SOCIAL COMPARISON TO THIN AND PLUS SIZE MEDIA IMAGES:

IMPACT ON CANDY CONSUMPTION, AFFECT, AND BODY IMAGE IN BINGE EATERS

by

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Abstract

Binge eating has long been a prevalent issue for young women. Though the development of binge eating is multifactorial, much attention has focused on the etiological mechanisms underlying binge behaviour. Affect regulation models are empirically supported; models illustrate the importance of affective dysregulation and negative experiences as antecedents of binge eating. The sociocultural pressure to achieve thinness is also a known risk factor for the development of binge eating. Previous research has shown that women eat less when exposed to thin media images. Several studies also indicate that social comparisons to thin media images result in negative affect and body dissatisfaction. Nevertheless, some research has shown that for dieters, thin images appear to have self-enhancement effects. Research to date has focused on the internalization of the thin ideal and the effects of exposure to thin models in studies examining media influence on pathological eating. The current study explored the effect of social comparison to thin and plus size media images on candy consumption, negative affect and body satisfaction among binge eaters and nonbinge eaters. One hundred and one undergraduate females participated in the current experiment, during which they were exposed to thin and plus size media images and asked to engage in an objective social comparison task followed by a taste test. Results indicated that binge eaters ate more compared to nonbinge eaters, specifically postexposure to thin media images. Increases in negative affect were found to occur as a function of one's binge status and image type. Further, comparisons to thin media images led to decreases in body satisfaction whereas plus size images had the opposite effect. Results are discussed in relation to the etiological models of binge eating, differentiating factors associated with binge eating, and upward and downward social comparisons.

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The pathway to developing pathological eating behaviours is multifactorial. Of the many factors, dieting behaviours have received much attention given the high frequency of dieting among women in an attempt to exert control over their weight. Dieting and weight and/or shape preoccupation was once considered to be predominately phenomena of Western society, but the rise of these concerns has now also been documented in other societies. The sociocultural pressure to achieve an ideal body type has been implicated as a risk factor for the development of unhealthy eating patterns. Additionally, the pressure to lose weight leads many women to struggle with dieting. Dieting for the purposes of weight loss is often accompanied by increased appetite, food cravings, and the impulse to overeat (Polivy, Heatherton, & Herman, 1988). Further, in certain cases with increased severity, the urge to overeat can result in a loss of control of food intake, which can be conceptualized as a symptom of pathological eating (Fairburn & Wilson, 1993). The urge to overeat and consumption of a large amount of food accompanied by a perceived loss of control is known as binge eating. Binge eating is increasingly receiving attention in research and clinical practice as it is part of Binge Eating Disorder (BED), a newer disorder about which less is known relative to the other eating disorders (Polivy, Herman, & Boivin, 2008). Further, gaining a better understanding of binge eating is important given that it is a phenomenon that can occur in all categories of eating disorders.

Binge Eating Defined

In both clinical practice and research, a binge is defined by a two-part criteria. The current *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision* (DSM-IV-TR, American Psychiatric Association, 2000) outlines the first criterion by defining

binge eating as the consumption of an amount of food that is significantly larger than what most people would eat within a similar time period and under similar circumstances. Along with this criterion, the binge episode must be accompanied by a sense of loss of control over eating. Thus, the individual must feel that he or she cannot control what he or she is eating or the amount of food that is being consumed. Binge eating is also a criterion for Bulimia Nervosa (BN). Individuals with BN show a pattern of recurrent episodes of binge eating followed by inappropriate compensatory behaviours that are sought in order to prevent weight gain. Examples of inappropriate compensatory behaviours are misuse of laxatives, self-induced vomiting, and excessive exercise (American Psychiatric Association, 2000).

The criterion that a binge episode involve eating a large amount of food is consistent with both laboratory findings and self-report caloric intake during binges in patients with BN (Walsh & Garner, 1997). However, some researchers have suggested that the amount of food consumed during a binge is not the defining feature of the binge. For example, it has been shown that approximately one third of patients, who otherwise satisfy the criteria for BN, reported consuming a relatively small number of calories during a binge (Fairburn & Wilson, 1993). These findings suggest a subjective component to what constitutes a "binge" rather than it solely relying on calories consumed. It is possible that individuals with eating disorders consider varying amounts of food, or the consumption of specific foods that are considered forbidden, to constitute a "binge." That is, it is not necessarily consuming a large number of calories or large amounts of food that may cause one to feel that they have engaged in a binge episode (Rosen, Leitenberg, Fisher, & Khazam, 1986). Currently, studies differ in their definition of binges, with some accepting the Eating Disorder Examination's (Fairburn & Cooper, 1993) definition of subjective overeating whereby amount of food eaten is not "large," but is viewed by the

individual as excessive, and with others adopting the DSM-IV-TR definition of a binge episode. This has important implications for research in the area given the variation in what people would consider to be eating outside of their normal limits. Further, individuals may report a higher frequency of binge eating based on the subjective interpretation of what is excessive.

The second part of the DSM-IV-TR binge criterion is a subjective sense of loss of control over eating. This criterion is important in order to distinguish a binge from general overeating. This results from concern over whether the symptom of binge eating itself distinguishes individuals with disordered eating from individuals who periodically engage in overeating. The DSM-IV-TR includes a loss of control in the diagnostic criteria for binge episodes, both in the context of BED and BN. The two-part criteria for binge episodes reduces the number of individuals who meet the criteria for binge eating episodes and is thought to further differentiate them from those who are occasional overeaters (Devlin, Goldfein, & Dobrow, 2003).

