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# Self-Schema And Social Comparison Explanations of Body Dissatisfaction

Patricia Van den Berg  
*University of South Florida*

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Self-Schema And Social Comparison Explanations of Body Dissatisfaction

by

Patricia van den Berg

A dissertation submitted in partial fulfillment  
of the requirements for the degree of  
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Department of Psychology  
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University of South Florida

Major Professor: J. Kevin Thompson, Ph.D.  
Michael Brannick, Ph.D.  
Jonathon Rottenberg, Ph.D.  
Douglas Nelson, Ph.D.  
Vicky Phares, Ph.D.

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## Self-schema and Social Comparison Explanations of Body Dissatisfaction

Patricia van den Berg

### ABSTRACT

The current study was an investigation of the self-schema and social comparison theories of the development of body dissatisfaction. Social comparison stimuli, consisting of photographs of women, were piloted and selected to form 3 stimuli sets: upward comparison, downward comparison, and no comparison. A priming manipulation consisting of an imagery exercise intended to prime participants' appearance self-schema was also piloted. Participants completed state measures of body image and mood at pretest, were given the priming manipulation and the social comparison stimuli, then completed posttest measures of mood and body image, as well as providing demographic information. Results indicated no significant interaction between priming and social comparison and no significant main effect for priming. However, there was a significant effect of social comparison, such that those in the downward comparison condition showed decreased body dissatisfaction and negative mood. Results are discussed in the context of self-schema theory and social comparison, and suggestions are given for future research that might further shed light on these topics.

## Introduction

The current understanding of body image is as a multi-faceted construct with perceptual, cognitive, affective, and behavioral components (Cash & Pruzinsky, 2002; Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999). Cash and Pruzinsky (1990) defined the first three of these components in this way:

Perceptually, we construct images and appraisals of the size and shape of various aspects of our body. Our cognitive body image includes attentional body-focus and related self-statements, as well as beliefs about our bodies and bodily experience ... The emotional component includes our experiences of comfort or discomfort, satisfaction or dissatisfaction associated with our appearance as well as with many other aspects of body experience. (p. 338)

Behavioral aspects of body image have most often been operationalized in terms of avoidance of body image-related activities (Rosen, Srebnik, Saltzberg, & Wendt, 1991), appearance concealment and fixing behaviors such as checking one's appearance in the mirror, and more recently behavioral methods of coping with a challenge to one's body image (Cash, 2002b). Individuals can manifest "body image disturbance" in any of these areas. The term "body dissatisfaction" is generally used to refer to subjective unhappiness with one's body or appearance (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999).

Body image disturbance is closely associated with the clinical disorders of anorexia nervosa, bulimia nervosa, and body dysmorphic disorder. Diagnostic criteria for



anorexia nervosa and bulimia nervosa, for instance, include body image disturbance (DSM-IV; American Psychiatric Association, 1994). Rates of anorexia nervosa and bulimia nervosa are reported to be 1.0% and 3.0% of young women, respectively (American Psychiatric Association, 1994), with partial syndromes occurring much more frequently (Hoek & van Hoeken, 2003). These rates appear to have risen over the last century, especially among adolescent girls (Hoek & van Hoeken, 2003). Anorexia nervosa is an extremely serious disorder, with ten percent of individuals who have been treated in a hospital setting eventually dying of the disorder. Bulimia nervosa, likewise, has serious medical consequences (American Psychiatric Association, 1994). Body dysmorphic disorder is a disorder of body image in which a person becomes preoccupied with a real but minor, or nonexistent, defect in his or her appearance (American Psychiatric Association, 1994). It has severe consequences for sufferers, who in one study had a rate of suicide attempts of 30% (Phillips and Diaz, 1997).

Body image disturbances also predict the later onset and maintenance of anorexia and bulimia nervosa (Stice & Shaw, 2002). In longitudinal studies body image disturbance has been found consistently to be one of the strongest risk factors for the development of eating disordered behavior in adolescents (Attie & Brooks-Gunn, 1989; Cattarin & Thompson, 1994; Krahnstover Davison, Markey, & Birch, 2003) and adults (Striegel-Moore, Silberstein, Frensch & Rodin, 1989; Wertheim, Paxton, & Blaney, 2004).

Body dissatisfaction occurs at such high rates in the general population of women that Rodin, Silberstein, and Striegel-Moore (1984) coined the term “normative discontent” to characterize this phenomenon. The rates of body dissatisfaction in women,

and also men, have increased steadily over the last several decades (Cash, 2002a; Garner, 1997; Rodin, Silberstein, & Striegel-Moore, 1984). Body dissatisfaction has been found to be related both concurrently and prospectively to depression (Denniston, Roth, & Gilroy, 1992; Stice, Nemeroff, & Shaw, 1996), and also plays a role in arenas such as social functioning (Cash & Fleming, 2002) and sexual functioning (Wiederman, 2002), and is an important concern in many medical conditions (for reviews see Cash & Pruzinsky, 2002, chapters 38-45). Clearly, the investigation of body image disturbance could contribute to the alleviation of mental health concerns in a variety of contexts.

Two prominent theories of body image form the foundation for the current study: appearance self-schema and appearance social comparison . These theories will be discussed and the empirical support for each will be reviewed, followed by a detailed description of the current study, which is a laboratory study designed to determine the unique and combined effects of social comparison and appearance self-schema manipulations on state levels of body image and mood.

#### *Self-Schema Theory*

The schema as an organizing structure of the self was first proposed by Markus (1977). She defined self-schemata as “cognitive generalizations about the self, derived from past experience, that organize and guide the processing of self-related information” (p. 64). This approach to the self has been adopted by various researchers to explain different types of psychopathology, including depression (Ingram, Bernet, & McLaughlin, 1994; Segal, 1988; Segal, Gemar, Truchon, Guirguis, & Horowitz, 1995) and anxiety disorders (Beck & Clark, 1997). Self-schema theory was first applied to body image by Markus and colleagues (Markus, Hamill, & Sentis, 1987). According to this approach,

individuals can vary in the degree to which body image and appearance is important to them or “self-relevant.” Those for whom appearance is an important aspect of their self are considered “schematic” for body image, whereas those for whom appearance is not important are considered “aschematic.” Individuals who are schematic for body image are purported to develop more complex, interconnected networks of knowledge regarding appearance, and to demonstrate a variety of information-processing biases related to their self-schema (Markus et al., 1987).

Since Markus’ introduction of the self-schema concept to the field of body image and eating disorders, self-schema cognitive models have been adopted, refined, and evaluated by a number of body image and eating disorders researchers. Vitousek and Hollon (1990) provided an early review of the self-schema theory of body image and the research on it, drawing from the literature in social cognition and cognitive psychology to suggest several ways in which the presence of self-schemata for weight and shape could be further investigated. They proposed, for example, testing for differences between aschematics and schematics on information-processing ease and speed, complexity of relevant cognitive structures and degree of specialized knowledge related to the self-schema, intrusion of irrelevant information into the processing of schema-activating situations, memory for schema-relevant information, affective involvement in components of the schema, and resistance to counter-schematic information (Vitousek & Hollon, 1990). In later reviews Williamson and colleagues (Williamson, 1996; Williamson, Muller, Reas, & Thaw, 1999) discussed the burgeoning literature on cognitive biases related to eating and appearance, the existence of which has been taken as evidence of the presence of appearance schemas. Williamson and colleagues

organized the research into studies on attentional bias, memory bias, and judgment or selective interpretation bias, and this categorization will be used in the following review of this literature.

A number of studies have examined attentional biases toward schema-relevant stimuli, many using the modified Stroop test (Faunce, 2002; Stroop, 1935). In these studies, researchers measured the response time to color name body weight- or shape-related, food-related, and control words used as Stroop stimuli (Williams, Mathews, & MacLeod, 1996). They found increased interference for body shape-, and weight-related words in both eating disordered samples and nonclinical samples with a high degree of shape and weight concern (Williamson, 1996; Williamson et al., 1999). For instance, in one of the most methodologically rigorous studies using the Stroop, Jones-Chesters, Monsell, and Cooper (1998) found that eating disordered participants showed more interference for food/eating and weight/shape words compared to control words. This effect persisted even when the target words were presented not in blocks, as is usual, but interspersed with control words, with response time for each word measured individually. In addition to experimental findings of differences between groups, researchers have also reported that women with bulimia nervosa showed decreased interference on the Stroop after treatment of their eating disorder (Cooper & Fairburn, 1994).

The dichotic listening task has also been used to show attentional biases in an eating disturbed sample. Schotte, McNally, and Turner (1990) found that bulimic participants detected an appearance-related word (“fat”) more often than a non-appearance word (“pick”) presented in the unattended ear. Similarly, in a lexical decision task in which participants were required to determine whether a string of letters was a

word, Fuller, Williamson, and Anderson (1995) found that participants with higher body dissatisfaction performed more accurately and quickly in responding to appearance words. In the case of the lexical decision task, enhanced performance is considered indicative of the presence of an underlying schema because individuals schematic for a construct should be able to process schema-related information more quickly (Williamson et al., 1999).

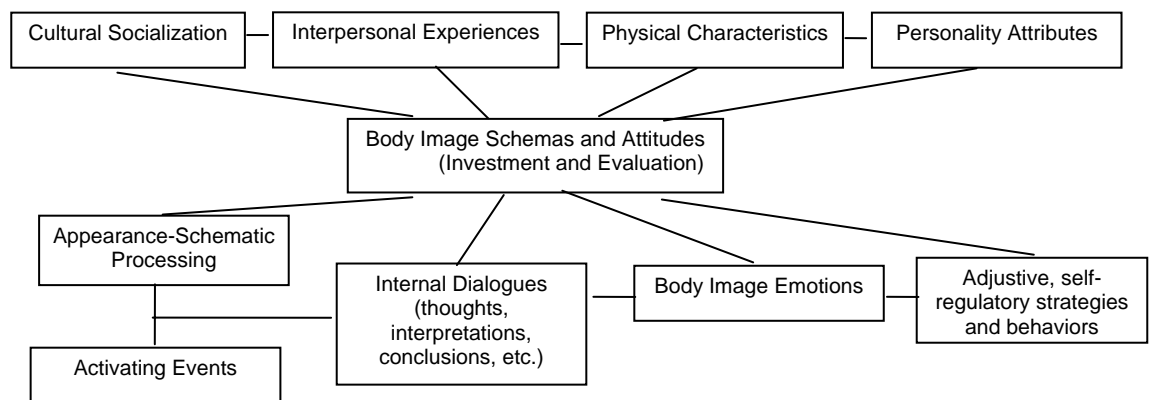
Biases in memory for appearance-related information have also been demonstrated. In a study of undergraduate women, Baker, Williamson, and Sylve (1995) found increased recall for fatness-related words in participants high on body dysphoria. These authors also included a negative mood induction condition, and found that this condition resulted in enhanced memory for depression-related words, but not body image-related words. Watkins, Martin, Muller, and Day (1995) conducted a more naturalistic study in which they asked participants to recall items they had seen in an office. The investigators had placed body- and food-related items in an office, along with several other types of items. Their results indicated that those with higher body dysphoria recalled more body-related items, compared to those with lower body dysphoria. Similarly, Geller, Johnston, and Madsen (1997) found that the “false alarm effect” was higher for women who were schematic for shape and weight. The “false alarm effect” occurred when participants were given a list of schema-related and schema-unrelated words to memorize. When recall was later tested, schematic participants generated a greater number of schema-related words that had not actually occurred on the original list. This study provides especially compelling evidence of the existence of an appearance schema because participants were recalling not words they had actually

seen, but presumably words which were associated in their minds with the construct of appearance.

Judgment or selective interpretation biases involve the interpretation of ambiguous situations, and are hypothesized to be biased towards weight and shape interpretations in persons schematic for appearance, weight, and shape. Several studies have supported this hypothesis, including a study in which participants were instructed to imagine themselves in situations that had been described to them in ambiguous terms, allowing either a positive or negative interpretation (Jackman, Williamson, Netemeyer, & Anderson, 1995). Results indicated that those participants with high levels of body dysphoria remembered the body size-related scenarios with a negative connotation more often than those with lower levels of body concerns, suggesting a bias in interpretation of body image-related ambiguous information. In another study of selective interpretation, participants were asked to write sentences with words that were homophones (e.g., waist or waste) or which had multiple meanings (e.g., chest). Results indicated that participants with high levels of body dysphoria tended to interpret these words as related to body shape or weight, whereas participants with low body dysphoria did not (Watkins, Martin, Muller, & Day, 1995). Tantleff-Dunn and Thompson (1998) examined biased interpretations of videotaped scenarios involving ambiguous appearance-related or nonappearance-related critical feedback given by a male student to a female student. They found that participants with high levels of body anxiety responded more negatively to the appearance feedback video, and also that anger increased more in the appearance condition overall.

