PSYCHOPHYSIOLOGICAL REACTIVITY TO SELF AND MODEL IMAGES IN AN UPWARD SOCIAL COMPARISON MANIPULATION

A Dissertation

by

JEANNINE PAOLA TAMEZ

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

December 2010

Major Subject: Psychology

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Approved by:

Chair of Committee,	Antonio Cepeda-Benito
Committee Members,	Marisol Perez
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ABSTRACT

Psychophysiological Reactivity to Self and Model Images in an Upward Social Comparison Manipulation. (December 2010)

Jeannine Paola Tamez, B.A., M.S., Texas A&M University

Chair of Advisory Committee: Dr. Antonio Cepeda-Benito

The current study examined affective reactivity to oneself in an upward social-comparison manipulation using autonomic physiological responses. Study I was conducted to select images of thin and average size models used to elicit a social comparison process for Study II. For Study II, thirty-two female undergraduate students had their startle reflex and skin conductance responses recorded while viewing images of themselves presented adjacent to thin or average size models. Participants also viewed positive, negative, and neutral affect images to test our experimental manipulation of Peter Lang's startle paradigm. Following the visual presentation, participants used the SAM scale to rate each image along the dimensions of valence, arousal, dominance, body satisfaction, and attractiveness. Analyses revealed that participants reacted to thin and average size models and self with similar levels of body image satisfaction, valence, and arousal, even though thin models were perceived as highly more attractive. Positive affect images were rated higher on valence and arousal among all the picture types. With regards to the psychophysiological data, there were differences in startle reactivity among the three *model-to-self comparison* images, with images of Thin-to-Self Comparison eliciting more of an inhibited startle response and Thin-to-Average

Comparison images eliciting more of a potentiated startle response. In terms of arousal, positive affect images were perceived as more arousing among all the picture types. Contrary to what was expected, there were no significant differences in skin conductance responsiveness between the three *model-to self comparison* images. The results are discussed from a social-comparison perspective with regard to affective reactivity to body image. Future research directions are proposed.

DEDICATION

To my parents

ACKNOWLEDGMENTS

I would like to thank my committee chair, Dr. Antonio Cepeda-Benito, and my committee members, Drs. Marisol Perez, Brandon Schmeichel, and Louis Tassinary, for their invaluable guidance, time, and support throughout the course of this project. I would also like to extend my deepest gratitude to the numerous undergraduate research assistants that worked diligently on this project. I am forever indebted for your invaluable contributions. Thank you to all my friends, both at A&M and in Houston, for your constant encouragement and, at times, much needed laughter throughout my graduate school journey. Most importantly, I would like to thank my parents (Mami y Papi) and siblings, Jorge, Jeanett, and Joanna, for always believing in me and making me feel like I can conquer the world. Without your unconditional love, guidance, encouragement, and, often times, sacrifices, I would not have been able to push myself throughout these years to achieve this grand dream of mine. To Andrea, Ethan, and Frankie, you serve as my daily inspiration to move forward in life. I only hope that one day I can inspire you to achieve your dreams.

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INTRODUCTION

Sociocultural factors have long been thought to influence the extent to which women are dissatisfied women with their own body. Most researchers agree that this relationship is a result of Western cultural ideals equating thinness with beauty and success. Body image dissatisfaction, defined as a negative perception of one's physical appearance, often results from a failure to achieve unrealistic or idealized social standards of beauty, which in turn may drive women to engage in extreme body altering behaviors to achieve the ideal body (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999). Although body dissatisfaction is somewhat normative among women, high levels of body image dissatisfaction are highly prevalent among eating disorder populations (Rodin, Silberstein, & Streigel-Moore, 1984; Heinberg, Thompson, & Matzon, 2001).

Researchers investigating social and cultural influences on body image have primarily focused on the potential impact of the "thin ideal" that is portrayed in various communication media outlets, such as music videos, commercials, print ads, and magazines (Groesz, Levine, & Murnen, 2002; Heinberg & Thompson, 1995). Media outlets tend to portray the female body as an object of desire, which may drive women to high levels of self-consciousness and set unrealistic expectations of physical beauty (Groesz, Levine, & Murnen, 2002). Thus, in assessing the impact of the pervasiveness of dietary advertisements and the presence of very thin models in commercialized media, researchers have found that exposure to fashion and beauty magazines was positively

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correlated with internalization of sociocultural standards of appearance, body dissatisfaction, negative mood, dieting practices, and disordered eating (Lokken, Worthy, & Trautmann 2004; Morry & Staska, 2001; Tiggeman, Verri, & Scaravaggi, 2005; Stice & Shaw, 1994).

However, Thompson, Heinberg, Altabe, and Tantle-Duff (1999) noted that not all women are equally affected by media exposure to the thin-ideal. A growing body of literature has used *Social Comparison Theory* as a conceptual framework to explain why the thin-ideal portrayed in the media may affect individuals to varying degrees. Social comparison theory posits that we have an innate tendency to judge our own abilities through comparison with others (Festinger, 1954). That is, uncertainty about an aspect of ourselves propels us to seek out information and evaluate ourselves in relations to others on a dimension of interest and react accordingly. Social comparison processes lends itself for self-evaluation, self-improvement, and self-enhancement (Woods, 1996). According to Woods (1996), social comparison processes can be broken down into 3 sequential steps: attainment of social comparison information, perception of social information in relation to self, and reaction to social comparisons.

Researchers contend that the type of social comparison made depends in large part to the relevance of the comparison target. In general, we prefer to select a comparison target that is not too divergent from our own abilities because those similar in attributes provide meaningful information and serve as a good frame of reference (Miller, Turnbull, & McFarland, 1988; Trampe, Stapel, & Siero, 2007). This is because comparison targets we identify as having a categorical similarity to us (e.g. gender, race,

age, etc.) will elicit more of a social comparison process than those targets that are less similar to us (Trampe, Stapel, & Siero, 2007). Thus, a woman in her twenties is more inclined to compare her body shape with another woman in her twenties than a woman in her forties. Research has supported this assertion. Franzoi and Klaiber (2007) found that college women were more inclined to compare themselves to models when it comes to weight concerns and sexual attractiveness.

Central to social comparison theory is the prediction that individuals will make either upward or downward social comparisons. In upward social comparisons, individuals measure themselves against those they feel are superior on the targeted attribute or dimension of interest. Upward comparisons are often associated with increases in negative affect and negative self-evaluations and decreases in self-esteem (Thompson et al., 1999). Conversely, in downward social comparisons, individuals measure themselves against those they feel are inferior on the targeted attribute or dimension of interest. Downward comparisons are frequently associated with increases in positive affect and self-esteem (Buunk, Collins, Taylor, VanYperen, & Dakof, 1990; Thompson et al., 1999). With regards to body shape and size, women generally overestimate their own body size (Thompson & Thompson, 1986) and report that their "ideal" body is thinner than their actual body size (e.g., Williams, Gleaves, Cepeda-Benito, Erath, & Cororve, 2001). Therefore, most women who judge themselves against thinner women engage in upward social comparison, whereas women who measure themselves against heavier women engage in downward social comparison. Congruent with an upward comparison effect, most correlational and experimental studies have

found that upward social comparison tendencies in women translate into higher body image dissatisfaction (for a meta-analysis, see Groesz, Levine, & Murnen, 2002).

Tests of social comparison theory applied to body image satisfaction have often found that exposure to thin model manipulations usually result in increases in body image dissatisfaction and negative mood. For example, Cattarin, Thompson, Thomas, & Williams (2000) asked college women to view a 12-minute segment of television commercials featuring models who were either representative or not representative of the "thin-ideal." Participants were given one of three instructional sets: to compare themselves to the models (comparison condition), focus on the products being advertised (distracter condition), or simply view the commercials (neutral condition). The authors found that regardless of the instructional set given, participants who viewed commercials featuring thin and attractive models reported greater self-to-model comparisons, depressed mood, and anger than women who watched commercials devoid of thin models. Similarly, Tiggemann and Slater (2005) found that women reported increases in body image dissatisfaction after watching music video clips featuring thin and attractive women versus ordinary people. However, mood was not affected by either the experimental or control video condition.