Prevalence

The American Psychiatric Association describes eating disorders as complex psychiatric and medical conditions whereby individuals suffer from persistent disturbances in their eating (American Psychiatric Association, 2000). Eating disorders are found predominantly among young women in Western countries. The most defined eating disorders are Anorexia Nervosa (AN) and BN. Garfinkel, Lin, and Goering (1995) report that the lifetime prevalence of AN in Canada was found to be 0.56% for females and 0.16% for males; the lifetime prevalence of BN was found to be 1.1% for females and 0.1% for males. McVey et al. (2005) reported that one in four females in Ontario, Canada report symptoms associated with eating disorders. Among females aged 15 to 24, estimates of incidence rates suggest that both AN and BN have increased markedly since the 1950s. Such studies have estimated incidence rates to be 8.1 per 100, 000

population per year for AN and 11.4 per 100, 000 for BN (Hoek, 2002). A more recent study conducted in the United States using the National Comorbidity Survey reported that for women, the lifetime prevalence rates for anorexia nervosa, bulimia nervosa, and binge eating disorder are estimated at .9%, 1.5%, and 3.5%, respectively (Hudson, Hiripi, Pope, & Kessler, 2007). Importantly, it is likely that incidence rates for subthreshold eating disorders or those that are not otherwise specified are underestimated given the acceptability of dieting and attainment of the thin ideal in Western societies. Further, pathological eating is likely associated with a sense of shame, which may render the behaviours to be secretive and thus underreported (Grilo, 2006). Moreover, variations in the severity of pathological eating may contribute to underestimations of eating disorders. For example, severe dieting is not captured in incidence rates, but could develop into an eating disorder, which may go unrecognized.

At present, binge eating can be a symptom of each of the eating disorders included in the DSM-IV-TR. Binge eating is the key feature of BN and BED. In addition, in the DSM-IV-TR, binge eating has also been included as part of a subtype of AN referred to as the "binge-eating/purging type" whereby individuals engage in either binge eating or purging (American Psychiatric Association, 2000).

Prevalence rates for binge eating vary among different populations. Weekly binge eating episodes have been reported in 1.5%-10% of North American female college students (Fairburn & Wilson, 1993). Additionally, 16%-19% of college females report engaging in binge eating on a regular basis (Whiteside et al., 2007). Recent studies suggest that the transition period to university may be a time of heightened risk for eating difficulties, including higher instances of binge eating (Barker & Galambos, 2007). Such findings may suggest a normalization of binge eating, and are indicative of a common behaviour among university students. Further, increasing

rates of binge eating and intense dieting have been reported in a national study of women (as cited in Polivy et al., 2008). Also, prevalence rates of binge eating for those in weight loss programs are much higher, with reported rates of 18%-35% (Ramacciotti et al., 2000). It has been suggested that these rates continue to increase, with reported rates as high as 55% (Clyne & Blampied, 2004). Such high prevalence rates justify the need for continued research into the psychological mechanisms associated with this behaviour.

As mentioned above, binge eating is a defining feature of BN, in which the binge behaviour is typically followed by inappropriate compensatory behaviours such as the use of laxatives, excessive exercise and/or self-induced vomiting (American Psychiatric Association, 2000). The motivation behind inappropriate compensatory behaviours is to prevent weight gain. Compensatory behaviours provide a distinguishing factor from those with BN and a group of individuals who engage in binge eating alone. BED has thus been designated its own entity in the DSM-IV-TR defined by the absence of inappropriate compensatory behaviours to prevent weight gain. Research has focused on further identifying features associated with BED and it has been suggested that BED differs from BN both in terms of general psychopathology and restraint. It has been suggested that BED individuals who exhibit restrained eating are more likely to disinhibit and lose control over eating (Roberto, Grilo, Masheb, & White, 2010). BED requires further research and understanding given this new designation, and the similarities and differences between BED, BN, and restrained eating must be better understood.

Characteristics and Related Psychological Problems

Individuals who engage in binge eating have been found to exhibit greater body image dissatisfaction and other associated psychopathology compared to their nonbinge counterparts (Mitchell & Mussell, 1995). Further, body image disturbance has been found to be related to

changes in self-esteem (Masheb & Grilo, 2003). Body image disturbance has also been linked to variations in weight and/or shape evaluation. Studies examining this concept suggest that elevated weight or shape concerns are strongly present, and may be indicative of severity levels among individuals with BED as they are among individuals with AN and BN (Goldschmidt et al., 2010; Mond, Hay, Rodgers, & Owen, 2006). It has further been suggested that overvaluation of weight and shape be considered a specifier for BED. A recent study examined construct and discriminant validity of overvaluation of shape and weight in a sample of 160 women with BED and 108 women with psychiatric disorders unassociated with eating. It was found that the BED women with threshold shape and weight overvaluation exhibited poorer psychosocial functioning as compared to those with subthreshold shape and weight overvaluation, and other psychiatric disorders. Further, it was found that shape and weight overvaluation concerns predicted BED in participants with 67.7% accuracy (Goldschmidt et al., 2010). The nature of weight or shape concerns has also been tied to greater eating pathology, body dissatisfaction and poor psychological functioning (e.g., depression and low self-esteem) among individuals with BED (Hrabosky, Masheb, White, & Grilo, 2007). Thus, it is important to consider such factors as part of the multifactorial pathway to the development of binge eating behaviours. In addition, individuals who engage in binge eating tend to have elevated rates of comorbid Axis I disorders compared to controls. The disorder most commonly comorbid with eating disorders is depression (Grilo, 2006; Telch & Stice, 1998). Obsessive-Compulsive Disorder has also been reported to co-occur at higher rates in eating disordered individuals (Polivy et al., 2008), which is likely related to ideas of perfectionism, body checking, and thoughts about food and weight.