In accordance with the literature on cognitive factors in eating and body image disturbance, Cash has proposed a cognitive-behavioral model of body image that includes self-schema regarding appearance (Cash, 2002b; see Figure 1). He suggests that appearance schemas are formed as a result of historical influences, which include cultural socialization, interpersonal experiences such as teasing, physical characteristics, and individual personality attributes. The appearance self-schema in turn gives rise to disturbances or biases in the processing of schema relevant information, as well as to affect and behavior related to appearance. In addition to the more distal variables' contribution to the formation of the self-schema, the self-schema is purported to be activated proximally by body image relevant events. The self-schema manipulation in the current study is conceptualized as activation of the self-schema in this manner.

Figure 1. *Cash's (2002b) model of the development and maintenance of body image disturbance.*



There has been a growing body of literature on body image or appearance self-schemas since the topic was first introduced by Markus and colleagues (1987), and this literature has begun to test some of the components of Cash's model. Included in this body of work are questionnaire development studies, correlational and cross-sectional studies, prospective longitudinal studies, and experimental studies.

In order to study appearance self-schemas, Cash developed a questionnaire measure of schematicity (Cash & Labarge, 1996; Cash, Melnyk, & Hrabosky, 2004). The Appearance Schemas Inventory (ASI) and its revised version (ASI-R) were developed to measure attitudes and beliefs regarding appearance, as well as investment in one's appearance as an important component of one's sense of self (Cash & Labarge, 1996; Cash et al., 2004). This questionnaire has proven to be reliable, and to correlate with other measures of body image such as body image quality of life and situational body image distress (Cash, 2002b; Cash & Fleming, 2002; Cash et al., 2004).

The earliest investigation of body image self-schemas was also the first to examine such schemas cross-sectionally. An investigation of group differences in level of schematicity was undertaken by Markus, Hamill, and Sentis (1987) in their original study of weight self-schemas. The authors classified participants as aschematic, schematic-overweight, or schematic-obese on the basis of participants' evaluations of their own weight status and the importance of their weight to their overall self-evaluation.<sup>1</sup> They found that there were no differences between the groups in response

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<sup>1</sup> In earlier studies of body image self-schema, schematicity was defined as being both invested in a trait or characteristic, and rating oneself as high on the trait. In later research, however, schematicity has come to be understood as being for the most part separate from one's actual or perceived weight (Cash, 1994). For instance there is variation in schematicity even within groups that rate themselves as overweight (Cash, Melnyk, & Hrabosky, 2004).



latency to questions asking the participants to identify weight-related traits as “Me” or “Not me”, which the authors attributed to the presence of a universal, general schema for weight and one’s body. However, when asked to respond to silhouettes of varying sizes in a similar manner, the schematic participants (regardless of weight) differed from the aschematics in both the content and the latency of their responses. The authors interpreted this difference in response times as evidence of the operation of underlying self-schemas for weight.

Cash and his colleagues have also conducted two studies on body image treatment and change in appearance schematicity. Grant and Cash (1995) compared Cash’s group cognitive-behavioral body image therapy with a modest-contact treatment based on the group sessions. They found that in addition to reductions in body image, the participants in both groups also showed a decrease in their ASI scores compared to pre-treatment levels. Cash and Lavalley (1997) extended this experiment, using a self-administered treatment based on a workbook compared to standard treatment. Their results replicated those of Grant and Cash, showing an effect of the body image treatment on appearance schematicity as measured by the ASI.

Hargreaves and Tiggemann (2002b) conducted a longitudinal study in which they used scores on the ASI to predict body dissatisfaction 2 years later in a sample of Australian adolescents. Their results indicated that the ASI was in fact a significant predictor of later body dissatisfaction in girls, above and beyond baseline levels of dissatisfaction. Of note, self-esteem, which is generally a significant predictor of future food and body image problems (Wertheim, Paxton, & Blaney, 2004), was no longer significant when ASI was added to the set of predictors. Further, the authors did not find

that the reverse relationship (body dissatisfaction predicting future ASI scores) was significant.

Several experimental studies have included dispositional level of appearance schematicity, measured by the ASI, as a moderator of the independent variable's effect on mood and body image outcomes. For instance, Lavin and Cash (2001) conducted a study in which they exposed undergraduate women to audiotapes containing either information regarding appearance stereotyping and discrimination, or information regarding the effects of television violence on aggression. The authors found a significant influence on body dissatisfaction for the appearance information, but also found that this influence was strongest in a group classified as highly schematic. Cash, Fleming, and colleagues (2002) also found a moderating effect of ASI scores. They tested the influence on state body dissatisfaction of having to report information regarding one's weight and appearance, finding this influence to be significant overall and greater in the group that was more highly schematic for appearance.

Because schematicity can not be manipulated as an independent variable, Altabe and Thompson (1996) borrowed a paradigm from cognitive psychology in which a possible pre-existing self-schema is primed or activated by the presentation of schema-relevant stimuli. In their first experiment, the priming or schema activation condition consisted of the completion of sentence stems that had been rated as relevant to the body image of the participants in a previous study session. Other conditions received stems that were body-related but which had not been rated as important by the participant, or non-body-related stems. The authors did not find a difference in posttest body dissatisfaction, although post hoc exploratory analyses indicated an effect of the priming

on depression/anxiety, and increased recall for the word stems in the priming condition. In a second study, Altabe and Thompson used a prime that consisted of pictures of body parts participants had rated as most relevant to their body image. Results indicated that there was an effect of the prime on depression, weight dissatisfaction, and overall appearance dissatisfaction.

In another priming study, Meyer and Waller (2000) presented words subliminally in order to examine participants' schematic processing. As a test of their theory that fear of abandonment is a contributing factor in eating and weight issues, they presented a word that was either "appetitive", related to "abandonment", or neutral. Their dependent variables, which they characterized as measures of schema activation, were modified Stroop tasks using either food/shape or abandonment words. They found that participants showed greater interference on both the abandonment and food/shape Stroop tasks after exposure to the appetitive cue, although in the case of the food/shape Stroop this was a nonsignificant trend. They interpreted their results as indicating the presence of an underlying schema having both abandonment and food and shape components.

Also using the modified Stroop task with appearance words versus control words, Labarge, Cash, and Brown (1998) tested the effects of priming participants' appearance schemas by asking them to report appearance information and by having their weight assessed. Their results were consistent with their hypotheses, indicating that participants given an appearance prime indeed showed greater interference on the appearance-word Stroop. Further, the investigators also examined the moderating effects of ASI scores, finding that schematics given an appearance prime had slower Stroop times than the other groups.

In addition to the longitudinal study mentioned previously, Hargreaves and Tiggemann have also conducted two relevant experimental studies. In a 2002 study (Hargreaves & Tiggemann, 2002a) they exposed older adolescent males and females to television commercials, with one group viewing commercials containing images of idealized females and the other group viewing nonappearance commercials. They measured body dissatisfaction before and after viewing the commercials, and also included a measure of schema-activation consisting of a word stem completion task they designed. The authors reported that viewing the appearance commercials resulted in higher mean levels of schema activation, anger, and body dissatisfaction, and also lower mean levels of confidence. Further, the authors found support for partial mediation by schema activation of the relationship between commercial viewing and body dissatisfaction. They also included the ASI in their measures, and found that it moderated the relationship between commercial condition and dissatisfaction.

The authors replicated their findings in a slightly younger sample (Hargreaves & Tiggemann, 2003). They found a significant difference between pre and post measures of body dissatisfaction in girls who had viewed the appearance commercials. They also found increased schema activation in the appearance commercial condition, for both boys and girls. However, in this study they did not find that ASI scores significantly moderated the effect of viewing appearance commercials on posttest dissatisfaction.

Finally, Birkeland, et al. (2005) conducted a study of schema activation or priming which forms the basis for the current study. In their study, exposure to magazine ads for beauty products (without human figures) served as an appearance schema prime, compared to magazine ads of household products. This variable was crossed with one of

two social comparison conditions: presence or absence of an image of a fashion model, representing the female sociocultural ideal. In their investigation they did not find an effect of schema activation, but did find that exposure to a fashion model led to increases in body dissatisfaction and negative mood. Their study will be further discussed below after first reviewing the second theory to be evaluated in the current study – a social comparison explanation of body image disturbance.

To summarize, researchers have documented weight- and shape-related attentional, memory, and interpretational biases in a variety of samples. The existence of these systematic biases argues for the presence of an underlying structure, deemed a self-schema, that drives cognitive processes and affect related to weight and shape. To more directly study the influence of self-schemas researchers have begun to use a priming paradigm, which consists of exposing participants to stimuli purported to activate an underlying cognitive structure related to weight and shape, and then measuring outcome variables such as body dissatisfaction and mood. In addition, Hargreaves and Tiggemann (2002a, 2003) introduced a schema activation measure in order to better assess this aspect of the paradigm. The current study will use this priming paradigm to investigate the joint effects of both body image self-schemas and social comparison on body image and related constructs.

### *Social Comparison Theory*

An alternative cognitive explanation of body dissatisfaction is social comparison theory. Social comparison theory was originally proposed by Festinger (1954), and has been elaborated on and expanded by social psychologists and other researchers since that time (Suls & Wheeler, 2000). According to this theory, in order to form assessments of

themselves individuals compare themselves to others in their social environment on traits or characteristics that are important to them. These comparisons can occur to others who are more accomplished on a particular trait, which has been termed an “upward comparison,” or to others who are less accomplished on a particular trait, called “downward comparison.” Upward comparisons would be expected to result in negative affect, while downward comparisons generally result in enhancement of one’s self-esteem (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999). Within the field of body image and eating disorders, social comparison has been studied as a trait level tendency to engage in social comparisons, a manipulated independent variable, and a dependent or process variable. Studies using each of these approaches have found support for the important role of appearance social comparison in body dissatisfaction.

Dispositional level of social comparison tendency has been tested in a number of studies and generally found to be a potent predictor of body dissatisfaction and disordered eating. For example, in an early study of undergraduate women, Striegel-Moore, McAvay, and Rodin (1986) found a positive correlation between a single questionnaire item about social comparison and an item on “feeling fat,” which can be seen as roughly equivalent to body dissatisfaction. The first questionnaire measure designed to measure individual differences in social comparison tendencies was the Physical Appearance Comparison Scale (Thompson, Heinberg, & Tantleff, 1991), which was found to correlate significantly with body dissatisfaction. Thompson and Heinberg attempted to replicate this finding in a 1993 study, and while they did not find an effect for frequency of social comparison, there was an effect for comparison target importance

ratings such that higher rating of the importance of a range of comparison targets was associated with more negative eating and body image outcomes.

Rieves and Cash (1996) examined retrospective reports of participants' comparison with siblings and found that comparison was related to body image, particularly comparison occurring during the adolescent years. Tsiantas and King (2000) studied 43 sibling pairs and likewise found that, for younger sisters, self-reports of comparison to their sister predicted body dissatisfaction.

Also confirming their predictions, Stormer and Thompson (1996) found that social comparison tendencies predicted body dissatisfaction in a sample of college women, even after removing the effects of Body Mass Index (BMI) and self-esteem, both of which are established correlates of body dissatisfaction (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999). They found, further, that appearance comparison specifically on a dimension of weight or size, as opposed to general appearance comparison, was most predictive of body image dissatisfaction. This distinction between weight and non-weight comparison was confirmed by Fisher, Dunn, and Thompson (2002) in a study using multidimensional scaling to examine the construct of appearance comparison tendency. Additionally, Stormer and Thompson's 1996 results were replicated in an Italian and a British sample by Mautner, Owen, and Furnham (2000). Extending this line of inquiry further, Thompson, Covert, and Stormer (1999) conducted a Covariance Structure Modeling (CSM) study in which they investigated the mediational role of comparison between appearance-related teasing and body image disturbance. Social comparison was in fact found to mediate this relationship. van den Berg, Thompson, Obremski-Brandon, and Covert (2002) also conducted a CSM investigation of

comparison, family, peer, and media influences such as teasing and the level of importance of placed on appearance, and body image and eating outcomes. They replicated previous results, finding support for social comparison as a mediator of the relationship between media and family influences and body dissatisfaction.

Heinberg and Thompson (1992) conducted an early experimental investigation of social comparison in university students in which they manipulated both the direction of comparison and the characteristics of the target group. They gave participants feedback regarding their own weight, indicating that they were larger or smaller than a target group that was either universal (the average U.S. citizen) or particularistic (the average student attending the participants' university). Their results indicated that comparison with peers resulted in decreases in body satisfaction, however size feedback (smaller, larger) did not interact with target group. Lin and Kulik (2002) also used peers as comparison targets. They conducted an experiment in which they told participants they would participate in a "Dating Game" scenario in order to study decision-making in dating relationships. They told the participants that they and another female participant would meet a male participant, who would later identify one of the women as someone he would prefer to date. Participants in the two experimental conditions were given a photo of either a slender or an overweight woman, identified as the hypothetical other woman; they were given no photo in the control condition. Results indicated that participants in the thin-peer condition had greater body dissatisfaction and lower confidence.