In contrast to these findings, other studies have found a small or no effect on body dissatisfaction after acute exposure to thin ideal models compared to average size models or control conditions (for a meta-analysis, see Groesz, Levine, & Murnen, 2002; Champion & Furnham, 1999; Posavac, Posavac, & Posavac, 1998). For example, Posavac, Posavac, and Posavac (1998) reported that women who were relatively

satisfied with their body size were less likely to report heightened weight concerns after viewing images of thin models. In another study by Champion and Furnham (1999), the authors failed to find a significant difference in body satisfaction after adolescent girls (ages 12-16) viewed images of thin models, overweight individuals, or neutral objects. A review of these studies suggest that the magnitude of an upward social comparison effect on self-evaluations is potentially moderated by variables such as self-esteem (Jones & Buckingham, 2005), social comparison tendency, internalization of the thin-ideal, body image dissatisfaction (Trampe, Stapel, & Siero, 2007), and weight concerns (for a meta-analysis, see Grabe, Ward, & Hyde, 2008; Corning, Krumm, & Smitham, 2006).

Another variable thought to influence the effects of viewing thin models on women involves demand characteristics. That is, if participants become fully aware of the true purpose of the experiment, they might respond the way they think the experimenter would like for them to respond. Mills, Polivy, Herman, & Tiggemann (2002) found that when college women were made aware that the researchers would be measuring their mood after viewing advertisements featuring thin models, they were more likely to report feeling more depressed than after looking at neutral images. Thus, the aforementioned studies highlight the need to incorporate additional methods to help capture how women feel about their body.

Whereas most research has employed subjective measures to assess affect and body dissatisfaction in response to presentations of thin models, recent studies have begun to look more closely at objective measures to assess affect with varying body image stimuli. We found two published studies that measured autonomic physiological

reactivity to assess participants' responsiveness to full-body pictures of themselves. These studies relied mainly on Lang's biphasic theory of emotion to interpret participants' responses to body images. Lang (1995) proposed that organisms engage in either approach/consummatory or avoidance/defensive reflexive processes in response to appetitive/pleasant or aversive/threatening stimuli, respectively. These responses are assumed to be reflexive and are influenced by the nature (meaning) of the stimuli and the affective state of the individual at the time of the stimulus presentation. Positive/pleasant stimuli activate the appetitive motivational system, particularly if the individual is in a pleasant mood state. Lang and colleagues have found that defensive reflexes, such as the eye blink or startle response are inhibited by positive/pleasant stimuli. Negative/unpleasant stimuli activate the aversive/defensive motivational system, particularly if the individual is in a negative mood state. In the presence of negative/unpleasant stimuli, defensive reflexes such as the startle reflex are potentiated (Lang, Bradley, & Cuthbert, 1998). Another important prediction of Lang's startle paradigm is that the inhibition or potentiation of the startle reflex depends on the level of arousal of the individual. Hence, while processing positive affect information, startle reflex would be further inhibited if the individual experienced high levels of activation, which can be measured physiologically using skin conductance and heart rate levels (Lang, Bradley, & Cuthbert, 1998).

Using Lang's biphasic theory of emotion, Buck, Hillman, Evans, and Janelle (2004) recorded startle responses and facial EMG in 32 females participants who viewed pictures of their own bodies, as well as positive, negative, and neutral affect pictures.

The authors found that exposure to pictures of one's own body resulted in inhibited startle responses and zygomatic EMG activity, suggesting that participants responded as if they had been exposed to images that evoke positive affect (see Lang, 1995). Contrary to their expectations, these participants reported elevated scores in eating disorder symptoms and they also indicated to have high levels of social anxiety related to how the judged their own physique.

Overduin, Jansen, and Eilkes (1997) measured physiological reactivity (i.e. heart rate, skin conductance, startle response, and facial EMG activity) in restrained and non-restrained eaters while they viewed full-body pictures of themselves, their favorite binge food items, and neutral stimuli. Although neither startle reflex responses nor facial EMG activity differed between restrained and non-restrained eaters, both groups showed an increase in heart rate activation and an elevation in skin conductance recovery time when viewing pictures of themselves. These findings suggested that restrained and non-restrained eaters were more aroused while viewing pictures of one's own body than food items and neutral stimuli.

Drawing from social comparison theory and Lang's startle paradigm, a previous study conducted in our laboratory examined reactivity (i.e. skin conductance and startle response) to body image stimuli with a sample of college women (n = 56). The purpose of the study was to incorporate Lang's startle paradigm with an upward social comparison task and measure affective responses to images of thin models, average size models, and neutral objects through physiological measures. In order to elicit an upward social comparison effect, we instructed participants to compare themselves to the people

in the images while we measured their skin conductance and startle reflex responses. Following the visual presentation, participants rated how they felt while viewing each picture using the Self-Assessment Manikin (SAM) scale. For the purposes of our study, we adapted the SAM scale to include a body dissatisfaction dimension to capture changes in body dissatisfaction. Analysis revealed that women reported feeling more aroused, more dissatisfied with their own bodies, and less in control after viewing images of thin models in comparison to images of average size models and neutral objects. These findings replicated previous research demonstrating that upward social-comparison manipulations increase body image dissatisfaction (for a meta-analysis, see Groesz, Levine, & Murnen, 2002).

In comparison to average size models and neutral images, participants' startle responses were inhibited while viewing thin models. This finding was interpreted to indicate that young women perceived images of thin models as more positive or pleasant than images of average size models and neutral objects. This finding cannot be attributed to differentially elicited levels of physiological arousal between picture categories as there were no statistically significant differences in skin conductance responses while women viewed images of thin models, average size models, or neutral objects. Contrary to our expectations, these contrasting results between the self-reported and startle-response data may imply that our experimental manipulation provoked an upward social comparison effect during the self-report but not the physiological-recording phase of the experiment.

Thus, one could argue that increasing the salience of the comparison between the self and the model images could strengthen of the upward social comparison manipulation. For instance, incorporation of pictures of the participants themselves may compel the participant to compare their own body shape to those of the models. Exposure to only model images may elicit reactivity to the images themselves rather that to feelings about how the person compares herself to the image. Through inclusion of pictures of the participants, we might better be able to index how females feel about themselves under different contextual situations, that is, in comparison to either thin or average-size models.

Current Study and Hypotheses

Expanding on findings from prior research conducted in our lab, the present study sought to explore reactivity to viewing images of oneself in an upward social-comparison manipulation. In an attempt to increase the salience of the experimental manipulation, we decided to present images of oneself alongside images of thin and average size models. The objective was to measure affective reactivity to oneself in an upward social-comparison context using autonomic physiological responses (i.e. startle eye blink reflex and skin conductance) and test our experimental manipulation through incorporation of affect images. Given that previous research has shown that women exposed thinner women engaged in upward social-comparisons report a negative impact in self-reported affect, self-esteem, and body satisfaction, we hypothesized that images featuring oneself adjacent to thin models (Thin-to-Self Comparison) would elicit an aversive motivational response pattern, including a potentiated startle response and

increased arousal, when compared to social comparison stimuli featuring thin and average size models presented next to each other (Thin-to-Average Comparison) and images of oneself adjacent to average size models (Average-to-Self Comparison). Based on prior research conducted in our lab in which there was an inhibition of startle response to images of models, it was also hypothesized that images in the Thin-to-Average Comparison condition would exhibit more of an inhibited startle response and increased level of arousal in comparison to images presented as Average-to-Self Comparison. Further, it was hypothesized that affective reactivity for affect pictures (Positive, Negative, and Neutral affect) would mirror reactivity from prior research studies with similar stimuli, such that negative affect images would elicit a stronger aversive motivational responses pattern (i.e., potentiated startle response) and positive affect images would elicit a stronger approach motivational responses (i.e., inhibited startle response).

