.31**	.15/.39**	.22**/.22**	.04/.27**	-.01/.31**	.26**/.37**	.12/.30**	.12/.34**
EDEQ-Eating Concerns	.26**/.39**	.36**/.32**	.39**/.36**	.33**/.43**	.21**/.32**	.34**/.43**	.13/.32**	.26**/.29**	.30**/.33**	.27**/.45**	.33**/.33**	.39**/.41**
EDEQ-Shape Concerns	.33**/.52**	.46**/.51**	.44**/.52**	.36**/.59**	.39**/.52**	.52**/.61**	.18*/.29**	.35**/.45**	.39**/.48**	.32**/.55**	.45**/.54**	.50**/.60**
EDEQ-Weight Concerns	.32**/.49**	.48*/.52**	.44**/.53**	.38**/.58**	.39**/.49**	.49**/.60**	.19**/.30**	.29**/.43**	.32**/.47**	.33**/.54**	.43**/.53**	.46**/.59**
EDEQ-Global	.34**/.48**	.39**/.46**	.39**/.48**	.37**/.57**	.31**/.47**	.43**/.58**	.21**/.31**	.27**/.41**	.28**/.45**	.34**/.54**	.38**/.49**	.41**/.55**
MBSRQ	-.16*/-.31**	-.53**/-.62**	-.54**/-.61**	-.22**/-.40**	-.40**/-.46**	-.47**/-.54**	-.03/-.16**	-.35**/-.48**	-.41**/-.49**	-.15*/-.34**	-.48**/-.58**	-.55**/-.62**
RSES	-.28*/-.29**	-.37**/-.42**	-.44**/-.42**	-.35**/-.39**	-.25**/-.28**	-.39**/-.36**	-.13/-.25**	-.19*/-.26**	-.33**/-.28**	-.28**/-.37**	-.35**/-.38**	-.46**/-.42**
BMI	-.04/.12**	.28**/.39**	.23**/.36**	.00/.10*	.12/.23**	.16/.29**	-.06/-.01	.04/.15**	.08/.19**	-.03/.09*	.16*/.31**	.17*/.33**

Note. Correlation coefficients appear before the backslash for men and after for women. PACS = Physical Appearance Comparison Scale; UPACS = Upward Physical Appearance Comparison Scale; DACS = Downward Appearance Comparison Scale; EDEQ = Eating Disorder Examination Questionnaire; MBSRQ = Multidimensional Body-Self Relations Questionnaire–Appearance Evaluation subscale; RSES = Rosenberg Self- Esteem Scale; BMI = Body mass index.
*p < .05. **p < .01.

Table 6

Multiple Regression Analyses Predicting Disordered Eating and Body Satisfaction in Women

Predictors	Disordered Eating			Body Satisfaction		
	R^2	$R^2\Delta$	β	R^2	$R^2\Delta$	β
Step 1	.14***	.14***		.16***	.16***	
BMI			.38***			-.39***
Step 2	.40***	.25***		.29***	.13***	
BMI			.36***			-.39***
PACS			.21***			-.02
UPACS			.33***			-.36***
DACS			.05			.03
Step 3	.45***	.05***		.30***	.01**	
BMI			.35***			-.38***
PACS			.09			.04
UPACS			.21			-.31***
DACS			.01			.05
PACS-3-Frequency			.32***			-.14**
Step 4	.48***	.03***		.44***	.15***	
BMI			.28***			-.24***
PACS			.10*			.01
UPACS			.14**			-.16
DACS			.02			.03
PACS-3-Frequency			.27***			-.03
PACS-3-Direction			.23***			-.47***
Step 5	.50***	.02***		.46***	.02***	
BMI			.26***			-.22***
PACS			.12**			.00
UPACS			.11*			-.13**
DACS			.04			.02
PACS-3-Frequency			.24***			.00
PACS-3-Direction			-.02			-.24**
PACS-3-Effect			.30***			-.28***

Note. BMI = Body mass index; PACS = Physical Appearance Comparison Scale; UPACS = Upward Physical Appearance Comparison Scale; DACS = Downward Appearance Comparison Scale.