Faith, Leone, and Allison (1997) also manipulated the direction of comparison, but proposed that comparison to a participants' own ideal might produce even an even greater effect than comparison to peers or other targets. Thus, they asked participants to



visualize their own comparison target. In the two experimental conditions participants were directed to imagine and then write a description of someone who was very attractive or someone who was very unattractive, whereas in the control condition they were instructed to think of a TV show or movie. The authors found that comparison condition did not significantly affect the posttest measure of body dissatisfaction. However, dispositional level of social comparison tendency assessed beforehand did predict body image and appearance anxiety.

A recent meta-analysis of studies of exposure to idealized images of female bodies concluded that viewing these images leads to a consistent, but small, effect on body dissatisfaction (Groesz, Levine, & Murnen, 2002). Even so, this is not a universal effect, and attention has turned to uncovering individual differences in reactions to idealized images, as well as the processes involved in the effect of media images on body dissatisfaction (Tiggemann & McGill, 2004). A number of studies have examined social comparison in this vein. For example, Martin and her colleagues have conducted a series of studies exploring the effects of both media exposure and comparison processes (Martin & Gentry, 1997; Martin & Kennedy, 1993). Martin and Kennedy (1993) found that 4<sup>th</sup> through 8<sup>th</sup> grade girls' tendency to compare themselves to models in ads predicted both lower self-esteem and lower ratings of participants' own attractiveness. Their findings were corroborated by those of Carlson-Jones (2001), who reported that girls' tendency to compare themselves to same-sex peers or models was significantly correlated with body dissatisfaction. Botta (1999, 2003) similarly found that, in a sample of high school girls and a sample of college women, comparison to images in the media predicted body image and eating outcomes such as endorsement of the thin ideal, body image

disturbance, drive for thinness, and bulimic behaviors. Social comparison to media images was a significant predictor above and beyond BMI, and also above the amount of exposure to media.

A second finding from Martin and Kennedy's (1993) study was that girls rated a picture of an "average-looking" woman as less attractive when they had been previously exposed to ads with attractive models. Thus, their comparison standard was raised after exposure to unrealistic, idealized images. The power of this single episode of exposure to change girls' ratings of attractiveness is particularly informative in that it provides a clue as to the mechanism by which media exposure may lead to adverse body and eating outcomes.

Martin and Gentry (1997) later continued their line of research on media images and social comparison in girls, manipulating instructional sets in order to investigate the processes involved in responses to advertisements containing idealized images of women. In one condition participants were told to use the pictures of the models to evaluate their own appearance, in another condition to inspire them to improve their own appearance, and in the final condition they were encouraged to enhance their self-esteem by discounting the models' appearance or making a downward comparison to some aspect of the model. While there were some mixed results across different age groups, overall they found that self-esteem and self-ratings of attractiveness were lower when participants were instructed to use the images of models to evaluate their own attractiveness.

Cattarin, Thompson, Thomas, and Williams (2000) also studied comparison processes as related to media exposure. They showed appearance and non-appearance television commercials to participants who had been given an instructional set either

encouraging social comparison or leading to distraction from the models in the commercials. They found a “marginally” significant interaction between video and instruction conditions, with participants who were instructed to engage in social comparison having lower body satisfaction.

Overall, comparison studies indicate that appearance comparison, to peers and especially to media images, has an effect on body image outcomes. A common experimental technique used to measure comparison is exposing participants to images designed to invoke comparison in an upward or downward direction. Instructional set has also been manipulated and has shown some effect, though this has been somewhat inconsistent. The current study will likewise involve exposure to comparison images, both upward and downward. However, instead of manipulating instructional set, we will prime the participants’ self-schemas to examine the possible effects of schema-activation on social comparison processes.

#### *Studies Combining Self-schema and Social Comparison*

A few studies have examined both appearance comparison and schemas in body dissatisfaction. For instance, Tiggemann (2001) examined the interaction of person and situational determinants of body dissatisfaction in Australian undergraduate women. Participants were instructed to imagine themselves in 4 different situations which varied on level of body focus and social interaction: walking by attractive people while at the beach in a bathing suit (body focus and social), in a dressing room trying on bathing suits (body focus only), eating with a friend at a cafeteria (social only), and at home getting ready for school (neither body focus nor social). The social situations were hypothesized to induce comparison processing, whereas the body focus conditions were hypothesized

to evoke more general appearance-related processing that did not necessarily involve comparison. The participants rated their body dissatisfaction and body esteem in each condition. They also reported demographic information and completed a measure of social comparison tendency prior to the manipulation. The results showed the expected effect on body dissatisfaction of the body focus situations, as well as a significant 3-way interaction between BMI, social comparison tendency, and condition such that women with high BMI who tended to engage in social comparisons had lower body esteem in the social conditions.

Tiggemann and McGill (2004) conducted a study which investigated the effects of viewing images from fashion magazine ads on mood and body dissatisfaction. In addition they studied the role of several dispositional variables as possible moderators: internalization of sociocultural ideals, dispositional level of appearance comparison, and appearance schematicity. Further, they also studied appearance comparison as a process variable or dependent variable hypothesized to be caused by the experimental manipulations. They exposed participants to one of 3 types of images: full body shots of highly attractive models, shots of body parts that met the sociocultural ideal, or shots of various products. They also manipulated the instructional set given to the participants to induce social comparison, general appearance processing, or distraction from the appearance aspects of the stimuli. Directly after exposure to the photos, participants answered several questions regarding the amount of thought given to their appearance and the amount of comparison in which they engaged. As can be expected from a study with so many variables, their results were complex. Overall, however, they found that exposure to products led to less body dissatisfaction and negative mood than did

exposure to either type of idealized body image. They also found that appearance comparison (as an outcome variable) was increased in the full body and body part conditions compared to the product condition, and that comparison decreased across the instructional set conditions, with social comparison instructions as expected leading to the highest level of appearance comparison, followed by general appearance focus instructions, and control instructions.

Continuing this line of research on media exposure, schematic processing and social comparison, Tiggemann and Slater (2004) conducted a study in which they exposed female college students to 15 minute music video clips with either highly attractive women and a focus on appearance, or with “ordinary-looking” women and non-appearance-related images such as landscape shots. They found that the appearance video condition resulted in higher appearance schema activation, as measured by their schema activation measure, as well as higher body dissatisfaction, whereas they found no differences between the two conditions on mood. They also included comparison as a dependent variable, finding that it was also increased in the idealized appearance condition. Further, they tested social comparison and appearance schema activation as mediators of the relationship between exposure to the appearance music videos and body dissatisfaction. Social comparison was found to be a full mediator of this relationship, although schema activation was not. Thus, the results of their study point to social comparison as the more important variable in women’s reactions to idealized media images.

Birkeland and colleagues’ experiment (2005), mentioned previously, evaluated both social comparison and self-schema theories of body dissatisfaction. The authors

explicitly manipulated schema activation and social comparison to ideal female images in their stimuli consisting of ads from magazines. The four conditions included ads with either an appearance-related product or a non-appearance product, crossed with either images of a model or no images of a model. The authors hypothesized that if schema activation were the predominant mechanism for media-related body image disturbance outcomes, then dissatisfaction would be equivalent in the two (model-present and model-absent) appearance product conditions, with lower dissatisfaction in the non-appearance product conditions. Conversely, if social comparison were the governing process, then the presence or absence of a model in the ads would produce an effect. They found support for the latter hypothesis.

Despite the significance of the studies discussed above, especially those by Birkeland et al. (2005) and by Tiggemann and colleagues (Hargreaves & Tiggemann, 2002a, 2003; Tiggemann & McGill, 2004; Tiggemann & Slater, 2004), further research is needed to investigate the role of both appearance self-schemas and social comparison in the development and maintenance of body dissatisfaction. There are several shortcomings to the previous studies, the remediation of which provides the impetus for the current investigation.

For example, in several studies social comparison and schema-activation manipulations or processes cannot be separated. In the studies of television commercials by Hargreaves and Tiggemann (2002a, 2003), the condition intended to activate participants' schemas involved viewing idealized images of women, resulting in an inability to assess social comparison and non-comparison schema activation as separate effects. Also, in Tiggemann and McGill's (2004) study of magazine ads and Tiggemann

and Slater's (2004) investigation of music television, the mediational measure of comparison consisted of one or two comparison items and an item assessing "appearance processing," which was the extent to which the participant thought about her appearance. As these items were correlated highly ( $r_s = .71$  to  $.85$ ), the authors combined them into one measure of "appearance and comparison processing", effectively conflating the variables of schema-activation and appearance comparison. This is also the case in Altabe and Thompson's (1996) study; the priming stimuli in one of their experiments were pictures of idealized versions of body parts. A clearer distinction between social comparison and appearance priming variables, and between social comparison and appearance schema-activation outcomes, would help to clarify the findings in this area.

In addition, Birkeland and colleagues (2005) used images of appearance products as stimuli they believed would activate schematic processing. However, these stimuli were not piloted to determine the strength of the manipulation. In fact, this is a criticism appropriate for most of the self-schema studies, as few, if any, of the authors validated their priming manipulation. A better test of the self-schema model of body dissatisfaction would include a prime that has been found to be particularly strong, thus providing adequate power to test the hypothesis. Related to this issue, in Birkeland and colleagues' study the "prime" was actually presented simultaneously with the model in the model-present condition. This is not technically a prime in the sense that it did not occur prior to the presentation of the target stimulus or task.

Finally, a number of studies tested only upward comparisons (Birkeland et al., 2005; Hargreaves & Tiggemann, 2002a, 2003; Tiggemann and McGill, 2004). For a complete test of the social comparison model, a downward comparison condition would

need to be included. A downward comparison condition would allow for the evaluation of the strength of the priming effect compared to a comparison effect, as the two variables should have opposing influences on body dissatisfaction in the appearance priming and downward comparison cell.

In summary, it appears that the individual and combined effects of schema activation and social comparison processes on body dissatisfaction have been inadequately addressed in the few studies that have been conducted to date, and the current study was designed to address some of these limitations.

#### *Current Study*

The current study investigated the effects of both social comparison and appearance schema activation on women's body dissatisfaction. The experiment consisted of a 2 X 3 between subjects design. Two levels of schema activation consisted of appearance schema priming and non-appearance schema priming. A unique aspect of this study was the validation of the priming stimulus. The appearance and non-appearance (control) stimuli were tested in a pilot study in order to insure the effectiveness of the manipulation. During the primary study, the schema activation manipulation was followed by the social comparison manipulation. Social comparison was operationalized as exposure to slides containing either images of women who have been judged to meet sociocultural ideals of attractiveness (upward comparison), women who do not meet ideals of attractiveness (downward comparison), or blank slides (no comparison). Dependent variables included state measures of appearance satisfaction, physical fitness dissatisfaction, anger, anxiety, depression, and self-confidence.

#### *Hypotheses*



1. Mean levels of appearance satisfaction and self-confidence will be lower in the appearance prime condition than in the non-appearance prime condition; the reverse will be true for negative mood and dissatisfaction with physical fitness.
2. Mean levels of body appearance satisfaction and self-confidence will be lowest in the upward comparison condition, followed by the no comparison condition, and highest in the downward comparison condition; the reverse will be true for negative mood and dissatisfaction with physical fitness.
3. There will be a significant interaction between prime and comparison such that schema activation will exacerbate the effects of both the downward and upward comparisons. Specifically, we predict that participants given an appearance prime will have lower appearance satisfaction and self-confidence, as well as higher negative mood and dissatisfaction with physical fitness, in the upward comparison condition than participants who are given a non-appearance prime. They will have higher appearance satisfaction and self-confidence, as well as lower negative mood and dissatisfaction with physical fitness, in the downward comparison condition than participants who are given a non-appearance prime. Participants given either a prime only or an upward comparison only will have moderate levels of the outcome variables, whereas those receiving neither appearance priming nor comparison will have levels indicating slightly less distress compared to participants receiving one or the other. Finally, appearance satisfaction and self-confidence will be highest (and negative mood and dissatisfaction with physical fitness lowest) in the downward comparison condition, and this effect

will be even more pronounced among those given an appearance prime compared to those with a non-appearance prime.

## Method and Results

### *Pilot Study 1: Social Comparison Stimuli*

The aim of this pilot study was to select photos that best characterized an upward and a downward comparison.

#### *Method*

*Participants.* An expert panel consisting of 8 members of a body image research lab served as the initial raters of the photos<sup>2</sup>. Subsequently, data were collected from 53 female students between the ages of 18 and 52 at the University of South Florida, recruited from undergraduate psychology courses. The average age of the participants was 21.6, with a standard deviation of 4.9. The mean Body Mass Index (BMI; Keys, Fidanza, Karvoren, Kimura, & Taylor, 1972) was 23.6 ( $SD = 5.25$ ). Nine percent of the participants identified themselves as Asian, 24.5% as Hispanic/Latino, 43.4% as Caucasian, 17% as African-American, and 5.7% as “Other.” The participants received extra credit in their psychology course for participation in the study.