STUDY I

Study I was designed to ensure that the images selected for the visual presentation for Study II were representative of thin and average size models. Undergraduate female students were asked to rate female models on dimensions of attractiveness, body size and shape, ethnicity, closeness to thin-ideal, and closeness to the average woman's body shape. Participants were also asked to report their reactivity to the models along the dimensions of valence, arousal, and feelings of dominance and control. It was hoped that the above procedures would allow for the selection of stimuli that could be classified as representative of the "thin-ideal" and the "average size" for women, with the images in both categories matched in attractiveness and arousal.

Method

Subjects

Forty-eight female students from introductory psychology classes participated in this study in exchange for research participation credit. The age of the participants ranged from 17 to 21 (M = 18.74, SD = 0.85). Their body mass indexes (BMI, weight [lb] * 703/height [in] ^{2}) ranged from 16.95 to 33.79 (M =23.70, SD = 5.12). Most of the participants self-identified either as Caucasian (n = 33), followed by Hispanic/Latino (n = 8), African American and Asian/Pacific Islander (n = 2, respectively), and Other (n = 1). Two participants failed to report their ethnicity.

Materials

One hundred images featuring female models of varying sizes were selected from several women's beauty, fashion, and health magazines such as *Glamour, Cosmopolitan,*

Allure, Vogue, Self, Shape, and *Redbook* and from the Internet. The images selected displayed at least half of the female's body from the waist up and did not contain more than one model. Any logos and brand names within the images were covered to reduce the number of distracters.

Measures

Self-Assessment Manikin (SAM; Lang, 1980). The SAM rating scale asked participants to rate the affective quality of visual stimuli for valence (ranging from completely happy to completely unhappy), arousal (ranging from completely aroused to completely calm) and dominance (ranging from completely controlled to completely in-control) along a 9-point scale. Each dimension has 5 figures, which represent varying intensity levels of the dimension being measured. Participants were instructed to place an X over any or in between the figures that best represents their emotional experience while viewing the visual stimulus. Scores on the SAM rating scale for pleasure and arousal have near perfect agreement with scores on a lengthier, verbal measure of emotional reactivity, the Semantic Differential scale, proving that the SAM ratings scale is an easy and efficient way to measure subjective emotional responses with a variety of stimuli (Bradley & Lang, 1994). There is evidence of strong associations between valence and arousal scores and physiological and behavioral measures of similar constructs (Bradley & Lang, 1994).

Image Rating Form (IRF). Developed for the purpose of the present study, the IRF consisted of three, 5-point Likert scale (1 = *strongly disagree* to 5 = *strongly agree*) items that served to rate and compare the female models along the dimensions of

attractiveness and closeness to thin-ideal and the average female body shape. Two additional items assessing the models' physical body size and ethnicity were also included. To control for the influence of ethnicity on attractiveness ratings, participants rated all the models on attractiveness, closeness to the thin-deal, closeness to the average body size, and physical body size first and then viewed the slideshow a second time and rated them on perceived ethnicity. Ethnicity of the models was not used to select images but included to provide descriptive data regarding the models.

Procedures

Upon arrival to the laboratory, participants in groups of ten each signed a consent form, answered four questions regarding demographics (age, ethnicity, weight, and height), and were given oral instructions on how to rate the images using both the IRF and SAMs rating scale. The visual presentation consisted of 100 images individually presented for 30 seconds on a PowerPoint slide and displayed on individual computers for each participant. Participants viewed the slideshow of images and rated the models using the aforementioned scales. At the end of the visual presentation, participants were debriefed on the true purpose of the experiment.

Results

Ratings for the female models were analyzed for participant agreement on body shape and attractiveness. Using scores from the IRF, a criterion cut-off score of 4 (*Agree*) or 5 (*Strongly Agree*) for three of the questions (how much the model represented our society's standard of ideal beauty, how attractive the model was, and how much the model's body shape was representative of the average woman's body

shape) was used to calculate inter-rater reliability analysis. Images rated with a score of 4 or 5 as conforming to the thin-ideal by 70% or more of participants were placed in the thin model category. Images with an inter-rater reliability of at least 70% for being representative of the average size woman were placed in the average model category. To further ensure that the images chosen for the average size model category were representative of the average size woman, the images also had to have been rated with a score of 2 (*Disagree*) or lower (1= S*trongly Disagree*) as conforming to the thin-ideal by 70% or more of participants. Additionally, an attempt was made to match images in the thin model and average size model category on attractiveness. However, thin models were rated more attractive than average size models (M = 4.29, SD = 0.52 for thin models and M = 3.40, SD = 0.68 for average size models).

Attempts were also made to match images in both of these categories on arousal levels (M = 4.36, SD = 1.93 for thin models and M = 3.84, SD = 1.73 for average size models). This process resulted in 12 images being placed in the thin model category and 12 images in the average size model category. Based on the above selection criteria, the 12 models selected for the thin model category were rated by 80% or more of participants as having a body size of 5 or below and by 60% or more of participants as Caucasian, and the 12 models selected for the average size model category were rated by 80% or more of participants as having a body size of 6 or above and by 64% or more of participants as Caucasian.

STUDY II

Method

Subjects

Thirty-two female undergraduate students from introductory psychology classes participated in this two-part study in exchange for research participation credit. Two subjects were excluded due to equipment malfunction occurring during the second testing session, and one participant was excluded because she only completed part one of the study. The ages of the remaining 29 participants ranged from 18 to 20 years (M =18.90, SD = 0.67). With regards to weight perception, 89.7% of the participants considered themselves to be of normal weight and 10.3% reported feeling overweight. Their body mass indexes (BMI, weight [lb] * 703/height [in]^2) ranged from 17.75 to 34.17 (M =22.05, SD = 3.11), with 69% of participants rating themselves as having a medium body frame, 27.6% of participants rating themselves as having a small body frame, and 3.4% of participants rating themselves as having a large body frame. Participants also rated how attractive they perceived themselves. 69% of participants rated themselves as somewhat attractive, 13.8% of participants rated themselves as neither attractive nor unattractive, and 13.8% of participants rated themselves as somewhat unattractive. Only one participant rated herself as very attractive. Similar to Study 1, most of the participants self-identified as Caucasian (n = 19), with Black/African American being the second most numerous ethnic group (n = 4). Three participants self-identified as Asian/Pacific Islander, four participants self-identified as Hispanic/Latino, and one participant chose the *other ethnicity* category.

Materials

Visual Stimuli. A collection of 72 color images were presented on a 21-inch computer monitor at a distance of 1.5 m from the subject. The content of the pictures varied across six categories with twelve pictures per category. For the purposes of this study, two picture categories were created to generate a social comparison process (Thin-to-Self Comparison and Average-to-Self Comparison), and one was created to serve as a control condition (Thin-to-Average Comparison). The Thin-to-Self Comparison category consisted of a thin model juxtaposed next to a full- or half- body picture of the participant. The Average-to-Self Comparison category was comprised of an average size model presented next to a full- or half- body picture of the participant. Lastly, the Thin-to-Average Comparison category consisted of a thin model adjacent to an average size model. All images featuring models that were used in this study were categorized into thin and average size models based on inter-rater reliability results for body shape and size and attractiveness from Study 1. Full- or half- body pictures of participants were taken during the first testing session. To ensure standardization of photos, participants were instructed on how to pose with three business casual outfits they were asked to bring to the first testing session, given props for some of the pictures (i.e., a notebook, purse, sunglasses, umbrella), and asked to smile for each picture. Props were used in an effort to mirror the content used in pictures of thin and average size models. The experimenter stood 3.2 m away from the participant and took twelve half-body to full-body pictures of the participant. Immediately after the testing session was over, the experimenter uploaded the images of the participants onto a study computer,

combined the images with the corresponding model pictures, and created the aforementioned picture categories. Participants were not allowed to view the pictures taken of themselves prior to the experimental manipulation.

The remaining three picture categories (positive affect, negative affect, and neutral affect) contained pictures selected from the International Affective Picture System (IAPS). Selection of the IAPS pictures was based on valence and arousal ratings (positive high arousal, negative high arousal, and neutral medium arousal) from a previous study conducted in our lab.

Self-report Measures

Demographics Questionnaire. Participants gave information concerning age, ethnicity, weight, height, perception of weight (i.e., underweight, normal weight, or overweight), body frame (i.e., small, medium, or large), attractiveness, and current medication use.