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

Table 7

Multiple Regression Analyses Predicting Disordered Eating and Body Satisfaction in Men

Predictors	Disordered Eating			Body Satisfaction		
	R^2	$R^2\Delta$	β	R^2	$R^2\Delta$	β
Step 1	.10***	.10***		.15***	.15**	
BMI			.32***			-.38**
Step 2	.23***	.13***		.18***	.04*	
BMI			.32***			-.40**
PACS			.16			.06
UPACS			.13			-.22*
DACS			.17*			-.01
Step 3	.24***	.01		.19***	.01	
BMI			.33***			-.40***
PACS			.11			.11
UPACS			.09			-.18
DACS			.15*			.01
PACS-3 Total Frequency			.10			-.12
Step 4	.29***	.06***		.34***	.15***	
BMI			.28***			-.32***
PACS			.15			.05
UPACS			.00			-.04
DACS			.16*			.00
PACS-3 Total Frequency			.07			-.06
PACS-3 Total Direction			.26***			-.43***
Step 5	.31***	.01		.39***	.05***	
BMI			.27***			-.30***
PACS			.14			.06
UPACS			-.01			-.01
DACS			.16*			-.01
PACS-3 Total Frequency			.05			-.03
PACS-3 Total Direction			.10			-.10
PACS-3 Total Effect			.21			-.42***

Note. BMI = Body mass index; PACS = Physical Appearance Comparison Scale; UPACS = Upward Physical Appearance Comparison Scale; DACS = Downward Appearance Comparison Scale.

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

Table 8

Test-Retest Reliability for the PACS-3 Subscales in Men and Women

PACS-3 Subscale	Intraclass Correlation Coefficient
Frequency: Proximal	.83
Direction: Proximal	.84
Effect: Proximal	.79
Frequency: Distal	.86
Direction: Distal	.85
Effect: Distal	.76
Frequency: Muscularity	.77
Direction: Muscularity	.73
Effect: Muscularity	.77
Total Frequency	.83
Total Direction	.88
Total Effect	.84

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Appendices

Appendix A: Preliminary Physical Appearance Comparison Scale-3 (PACS-3)

People sometimes compare their physical appearance to the physical appearance of others. This can be a comparison of their weight or shape, muscularity, or overall appearance. Below you will find a list of different contexts in which people may engage in these types of physical appearance comparisons.

For each type of comparison, please do the following:

Step 1: First indicate how often you make these kinds of comparisons (using the scale provided, *Never* to *Almost Always*)

Step 2: If you *never* engage in a particular type of comparison (i.e., rated the item as "Never"), then go directly to the next set of items. However, if you rate an item as "Seldom," "Sometimes," "Often," or "Almost Always" please also rate how you felt you looked relative to the comparison target (*Much Better* to *Much Worse*), and how that comparison made you feel (*Very Positive* to *Very Negative*).

1) When I watch television, I compare my overall appearance to the appearance of the actors/actresses.	Never	Seldom	Sometimes	Often	Almost Always
1a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
1b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative
2) When I see a model in a magazine, I compare my overall appearance to his/her appearance.	Never	Seldom	Sometimes	Often	Almost Always
2a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
2b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative
3) When I watch a movie, I compare my overall appearance to the appearance of the actors/actresses.	Never	Seldom	Sometimes	Often	Almost Always
3a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse

3b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative
4) When I see a billboard or advertisement, I compare my overall appearance to the appearance of the models in the billboard or advertisement.	Never	Seldom	Sometimes	Often	Almost Always
4a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
4b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative
5) When I see a famous athlete or watch an athletic event, I compare my overall appearance to the appearance of the athlete.	Never	Seldom	Sometimes	Often	Almost Always
5a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
5b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative
6) When I'm surfing the Internet, I compare my overall appearance to the overall appearance of same-sex others that I see.	Never	Seldom	Sometimes	Often	Almost Always
6a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
6b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative
7) When I play videogames, I compare my overall appearance to the overall appearance of the videogame characters.	Never	Seldom	Sometimes	Often	Almost Always
7a) When I make these comparisons, I typically believe	Much Better	Better	The same	Worse	Much Worse

that I look _____ than the person to whom I am comparing myself.

7b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative

8) When I view pictures of same-sex others on dating websites or social networking sites, I compare my overall appearance to their overall appearance.	Never	Seldom	Sometimes	Often	Almost Always
8a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
8b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative

9) When I'm out in public, I compare my overall appearance to the appearance of others.	Never	Seldom	Sometimes	Often	Almost Always
9a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
9b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative

10) When I meet a new person (same sex), I compare my overall appearance to his/her appearance.	Never	Seldom	Sometimes	Often	Almost Always
10a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
10b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative

11) When I'm at work or school, I compare my overall appearance to the appearance of others.	Never	Seldom	Sometimes	Often	Almost Always
11a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am	Much Better	Better	The same	Worse	Much Worse

comparing myself.