*Materials.* A pool of over 180 images was gathered, chosen from a large number of images that had been collected from a variety of sources, primarily online, including magazines, catalogs, models’ online portfolios, photo banks, and similar websites. The pilot images were selected to include full-body, partial (upper) body, and face shots, at least  $\frac{3}{4}$  frontal orientation. Photos were selected that would represent a variety of racial/ethnic backgrounds in both the upward and downward comparison photos. Pilot

images were compiled into a Powerpoint presentation, which was projected onto a screen using a Proxima projector.

*Measures.* For each photo, participants rated the overall attractiveness level and age of the model, and the undergraduate pilot sample also rated the mood of the model<sup>3</sup> (see Appendix A for sample questions for the undergraduate pilot sample). Space was also provided for comments about each photo. Participants also provided demographic information, including age, race/ethnicity, year in school, height and weight, and other variables to be used in an unrelated study.

*Procedure.* The initial pool of 184 photos was first rated by the expert panel for attractiveness level, age, and appropriateness for use in the study. Of those 184 photos, 108 were selected to be piloted with an undergraduate sample. The undergraduate pilot sample then rated the photos, and a subsample of 8 participants also participated in a focus group in order to identify any problematic aspects of any of the photos and provide other feedback. Of those 108 photos, 20 were selected to be used as the comparison stimuli. The number of images used was chosen based on a meta-analysis of exposure to ideal media images, which showed a trend towards a greater effect with fewer than 11 images (Groesz, Levine, & Murnen, 2002).

The selection of the final sets of photos was conducted in an iterative process. The primary criteria in selecting photos was overall attractiveness ratings of the photos, with the most and least attractively rated photos initially selected for the stimuli sets. Other variables were used in order to match the two stimuli sets, including racial/ethnic

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<sup>2</sup> Not all panel members were available to rate each photo. However, each photo was rated by at least 5 panel members.

make-up (which was also matched to that of the university at which the participants are students), age category and mood, and number of face-only and full-body or torso poses.

### *Results*

Both photo stimuli sets consisted of 10 images, including 5 torso/full body shots and 5 face shots in the upward comparison set, and 6 torso/full body shots and 4 face shots in the downward comparison set. The stimuli sets each included 1 African-American model, 1 Asian-American model, 1 Hispanic/Latina model, and 7 Caucasian models. As can be seen in Table 1, the mean response to the age question for each of the stimuli sets indicated that the photos were rated as being in the 18-25 year-old category. The mean mood was moderately to slightly positive for each set of photos. The differences between the two sets of stimuli on mean ratings of attractiveness, age category, and mood were examined using *t*-tests, which can also be seen in Table 1. There was a significant difference between the upward and downward comparison sets on mean attractiveness, but not on age or mood.

Table 1

*Mean ratings and t-tests of the stimuli sets selected for use in the main study*

	<u><i>M (SD) ratings</i></u>				
	Upward comparison photos	Downward comparison photos	<i>t</i>	<i>df</i>	<i>p</i>
Attractiveness	2.20 (.20)	5.13 (.46)	-18.64	18	.00
Age category	2.14 (.26)	2.22 (.55)	-.46	18	.65
Mood	2.83 (.85)	3.54 (1.04)	-1.67	18	.11

<sup>3</sup> The undergraduate pilot sample also rated the degree of under- or over-weight of the models in the photos, but this information was for another study and was not used in the current study.

### *Pilot Study 2: Priming Manipulation*

As there have been very few studies using body image priming or schema activation stimuli that do not also have a comparison component, another pilot study was conducted to test the appearance prime and its corresponding non-appearance control prime.

#### *Method*

*Participants.* The pilot sample consisted of 98 female students between the ages of 18 and 25 at the University of South Florida, recruited from undergraduate psychology courses. Participants were required to be native English speakers. The mean age of the participants was 21.1 years ( $SD = 1.8$ ). Nineteen percent of the sample identified themselves as African-American/Black, 56% as Caucasian, 9% as Latino/Hispanic, 7% as Asian-American, 1% as Native American, and 7% as “Other.” The average BMI was 23.2 ( $SD = 4.4$ ). The participants received extra credit in their psychology course for participation in the study.

*Materials.* The priming task was adapted from tasks used in previous research (Cash, Fleming, et al., 2002; Tiggemann, 2001), and incorporated recommendations made by Williamson, Stewart, White, and York-Crowe (2002) regarding the types of stimuli that have most consistently been found to provoke biased information-processing, presumably by activating appearance self-schemas. The task asks participants to imagine themselves for 60 seconds in a body image relevant situation that does not involve comparison, or a situation that is not relevant to body image (see Appendix B for instructions given to participants).

*Measures.* The first dependent variable used in the pilot study was a word stem completion task developed by Tiggemann, Hargreaves, Polivy, and McFarlane (2004; WSC). This task was constructed to assess implicitly the activation of appearance schematic processing. It has been used in prior research to assess the schema activating effects of exposure to media images, including television and print media (Tiggemann & McGill, 2004; Tiggemann & Slater, 2004). It consists of 20 word stems that can be completed to form nonappearance terms or appearance-related terms, for instance “SLE\_\_\_” which could become sleep or slender. The word stems were chosen by the authors of the task so that the nonappearance words are more frequent in general usage, such that completion of the stems with appearance words is taken to be indicative of schematic processing. The score on this measure is the number of appearance-related words produced. In previous studies using this measure, it correlated significantly and moderately with measures of general appearance dissatisfaction, body dissatisfaction, and social comparison, and significant differences on the measure were found after exposure to appearance-related stimuli (Hargreaves & Tiggemann, 2002a, 2003; Tiggemann & Slater, 2004).

The bias against appearance completions of the words in the task might have made finding an effect unnecessarily more difficult. To address this issue, additional stems were located that were more even regarding the likelihood that they be completed as an appearance stem. We examined word association norms to locate appearance-related words (Nelson, McEvoy, & Schreiber, 1998). Additional words were also generated by the author. Using stem completion norms by Shaw (1997), the percentage of appearance or body related completions for each new stem was computed. The 45

stems with the highest percentages of appearance related completions were included in the adapted task (see Appendix C for the adapted version of the task). However, in the end the additional stems were not necessary to show an effect (see results below) and so were not analyzed and will not be reported here.

The second dependent variable was the Body Image States Scale (BISS; Cash, Fleming, et al., 2002; see Appendix D). The Body Image States Scale is a 6 item measure of state body dissatisfaction. The items in the scale have a 9-point Likert response format. In previous research (Cash, Fleming, et al., 2002) the BISS has demonstrated adequate reliability, with a 2-3 week test-retest coefficient of .69 and an alpha of .77 in a sample of undergraduate women. It also demonstrated convergent validity, correlating significantly and moderately with trait body image measures, and known groups validity, with significant mean differences between scores for males and females. Additionally, the BISS was found to be sensitive to imaginal manipulations of body image states. In the current study the BISS had a Cronbach's alpha of .85.

Finally, a Visual Analog Scale item was included (VAS; Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999; example appears in Appendix E). Visual Analogue Scales are brief, non-verbal instruments used to evaluate a variety of affective states and conditions. The participants place a vertical mark on a 10 cm horizontal line to indicate their position on the named construct or mood state. Responses are transformed into scores from 0 to 100 by measuring to the nearest millimeter. In prior research (Heinberg & Thompson, 1995) VAS measures of depression, anxiety and anger were found to correlate substantially with the Profile of Mood States-Depression/Dejection, -Tension/Anxiety, and -Anger scales (McNair, Lorr, & Droppleman, 1971). VAS



measures of weight and overall appearance dissatisfaction also correlated highly with scores on the Eating Disorders Inventory – Body Dissatisfaction subscale, a commonly used 7-item index of body image disturbance (Garner, Olmstead, & Polivy, 1983). In the current study, participants completed one VAS item, “Satisfaction with your overall appearance.”

Participants also provided demographic information, including their age, race/ethnicity, height, weight, year in college, and major (see Appendix F for demographic questionnaire). Prior research (Cash, Fleming, et al., 2002) has indicated that answering questions about one’s own appearance, particularly height and weight, can increase anxiety in participants. Therefore, this questionnaire was the last questionnaire administered in the questionnaire packet in order to avoid biasing the study results.

*Procedure.* Participants provided consent and were given a questionnaire packet which contained the imagery instructions and measures. They were read the imagery instructions by the researcher, and then asked to close their eyes and imagine themselves in the given situation for 60 seconds. They completed the rest of the measures in the questionnaire packet and were debriefed.

### *Results*

Cases with missing data on the dependent variables were deleted pairwise (ie, only from analyses which involved those variables). As can be seen in Table 2, there were significant medium to large differences between the appearance and non-appearance prime groups for the WSC and BISS. While the difference was not significant for the VAS item, the trend was in the expected direction, and the effect size (Cohen’s  $d = .31$ ) was between small and medium. The VAS item also correlated .78 with the BISS, which

did show an effect. Given that the main study was to include a pretest VAS item assessing satisfaction with appearance to be used as a covariate, it was decided that the pilot results provided adequate justification to continue with the main study using the manipulation as piloted.

Table 2

*Means (standard deviations) and t-tests for the priming manipulation pilot sample*

	Non-appearance prime: telescope situation	Appearance prime: dressing room situation	<i>t</i>	<i>df</i>	<i>p</i>	Effect Size (Cohen's <i>d</i> )
WSC	3.84 (1.81) <i>n</i> = 45	6.37 (3.44) <i>n</i> = 43	-4.28	62.89 <sup>a</sup>	.00	-.92
VAS	61.68 (18.94) <i>n</i> = 50	55.69 (19.25) <i>n</i> = 45	1.53	93	.13	.31
BISS	33.38 (8.85) <i>n</i> = 53	29.22 (9.25) <i>n</i> = 45	2.27	96	.03	.50

*Note.* WSC = Word Stem Completion task. VAS = Visual Analog Scale. BISS = Body Image States Scale.

<sup>a</sup> *df* adjusted for unequal variances

### *Main Study*

#### *Method*

*Participants.* Participants were again female undergraduate students at the University of South Florida who received extra credit for their participation. The entire sample contained 227 participants, 58% of whom identified themselves as Caucasian, 17% of whom identified themselves as African-American/Black, 11% of whom identified themselves as Latino/Hispanic, 8% of whom identified themselves as Asian-American,

and 7% of whom identified themselves as “Other.” The average age of participants in the sample was 20.47 ( $SD = 1.74$ ), and the average BMI was 23.22 ( $SD = 4.46$ ).

*Materials.* The social comparison stimuli were those that had been selected as a result of pilot testing (see above). For each condition, a Powerpoint presentation was compiled consisting of an initial blank slide followed by 10 slides containing either upward or downward comparison photographs, or no photographs for the control stimuli. The photo stimuli sets contained 5 torso/full body shots and 5 face shots in the upward comparison set, and 6 torso/full body shots and 4 face shots in the downward comparison set. The photo stimuli sets each included 1 African-American model, 1 Asian-American model, 1 Hispanic/Latina model, and 7 Caucasian models. The Powerpoint presentations were set to show each slide for 10 seconds. The presentations were either projected onto a screen using a data projector, or shown on a large television screen connected to a computer.

The priming manipulation used was identical to the one that had been piloted (see above). The task asks participants to imagine themselves for 60 seconds in a body image relevant situation that does not involve social comparison – trying on bathing suits – or a situation that is not relevant to body image – looking through a telescope at the night sky (see Appendix B for instructions given to participants).

*Measures.* Participants completed 6 VAS measures (Depression, Anxiety, Anger, Overall Satisfaction with Appearance, Overall Dissatisfaction with Physical Fitness, and Self-Confidence) at both pretest and posttest (see above for further description of VAS measures). In addition, at posttest the participants completed an additional VAS item, “Intention to diet,” which was intended to be used in exploratory analyses and was not

part of the original study design. This item was not given at pretest because it was believed to be likely to sensitize participants to the purpose of the study, thus acting as a prime and weakening the priming manipulation. VAS measures were selected for the dependent variables instead of standard questionnaire measures in order to reduce the practice effects and pretest sensitization of the repeated measures. Participants completed the VAS measures immediately prior to the priming condition, and again immediately after the comparison condition. The order of the VAS items was varied between participants. Four different random orders of the VAS items were created, and for both the pretest and posttest one of the four orders was randomly selected.

In order to ensure that participants attended to the comparison stimuli, they were tested on the content of the stimuli using an attention check questionnaire (see Appendix G). Feedback from participants made it clear that one of the original 4 questions was confusing. Question asked whether any of the models was wearing a bathing suit, but participants indicated that for the face shots they were unable to tell whether the models wore a bathing suit, a tank top, or some other type of clothing with thin shoulder straps. Therefore, that question was discarded. Only data from those participants who correctly answered all 3 of the remaining questions were used. Participants in the no comparison condition did not complete this questionnaire.