Positive Affect Negative Affect Schedule (PANAS; Watson, Clark, & Tellegan, 1988). The PANAS, a 20 item scale, measures subjective positive and negative mood states. Participants were asked to rate their mood on a scale of 1 to 5 (1= *very slightly or not at all* and 5= *extremely*). Scores on the PANAS have been found to have good reliability, as well as good convergent and discriminant validity with scores on other mood measures, including the Beck Depression Inventory, Hopkins Symptom Checklist, and STAI State Anxiety Scale (Watson, Clark, & Tellegan, 1988). For this study, Cronbach's alpha was 0.89 for positive affect and .54 for negative affect.

Sociocultural Attitudes Towards Appearance Questionnaire (SATAQ; Heinberg, Thompson, & Stormer, 1995). The SATAQ is a 14-item questionnaire used to measure perceived social standards of beauty and perceived importance of physical appearance in social advancement and success. Items are scored along a 5-point Likert scale (1 = *completely disagree* to 5 = *completely agree*) and grouped into two subscales, Awareness and Internalization. Awareness measures the degree to which individuals are aware of sociocultural norms, whereas internalization measures the extent to which individuals accept these standards. Among a non-eating disordered population, reported means scores were 18.1 (*SD* = 3.9) for the Awareness subscale and 24.1 (*SD* = 6.0) for the Internalization subscale (Griffiths, Beumont, Russell, et al., 1999). Heinberg et al. (1995) reported high reliability coefficients of $\alpha = 0.88$ for the scores of the internalization subscale and $\alpha = 0.71$ for the scores of the awareness subscale with a sample of undergraduate women. The reliability estimate for the present sample was 0.57 for the Internalization subscale and 0.90 for the Awareness subscale.

Rosenberg Self Esteem Inventory (RSEI; Rosenberg, 1979). The RSEI is a 10-item scale used to measure global self-esteem. Participants are asked to rate how true each statement is along a 4-point Likert scale (0 = *strongly agree* to 4 = *strongly disagree*). Items were reverse-scored such that higher scores are indicative of more positive global self-esteem. Studies have reported satisfactory internal consistency (α = 0.72-0.92) and temporal reliability (test-retest r = 0.85) (Rosenberg, 1979). Cronbach's alpha for the present sample was 0.97.

Bulimia Test-Revised (BULIT-R; Thelen, Farmer, Wonderlich, & Smith, 1991). The BULIT-R is a 36-item questionnaire used to measure symptoms of bulimia along a 5-point Likert scale; however, only 28 of the 36 items are used for scoring purposes. Scores on the BULIT-R have been found to exhibit high internal consistency ($\alpha = 0.98$) and correlate with the severity of bulimic symptoms (Thelen et al., 1991). Higher scores (104 or above) are indicative of a higher likelihood that an individual may be diagnosed with bulimia in a clinical interview. Among a non-eating disordered female population, reported mean scores for Black women was 43.22 (SD = 15.66) and 51.92 (SD = 19.87) for White women (Bardone-Cone & Boyd, 2007). For this study, the reliability estimate of the scores in the present sample was 0.93.

*Body Image Assessment (*BIA; Williams, Gleaves, Cepeda-Benito, Erath, & Cororve, 2001). The BIA consists of 9 silhouettes ranging in sizes from very thin to very large. The BIA required participants to identify which body shape best approximates their current body shape and ideal body shape. The discrepancy between current body shape and ideal body shape indicated the degree of body image dissatisfaction; thus, higher scores are indicative of a higher degree of body dissatisfaction. Williams and colleagues (2001) found satisfactory test-retest reliability for current body shape ($r = 0.9$) and for ideal body shape ($r = 0.71$).

Body Esteem Scale (BES; Franzoi & Shields, 1984). The BES, a 35-item scale, measures how women feel about specific part of their body (e.g., face, stomach, thighs) along a 5-point Likert scale (0 = strong negative feelings to 5 = strong positive feelings) and grouped into three subscales, Sexual Attractiveness, Weight Concerns, and Physical

Condition. Sexual attractiveness focuses on one's attitudes towards body parts associated with facial attractiveness and sexuality. The Weight Concerns subscale assesses attitudes towards body parts associated with food intake. The Physical Condition subscale pertains to attitudes towards body parts associated with stigma, strength, and agility. Higher scores are indicative of more positive feelings towards one's own body. Among a university population, reported means scores were 45.3 (*SD* = 6.3) for the Sexual Attractiveness subscale, 26.4 (*SD* = 9.5) for the Weight Concern subscale, and 31.6 (*SD* = 5.8) for the Physical Condition subscale (Franzoi & Herzog, 1986). Scores on the BES have been found to exhibit high internal consistency, ranging from 0.82 to 0.88 (Franzoi & Herzog, 1986). Cronbach's alpha for the present sample was 0.81 for sexual attractiveness, 0.91 for weight concerns, and 0.90 for physical condition.

Self-Assessment Manikin (SAM; Lang, 1980). The SAM rating scale asks participants to rate the affective quality of visual stimuli for valence (ranging from completely happy to completely unhappy), arousal (ranging from completely aroused to completely calm), and dominance (ranging from completely controlled to completely in-control) along a 9-point scale. Two additional dimensions, body satisfaction (ranging from completely satisfied to completely dissatisfied with body shape) and attractiveness (ranging from completely unattractive to completely attractive), were added for this study to capture how participants feel about their bodies and how attractive participants perceive themselves, the models, and the images. Body satisfaction was created using the same figures as the rest of the dimensions measured; however, attractiveness was asked using a 9-point Likert scale (1 = *not attractive* and 9 = *extremely attractive*). Each

SAM dimension, minus attractiveness, had five figures, which represented varying intensity levels of the dimension being measured. Participants were instructed to place an X over any of the figures or in between the figures that best represents their emotional experience while viewing the visual stimulus. Scores on the SAM rating scale for pleasure and arousal have near perfect agreement with scores on a lengthier, verbal measure of emotional reactivity, the Semantic Differential scale, proving that the SAM ratings scale is an easy and efficient way to measure subjective emotional responses with a variety of stimuli (Bradley & Lang, 1994). There is evidence of strong associations between valence and arousal scores and physiological and behavioral measures of similar constructs (Bradley & Lang, 1994).

Physiological Measures

Defensive Reflex. The defensive reflex measured was the startle (eye blink) response. The eyeblink response was used as an index of affective responding to visual stimuli. The eye blink response was assessed as EMG activity using the MP100 System (Biopac, Goleta, CA) data recorder. Two 4mm Biopac Ag-AgCl electrodes filled with electrode gel (Signa Gel) were secured on the orbicularis oculi region below the left eye. Impedance was then checked using the UFI 1089 mk III Checktrode, and an effort was made to have impedance readings below 15 ohms. The raw EMG signal was amplified, filtered (bandpass = 10-500Hz), and integrated using EMG100 and the AcqKnowledge 3.5 software (Biopac, Goleta, CA). The data was edited off-line to detect any clear movement artifact. Each startle score for any given trial was the difference of the peak amplitude of EMG between 20 ms to 120 ms interval after the probe onset minus the

mean baseline EMG activity recorded during the second prior to the picture onset. Trials where the waveform suggest too much baseline activity or clear movement artifact in the startle response were considered a zero-response trial and not included in the analyses (zero-response trials < 7%). Each startle response was converted to a z score (using the mean and standard deviation for that particular participant's startle response), and then transformed to a *T* score ([z x 10] + 50) (Drobes, Miller, Hillman, Bradley, Cuthbert, & Lang, 2001).

Skin Conductance. To measure skin conductance, leads filled with Grass Electrode paste were placed on the middle phalanges of the participant's index and middle finger, amplified using the GSR100 amplifiers, and recorded using AcqKnowledge 3.5 software. AcqKnowledge 3.5 converted the pulse signal into BPM through a calculation function. Skin conductance was scored offline, and each image viewing period was divided into 1 second time intervals with an additional 1 second time interval extending past the image viewing period due to the latency of the sweating response (Stern, Ray, & Quigley, 2001). The mean BPM of the second preceding the onset of each image exposure trial was used as the baseline. The skin conductance score for any trial was the difference between its peak and baseline BPM. For each participant, skin conductance scores were grouped and averaged within picture type across all trials.