Research has also demonstrated that the severity of binge eating correlates with the severity of general psychological disturbance in areas such as depression and anxiety (Mitchell

& Mussell, 1995). Additionally, alcohol abuse is commonly found among BN patients, and has been speculated to occur at higher rates among BED patients (Polivy et al., 2008). Comorbidity studies have also identified higher rates of Axis II disorders in binge eaters than in nonbinge eating controls, including Obsessive-Compulsive Personality Disorder, Avoidant Personality Disorder and Borderline Personality Disorder (Wonderlich & Mitchell, 2001; Yanovski, Nelson, Dubbert, & Spitzer, 1993).

Furthermore, individuals who engage in binge eating in the absence of compensatory weight loss methods are at an increased risk of obesity. Binge eating disorder is associated with weight gain and obesity, as evidenced by findings from clinic, community and population-based studies, with more than 30% of binge eaters falling into the obese weight range (Yanovski, 2002). It is also suggested that there are differences among individuals with BED and obese nonbinge eaters, with the former displaying greater levels of psychological distress (Mond et al., 2007).

Etiological Models of Binge Eating

The etiology of binge eating has received attention and speculation. There is little consensus and a lack of clear understanding about what causes binge eating. As a result, many etiological theories have been proposed. For example, addiction models, cognitive and information processing, personality factors, and sociocultural models have all been suggested to contribute to eating pathology (Polivy et al., 2008). There is currently no consensus as to whether binge eating has one specific etiological foundation or whether it arises from the interplay between several different etiological factors. Current literature regarding etiological foundations has focused primarily on two principal explanatory models: the restraint model and the affect regulation model. Both of these models focus on the antecedent factors of binge

eating, yet differ with respect to the point in time at which these antecedents are thought to occur.

Restraint Model

The restraint model (Polivy & Herman, 1985) is one of the most highly regarded etiological models of binge eating. It proposes that the current sociocultural pressure to be thin is a causal pathway leading to binge eating. In this model, the internalization of the thin ideal leads to chronic body dissatisfaction, which then leads to dieting. Chronic dieting has been established as a contributing factor in the development of binge eating (Abraham & Beumont, 1982; Heatherton & Polivy, 1992; Howard & Porzelius, 1999; Polivy & Herman, 1985; Polivy et al., 2008). Restrained eaters are traditionally operationally defined as individuals who score 15 or above on the Revised Restraint Scale (RRS; Herman, Fitzgerald, & Polivy, 2003) which measures weight history and fluctuation, as well as concerns with food and eating. The restraint model has been founded in experimental laboratory research. Restrained eaters are thought to cognitively regulate their food intake until their cognitive restraint is disrupted. Laboratory studies have shown that the temporary disruption of cognitive restraint has led restrained eaters to disinhibit and overeat or engage in counterregulatory eating behaviours (Polivy & Herman, 1985, 1999). Those who internalize the thin ideal and strive to attain the ideal body tend to adopt unhealthy means in hopes of achieving their goal. However, attaining the goal of the perfect body and weight loss is not likely, leaving restrained eaters nutritionally deprived and with heightened negative affect. These physiological and psychological experiences put individuals at a heightened risk of loss of control over eating, or binge episodes (Heatherton, Polivy, & Herman, 1990; Herman & Polivy, 1990). Furthermore, food cravings resulting from dieting have been reported to lead to the onset of binge episodes (Telch & Agras, 1993). In addition, it

has been found that females with BN are calorie deprived prior to binge eating compared to female controls (Davis, Freeman, & Garner, 1988). Thus, both individuals with BN and many dieters disinibit and eat more, and in the laboratory this occurs in response to a stimulus that acts as a precipitating factor to the onset of overeating. Moreover, significant correlations have been found between the degree of dietary restraint and the severity of binge eating (Leon, Fulkerson, Perry, & Cudek, 1993). Thus, it appears that dieting behaviour is a key component to binge eating, often preceding the episode.

The restraint model is not easily applied to individuals with BED. Some studies have found that a significant portion of individuals with BED report that their first binge episodes occurred before their first diet (Spitzer et al., 1993; Spurrell, Wilfley, Tanofsky, & Brownell, 1997). It has also been found that caloric deprivation in lab studies led to overeating and binge eating (Agras & Telch, 1998). Recently, in a study examining longitudinal data on 1, 678 female twins, it was found that dietary restraint may be the most important factor for individuals presenting with a genetic risk for binge eating (Racine, Burt, Iacono, McGue, & Klump, 2011). More specifically, genetic influences on binge eating increased with increasing levels of dietary restraint. Another study examined the relationship between dietary restraint, the urge to binge, and actual binge eating (Engelberg, Gauvin, & Streiger, 2005). In this study, dietary restraint was examined as an antecedent to binge episodes and cravings to binge eat. Results showed that stronger urges to binge were preceded by elevations in dietary restraint. Interestingly, higher levels of restraint did not precede the actual binge episodes. The authors suggest that restraint increases the susceptibility to binge eat, but not the actual occurrence of binge eating (Engelberg et al., 2005). Thus, it is possible that restraint makes one more vulnerable to binge eating and other triggers cause the binge episode to occur. It is important to note that more research is

needed with this specific population, as some researchers have found that individuals with BED have reported dieting behaviour to precede binge episodes (Mussell et al., 1995), while others suggest that binge eating preceded the onset of dieting. Also, studies in this area have been criticized for many methodological limitations (Howard & Porzelius, 1999). For example, it has been found that self-reported restraint does not translate into actual dietary restraint in terms of observed caloric intake (Stice, Cooper, Schoeller, Tappe, & Lowe, 2007; Stice, Fisher, & Lowe, 2004). Currently, there are mixed findings and a lack of research specifically with individuals with BED as to whether dieting is a precursor to binge or the result of binge eating in this population. As a result, the restraint model cannot currently explain binge eating for all individuals with BED.