The final questionnaire completed by participants was the demographic questionnaire that was used in the priming pilot study (see Appendix F). The questionnaires were presented in two packets. The first packet included the initial VAS measures and the priming manipulation instructions. The second packet contained the

second set of VAS measures, the attention check questionnaire (except for participants in the no comparison condition), and the demographics questionnaire.

*Procedure.* So as to reduce possible social comparison to other participants, the participants were administered the experiment individually. They were randomly assigned to either the appearance or non-appearance prime manipulation and either the upward, downward, or no comparison conditions. The participants were informed that the study would investigate the effects of imagery and photographic images on peoples' thoughts and feelings. The procedure of the experiment was explained, and participants read and signed consent forms. They completed the first set of VAS items and then were guided through the imagery exercise by the research assistant. The researcher read the imagery exercise instructions to the participant, then directed her to close her eyes and imagine herself in the given situation, stating that she would be told when to open her eyes and stop. After 60 seconds the exercise was ended and the comparison stimuli were shown. Participants were informed that they would be shown a Powerpoint presentation containing 11 slides, with the first slide blank. They were told that they might or might not see photos on the slides, that if they did not have photos they should sit quietly until the presentation was finished, and that if they did have photos they should pay attention to them because they would be asked questions about them afterwards. The photo stimuli Powerpoint presentation was shown, with each photo (or blank slide) appearing for 10 seconds. Participants then completed the second set of VAS measures, the attention check (for the upward and downward conditions), and the demographic questions. Participants were debriefed, asked not to discuss the study with anyone, and then

released. A researcher was available at all times during administration of the experiment to answer any questions.

### *Design and Analyses*

Data from 50 participants were double entered to determine the error rate of data entry. Only 1 error was found, which was considered an acceptable error rate.

The study design was a 2 X 3 MANCOVA, with two levels of priming (control and appearance related) and 3 levels of social comparison (upward target, downward target, and no comparison). Following the suggestion of Rausch, Maxwell, and Kelley (2003) the pretest VAS scores were entered as covariates in order to increase the power of the test. The dependent variables were the overall appearance satisfaction, dissatisfaction with physical fitness, anger, depression, anxiety, and self-confidence posttest VAS measures. A significant omnibus MANCOVA test was followed by a series of ANCOVAs, with follow-up t-tests with a Bonferroni correction.

A separate 2X3 ANOVA was conducted on the Intention to Diet posttest VAS item, as this item was added specifically for exploratory analyses and was not part of the original study design. Additionally, there was no covariate corresponding to the posttest item, as discussed above. A significant main effect was to be followed by posthoc t-tests with a Bonferroni correction.

A power analysis was conducted according to procedures suggested by Cohen (1988) for a between subjects factorial ANOVA. Based on the results of Birkeland and colleagues (2005) and the findings of Groesz, Levine, and Murnen (2002) for between subjects designs, a medium effect size was posited for the comparison main effect. The effect size for the priming condition was found in the pilot study to be small to medium

for the satisfaction with overall appearance VAS item, medium for the body image state measure, and large for the Word Stem Completion task. Given that the main study would also include a pretest appearance satisfaction VAS item to be used as a covariate, the effect size for the priming manipulation was projected to be medium. Effect size for the interaction was also estimated as medium. The minimum sample size for power of .80 for the main effects and interactions in this design was found to be 162 participants, or 27 participants per cell.

### *Results*

Fifteen participants were excluded from analyses because they failed the attention check questionnaire, leaving a final sample of 212 participants. Participant characteristics across condition were examined for equivalence. Means and standard deviations for age and BMI can be found in Table 3, and frequencies for race can be found in Table 4. The conditions were compared on age and BMI using 2 (Priming condition) X 3 (Comparison condition) ANOVAs, which revealed no main effects or interaction among the variables on age. There was a significant main effect of Priming condition for BMI, however, such that participants in the appearance priming condition ( $M = 22.45$ ,  $SD = 4.17$ ) had a significantly lower BMI than those in the nonappearance priming condition ( $M = 23.85$ ,  $SD = 4.42$ ),  $F(1, 205) = 5.68$ ,  $p = .018$ . While this is a significant difference, it is very small, and both groups are well within the normal weight range for BMI. However, the analyses on the dependent variables were run both with and without BMI as an additional covariate to ensure that BMI did not affect the results. The results were nearly identical, and BMI was not a significant covariate. Therefore, the results reported below do not include BMI as a covariate. Finally, Chi-square analysis

was conducted to test the equivalence of race across condition, and no significant differences were found.

Table 3

*Descriptive statistics for age and BMI by condition*

Prime condition	Comparison condition	Age		BMI	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Dressing room	Upward	20.40	1.72	22.13	3.54
	Downward	20.41	1.94	21.60	4.27
	Control	20.66	1.59	23.59	4.51
Telescope	Upward	20.28	1.70	23.68	4.26
	Downward	20.69	1.80	24.01	4.58
	Control	20.64	1.82	23.86	4.53

Table 4

*Descriptive statistics for race by condition*

Prime condition	Comparison condition	African	Asian-	Caucasian	Latino/	Other
		American/ Black	American		Hispanic	
Dressing room	Upward	2 (6%)	5 (14%)	22 (63%)	3 (9%)	3 (9%)
	Downward	5 (15%)	2 (6%)	20 (59%)	3 (9%)	4 (12%)
	Control	2 (6%)	2 (6%)	24 (69%)	5 (14%)	2 (6%)
Telescope	Upward	8 (22%)	2 (6%)	16 (44%)	5 (14%)	5 (14%)
	Downward	6 (17%)	4 (11%)	23 (64%)	3 (8%)	0
	Control	9 (25%)	1 (3%)	21 (58%)	5 (14%)	0

The data were examined following procedures suggested by Stevens (2002) to verify that the assumptions for multivariate analysis of covariance were met. Descriptive information was computed (see Table 5 for descriptive statistics), and distributions of each of the variables in each of the cells were examined for normality and outliers. No extreme outliers were found and no participants were removed from the dataset. Variables were tested for univariate normality, which is generally considered sufficient to satisfy the multivariate normality assumption (Stevens, 2002). Shapiro-Wilks tests and



skewness and kurtosis statistics were examined for each variable in each of the 6 cells (see Table 6), and indicated that the pre and post measures of depression, anger, and anxiety demonstrated significant non-normality. Skew and kurtosis, and platykurtosis in particular, have been noted to affect both the power of MANOVA and Box's test for homogeneity of covariance matrices, which is used to evaluate one of the assumptions of MANOVA. Therefore, square root transformations were performed on these variables, which resulted in distributions that were sufficiently normal to carry out the MANCOVA (see again Table 6). Means and standard deviations of the transformed variables can be seen in Table 5.

Table 5

*Descriptive statistics for pretest and posttest VAS items*

	<i>N</i>	Minimum	Maximum	<i>M</i>	<i>SD</i>
Pre Satisfaction with Appearance	212	1.00	100.00	56.37	21.07
Post Satisfaction with Appearance	212	.00	100.00	57.38	23.17
Pre Dissatisfaction with Fitness	212	.00	100.00	47.19	26.16
Post Dissatisfaction with Fitness	212	.00	100.00	46.76	26.72
Pre Depression	212	.00	99.00	20.24	21.08
Sqrt Pre Depression	212	.00	9.95	3.75	2.50
Post Depression	212	.00	94.00	18.98	20.90
Sqrt Post Depression	212	.00	9.70	3.57	2.50
Pre Anxiety	212	.00	100.00	35.50	24.82
Sqrt Pre Anxiety	212	.00	10.00	5.43	2.47
Post Anxiety	212	.00	100.00	28.74	24.55

Table 5 (Continued).

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	<i>N</i>	Minimum	Maximum	<i>M</i>	<i>SD</i>
Sqrt Post Anxiety	212	.00	10.00	4.69	2.61
Pre Self-Confidence	212	6.00	100.00	63.68	20.08
Post Self-Confidence	212	.00	100.00	60.38	22.39
Pre Anger	212	.00	100.00	15.24	19.84
Sqrt Pre Anger	212	.00	10.00	3.03	2.47
Post Anger	212	.00	85.00	15.62	19.91
Sqrt Post Anger	212	.00	9.22	3.09	2.47
Post Intention to Diet	209	.00	99.00	41.86	30.91

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Table 6

*Normality tests for original and transformed variables*

<u>Condition</u>				<u>Skewness</u>		<u>Kurtosis</u>		<u>Kolmogorov-Smirnov</u>			<u>Shapiro-Wilk</u>		
Prime	Comparison	Dependent variable	<i>n</i>	Statistic	<i>SE</i>	Statistic	<i>SE</i>	Statistic	<i>df</i>	<i>p</i>	Statistic	<i>df</i>	<i>p</i>
Dressing room	Upward	Pre Satisfaction with Appearance	35	-.691	.398	-.400	.778	.162	35	.020	.932	35	.033
		Post Satisfaction with Appearance	35	-.522	.398	-.588	.778	.091	35	.200	.940	35	.057
		Pre Dissatisfaction with Fitness	35	.186	.398	-1.015	.778	.135	35	.107	.950	35	.110
		Post Dissatisfaction with Fitness	35	.087	.398	-1.282	.778	.121	35	.200	.932	35	.033
		Pre Depression	35	1.293	.398	.720	.778	.198	35	.001	.820	35	.000
		Sqrt Pre Depression	35	.298	.398	-.661	.778	.089	35	.200	.950	35	.116
		Post Depression	35	1.301	.398	.998	.778	.201	35	.001	.848	35	.000
		Sqrt Post Depression	35	.211	.398	-.534	.778	.092	35	.200	.967	35	.372
		Pre Anxiety	35	.883	.398	.990	.778	.157	35	.028	.916	35	.011
		Sqrt Pre Anxiety	35	.022	.398	-.152	.778	.148	35	.051	.966	35	.343
		Post Anxiety	35	.876	.398	-.152	.778	.219	35	.000	.863	35	.000
		Sqrt Post Anxiety	35	.366	.398	-1.175	.778	.181	35	.005	.922	35	.016
		Pre Self-Confidence	35	-1.092	.398	.690	.778	.155	35	.032	.900	35	.004
		Post Self-Confidence	35	-.434	.398	-.669	.778	.132	35	.126	.958	35	.197
		Pre Anger	35	1.636	.398	2.127	.778	.238	35	.000	.778	35	.000
		Sqrt Pre Anger	35	.562	.398	-.488	.778	.119	35	.200	.935	35	.039
		Post Anger	35	1.351	.398	.709	.778	.208	35	.001	.801	35	.000
Sqrt Post Anger	35	.402	.398	-.606	.778	.088	35	.200	.945	35	.080		
		Post Intention to Diet	34	.042	.403	-1.344	.788	.138	34	.099	.928	34	.027

Table 6 (Continued).

<u>Condition</u>				<u>Skewness</u>		<u>Kurtosis</u>		<u>Kolmogorov-Smirnov</u>			<u>Shapiro-Wilk</u>		
Prime	Comparison	Dependent variable	<i>n</i>	Statistic	<i>SE</i>	Statistic	<i>SE</i>	Statistic	<i>df</i>	<i>p</i>	Statistic	<i>df</i>	<i>p</i>
	Downward	Pre Satisfaction with Appearance	34	-.323	.403	-.667	.788	.125	34	.197	.966	34	.366
		Post Satisfaction with Appearance	34	-.434	.403	-.389	.788	.096	34	.200	.969	34	.430
		Pre Dissatisfaction with Fitness	34	.201	.403	-1.165	.788	.135	34	.122	.941	34	.067
		Post Dissatisfaction with Fitness	34	.515	.403	-.668	.788	.127	34	.185	.950	34	.123
		Pre Depression	34	1.384	.403	1.505	.788	.173	34	.012	.838	34	.000
		Sqrt Pre Depression	34	.120	.403	-.698	.788	.126	34	.192	.940	34	.060
		Post Depression	34	.905	.403	.064	.788	.162	34	.024	.880	34	.001
		Sqrt Post Depression	34	.031	.403	-1.201	.788	.108	34	.200	.938	34	.056
		Pre Anxiety	34	.474	.403	-.908	.788	.135	34	.118	.925	34	.023
		Sqrt Pre Anxiety	34	-.344	.403	-.656	.788	.085	34	.200	.960	34	.246
		Post Anxiety	34	.760	.403	-.436	.788	.163	34	.023	.905	34	.006
		Sqrt Post Anxiety	34	-.028	.403	-.953	.788	.102	34	.200	.969	34	.430
		Pre Self-Confidence	34	-.573	.403	.071	.788	.077	34	.200	.972	34	.515
		Post Self-Confidence	34	-.077	.403	.173	.788	.112	34	.200	.964	34	.307
		Pre Anger	34	1.727	.403	2.610	.788	.247	34	.000	.743	34	.000
		Sqrt Pre Anger	34	.727	.403	-.555	.788	.158	34	.032	.890	34	.003
		Post Anger	34	1.370	.403	.925	.788	.224	34	.000	.788	34	.000
		Sqrt Post Anger	34	.449	.403	-.919	.788	.140	34	.087	.910	34	.008
		Post Intention to Diet	33	.125	.409	-1.338	.798	.123	33	.200	.916	33	.014

Table 6 (Continued).