Procedures

This study was divided into two individual testing sessions, with the first session lasting one hour and the second session lasting two hours. Participants were recruited through the psychology department's subject pool website. Upon signing up for the

experiment through the webpage, all participants were instructed to bring three business casual outfits to their first scheduled testing session because their picture would be taken. No additional information regarding the study was provided. Upon arrival to the laboratory, participants were greeted by a female research assistant and asked to complete a battery of questionnaires: demographics form, PANAS, RSE, SAQAT, BULIT-R, BIA, and BE. Following this, a female research assistant used a digital camera to take twelve pictures of the participant wearing the three different business casual outfits the participant brought to session. The research assistant instructed the participant on how to pose for each picture. After taking the participant's pictures, the research assistant reviewed the participant's data and looked for any exclusionary criteria. Potential participants were excluded if they have any heart-related or blood pressure medical conditions, suffered from epilepsy, any other seizure disorder, panic attacks, any other anxiety disorder, and insulin dependent diabetes or other sugar metabolism problems or if they were taking seizure, anti-parkinsonian, anti-psychotics, anti-depressants, and anti-anxiety medications as these problems might interfere with electrode readings. For those participants not meeting exclusion criteria, their half- and full-body pictures were uploaded onto a computer and incorporated into the corresponding visual presentation.

During the second testing session, participants filled out the PANAS (time 2). After completing the questionnaire, participants were asked to rinse and dry their hands and sit in a comfortable recliner. Their face was then prepared for electrode placement, and the electrodes were attached according to established guidelines (Blumenthal, et al.,

2005). Participants were then given instructions to sit still, attend to the images, and to compare themselves to the females presented next to them in the slideshow. They were told to focus on what the other females looked like and what they are wearing. In addition, they were told that they would also be viewing other images that vary in content. To increase compliance with the instructions, participants were told that half of the participants would be randomly assigned to a memory task and asked to recall the images they saw. Lastly, participants were told to ignore the noises that could come from the headphones. After the instructions were given, the lights in the room were dimmed, headphones were put in place, and baseline physiological data was collected for 10 minutes while the participant relaxed. Following the 10-minute accommodation period, physiological reactivity (eye blink startle response and skin conductance) to the visual presentation was monitored.

At the end of the visual presentation, all electrodes were removed and participants filled out the PANAS again (time 3). Following this, the same images presented in the visual presentation were shown again in groups of three, with all the pictures in each group corresponding to the same type of picture (i.e., thin models, average size models, self-pictures, positive affect, neutral affect, and negative affect). To delineate between participants' ratings for attractiveness for themselves and each model, pictures comprising three of the comparison categories were rated individually. Each picture was shown for 6 seconds and, after each block presentation, participants were given 15 seconds to rate each picture type along dimensions of valence, arousal, dominance, body satisfaction, and attractiveness. Attractiveness ratings were only

collected for participants' pictures and for images featuring models. At the end of the session, participants were thanked for their participation, given the CD with their pictures saved on, and debriefed on the true purpose of the study.

Stimuli Presentation

The images were presented in twelve pseudorandomised orders, where each picture is shown for six seconds, followed by a blank (white background) monitor for ten seconds. The stimulus presentation was counterbalanced to lessen carry over effects. The acoustic startle stimulus consisted of a 100dB (A) white noise burst presented for 50 ms. over Sennheiser EH2270 headphones. The white noise was produced by Cool Edit 2002 (Syntrillium, Phoenix, AZ) with instantaneous rise time. To reduce anticipation of the startling noise, the noise was presented at three random intervals from two to five seconds after picture onset (two, four, and five) and only during nine of twelve pictures per picture category. Additionally, 18 startle probes were presented randomly during inter-trial intervals (ITI). The presentation and timing of the pictures and startle probes were controlled by Superlab software (Cedrus Corporation, San Pedro, CA). Given that the main purpose of study to capture the social comparison process and the habituation effect that often occurs with psychophysiological research, participants viewed all the images in the Thin-to-Self Comparison, Average-to-Self Comparison, and Thin-to-Average Comparison category first, then viewed all the images for positive affect, negative affect, and neutral affect pictures last.

Statistical Analysis

All analyses were conducted using the SPSS version 16.0 statistical package. SAM ratings for each of the four dimensions assessed (valence, dominance, arousal, body satisfaction) were subjected to separate repeated measures ANOVAS, with picture type (thin models, average size models, self-picture, positive affect, neutral affect, and negative affect) as the within subject factors. For attractiveness, a repeated measures ANOVA tested the picture type effect (thin models, average size models, and self-picture) in a within subject factor analysis. Startle responses and peak skin-conductance were also tested with a repeated measures ANOVA with picture type (Thin-to-Self Comparison, Average-to-Self Comparison, Thin-to-Average Comparison, positive affect, neutral affect, and negative affect) as the within subject factors. To control for deviations from the sphericity assumption, the degrees of freedom associated with the within subject factor were adjusted using the Greenhouse-Geisser correction for all of our repeated measures analyses. Statistically significant factor effects were followed with Bonferroni corrected, paired *t*-test comparisons.

To facilitate the presentation of the results, valence, arousal, and body satisfaction SAM-scores were reversed so that higher values were indicative of positive mood, high arousal, and high body satisfaction. Direct SAM-dominance scores are indicative of high perceived control. Statistical significance will be set at $\alpha < .05$.

Results

Subjective Variables

Table 1 (see page 43) summarizes the means and standard deviations for the self-report measures, and Table 2 (see page 44) has the means and standard deviations for the SAMs ratings for each dimension and picture category. Figures 1-6 depict the results for the within subjects ANOVAs comparing mean scores across the six picture types.

With regards to valence, a significant picture type effect emerged, F (5, 20) = 3.25, $p < 0.001$, $\eta^2 = .891$ (see Figure 1 on page 47). As might be seen by Figure 1, participants reported feeling more positively while viewing positive affect image in comparison to thin models, t (26) = -5.03, $p < .001$, average size models, t (26) = -8.17, $p < .001$, self-pictures, t (26) = -3.91, $p < .001$, negative affect, t (26) = 14.87, $p < .001$, and neutral affect pictures, t (24) = 11.88, $p < .001$. Additionally, participants reported feeling more negatively to negative affect pictures in comparison to images of neutral affect, t (24) = -10.46, $p < .001$, thin models, t (26) = 8.89, $p < .001$, average size models, t (26) = 12.19, $p < .001$, and self-pictures, t (26) = -7.75, $p < .001$. However, there were no statistically significant differences on self-reported valence between the responses to thin models, average size models, and self-pictures.

In terms of arousal, analysis revealed a significant effect for picture type, F (5, 19) = 1.10, $p < 0.001$, $\eta^2 = .743$ (see Figure 2 on page 48). Positive affect images were significantly more arousing than images of average size models, t (24) = -4.71, $p < .001$, and neutral affect, t (23) = 4.49, $p < .001$. Additionally, neutral affect images were rated as producing the least amount of arousal in comparison to images of thin models, t (23)

= 4.83, $p < .001$, self-pictures, t (23) = 3.64, $p < .05$, and negative affect, t (23) = 4.08, $p < .001$. Participants reported similar levels of arousal for thin models, average size models, and self-pictures. The lack of difference in arousal among thin models, average size models and self-pictures are congruent with the similar valence ratings and the fact that they were pre-selected to have similar levels of self-perceived arousal.