	Very Positive	Positive	Neutral	Negative	Very Negative
11b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative

12) When I'm shopping for clothes, I compare my overall appearance to the appearance of others.	Never	Seldom	Sometimes	Often	Almost Always
12a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
12b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative

13) When I'm at a party or social gathering, I compare my overall appearance to the appearance of others.	Never	Seldom	Sometimes	Often	Almost Always
13b) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
13c) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative

14) When I'm at the gym, I compare my overall appearance to the appearance of others.	Never	Seldom	Sometimes	Often	Almost Always
14a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
14b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative

15) When I'm with a group of friends, I compare my overall appearance to the appearance of others.	Never	Seldom	Sometimes	Often	Almost Always
15a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse

15b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative

16) When I'm eating in a restaurant, I compare my overall appearance to the appearance of others.	Never	Seldom	Sometimes	Often	Almost Always
16a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
16b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative

17) When I watch television, I compare my weight/shape to the weight/shape of the actors/actresses.	Never	Seldom	Sometimes	Often	Almost Always
17a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
17b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative

18) When I see a model in a magazine, I compare my weight/shape to his/her weight/shape.	Never	Seldom	Sometimes	Often	Almost Always
18a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
18b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative

19) When I watch a movie, I compare my weight/shape to the weight/shape of the actors/actresses.	Never	Seldom	Sometimes	Often	Almost Always
19a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
19b) When you make these comparisons, how does it	Very Positive	Positive	Neutral	Negative	Very Negative

usually make you feel?

20) When I see a billboard or advertisement, I compare my weight/shape to the weight/shape of the models in the billboard or advertisement.	Never	Seldom	Sometimes	Often	Almost Always
20a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
20b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative
21) When I see a famous athlete or watch an athletic event, I compare my weight/shape to the weight/shape of the athlete.	Never	Seldom	Sometimes	Often	Almost Always
21a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
21b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative
22) When I'm surfing the Internet, I compare my weight/shape to the weight/shape of same-sex others that I see.	Never	Seldom	Sometimes	Often	Almost Always
22a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
22b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative
23) When I play videogames, I compare my weight/shape to the weight/shape of the videogame characters.	Never	Seldom	Sometimes	Often	Almost Always
23a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse

23b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative

24) When I view pictures of same-sex others on dating websites or social networking sites, I compare my weight/shape to their weight/shape.	Never	Seldom	Sometimes	Often	Almost Always
24a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
24b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative

25) When I'm out in public, I compare my weight/shape to the weight/shape of others.	Never	Seldom	Sometimes	Often	Almost Always
25a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
25b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative

26) When I meet a new person (same sex), I compare my weight/shape to his/her weight/shape.	Never	Seldom	Sometimes	Often	Almost Always
26a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
26b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative

27) When I'm at work or school, I compare my weight/shape to the weight/shape of others.	Never	Seldom	Sometimes	Often	Almost Always
27a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse

27b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative
28) When I'm shopping for clothes, I compare my weight/shape to the weight/shape of others.	Never	Seldom	Sometimes	Often	Almost Always
28a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
28b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative
29) When I'm at a party or social gathering, I compare my weight/shape to the weight/shape of others.	Never	Seldom	Sometimes	Often	Almost Always
29a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
29b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative
30) When I'm at the gym, I compare my weight/shape to the weight/shape of others.	Never	Seldom	Sometimes	Often	Almost Always
30a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
30b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative
31) When I'm with a group of friends, I compare my weight/shape to the weight/shape of others.	Never	Seldom	Sometimes	Often	Almost Always
31a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
31b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative

32) When I'm eating in a restaurant, I compare my weight/shape to the weight/shape of others.	Never	Seldom	Sometimes	Often	Almost Always
32a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
32b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative
33) When I watch television, I compare my muscularity to the muscularity of the actors/actresses.	Never	Seldom	Sometimes	Often	Almost Always
33a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
33b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative
34) When I see a model in a magazine, I compare my muscularity to his/her muscularity.	Never	Seldom	Sometimes	Often	Almost Always
34a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
34b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative
5) When I watch a movie, I compare my muscularity to the muscularity of the actors/actresses.	Never	Seldom	Sometimes	Often	Almost Always
35a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
35b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative

36) When I see a billboard or advertisement, I compare my muscularity to the muscularity of the models in the billboard or advertisement.	Never	Seldom	Sometimes	Often	Almost Always
36a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
36b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative
37) When I see a famous athlete or watch an athletic event, I compare my muscularity to the muscularity of the athlete.	Never	Seldom	Sometimes	Often	Almost Always
37a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
37b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative
38) When I'm surfing the Internet, I compare my muscularity to the muscularity of same-sex others that I see.	Never	Seldom	Sometimes	Often	Almost Always
38a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
38b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative
39) When I play videogames, I compare my muscularity to the muscularity of the videogame characters.	Never	Seldom	Sometimes	Often	Almost Always
39a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
39b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative

40) When I view pictures of same-sex others on dating websites or social networking sites, I compare my muscularity to their muscularity.	Never	Seldom	Sometimes	Often	Almost Always
40a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
40b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative
41) When I'm out in public, I compare my muscularity to the muscularity of others.	Never	Seldom	Sometimes	Often	Almost Always
41a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
41b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative
42) When I meet a new person (same sex), I compare my muscularity to his/her muscularity.	Never	Seldom	Sometimes	Often	Almost Always
42a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
42b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative
43) When I'm at work or school, I compare my muscularity to the muscularity of others.	Never	Seldom	Sometimes	Often	Almost Always
43a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
43b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative

44) When I'm shopping for clothes, I compare my muscularity to the muscularity of others.	Never	Seldom	Sometimes	Often	Almost Always
44a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
44b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative
45) When I'm at a party or social gathering, I compare my muscularity to the muscularity of others.	Never	Seldom	Sometimes	Often	Almost Always
45a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
45b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative
46) When I'm at the gym, I compare my muscularity to the muscularity of others.	Never	Seldom	Sometimes	Often	Almost Always
46a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
46b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative
47) When I'm with a group of friends, I compare my muscularity to the muscularity of others.	Never	Seldom	Sometimes	Often	Almost Always
47a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
47b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative
48) When I'm eating in a restaurant, I compare my	Never	Seldom	Sometimes	Often	Almost Always

muscularity to the muscularity of others.

	Much Better	Better	The same	Worse	Much Worse
48a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse

	Very Positive	Positive	Neutral	Negative	Very Negative
48b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative

Finally, while we have listed a number of aspects of physical appearance that individuals may compare (e.g., weight/shape, muscularity, and overall appearance), we are interested in understanding more about this issue. When you make appearance comparisons, what aspect of your physical appearance do you typically compare? (Note that this does not have to be one of the aspects of physical appearance listed above.)

_____

Appendix B: Final Physical Appearance Comparison Scale-3 (PACS-3)

People sometimes compare their physical appearance to the physical appearance of others. This can be a comparison of their weight or shape, muscularity, or overall appearance. Below you will find a list of different contexts in which people may engage in these types of physical appearance comparisons.

For each type of comparison, please do the following:

Step 1: First indicate how often you make these kinds of comparisons (using the scale provided, *Never* to *Almost Always*)
Step 2: If you *never* engage in a particular type of comparison (i.e., rated the item as "Never"), then go directly to the next set of items. However, if you rate an item as "Seldom," "Sometimes," "Often," or "Almost Always" please also rate how you felt you looked relative to the comparison target (*Much Better* to *Much Worse*), and how that comparison made you feel (*Very Positive* to *Very Negative*).

1) When I'm at a party or social gathering, I compare my overall appearance to the appearance of others.	Never	Seldom	Sometimes	Often	Almost Always
1b) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
1c) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative

2) When I'm out in public, I compare my weight/shape to the weight/shape of others.	Never	Seldom	Sometimes	Often	Almost Always
2a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
2b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative

3) When I meet a new person (same sex), I compare my weight/shape to his/her weight/shape.	Never	Seldom	Sometimes	Often	Almost Always
3a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am	Much Better	Better	The same	Worse	Much Worse

comparing myself.

3b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative
4) When I watch a movie, I compare my overall appearance to the appearance of the actors/actresses.	Never	Seldom	Sometimes	Often	Almost Always
4a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
4b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative
5) When I watch television, I compare my weight/shape to the weight/shape of the actors/actresses.	Never	Seldom	Sometimes	Often	Almost Always
5a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
5b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative
6) When I see a model in a magazine, I compare my weight/shape to his/her weight/shape.	Never	Seldom	Sometimes	Often	Almost Always
6a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
6b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative
7) When I see a model in a magazine, I compare my muscularity to his/her muscularity.	Never	Seldom	Sometimes	Often	Almost Always
7a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse

7b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative

8) When I watch a movie, I compare my muscularity to the muscularity of the actors/actresses.	Never	Seldom	Sometimes	Often	Almost Always
8a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
8b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative

9) When I'm out in public, I compare my muscularity to the muscularity of others.	Never	Seldom	Sometimes	Often	Almost Always
9a) When I make these comparisons, I typically believe that I look _____ than the person to whom I am comparing myself.	Much Better	Better	The same	Worse	Much Worse
9b) When you make these comparisons, how does it usually make you feel?	Very Positive	Positive	Neutral	Negative	Very Negative