<u>Condition</u>				<u>Skewness</u>		<u>Kurtosis</u>		<u>Kolmogorov-Smirnov</u>			<u>Shapiro-Wilk</u>		
Prime	Comparison	Dependent variable	<i>n</i>	Statistic	<i>SE</i>	Statistic	<i>SE</i>	Statistic	<i>df</i>	<i>p</i>	Statistic	<i>df</i>	<i>p</i>
	Control	Pre Satisfaction with Appearance	35	-.579	.398	-.088	.778	.098	35	.200	.956	35	.179
		Post Satisfaction with Appearance	35	-.370	.398	-.643	.778	.137	35	.096	.958	35	.203
		Pre Dissatisfaction with Fitness	35	.371	.398	-.978	.778	.111	35	.200	.946	35	.086
		Post Dissatisfaction with Fitness	35	.328	.398	-.973	.778	.093	35	.200	.949	35	.103
		Pre Depression	35	1.415	.398	1.809	.778	.177	35	.007	.844	35	.000
		Sqrt Pre Depression	35	.111	.398	-.779	.778	.166	35	.016	.929	35	.027
		Post Depression	35	1.756	.398	2.585	.778	.215	35	.000	.766	35	.000
		Sqrt Post Depression	35	.506	.398	-.358	.778	.123	35	.197	.929	35	.027
		Pre Anxiety	35	.197	.398	-1.338	.778	.120	35	.200	.919	35	.013
		Sqrt Pre Anxiety	35	-.507	.398	-.984	.778	.138	35	.091	.911	35	.008
		Post Anxiety	35	.339	.398	-1.187	.778	.145	35	.061	.905	35	.005
		Sqrt Post Anxiety	35	-.319	.398	-1.360	.778	.137	35	.092	.897	35	.003
		Pre Self-Confidence	35	-.875	.398	.496	.778	.120	35	.200	.936	35	.044
		Post Self-Confidence	35	-.515	.398	-.476	.778	.123	35	.196	.956	35	.175
		Pre Anger	35	1.442	.398	.880	.778	.245	35	.000	.758	35	.000
		Sqrt Pre Anger	35	.571	.398	-.721	.778	.131	35	.133	.904	35	.005
		Post Anger	35	1.810	.398	2.342	.778	.235	35	.000	.717	35	.000
		Sqrt Post Anger	35	.725	.398	-.162	.778	.121	35	.200	.908	35	.006
		Post Intention to Diet	34	-.236	.403	-1.333	.788	.153	34	.043	.905	34	.006

Table 6 (Continued).

<u>Condition</u>				<u>Skewness</u>		<u>Kurtosis</u>		<u>Kolmogorov-Smirnov</u>			<u>Shapiro-Wilk</u>		
Prime	Comparison	Dependent variable	<i>n</i>	Statistic	<i>SE</i>	Statistic	<i>SE</i>	Statistic	<i>df</i>	<i>p</i>	Statistic	<i>df</i>	<i>p</i>
Telescope	Upward	Pre Satisfaction with Appearance	36	-.237	.393	-.815	.768	.150	36	.039	.966	36	.337
		Post Satisfaction with Appearance	36	-.376	.393	-.481	.768	.122	36	.199	.966	36	.321
		Pre Dissatisfaction with Fitness	36	-.022	.393	-1.146	.768	.123	36	.185	.956	36	.160
		Post Dissatisfaction with Fitness	36	.015	.393	-.719	.768	.116	36	.200	.973	36	.527
		Pre Depression	36	.760	.393	-.576	.768	.176	36	.006	.877	36	.001
		Sqrt Pre Depression	36	-.028	.393	-1.239	.768	.116	36	.200	.930	36	.025
		Post Depression	36	.897	.393	-.722	.768	.224	36	.000	.803	36	.000
		Sqrt Post Depression	36	.298	.393	-1.359	.768	.131	36	.120	.892	36	.002
		Pre Anxiety	36	.395	.393	-1.296	.768	.144	36	.058	.907	36	.005
		Sqrt Pre Anxiety	36	-.260	.393	-.974	.768	.114	36	.200	.950	36	.104
		Post Anxiety	36	.793	.393	-.691	.768	.187	36	.003	.867	36	.000
		Sqrt Post Anxiety	36	.062	.393	-1.174	.768	.079	36	.200	.945	36	.075
		Pre Self-Confidence	36	-.236	.393	-.421	.768	.071	36	.200	.983	36	.827
		Post Self-Confidence	36	-.458	.393	-.293	.768	.096	36	.200	.967	36	.350
		Pre Anger	36	1.440	.393	1.153	.768	.229	36	.000	.771	36	.000
		Sqrt Pre Anger	36	.571	.393	-.797	.768	.136	36	.091	.907	36	.005
		Post Anger	36	1.395	.393	.860	.768	.255	36	.000	.761	36	.000
		Sqrt Post Anger	36	.596	.393	-.903	.768	.159	36	.022	.883	36	.001
		Post Intention to Diet	35	.142	.393	-1.428	.768	.154	36	.031	.907	36	.005

Table 6 (Continued).

<u>Condition</u>				<u>Skewness</u>		<u>Kurtosis</u>		<u>Kolmogorov-Smirnov</u>			<u>Shapiro-Wilk</u>		
Prime	Comparison	Dependent variable	<i>n</i>	Statistic	<i>SE</i>	Statistic	<i>SE</i>	Statistic	<i>df</i>	<i>p</i>	Statistic	<i>df</i>	<i>p</i>
	Downward	Pre Satisfaction with Appearance	36	-.096	.393	-.976	.768	.109	36	.200	.963	36	.274
		Post Satisfaction with Appearance	36	-.556	.393	-.107	.768	.095	36	.200	.954	36	.144
		Pre Dissatisfaction with Fitness	36	-.186	.393	-.981	.768	.125	36	.168	.953	36	.133
		Post Dissatisfaction with Fitness	36	.036	.393	-.842	.768	.096	36	.200	.966	36	.337
		Pre Depression	36	1.812	.393	3.514	.768	.264	36	.000	.795	36	.000
		Sqrt Pre Depression	36	.571	.393	.086	.768	.175	36	.007	.960	36	.217
		Post Depression	36	2.563	.393	7.873	.768	.208	36	.000	.725	36	.000
		Sqrt Post Depression	36	.698	.393	1.492	.768	.124	36	.174	.946	36	.081
		Pre Anxiety	36	.217	.393	-.777	.768	.080	36	.200	.973	36	.518
		Sqrt Pre Anxiety	36	-.702	.393	.441	.768	.123	36	.183	.961	36	.233
		Post Anxiety	36	.702	.393	-.295	.768	.179	36	.005	.918	36	.011
		Sqrt Post Anxiety	36	-.049	.393	-.895	.768	.118	36	.200	.972	36	.494
		Pre Self-Confidence	36	-.276	.393	-.664	.768	.092	36	.200	.965	36	.304
		Post Self-Confidence	36	-.149	.393	-1.294	.768	.140	36	.073	.939	36	.047
		Pre Anger	36	3.638	.393	17.219	.768	.226	36	.000	.629	36	.000
		Sqrt Pre Anger	36	.885	.393	2.465	.768	.115	36	.200	.921	36	.014
		Post Anger	36	2.648	.393	7.841	.768	.280	36	.000	.679	36	.000
		Sqrt Post Anger	36	.903	.393	1.196	.768	.152	36	.035	.925	36	.018
		Post Intention to Diet	36	.174	.393	-1.422	.768	.138	36	.082	.909	36	.006

Table 6 (Continued).

<u>Condition</u>				<u>Skewness</u>		<u>Kurtosis</u>		<u>Kolmogorov-Smirnov</u>			<u>Shapiro-Wilk</u>		
Prime	Comparison	Dependent variable	<i>n</i>	Statistic	<i>SE</i>	Statistic	<i>SE</i>	Statistic	<i>df</i>	<i>p</i>	Statistic	<i>df</i>	<i>p</i>
	Control	Pre Satisfaction with Appearance	36	-.353	.393	-.323	.768	.109	36	.200	.976	36	.596
		Post Satisfaction with Appearance	36	-.184	.393	-.585	.768	.080	36	.200	.968	36	.379
		Pre Dissatisfaction with Fitness	36	-.001	.393	-.838	.768	.109	36	.200	.976	36	.595
		Post Dissatisfaction with Fitness	36	-.211	.393	-1.004	.768	.094	36	.200	.958	36	.190
		Pre Depression	36	1.256	.393	1.114	.768	.162	36	.018	.869	36	.001
		Sqrt Pre Depression	36	.138	.393	-.400	.768	.099	36	.200	.975	36	.566
		Post Depression	36	1.504	.393	1.991	.768	.172	36	.009	.833	36	.000
		Sqrt Post Depression	36	.240	.393	-.412	.768	.078	36	.200	.962	36	.250
		Pre Anxiety	36	.192	.393	-.556	.768	.117	36	.200	.955	36	.147
		Sqrt Pre Anxiety	36	-.711	.393	-.225	.768	.152	36	.034	.932	36	.030
		Post Anxiety	36	.191	.393	-1.131	.768	.121	36	.200	.947	36	.086
		Sqrt Post Anxiety	36	-.734	.393	-.054	.768	.105	36	.200	.928	36	.022
		Pre Self-Confidence	36	-.592	.393	-.142	.768	.124	36	.174	.949	36	.097
		Post Self-Confidence	36	-.417	.393	-.174	.768	.086	36	.200	.965	36	.295
		Pre Anger	36	1.511	.393	1.467	.768	.211	36	.000	.787	36	.000
		Sqrt Pre Anger	36	.512	.393	-.520	.768	.113	36	.200	.943	36	.062
		Post Anger	36	1.576	.393	1.687	.768	.203	36	.001	.781	36	.000
		Sqrt Post Anger	36	.496	.393	-.403	.768	.089	36	.200	.945	36	.072
		Post Intention to Diet	36	.193	.393	-1.051	.768	.129	36	.135	.935	36	.035



In order to ensure that a multivariate approach was appropriate, the correlations between the dependent variables were examined, and can be seen in Table 7. In general, the correlations are small to medium, with Self-Confidence and Satisfaction with Appearance slightly higher than the others. Overall, however, the pattern of mostly small to medium correlations among the variables makes the use of MANOVA appropriate.

Table 7

*Correlations among the dependent variables*

	Post Satisfaction with Appearance	Post Dissatisfaction with Fitness	Sqrt Post Depression	Sqrt Post Anxiety	Post Self-Confidence	Sqrt Post Anger
Post Satisfaction with Appearance	-					
Post Dissatisfaction with Fitness	-.543**	-				
Sqrt Post Depression	-.275**	.330**	-			
Sqrt Post Anxiety	-.180**	.147*	.557**	-		
Post Self-Confidence	.645**	-.527**	-.351**	-.255**	-	
Sqrt Post Anger	-.209**	.191**	.671**	.563**	-.260**	-

*Note.*  $N = 212$

\*  $p < .05$ . \*\*  $p < .01$ .

Assumptions for analysis of covariance were also examined and verified. The pretest covariates were found to be significantly correlated with the posttest dependent variables (see Table 8). The assumption of homogeneity of regression planes was evaluated by conducting a MANOVA in which the interactions between the covariates and the independent variables were treated as an effect. The interactions were not significant (Wilks' Lambda = .3341; approximate  $F(180, 981.65) = 1.114, p = .16$ ),

suggesting that the assumption of homogeneity of regression planes was not violated. Finally, Box's test of the equality of the covariance matrices was nonsignificant,  $F(105, 67935.53) = 1.090, p = .25$ , indicating that the pattern of variances and covariances did not differ across groups.

Table 8

*Correlations among the pretest covariates and posttest dependent variables.*

<u>Posttest Measures</u>	<u>Pretest Measures</u>					
	Satisfaction with Appearance	Dis-satisfaction with Fitness	Sqrt Depression	Sqrt Anxiety	Self-Confidence	Sqrt Anger
Satisfaction with Appearance	.656**	-.462**	-.180**	-.085	.485**	.004
Dissatisfaction with Fitness	-.456**	.811**	.290**	.147*	-.414**	.006
Sqrt Depression	-.314**	.215**	.825**	.485**	-.325**	.530**
Sqrt Anxiety	-.140*	.102	.484**	.790**	-.221**	.457**
Self-Confidence	.594**	-.479**	-.274**	-.231**	.799**	-.084
Sqrt Anger	-.192**	.138*	.584**	.467**	-.223**	.748**

*Note.*  $N = 212$

\*  $p < .05$ . \*\*  $p < .01$ .