With regards to dominance, analysis did not yield a significant effect for picture type, F (5, 19) = 2.37, p = 0.08, η^2 = .384 (see Figure 3 on page 49). For body satisfaction, results yielded a statistically significant effect for picture type, F (5, 16) = 1.22, $p < 0.001$, η^2 = .792 (see Figure 4 on page 50). Post-hoc analyses revealed that ratings for body satisfaction for most picture categories were significantly different from one another, ts (21) $\geq$ -5.31, $p < .05$, with the exception of thin models, average size models, and self-pictures, which did not differ. Finally, there was a statistically significant picture effect for attractiveness, F (2, 24) = 2.19, $p < 0.0001$, η^2 = .646 (see Figure 5 on page 51). Post-hoc analyses indicated that attractiveness ratings for thin models were significantly greater when compared to attractiveness ratings for average size models, t (25) = 6.62, $p < .001$, and self-pictures, t (25) = 3.65, $p < .05$. Attractiveness ratings for average models and self-pictures were not significantly different from one another.

Psychophysiological Data

Startle. The repeated measures ANOVA revealed a significant picture type effect, F (5, 24) = 5.739, $p < 0.01$, η^2 = .545. Means and standard deviations are presented in Table 3. Contrary to what was hypothesized, Figure 2 shows that startle

responses were potentiated during presentation of Thin-to-Average Comparison images in relation to Thin-to-Self Comparison images, t (28) = -4.12, $p < .05$, and Average-to-Self Comparison images, t (28) = -2.78, $p < .05$. These results suggest that participants were affectively processing Thin-to-Average Comparison images more like negative or aversive stimuli. Startle responses for Thin-to-Self Comparison were inhibited with respect to startle responses for Average-to-Self Comparison images, t (28) = -2.9, $p < .05$, suggesting that Thin-to-Self Comparison images elicited differentially more positive affect even when we thought participants would be engaging in an upward social comparison. However, the analyses did not reveal a statistically significant difference between startle responses of the different types of affect pictures. The lack of difference in startle reactivity among positive affect, negative affect, and neutral affect images could be attributed to the fact that participants might have habituated to the startle probe towards the end of the stimulus presentation.

Skin Conductance. For skin conductance, the repeated measures ANOVA revealed a significant picture type effect for skin conductance, F (5, 24) = 5.73, $p < 0.01$, $\eta^2 = .544$. The means and standard deviations are presented in Table 4 (see page 46). Post-hoc analyses revealed that there were no statistically significant differences in arousal among Thin-to-Self Comparison, Average-to-Self Comparison, and Thin-to-Average Comparison images. However, skin conductance responses for Positive Affect were significantly different with respect to skin conductance responses to Thin-to-Self Comparison images, t (28) = .98, $p < .05$, Average-to-Self Comparison images, t (28) = 2.06, $p < .05$, and Thin-to-Average Comparison images, t (28) = 3.12, $p < .05$. These

results indicate that participants were less aroused while viewing positive affect images than Thin-to-Self Comparison, Average-to-Self Comparison, and Thin-to-Average Comparison images. Additionally, skin conductance responses for Thin-to-Self Comparison images were significantly different from skin conductance responses from Negative Affect images, t (28) = -2.9, $p < .05$, indicating that participants were more aroused while viewing Thin-to-Self Comparison images than while viewing Negative Affect images.

DISCUSSION AND CONCLUSION

The purpose of this study was to add autonomic psychophysiological measures, such as startle reflex and skin conductance, to a self body image evaluation within an upward social-comparison manipulation. We assessed affective reactivity to oneself in college aged women within different social comparison contexts to test a theorized negative effect of media messages on female body image satisfaction. More specifically, we monitored and compared the amplitude of startle reflex and skin conductance responses for young women when comparing images of oneself to *thin* and *average* size models. We also included images of positive, negative, and neutral affect to test whether our manipulation of Lang's startle reflex paradigm could index differential physiological responding.

Contrary to findings from previous upward social comparison manipulations applied to body image satisfaction, female participants did not report feeling less satisfied with their body after viewing images of thin or average size models. In fact, participants reported almost similar levels of body satisfaction while viewing thin models, average size models, and self-pictures, regardless of the fact that thin models were perceived as highly more attractive. These findings suggest that perceived attractiveness for thin and average size models and self was not associated with body image satisfaction. When compared to affect images, however, participants reported feeling more satisfied with their body after viewing positive affect images and less satisfied with their body after viewing negative affect images.

Taken together, our results differ from previous studies using similar paradigms in which women rated themselves more negatively after being exposed to attractive models than to images of average size women and neutral objects (for a meta-analysis, see Groesz, Levine, & Murnen, 2002). One possible explanation for our failure to reproduce an upward social comparison effect on of body satisfaction in terms of self-report is that our sample consisted of young women with no or low symptoms of poor body-image satisfaction or weight related concerns. Prior studies have found a small or no effect on body image dissatisfaction after acute exposure to thin ideal models compared to average size models or control conditions among a non-eating disordered population (for a meta-analysis, see Groesz, Levine, & Murnen, 2002; Champion & Furnham, 1999; Posavac, Posavac, & Posavac, 1998).

In terms of valence, participants reacted to thin models, average size models, and self with similar levels of valence and with greater positive affect than negative and neutral affect images. More specifically, when asked how they felt as they watched the images presented to them, participants did not report being negatively affected by self-pictures or models. Contrary to what was expected, such findings mirror prior social comparison studies utilizing picture viewing tasks with a non-eating disordered population (Hausenblaus, Janelle, Gardner, & Hagan, 2002; Buck, Hillman, Evans, & Janelle, 2004). These findings may not be surprising given that women who endorse greater body image dissatisfaction, weight concerns, and internalization of the thin-ideal may be more susceptible to the negative influence of an upward social comparison (Myers & Crowther, 2009). Rating of valence for affect pictures in our study appeared to

be consistent with prior picture viewing studies, such that positive affect images were rated as more pleasant and negative affect images were rated as more unpleasant (Lang, Bradley, & Cuthbert, 1990; Lang, Bradley, & Cuthbert, 1998). Thus, our findings regarding subjective responsiveness to images of thin model appear to suggest that media messages that idealize and equate thinness with beauty do not have a substantial impact on the body image of women with no to low body image satisfaction. On the other hand, it was clear that women with healthy body images perceive thin women as more attractive than normal sized women.

With regards to arousal and dominance, participated reported similar levels of arousal for thin and average size models and self-pictures. Arousal ratings for models and self pictures appear congruent with ratings for valence and body satisfaction, suggesting that attractiveness was also not associated with level of arousal for model to self images. With regards to affect images, positive affect images emerged with greater dominance and arousal ratings, with neutral affect as prompting the least arousal and negative affect prompting less dominance.

It is important to clarify at this point that whereas the participants viewed individual pictures of themselves and of thin and average models, during the assessment of autonomic responding they viewed the pictures in dyads (Thin-to-Self, Average-to-Self, Thin-to-Average) during the assessment of autonomic reactivity. Therefore, the interpretation of any relationship between subjective responding and autonomic responding should be made with this difference in mind.

There was evidence of emotional modulation of the startle reflex in response to images of oneself in comparison to thin models and average size models. Participants' eye-blink responses were potentiated and inhibited while viewing Thin-to-Average Comparison and Thin-to-Self Comparison images, respectively. This pattern of responding suggests that the social comparison manipulation did not work in the way we had expected. That is, Thin-to-Average images were processed as aversive stimuli, whereas Thin-to-Self images were processed as appetitive stimuli. These findings cannot be attributed to differentially elicited levels of physiological arousal or valence between the different conditions, as there were no statistically significant differences in skin conductance.

An important weakness of the study is that the manipulation of the Lang paradigm did not lead to a finding of modulation of the startle response (Bradley et al., 1990; 2001). However, it is possible that this failure to replicate was due to habituation of the startle response and/or interference by the prior manipulation rather than lack of control over the experimental manipulations. Previous findings from our lab using the same procedure have found successful modulations of valence to aversive, appetitive, and neutral images (Tamez, 2008).