Affect Regulation Models

There are two variants of affect regulation models, both of which focus on negative affect as a precursor to binge eating (Heatherton & Baumeister, 1991). Affect regulation models suggest that heightened emotional disturbance increases the likelihood that an individual will binge eat (Abraham & Beumont, 1982; Baucom & Aiken, 1981; Greeno, 2000; Paxton & Diggens, 1997). That is, binge eating serves to decrease the experience of negative affect by providing comfort and/or distracting individuals from distress. Thus, in these models, negative affect is a proximal antecedent of binge eating (Telch & Agras, 1996). Additionally, self-regulation theories have received some attention. It has been hypothesized that binge eaters have difficulty regulating their mood states and may have limited access to emotion regulation strategies (Lynch, Everingham, Dubitzky, Hartman, & Kasser, 2000; Wheeler, Greiner, & Boulton, 2005; Whiteside et al., 2007). However, more research is needed to understand self-regulation with binge eaters in terms of access to and utilization of strategies, comprehension of

emotional states, and whether self-regulation difficulties are broader or specifically associated with the time period preceding binge eating.

Comfort model. According to the comfort model, binge eating provides comfort to emotionally distressed dieters or obese individuals who frequently diet (Polivy & Herman, 1999). The comfort hypothesis posits that food and eating provide a great deal of comfort to binge eaters. It is suggested that in nonbinge eaters, food and eating do not comfort individuals enough to allow for the offset of appetite suppressing effects that are ordinarily activated by stress. That is, in nonbinge eaters, high levels of distress tend to activate the nervous system causing appetite suppression. On the other hand, in binge eaters who find comfort in eating, distress acts as a trigger for the desire to eat. The desire to eat and binge behaviour are sought out to provide comfort and ease distress.

Escape model. Heatherton & Baumeister (1991) posit that binge eating may be motivated by a need to escape from aversive self-awareness. Binge eaters are considered to posess high personal expectations related to their body weight and shape. As a result, their self-image is strongly tied to their appearance and they are highly susceptible to the sociocultural presssure to be thin, resulting in the internalization of the thin ideal (Polivy et al., 1988). The escape model also posits that binge eaters evaluate themselves in relation to high standards, are avoidant of the stigma associated with obesity, and display a strong desire to be perceived favourably by others (Heatherton & Baumeister, 1991). The model further suggests that because binge eaters hold high standards and have high self-awareness, they tend to regard themselves negatively in comparing themselves to others. It is suggested that perfectionism is an integral concept to understanding self-awareness among binge eaters. Thus, binge eaters are thought to reduce their aversive self-awareness by engaging in binge behaviour. This eating behaviour is

suggested to help individuals escape, as attention is focused on the actions and sensations of eating. That is, thoughts about the self are put out of mind and are replaced by the physical sensations associated with eating. Also, engaging in binge eating may allow the individual to attribute their negative affect to the binge episode itself, rather than the original source of negative affect (Polivy & Herman, 1999). This may, in turn, maintain the source of distress and increase the likelihood of further binge episodes.

Empirical evidence for affect regulation models. Currently, there are mixed findings as to whether binge eating to regulate mood is motivated by comfort, distraction, or an escape from self-awareness. A study by Blackburn, Johnston, Blampied, Popp, and Kallen (2006) tested the applicability of escape theory to binge eating. The non-clinical sample consisted of 129 women who were asked to fill out a battery of questionnaires measuring the components of the escape model. Structural equation modelling was used to test the fit between the model and the data. Results indicated that the escape model was a good fit to the data. The authors suggest that the escape model provides a good framework for understanding causal pathways to binge eating. That is, perfectionistic ideals are thought to lead to higher self-awareness, which leads to negative affect, resulting in cognitive narrowing (i.e., attempts to escape by reducing self-awareness), which further predicts binge eating (Blackburn et al., 2006). Hypotheses similar to the escape model have been proposed in the treatment of BED through the training of emotion regulation (Clyne & Blampied, 2004). However, there is a dearth of research on the escape model and binge eating. This may be due to challenges in measuring the concept as well as the lack of experimental manipulations that can confidently isolate and attribute causes to 'escape' from aversive self-awareness. Nevertheless, the escape model does suggest that negative affect plays an important role in the causal pathway to binge eating.

Similarly, a large portion of research supports negative affect as an antecedent of binge eating. In an earlier study, Abraham and Beumont (1982) conducted a study of bulimic patients. They found that the majority of participants reported that their binge episodes were usually preceded by anxious, and dysphoric mood states. Kenardy, Arnow, and Agras (1996) found that binge eaters reported greater distress and lower tolerance of negative moods compared to nonbinge eaters. Further, binge eaters reported emotions, such as anger, depression, and anxiety to precede binge episodes. A sample of overweight women who engaged in binge behaviour reported more severe binge eating in response to negative affect compared to low levels of emotional distress (Henderson & Huon, 2002), suggesting that negative affect is a precursor to binge eating and predicts binge severity. Also, self-reports of individuals with BED found that participants reported a greater tendency to eat in response to negative mood states as compared to controls (Eldredge & Agras, 1996). Additionally, self-monitored reports of mood and eating showed that binge eaters reported more negative affect on binge days as compared to nonbinge days (Wegner et al., 2002).

Deaver, Miltenberger, Smyth, Meidinger, and Crosby (2003) conducted a study with university students. Participants were asked to self-monitor and record their level of pleasantness on an affect grid at 2-min intervals before, during, and after a binge, as well as during mealtimes. Results indicated that participants experienced more negative affect before binge episodes, which lessened during the binge episode, and then increased immediately after the binge episode. Thus, it is likely that binge eating relieved some of the negative affect experienced. Similarly, Telch and Agras (1996) examined the influence of negative affect on binge eating in participants with BED. They conducted a mood induction experiment using vivid negative or neutral imagery. Results indicated that negative emotional states were

associated with loss of control over eating and labeling an eating episode as a binge. Those participants who labeled their eating as a binge also reported a more negative affective state.