A multivariate analysis of covariance was then conducted, with the 6 pretest covariates, Comparison condition, Prime condition, and their interaction as independent variables, and the 6 posttest measures as dependent variables. The multivariate tests indicated that each of the covariates contributed significantly to the model (see Table 9). In addition, there was a significant main effect of type of comparison (Wilks' Lambda = .839,  $F(12, 390) = 2.99, p = .001$ , partial  $\eta^2 = .08$ ). However, neither the prime main effect nor the interaction between prime and comparison were significant.

Table 9

*Multivariate tests*

Effect	Wilks' Lambda	<i>F</i>	Hypothesis <i>df</i>	Error <i>df</i>	<i>p</i>	Partial $\eta^2$
Intercept	.897	3.74	6	195	.002	.10
Pre Appearance Satisfaction	.712	13.12	6	195	.000	.29
Pre Dissatisfaction with Fitness	.428	43.44	6	195	.000	.57
Sqrt Pre Depression	.491	33.70	6	195	.000	.51
Sqrt Pre Anxiety	.480	35.26	6	195	.000	.52
Pre Self-Confidence	.526	29.29	6	195	.000	.47
Sqrt Pre Anger	.584	23.11	6	195	.000	.42
Prime	.961	1.31	6	195	.255	.04
Comparison	.839	2.99	12	390	.001	.08
Prime * Comparison	.933	1.14	12	390	.326	.03

Follow up univariate ANCOVAs adjusting for pretest covariates were conducted to determine which of the dependent variables contributed to the multivariate effect. As can be seen in Table 10, there was a significant difference across Comparison condition for Satisfaction with Appearance,  $F(2, 200) = 11.42, p < .001$ , partial  $\eta^2 = .10$ , and for Self-Confidence,  $F(2,200) = 9.64, p < .001$ , partial  $\eta^2 = .09$ . The adjusted means, standard errors, and confidence intervals for all the dependent variables by Comparison condition appear in Table 11.

Table 10

*Univariate ANCOVA results*

Dependent Variable	<i>df</i>	F	<i>p</i>	Partial $\eta^2$
Post Satisfaction with Appearance	2	11.421	.000	.103
Post Dissatisfaction with Fitness	2	1.959	.144	.019
Sqrt Post Depression	2	.993	.372	.010
Sqrt Post Anxiety	2	1.768	.173	.017
Post Self-Confidence	2	9.641	.000	.088
Sqrt Post Anger	2	1.626	.199	.016

Table 11

*Adjusted means of dependent variables for Comparison conditions*

Dependent variable	Comparison condition	$M^a$	$SE$	95% Confidence Interval	
				Lower Bound	Upper Bound
Post Satisfaction with Appearance	Upward	52.071	1.924	48.277	55.865
	Downward	64.657	1.933	60.845	68.470
	Control	55.397	1.925	51.601	59.192
Post Dissatisfaction with Fitness	Upward	48.421	1.811	44.849	51.993
	Downward	43.823	1.820	40.234	47.413
	Control	48.007	1.812	44.434	51.580
Sqrt Post Depression	Upward	3.749	.161	3.432	4.066
	Downward	3.533	.162	3.214	3.851
Sqrt Post Anxiety	Upward	4.690	.187	4.320	5.059
	Downward	4.438	.188	4.067	4.809
	Control	4.937	.187	4.568	5.307
Post Self-Confidence	Upward	56.920	1.473	54.014	59.825
	Downward	65.597	1.481	62.677	68.516
	Control	58.668	1.474	55.762	61.575
Sqrt Post Anger	Upward	3.281	.184	2.917	3.644
	Downward	2.824	.185	2.459	3.190
	Control	3.155	.184	2.792	3.519

<sup>a</sup> Evaluated at covariates appeared in the model: Pre Satisfaction with Appearance = 56.3726, Pre Dissatisfaction with Fitness = 47.1887, Sqrt Pre Depression = 3.7459, Sqrt Pre Anxiety = 5.4270, Pre Self-Confidence = 63.6840, Sqrt Pre Anger = 3.0310.

The univariate analyses were followed by pairwise comparisons of the Comparison groups for Satisfaction with Appearance and Self-Confidence. A Bonferroni correction was applied, such that the significance level criterion was set to  $\alpha = .05/6 = .008$ , in order to control experiment-wise error. The pairwise comparisons on Satisfaction with Appearance and Self-Confidence appear in Table 12, and indicate that for both variables the Upward and Downward conditions differed significantly, as did the Downward and Control conditions, but that there was not a significant difference between the Upward and Control conditions.

Table 12

*Pairwise comparisons across comparison condition*

Comparison condition	Comparison condition	Mean difference	SE	p
<u>Post Satisfaction with Appearance</u>				
Upward	Downward	-12.586*	2.729	.000
Upward	Control	-3.325	2.731	.225
Downward	Control	9.261*	2.731	.001
<u>Post Self-Confidence</u>				
Upward	Downward	-8.677*	2.090	.000
Upward	Control	-1.749	2.091	.404
Downward	Control	6.929*	2.091	.001

*Note.* Based on estimated marginal means.

\* The mean difference is significant at the  $p < .008$  level.

As mentioned above, the Intention to Diet item was analyzed separately because its inclusion was highly exploratory. The distribution of this item was examined for outliers and extreme skewness and kurtosis, and no problems were found. However, three participants failed to provide answers to the posttest Intention to Diet VAS item. Since these participants answered all the other items, the three cases with missing data on Intention to Diet were deleted from the analysis on this item only.

The univariate ANOVA with Intent to Diet had nonsignificant main effects for prime condition,  $F(1,203) = .52, p = .47$ , partial  $\eta^2 = .003$ , for comparison condition,  $F(2,203) = .43, p = .65$ , partial  $\eta^2 = .004$ , and for their interaction,  $F(2,203) = .18, p = .83$ , partial  $\eta^2 = .002$ .

## Discussion

The results of the current study provided mixed support for the hypotheses. It was hypothesized that there would be an effect of comparison condition on mood and body image, with participants who viewed the photos of highly attractive women showing the lowest satisfaction with their appearance and most negative mood, participants who viewed the photos rated as highly unattractive being most satisfied and have the lowest levels of negative mood, and the blank slide control condition being in the middle of these two extremes. A significant main effect for priming condition was also hypothesized. It was expected that participants who underwent the appearance-related imagery prime would show lower satisfaction and more negative mood. Further, an interaction between comparison condition and priming condition was hypothesized. We proposed that participants who imagined themselves in a dressing room trying on bathing suits and who then viewed photos of highly attractive women would have the highest levels of body dissatisfaction and affective distress. However, participants given the same appearance prime but who then viewed photos of not-attractive women were expected to have the lowest levels of body image disturbance and negative mood. Participants in the other conditions we expected to fall somewhere between these two conditions on the dependent variables.

There was in fact an effect of comparison condition on both overall satisfaction with appearance and self-confidence. The pattern of means indicated that for both



dependent variables, the downward comparison condition resulted in a better outcome, i.e. greater satisfaction and self-confidence, compared to both the upward comparison condition and the blank slide control condition. The difference between the downward and upward comparison conditions is in agreement with the well-established finding that viewing media images of highly attractive women causes increases in body dissatisfaction compared to viewing less attractive women (Groesz, Levine, & Murnen, 2002). However, the upward comparison and control conditions did not differ significantly in the current investigation. This is an interesting result given the review and meta-analysis of media exposure studies conducted by Groesz et al. (2002), which found an effect of viewing ideal images. However, there are other studies that also found no difference between ideal images and control (no model) images (Stice & Shaw, 1994).

One possible, though perhaps unlikely, explanation for the findings here is that the effect found in the literature is not in fact due to the upward comparison condition resulting in increased distress, but to the downward comparison condition resulting in decreased distress. However, the findings of numerous studies in which increases in body dissatisfaction and negative affect after exposure to ideal images were found (Cattarin, Thompson, Thomas, & Williams, 2000; Heinberg & Thompson, 1995; Thornton & Maurice, 1997) would argue against this interpretation.

Motive for social comparison may help explain the variability in the outcomes of social comparison studies such as the current investigation. Some researchers have proposed that if individuals are comparing themselves to ideal images in order to evaluate their own appearance, as is assumed in most social comparison and media exposure studies, then the likely outcome is decreased satisfaction. However, if an individual's

motive for comparing is self-improvement, perhaps using the thin media images as models or goals, then the expected result is no decrease in satisfaction and perhaps even increased satisfaction (Martin & Gentry, 1997). Several studies (Mills, Polivy, Herman, & Tiggemann, 2002; Joshi, Herman, & Polivy, 2004) have found support for this hypothesis by examining exposure to thin-ideal images in restrained eaters, who are more likely to have a self-improvement motive, and unrestrained eaters. Restrained eaters were unaffected by exposure to ideal images, whereas unrestrained eaters showed decreased satisfaction. Halliwell and Dittmar (in press) experimentally manipulated social comparison motive, as was done by Martin & Gentry (1997), and confirmed that self-improvement-motivated comparison to thin media images led to no change in appearance anxiety. While there may be a significant overall negative effect of viewing thin media images, the current findings, in the context of the above studies, suggest that motive for social comparison might be an important variable to include in future social comparison and media exposure studies.

As regards the priming manipulation, the lack of a significant priming effect in the current study is disappointing. This finding is in agreement with the results reported by Birkeland et al. (2005), who did not find that images of beauty products led to any more body image or mood disturbance than images of everyday household products. However, it was hoped that by developing and piloting a stronger prime than was used by Birkeland et al., activation of participants' appearance-related self-schemata might be achieved. Unfortunately, the data did not support this. There was no difference on any of the dependent variables between those participants who were given the appearance prime and those who were given the non-appearance prime.

There are several possible explanations for this result. First, of course, is the possibility that appearance self-schemata do not in fact exist, and thus were not primed by the imagery exercise, resulting in no difference between the two priming conditions. However, the substantial literature showing information processing biases (Williamson, 1996; Williamson, Muller, Reas, & Thaw, 1999) makes this explanation unlikely. Alternatively, it could be that the imagery manipulation was not in fact an effective enough prime to activate participants' appearance self-schemata. However, the clearly significant results obtained on the BISS and the Word Stem Completion task in the pilot study argue against this explanation.

One possibility is that the lack of an effect is due to the choice of dependent variables, the VAS measures of body image and mood. These measures may not be sensitive enough to detect the effect. Or it may be that conducting a multivariate analysis reduced power. This may be the case if the effect of the prime was confined to body image outcomes only (Stevens, 2002). Lavin and Cash (2000) found that having participants listen to information regarding appearance stereotyping, for instance, affected body image but not mood outcomes. On the other hand, one of the three studies by Altabe and Thompson (1996) showed an effect of appearance priming on mood but not on body image. The priming manipulation in the current study was piloted with only body dissatisfaction measures as outcome variables, so we conducted an additional exploratory analysis of the main study data using only the overall satisfaction and physical appearance dissatisfaction VAS's. In this analysis there was an appearance-priming effect for overall satisfaction with appearance. Of course, this is post hoc and informed by the data, so this finding must be verified in a separate study. It would be

beneficial to include dependent variables other than just appearance satisfaction in such a study. It might also be advisable in future studies to group the mood and body image variables separately and conduct separate analyses.

Future studies might also include an even stronger priming manipulation, or at least a prime that is detected by VAS measures. Currently VAS measures of appearance and body dissatisfaction are the least likely to in themselves prime self-schemas, and so are better suited to a priming study than other measures of body image. It would appear that any prime which will be used in a single session pretest-posttest study will likely be assessed with VAS items, so it is important to test a prime which is clearly detected by VAS items. In addition to developing an even stronger priming manipulation, researchers might also develop several different VAS items which assess body dissatisfaction. These items could then be summed them to form a composite, which may be more reliable and perhaps more sensitive to priming.

Another potential explanation of the lack of a priming effect is that the priming may be very short-lived and have degraded substantially during the time that the photos or blank slides were shown. It might be helpful to test the effect of the priming manipulation across time in future pilot studies, perhaps with a distracter task in between assessments. Alternatively, we could have included the Word Stem Completion task as an additional dependent variable in the main study to assess whether participants were primed at the same level after the social comparison condition as participants in the pilot study were immediately after the manipulation.

One additional issue that was not addressed in the current study is that of possible moderators of the priming effect. Most of the studies of information processing biases

involved comparisons between groups scoring high and low on eating or body image related measures. For example, Fuller, Williamson, and Anderson (1995) found differences on a lexical decision task between participants with higher and lower body dissatisfaction. Jones-Chesters, Monsell, and Cooper (1998) demonstrated differences between eating disordered and non-eating disordered groups on a modified Stroop test, while Tantleff-Dunn and Thompson (1998) found that participants with higher body anxiety interpreted videotaped scenarios of ambiguous feedback regarding appearance more negatively than those with lower body anxiety. In addition, several studies included dispositional level of appearance schematicity or another cognitive body image related variable as a moderator of a priming or media exposure effect. Cash, for example, has conducted several studies in which a priming effect was found in all groups, but was also found to be strongest for participants with higher levels of pre-existing appearance schematicity (Cash, Fleming et al., 2002; Labarge, Cash, & Brown, 1998; Lavin & Cash, 2001).