Despite the significant findings of the current study, several limitations should be noted. First, this study utilized a within subjects design, thereby increasing the chance of carry-over effects and limiting the ability to draw a casual inference about the influence of social comparison processes. Future research could address this issue by creating a between groups design which would allow for comparisons of physiological reactivity

between groups to be made. Second, our sample consisted primarily of Caucasian undergraduate women, which limits the generalizability of the results with regards to age, ethnicity, and educational level. Thus, future attempts should be made to include a more diverse sample as well as individuals with more prominent weight and body image concerns as these individuals are more prone to development of eating disorders and might exhibit more of a physiological response in different social comparison contexts. An additional limitation involves not being able to control what participants are attending to in the image; thus, future research should incorporate additional psychophysiological methods (i.e., eye tracking method) that would could better capture what participants are attending to once the startle emerges. This would give a more accurate depiction of affectivity reactivity to the image. Further, although there was evidence of startle modulation among the *model to self* images, an importation limitation of this study involved not asking participants to rate themselves while viewing dyads, as opposed to individual pictures. It will be important to have participants rate the dyads as this might better help explain the contradictory results we found in this study. Lastly, the small sample size limited the power of our effects.

However, given these limitations, a major contribution of this research is the application of psychophysiological measures (i.e. startle eye blink reflex and skin conductance) to a social comparison task incorporating images of oneself juxtaposed next to images of thin and average size models. By incorporating Lang's theory of emotion with a social comparison task, this methodology provides us with information about the affective component of body image. Future research should continue to

examine the relationship between social comparison and body image through the use of additional psychophysiological methods (i.e., heart rate) with populations with higher levels of body image dissatisfaction, internalization of the thin-ideal, and weight concerns as this population is more prone to development of eating disorders. Evidence gathered from such studies could provide additional information on how to guide treatments and serve as a measure of treatment outcome for eating disordered populations.

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APPENDIX

Table 1. Descriptive statistics- means and standard deviations for mood and eating disorder related measures

Measures	**N**	**M**	**SD**
PA (time 1)	29	29.83	8.37
NA (time 1)	29	13.72	2.85
SAQAT-Intern	29	24.48	7.25
SAQAT-Aware	29	20.67	3.60
BIA	29	0.83	1.42
RSE	28	26.17	2.87
BULIT-R	26	47.42	16.35
BEQ-Sx Att	28	44.71	7.89
BEQ- Wt Con	28	25.96	8.21
BEQ- Phys Con	28	39.54	9.54
PA (time 2)	28	28.50	9.52
NA (time 2)	28	12.32	2.45
PA (time 3)	29	23.31	9.13
NA (time 3)	29	14.52	4.80

Note: PA= Positive Affect scale of Positive Affect Negative Affect Schedule (PANAS); NA= Negative Affect scale of PANAS; SAQAT-Intern= Internalization subscale of Sociocultural Attitudes Towards Appearance Questionnaire; SATAQ-Aware= Awareness subscale of SATAQ; BIA= Body Image Assessment; RSE= Rosenberg Self-Esteem Inventory; BULIT-R= Bulimia Test-Revised BE-Sx Att= Sexual Attractiveness scale of Body Esteem Questionnaire; BE- Wt Con= Weight Concerns scale of BEQ; BEQ-Phys Con= Physical Condition scale of BEQ

Table 2. Means and standard deviations for SAM ratings for each picture category

Picture Category	Valence		Arousal		Dominance		Body Satisfaction		Attractiveness	
	M	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**	**M**	**SD**
Thin Models	5.86	1.63	5.13	1.33	5.04	2.08	6.04	1.84	7.12	1.49
Average Size Models	5.84	1.22	3.92	1.33	6.05	1.42	6.31	1.51	5.09	1.45
Self-Pictures	5.80	2.07	5.00	1.65	5.76	2.09	5.96	2.01	5.30	2.01
Positive Affect	7.67	1.06	5.66	1.80	6.32	1.72	7.23	1.26	---	---
Negative Affect	2.17	1.45	5.21	2.48	4.27	2.09	3.20	1.95	---	---
Neutral Affect	4.25	1.05	3.51	1.34	5.51	1.16	4.71	1.06	---	---

Table 3. Startle magnitude means and standard deviations for each picture category

Picture Category	**M**	**SD**
Thin-to-Self Comparison	48.03	3.81
Average-to-Self Comparison	50.99	3.19
Thin-to-Average Comparison	52.91	3.27
Positive Affect	48.27	3.07
Negative Affect	49.00	2.66
Neutral Affect	49.95	1.66

Table 4. Skin conductance means and standard deviations for each picture category

Picture Category	**M**	**SD**
Thin-to-Self Comparison	-0.69	0.86
Average-to-Self Comparison	-1.30	1.65
Thin-to-Average Comparison	-0.86	1.18
Positive Affect	-1.88	1.67
Negative Affect	-1.22	1.15
Neutral Affect	-1.12	1.59

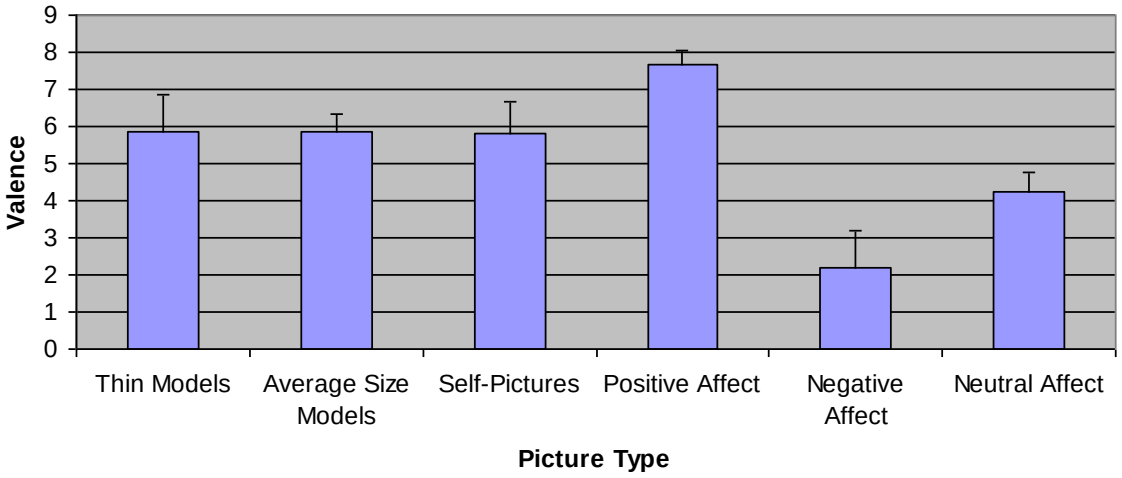

Figure 1. SAM rating of valence (with standard error bars) across all picture categories

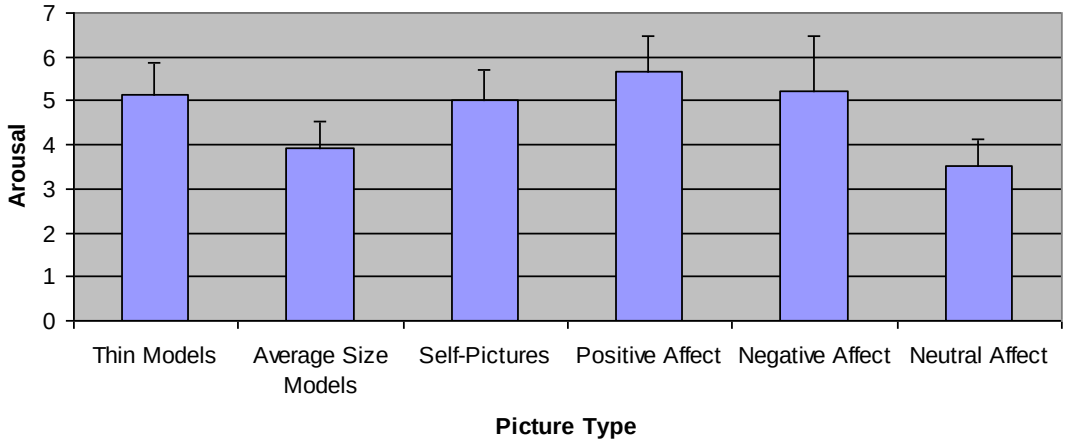

Figure 2. SAM rating of arousal (with standard error bars) across all picture categories