Hilbert and Tuschen-Caffier (2007) examined negative mood as both an antecedent and reinforcement of binge eating in both samples of participants with BED and BN. Participants were provided with a portable minicomputer along with paper and pencil assessments to measure psychological variables and food intake. Random sampling of mood and cognitions was obtained through beep sounds generated by the computer to prompt a response from the participant. Additionally, participants were asked to rate their mood and cognitions before, during, and after each episode of eating. Results showed that participants experienced increases in negative mood prior to eating. Also, participants experienced increases in negative mood after binge eating compared to before and during eating. Further, results supported negative mood as an antecedent of binge eating in both the samples of participants with BED and BN. These findings were specifically associated with the binge episodes compared to regular eating. This study supports other research (e.g., Masheb & Grilo, 2006), suggesting that negative affect is a specific antecedent to binge eating in individuals with BED. The finding that negative affect was increased after eating may be related to the idea that negative affect is attributed to the eating itself rather than a specific antecedent, as suggested by escape model.

A causal relationship between suppression of negative emotions, negative mood and overeating in women with BED was investigated by Dingeman, Martijn, Jansen, and van Furth (2009). This relationship was further examined for participants meeting criteria for clinical depression. Participants were shown an upsetting video clip and asked to either suppress their emotions or react naturally. After the task, all participants completed a taste test. Regardless of instructions to suppress emotions or react naturally, all participants who were most affected by

negative mood were found to have a higher caloric intake compared to those less affected. The subgroup of clinically depressed participants who were most affected by the negative mood induction were found to have consumed the most calories. Thus, the authors suggest that overeating may function to repair negative mood.

Aubie and Jarry (2009) conducted two studies examining the impact of weight-related teasing on the affect and eating behaviour among binge eaters and nonbinge eaters. The studies were masked as studies examining the impact of mood on taste ratings. Binge eaters and nonbinge eaters were assigned to read a weight-related teasing vignette or a neutral vignette, followed by a taste test procedure. Results showed that participants who read the weight-related teasing vignette reported more negative affect compared to participants who read the neutral vignette. Further, binge eaters were found to eat more overall compared to nonbinge eaters and to eat significantly more in response to the weight-related teasing vignette. The second study examined the specific effect of weight-related teasing by incorporating a third vignette about academic teasing. Results showed that binge eaters ate significantly more after reading the weight-related teasing vignette compared to the neutral and academic teasing vignettes. Thus, these studies support the notion that negative affect is an antecedent to binge eating behaviour with specific attention to weight-related material.

Davis and Jamieson (2005) examined the functional nature of binge eating by developing a measure called the Binge Eating Adjective Checklist (BEAC). A clinical sample of 405 adult women who presented to an eating disorders clinic completed the study. The BEAC is comprised of 103 adjectives that describe different moods and feelings. Participants completed the BEAC, which instructed them to indicate which adjectives best described how they felt before a binge episode. A second administration of the BEAC instructed participants to indicate

which adjectives described how they felt during a binge episode. Results showed that two-thirds of the participants retrospectively reported feeling anxious, depressed, frustrated, helpless, lonely, bored, having a lack of will power, being out of control, and craving food prior to a binge episode. Further, participants reported an amelioration of negative psychological and physiological states during the binge episode. The results of this study support the notion of the functionality of binge eating such that negative experiences or distress often precede a binge episode and are alleviated during the episode.

Stickney, Miltenberger, and Wolff (1999) also found support for the functionality of binge eating. In their study, college women who engaged in binge eating reported feeling down or sad, upset, empty, hopeless, stressed, and overwhelmed prior to binge eating. These women reported feeling better, relieved, good, and content during the binge episode. These results are consistent with affect regulation models whereby participants who experience negative affect before binge eating report less negative affect during binges, with an increase in negative affect after the binge. Other studies have found similar results (Deaver et al., 2003; Telch & Agras, 1996).

Many studies support the affect regulation models, however, a more recent study found no differences in caloric intake for individuals with BED after a negative mood induction task. It was suggested that a positive environment allows for individuals to eat more given that individuals may be less vigilant about food intake (Dingemans, Martijn, van Furth, & Janson (2009). Further, studies have focused on the multiple factors that play a role in binge eating (e.g., Womble et al., 2001). Thus, affection regulation is likely a key component to binge eating, but not a single cause. It is becoming increasingly clear that the etiological mechanisms

underlying binge eating are complex and vary across different groups of people. Thus, further research is needed for a clearer understanding of binge behaviour.

Key Sociocultural and Psychological Factors Associated with Binge Eating

As is evident in the existing literature, binge eating is a complex behavioural pattern that cannot be accounted for by any single cause (Polivy & Herman, 1993). Many researchers have suggested factors that may play a causal role in binge eating such as gender-role socialization (Streigel-Moore, 1995), shame and guilt (Sanftner & Crowther, 1998), as well as race, ethnicity, and social class (Polivy, Herman, Mills, & Wheeler, 2003; Swami et al., 2010). Additionally, family influences, genetic and physiological factors, cognitive factors, and personality factors have received attention (Polivy et al., 2008). Though many factors have been hypothesized in relation to binge eating, most research has focused on self-esteem, body image disturbance, and the sociocultural pressure to attain thinness. It is likely that the interplay among these factors leads to binge eating rather than any single factor.