Since simply assessing participants' dispositional levels of body dissatisfaction, appearance schematicity, or internalization of sociocultural appearance norms would in itself most likely have primed appearance self-schemas, we did not include these variables in the current investigation. However, future studies of appearance priming and social comparison might assess body image related dispositional characteristics in such a way as to not prime the participants' appearance self-schemata, whether that be by burying the relevant questionnaire among many others, conducting a longitudinal study in which Time 1 measures include dispositional variables but the priming manipulation does not occur until later, or some other technique.

Intention to Diet at posttest was a highly exploratory analysis, so its results should be taken with caution. The finding of no main effects or interactions could be due to a variety of design issues, including low power due to the fact that there was no pretest covariate for this measure. The suggestions above regarding pretest assessment of dispositional characteristics also are relevant here. Using a more complete measure of eating behaviors would also strengthen future research. In general, further investigation of the behavioral consequences of exposure to upward or downward comparison targets would be a useful addition to the literature on the cognitive and affective outcomes of comparison.

Overall the results of the current study support previous research that has not found an effect of priming on body image disturbance, when compared with viewing idealized images of women (Birkeland et al., 2005). If future studies also replicate this result, then it would appear that viewing idealized images is a much more powerful influence on body image than is simply priming appearance self-schemas. The social comparison results are in agreement with the substantial literature showing the important role of social comparison in body dissatisfaction (Cattarin, Thompson, Thomas, & Williams, 2000; Martin & Gentry, 1997; Stormer and Thompson, 1996; van den Berg, Thompson, Obremski-Brandon, and Coovert, 2002).

In addition to the weaknesses discussed above, the current study also possessed several characteristics that contributed to its strength. Primary among these is the piloting of the priming manipulation, which suggested that the imagery exercise was a significant and, for the Word Stem Completion task, a potent activator of participants' self-schemas. Also, the inclusion of a downward comparison condition allowed for a

more complete test of the social comparison theory of body dissatisfaction. The adequate sample size adds to validity of the results as well.

In summary, the current study suggests that viewing idealized images of women leads to a greater level of body dissatisfaction than viewing images of less attractive women. In the context of this study, priming of appearance schemas does not appear to be a significant cause of mood or body image disturbance. Modifications to the design and the conduct of additional studies would help to further explain these findings and lead to greater understanding of the role of appearance self-schemas and social comparison in body dissatisfaction in women.

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## Appendices

Appendix A: Sample items from Stimuli Rating Questionnaire

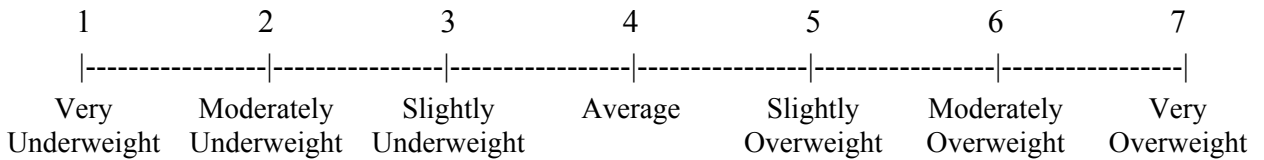
**DIRECTIONS:**

For each photo please complete the corresponding set of questions. Use the scales below indicate your answer by circling the correct number.

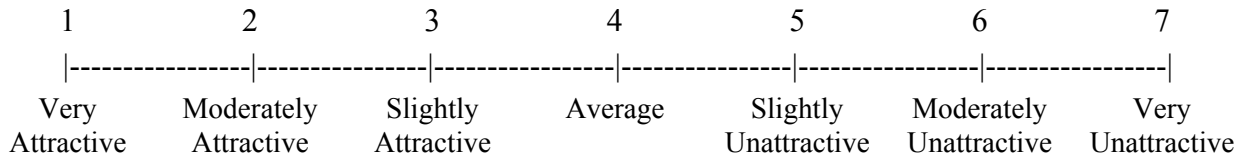
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**Photo Number:**

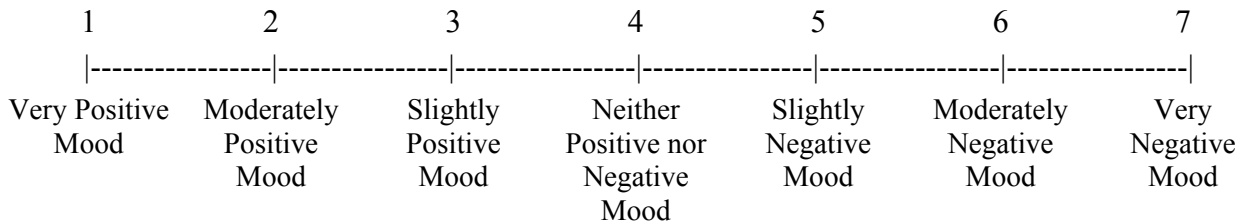
Please rate the model's appearance using the scale below (please circle one).



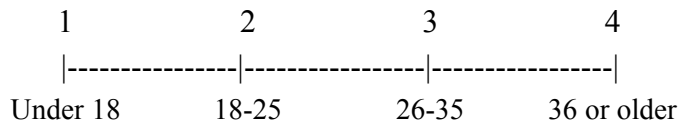
Please rate the model's attractiveness using the scale below (please circle one).



Please rate the model's mood using the scale below (please circle one).



Please rate the model's age using the scale below (please circle one).



Are there any problems with this photo (clarity, content, etc.) that we should address? \_\_\_\_\_

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We would like you to ***close your eyes*** and ***imagine yourself*** in the following situation:

**[Looking through a telescope at the night sky.] OR  
[Trying on bathing suits in the dressing room of a  
department or clothing store.]**



Please concentrate on making the situation as real as possible in your mind. For instance, think about:

- what you would see
- what you would feel
- the sounds you might hear



It is often easiest to imagine yourself in someplace you have been before, and that you can easily call to mind.

You will have approximately 1 minute to imagine this situation.

## Word Stem Completion Task

Please complete the following word stems with whatever word comes to your mind first.

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For example:

EXA\_\_\_\_\_ → EXA\_mple\_\_\_\_\_ or EXA\_mination\_\_\_\_\_ or EXA...\_\_\_\_\_

FRE\_\_\_\_\_ → FRE\_eze\_\_\_\_\_ or FRE\_e\_\_\_\_\_ or FRE...\_\_\_\_\_

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- |              |              |              |
|--------------|--------------|--------------|
| 1. PRE_____  | 23. BEA_____ | 45. CUT_____ |
| 2. CAL_____  | 24. ADO_____ | 46. TRI_____ |
| 3. BIN_____  | 25. ATT_____ | 47. BUS_____ |
| 4. SCA_____  | 26. WEI_____ | 48. HEA_____ |
| 5. GOR_____  | 27. FIG_____ | 49. TAL_____ |
| 6. DIE_____  | 28. STO_____ | 50. SHO_____ |
| 7. THI_____  | 29. LAR_____ | 51. FAC_____ |
| 8. SLE_____  | 30. BEL_____ | 52. EXE_____ |
| 9. PLU_____  | 31. MOD_____ | 53. OVE_____ |
| 10. SLI_____ | 32. MIR_____ | 54. GAR_____ |
| 11. SKI_____ | 33. FAS_____ | 55. WOR_____ |
| 12. HAN_____ | 34. FAT_____ | 56. APP_____ |
| 13. BLO_____ | 35. GLA_____ | 57. STY_____ |
| 14. GRO_____ | 36. AER_____ | 58. MAS_____ |
| 15. OBE_____ | 37. FIT_____ | 59. COS_____ |



Appendix C: (Continued)

16. PET\_\_\_\_\_

17. CHE\_\_\_\_\_

18. MUS\_\_\_\_\_

19. CEL\_\_\_\_\_

20. WAI\_\_\_\_\_

21. SHA\_\_\_\_\_

22. LOO\_\_\_\_\_

38. CHU\_\_\_\_\_

39. FLA\_\_\_\_\_

40. BUT\_\_\_\_\_

41. CLO\_\_\_\_\_

42. HAI\_\_\_\_\_

43. LEG\_\_\_\_\_

44. DRE\_\_\_\_\_

60. JAC\_\_\_\_\_

61. PUD\_\_\_\_\_

62. UNA\_\_\_\_\_

63. BIK\_\_\_\_\_

64. BRE\_\_\_\_\_

65. UND\_\_\_\_\_

Appendix D: Body Image States Scale (Cash, Fleming, et al., 2002).

For each of the items below, check the box beside the one statement that best describes how you feel RIGHT NOW AT THIS VERY MOMENT. Read the items carefully to be sure the statement you choose accurately and honestly describes how you feel right now.

1. Right now I feel...

- Extremely dissatisfied*** with my physical appearance
- Mostly dissatisfied*** with my physical appearance
- Moderately dissatisfied*** with my physical appearance
- Slightly dissatisfied*** with my physical appearance
- Neither dissatisfied nor satisfied*** with my physical appearance
- Slightly satisfied*** with my physical appearance
- Moderately satisfied*** with my physical appearance
- Mostly satisfied*** with my physical appearance
- Extremely satisfied*** with my physical appearance

2. Right now I feel...

- Extremely dissatisfied*** with my body size and shape
- Mostly dissatisfied*** with my body size and shape
- Moderately dissatisfied*** with my body size and shape
- Slightly dissatisfied*** with my body size and shape
- Neither dissatisfied nor satisfied*** with my body size and shape
- Slightly satisfied*** with my body size and shape
- Moderately satisfied*** with my body size and shape
- Mostly satisfied*** with my body size and shape
- Extremely satisfied*** with my body size and shape

3. Right now I feel...

- Extremely dissatisfied*** with my weight
- Mostly dissatisfied*** with my weight
- Moderately dissatisfied*** with my weight
- Slightly dissatisfied*** with my weight
- Neither dissatisfied nor satisfied*** with my weight
- Slightly satisfied*** with my weight
- Moderately satisfied*** with my weight
- Mostly satisfied*** with my weight
- Extremely satisfied*** with my weight

4. Right now I feel...

- Extremely physically attractive***
- Very physically attractive***
- Moderately physically attractive***
- Slightly physically attractive***
- Neither attractive nor unattractive***

Appendix D: (Continued)

- ☞ *Slightly* physically *unattractive*
- ☞ *Moderately* physically *unattractive*
- ☞ *Very* physically *unattractive*
- ☞ *Extremely* physically *unattractive*

5. Right now I feel...

- ☞ *A great deal worse* about my looks than I usually feel
- ☞ *Much worse* about my looks than I usually feel
- ☞ *Somewhat worse* about my looks than I usually feel
- ☞ *Just slightly worse* about my looks than I usually feel
- ☞ *About the same* about my looks as usual
- ☞ *Just slightly better* about my looks than I usually feel
- ☞ *Somewhat better* about my looks than I usually feel
- ☞ *Much better* about my looks than I usually feel
- ☞ *A great deal better* about my looks than I usually feel

6. Right now I feel that I look...

- ☞ *A great deal better* than the average person looks
- ☞ *Much better* than the average person looks
- ☞ *Somewhat better* than the average person looks
- ☞ *Just slightly better* than the average person looks
- ☞ *About the same* as the average person looks
- ☞ *Just slightly worse* than the average person looks
- ☞ *Somewhat worse* than the average person looks
- ☞ *Much worse* than the average person looks
- ☞ *A great deal worse* than the average person looks

Appendix E: Example of VAS item – Overall Appearance Satisfaction.

Instructions: Place a mark through the area of the line that matches your current level of feeling for the following emotion:

Satisfaction with your Overall Appearance:

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None Extreme

Appendix F: Demographics Questionnaire.

Age: \_\_\_\_\_

Race (circle one):

African-American/Black

Asian-American

Caucasian

Latino/Hispanic

Native American

Other (specify): \_\_\_\_\_

Weight: \_\_\_\_\_

Height: \_\_\_\_\_

Year in College: \_\_\_\_\_

Major: \_\_\_\_\_

Appendix G: Attention Check Questionnaire.

1. I saw image/s of men.  True  False
2. Some of the images I saw had several people in them.  True  False
3. I saw image/s of African-American women.  True  False
4. I saw image/s of a woman in a bathing suit.  True  False

### About the Author

Patricia van den Berg received her B.A. in Psychology from the University of California at Berkeley in 1994, and entered the Ph.D. program in Clinical Psychology at the University of South Florida in 1995. She earned her M.A. in Clinical Psychology from USF in 2001.

While in the Ph.D. program at the University of South Florida, Ms. van den Berg's primary area of interest was sociocultural factors in body image and eating behaviors. She coauthored several publications in various journals, and made poster presentations at the Academy of Eating Disorders and Association for Advancement of Behavior Therapy annual conferences. She taught courses in research methods, tests and measurements, and child psychology, as well as serving as a teaching assistant for several courses.