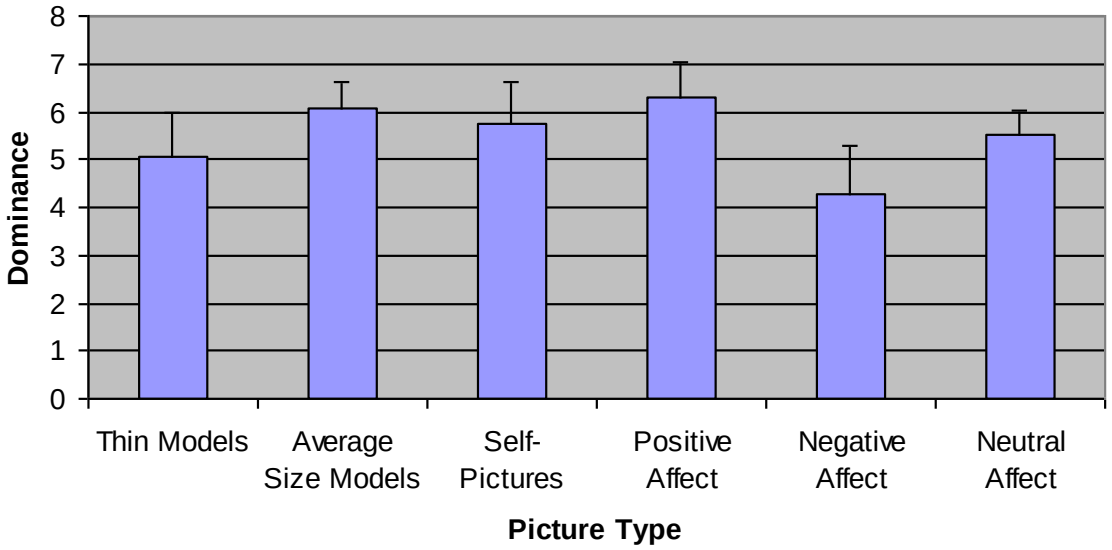

Figure 3. SAM rating of dominance (with standard error bars) across all picture categories

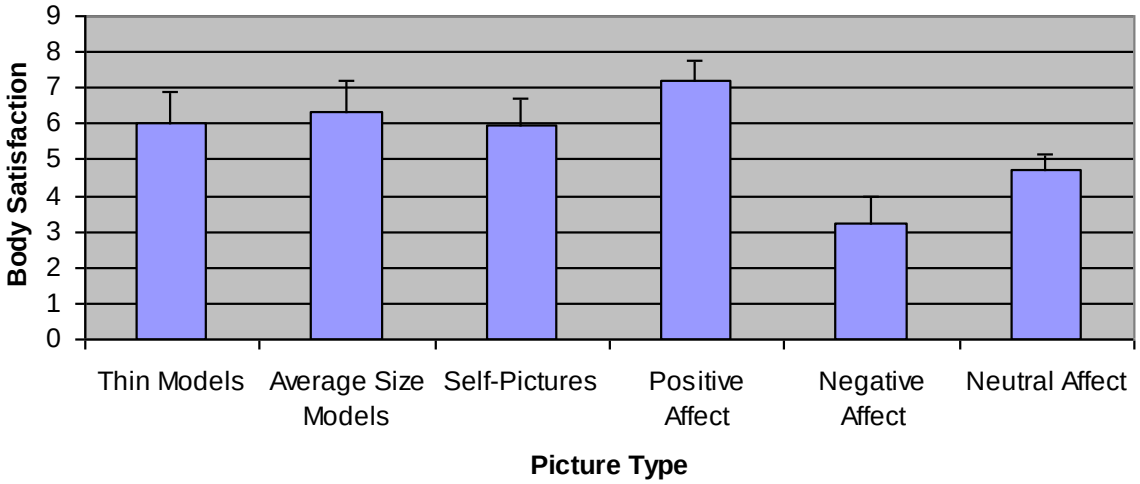

Figure 4. SAM rating of body satisfaction (with standard error bars) across all picture categories

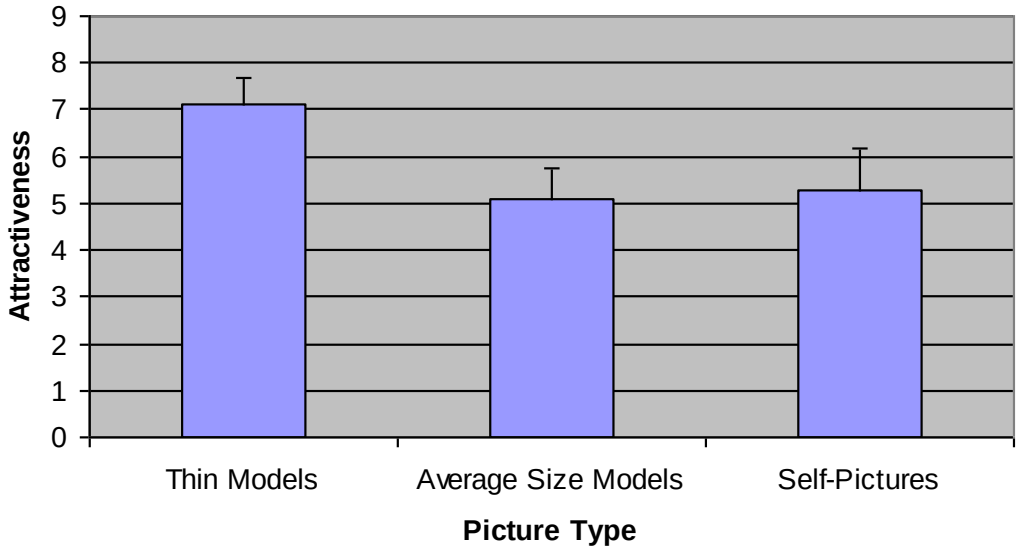

Figure 5. SAM rating of attractiveness (with standard error bars) across model to self picture categories

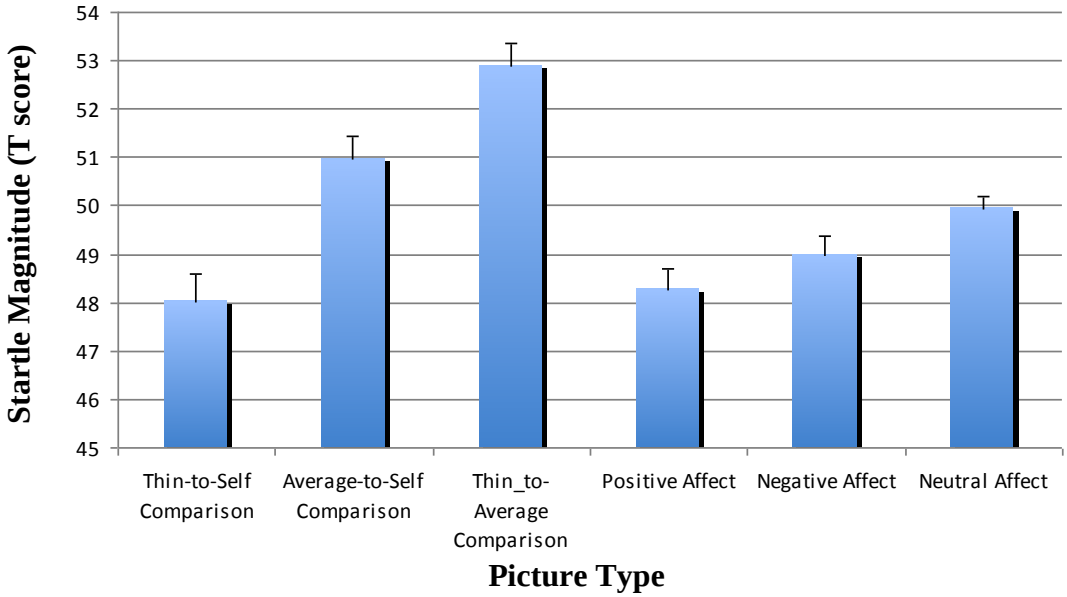

Figure 6. Standardized startle magnitude (with standard error bars) across all picture categories

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