Self-Esteem

It has been suggested that low self-esteem leads to an increased vulnerability to the sociocultural pressure to be thin. Susceptibility to this pressure makes individuals more likely to diet (Polivy & Herman, 1993). Studies have found a significant relationship between self-esteem and chronic dieting status, as well as between self-esteem and body dissatisfaction (Heatherton & Polivy, 1992). Given the relationships among self-esteem, body dissatisfaction, and the sociocultural pressure to be thin, studies have not typically investigated each of these variables as independent risk factors for binge eating. Further, these relationships have been less studied among binge eaters. Also, self-criticism has been conceptualized as holding negative judgments about the self that are related to feelings of failure in living up to a set of expectations (Dunkley

& Grilo, 2007). Though self-esteem may be thought of as a global view of the self, self-criticism may be considered to function as a part of self-esteem. This concept is important in that self-evaluation, self-criticism, and self-esteem all are factors implicated in the causal pathway to binge eating. Low self-esteem has been found to mediate the relationship between self-evaluation related to perfectionism, self-criticism, depressive symptoms, and weight/shape concerns among binge eaters (Pratt, Telch, Labouvie, Wilson, & Agras, 2001). Further, self-criticism has been linked to the overvaluation of body shape and weight (Dunkley, Blankstein, Masheb, & Grilo, 2006; Hrabosky et al., 2007). Similarly, low self-esteem has been found to partially mediate the link between self-criticism and both depressive symptoms and weight/shape evaluation among individuals with BED (Dunkley & Grilo, 2007).

One of the difficulties outlined in understanding the influence of self-esteem upon eating pathology is the lack of studies controlling for depressive symptomology (Jacobi, Paul, de Zwaan, Nutzinger, & Dahme, 2004). Though the two variables are highly correlated, it is important to consider self-esteem independently of depressive symptoms in order to evaluate the effects of low self-esteem on binge behaviour. Jacobi and colleagues (2004) examined the role of self-concept in relation to self-esteem and depressive symptoms in eating disorder patients (BN, AN, and BED). Their results showed that eating disorder patients had lower levels of self-esteem and higher feelings of ineffectiveness compared to healthy controls. Importantly, these effects were found after controlling for depression. The results of this study support that self-concept deficits are more pronounced among individuals with eating disorders.

Few studies have looked at self-esteem as a predictor of pathological eating. Button, Sonuga-Barke, Davis, and Thompson (1996) conducted a longitudinal study in which they found that low self-esteem in 11 to 12 year old females predicted the onset of eating disorder symptoms

5 years later. Also, Sanftner and Crowther (1998) showed that a sample of women in university who engaged in binge eating reported greater fluctuations in their self-esteem with more reports of shame and guilt. Some studies have examined self-esteem in relation to self-enhancement. It has been suggested that self-enhancement (i.e., perceiving oneself in an overly positive manner) plays a role in self-esteem regulation whereby increased self-enhancement leads to greater self-esteem (Kwan, John, Kenny, Bond, & Robins, 2004). Thus, this effect could impact whether threats to self-esteem lead to more negative consequences (e.g., binge eating). This concept was supported in a study examining self-esteem threat and body image self-enhancement. Jarry and Kossert (2007) investigated the effect of a self-esteem threat combined with exposure to thin media images on body dissatisfaction and body image investment. Participants received a self-esteem threat consisting of false failure feedback versus a false success feedback on an intellectual task prior to viewing ads of thin models. Results showed that participants who received failure feedback prior to viewing the thin images reported feeling more satisfied with their appearance and less invested in body image compared to those who received the success feedback. The authors suggested that exposure to the thin ideal may have inspired women who experienced threats to self-esteem to use appearance as an alternative source of self-worth, which in turn maintained global self-esteem through body image self-enhancement. Given that lower self-esteem has been identified as a factor associated with reported levels of body dissatisfaction (Wilksch & Wade, 2004), it is important to consider self-esteem on its own, in addition to the interplay between self-esteem and other factors such as body dissatisfaction, in relation to binge eating.

Masheb and Grilo (2003) found that binge eaters' changes in body dissatisfaction were significantly correlated with changes in self-esteem. Increased body dissatisfaction may increase

the vulnerability to thin ideal internalization. Attempting to achieve the thin ideal increases the likelihood that the individual will diet, which may lead to a cycle of dieting, breaking the diet, and binge eating. As a result, dieters who fall into this cycle, and do not have successful weight loss, experience decreases in self-esteem with each successive dieting failure (van den Berg, Thompson, Obremski-Brandon, & Coovert, 2002). Thus, low self-esteem has been shown to be a factor at the onset of dieting and binge eating as well as a result of unsuccessful dieting and binge eating (Polivy & Herman, 1993). Although it is currently unknown whether self-esteem is a precursor or the result of dieting, binge eating does appear to be more prevalent in those with low self-esteem (Polivy et al., 1988).

Body Image

Body image is a concept that has been studied extensively in eating disorder literature. Body image is a complex construct that includes one's perceptions and attitudes about his or her body (Cash & Pruzinsky, 2002) and overall appearance (Rudiger, Cash, Roehrig, & Thompson, 2007). Body image is comprised of different components, for example, body dissatisfaction is considered to include an affective component (Masheb & Grilo, 2003). Further, body image concerns have been conceptualized as part of the causal path to binge eating. Additionally, body image disturbance is part of the diagnostic criteria for AN and BN in the DSM-IV-TR (American Psychiatric Association, 2000), and is speculated to be an important criteria for BED (Masheb & Grilo, 2000). Research supports that body dissatisfaction is a consistent and strong risk factor for the development of eating disorders and poses risk for low self-esteem and depression (Grabe, Hyde, & Lyndberg, 2007; Grabe, Ward, & Hyde, 2008). Body dissatisfaction is thought to begin at an early age, with studies estimating initial reports as early as 7 years of age (Dohnt & Tiggeman, 2006). Increases in body dissatisfaction are thought to peak in adolescence and

impact females more than males, with greater eating pathology among individuals who place more emphasis on their bodies (Dittmar, 2005). It has been reported that up to 50% of female undergraduate women report body dissatisfaction (Bearman, Presnell, & Martinez, 2006), which is consistent with reported variation in body image concerns across different age groups (Dohnt & Tiggeman, 2006).

Rudiger and colleagues (2007) examined day-to-day body image states among a sample of university women. The researchers sought to investigate variables that are predictive of body image states. The study examined three variables in association with body image; body image disturbance, cognitive distortions and perfectionistic self-presentation. Participants completed a series of questionnaires in the first part of the study, followed by completing a daily body image states scale. Results showed that low levels of appearance investment for one's self-worth were related to lower levels of body dissatisfaction. Also, favourable body image was associated with less pathological eating attitudes. Finally, variability in body image states was predicted by greater perfectionistic self-presentation and greater cognitive distortions (Rudiger et al., 2007).

To date, few studies have examined body image disturbance in binge eaters. The focus of these studies has been on developing body image criteria for BED, for example, weight and shape concerns. As mentioned earlier, similarities regarding body image disturbance have been found among AN, BN, and BED. Masheb & Grilo (2000) studied the differences between criteria for BED, BN, and AN. Results of the study suggested that BED is lacking a requirement for distress associated with dysfunctional attitudes regarding weight and shape, which has implications for future classification and intervention with this population. Similarly, Wilfley, Schwartz, Spurrell, and Fairburn (2000) examined differences in weight/shape concerns among individuals with BED, BN, and AN. Results showed that participants with BED scored similarly

to participants with BN regarding weight and shape concerns. Additionally, participants with BED reported dysfunctional eating attitudes and behaviours, such as eating in secret (Wilfley et al., 2000). The results of these studies support body image as an important factor in BED. However, studies have looked at body image in conjunction with other variables known to impact BED such as self-esteem. In addition, a substantial amount of research has focused on examining body image in relation to sociocultural context, specifically the pressure to internalize and attain the thin ideal.

Sociocultural Pressure

Over time, the focus has shifted from viewing pathological eating as a result of psychiatric factors alone to being more inclusive of sociocultural context. It has been suggested that the cultural ideal for women in society has become an unrealistically thin ideal (Polivy et al., 2008). Further, sociocultural pressures have been theorized to contribute to the development of eating disorders (Grilo, 2006). In relation, a significant portion of eating disorders research has focused on the sociocultural pressure to be thin, and the corresponding impact that the thin ideal has on the prevalence of eating disorders (Thompson, Coovert, & Stormer, 1999). Several studies have additionally focused on the risks associated with internalizing the thin ideal for specific groups. For example, researchers have found support for the idea that female athletes in gymnastics and ballet are at higher risk of trying to achieve idealized thinness and thus increase their risk of developing eating disorders (Polivy et al., 2008). Furthermore, there are different venues that promote the thin ideal and place sociocultural pressure on women such as peer relationships, sex roles, and cultural contexts. For example, parenting and peer influences have been suggested to contribute to thin body preoccupation and social pressures to achieve thinness among children (Agras, Bryson, Hammer, & Kraemer, 2007). Nevertheless, the most widely

studied sociocultural influence is the media. Women in Western society are thought to be bombarded with messages and images that place an increased demand on them to attain thinness. Sociocultural notions of beauty in Western cultures are thought to equate thinness with beauty, femininity, and happiness (Striegel-Moore & Smolak, 2000).

Sociocultural theories (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999) posit that the media influences body dissatisfaction and pathological eating through its transmission and reinforcement of thin ideals. The sociocultural pressure to attain these unrealistic ideals is a large contributor that leads to the acceptance and internalization of the thin ideal (Cash, 1995; Dittmar, 2005). Studies over the years have suggested that the internalization of the thin ideal has also been accompanied by a high degree of body image dissatisfaction (Brown, Cash, & Lewis, 1989; Grabe et al., 2008; Groesz, Murned, & Levine, 2002). Body dissatisfaction and the desire to be thinner has contributed to the increasing prevalence of dieting (Polivy & Herman, 1993). Given that the majority of women do not develop eating disorders, it cannot be said that the media is solely responsible for such pathology. It has also been suggested that it is not exposure alone to sociocultural pressure that causes problems, but instead the internalization of such pressures in terms of ideas, beliefs and values (Dittmar, 2005). The sociocultural pressure to achieve thinness is also important to consider in relation to rates of obesity and unhealthy eating, suggesting that attempts to achieve the thin ideal may take precedence over maintaining one's health (Paquette & Raine, 2004).

It is important to highlight that self-esteem, body image, and sociocultural pressures to achieve thinness interact to enhance the risk of binge eating. Though the media is considered to be the most influential sociocultural context risk factor for the development of eating pathology and body dissatisfaction, it is likely only one part of the causal pathway. Further, it is evident

that there are mixed findings regarding media influences and their underlying mechanisms regarding binge eating behaviour.

The Media

Historical Shifts

With the increased interest in the impact of the sociocultural pressure to achieve the thin ideal, the media has received attention for its role in the development of eating disturbance and body image concerns. Few studies have tracked media images historically in order to gain a better understanding of the changes that have taken place over the years. Past studies have focused on specific magazines, such as Playboy or looked at changes among beauty pageant contestants in order to show trends toward thin body types (e.g., Garner, Garfinkel, Schwartz, & Thompson, 1980). However, it is likely that women were not regularly exposed to these images. Thus, it is important to consider everyday magazines that women are exposed to and are also readily available. For example, common magazines that are available through subscriptions, friends, in offices, coffee shops, and grocery stores are important sources of exposure and are readily available to women. In examining trends over a 40-year span (1959-1999), it was found that fashion models in magazines became increasingly thin during the 1980s and 1990s. Also, shifts have been made from headshots and focus on the upper body to full body images, especially on the covers of magazines (Sypeck, Gray, & Ahrens, 2004). Thus, models have become thinner and magazine images have become increasingly revealing. Further, it is important to consider that attainment of thinness is associated with perceived happiness in life, and overweight and normal weight women in the media have been derogated, ridiculed, and criticized (Polivy et al., 2008). Further, difficulties with weight and obesity have been culturally defined as an individual problem where these women are considered to be in need for more self-

control, thus resulting in greater stigmatization (Saguy & Gruys, 2010). Interestingly, what is currently considered plus size has also shifted whereby smaller size waists that were once considered 'normal' are now considered to be plus size. For example, the television industry and television shows such as America's Next Top Model consider sizes between 8 and 10 to be plus size, where traditionally sizes of 14 and above are considered to be plus size (Johnson, 2011).

The impact of the media has received much attention and many studies have supported negative consequences associated with exposure to media ideals. As a result, it has been suggested that recent shifts have been made to be more accepting of women of different shapes and sizes. Weston and Bliss (2005) reviewed the changes that have occurred in television and magazines over time and focus on newer trends, particularly greater inclusion of women with larger body sizes. The authors suggest that larger women were readily accepted in the 1800s and shifts were made to thinner body types in the mid 1900s. Further, it appears that society's acceptance of women's bodies tends to be rather specific with little variation among body types. Recent media depictions of women's body size has been thought to be more inclusive of all women's body types with companies such as Cover Girl, Clairol, and Dove including diverse women in their ads (Weston & Bliss, 2005). Though it appears that some shifts have been made with regards to including larger women and not solely focusing on the thin ideal, it is unclear whether these campaigns are effective. Further, it is unclear whether these women are truly accepted and viewed positively, rather than criticized, ridiculed, or simply ignored. Also, in comparison to the portrayal of the thin ideal, it is apparent that there are very few examples and situations that show women of all sizes compared to those showing thin ideals. As a result, this area has become a topic of interest, and there has been considerable recent research suggesting negative consequences of media exposure for women.

Negative Effects of the Media

Some of the variables studied in relation to media exposure are disinhibition and overeating, restrained eating, mood, self-esteem, and body dissatisfaction. Different studies have theorized why women experience negative outcomes when exposed to thin media images. Anschutz, Engels, and Van Strien (2008) examined susceptibility to thin media images and eating behaviour. In their study, the authors examined susceptibility for media-portrayed thin ideal internalization and three different types of eating styles directly and indirectly through body dissatisfaction. The types of eating styles included restrained (dieting), emotional (eating in response to emotional arousal), and external eating (eating in response to food-related cues). Results of the study indicated that higher thin ideal media susceptibility was directly related to higher scores for all three eating styles and indirectly related to more restrained and emotional eating through higher levels of body dissatisfaction. Thus, it is suggested that media influence is important to research in relation to eating behaviour (Anschutz et al., 2008). Other studies have found similar results whereby perceived media ideals and media arbitrated weight loss information were associated with higher levels of restrained eating (Dunkely, Wertheim, & Paxton, 2001). Choice of snack food after exposure to thin media images has been recently examined and results suggest that exposure to thin models compared to normal sized models led women to choose diet food over regular snacks. Moreover, for individuals who reported habitual restrained eating, the diet snack was chosen after exposure to the normal sized model as well (Krahé & Krause, 2010). Additionally, it has been found that young women exposed to thin female models ate less than when exposed to normal sized models (Strong, 2001). However, it is unclear what a normal sized model represents for women with distorted perceptions of body

image. Thus, it is important to consider the subjective nature of body image perception in relation to media image exposure.

Seddon and Berry (1996) found that restrained eaters ate more than unrestrained eaters when viewing video images of stereotypically thin and attractive women. However, a recent study examining the relationship between thin media images and diet product exposure, restraint status, and food intake found that restrained eaters ate less when exposed to thin media images and diet products compared to neutral images and neutral ads (Anschutz, Van Strien, & Engels, 2008). The authors highlight that cultural factors such as differences in beauty ideals and methods of dieting may explain these findings. More research in this area will clarify how media images influence eating behaviour among restrained women. Most of the research on media influence has focused on women's body image.

Recent studies examining body image states among women exposed to the thin ideal have focused both on magazine images and television. Bell, Lawton, and Dittmar (2007) examined exposure to thin models in music videos on the body dissatisfaction of adolescent females. They suggest that music videos provide another form of media portrayal of the thin ideal, which may heighten exposure given that the physical appearance and body size or shape of the models are emphasized through dance movements and close-up shots. Results of the study showed that females exposed to music videos with thin models reported greater levels of body dissatisfaction compared to females who listened to the songs in the absence of visual input. Female reports of body dissatisfaction were found to occur irrespective of level of self-esteem. A hypothetical explanation put forward by the authors is that body dissatisfaction may make females more likely to experience low self-esteem rather than low self-esteem causing increases in body dissatisfaction (Bell et al., 2007). Similar results showing increased body dissatisfaction

after exposure to models in music videos has been observed in college women (Tiggemann & Slater, 2004). Thus, it appears that thin models in music videos lead to higher body dissatisfaction across different age groups, which may also influence one's level of self-esteem.

Studies have also examined appearance-related information in television commercials. Legenbauer, Ruhl, and Vocks (2008) studied media influence on body image in eating disorder patients. Patients were exposed to commercials that featured appearance-related material. It was found that perceptual and attitudinal components of body image changed in the patients after viewing the appearance-related commercials compared to the control group. Further, it was found that eating disordered patients rated themselves to be heavier than the control group after viewing the images, even though there were no differences in measures of body mass index between the groups. Support was also found for the idea that exposure to the thin ideal in the appearance-related media triggered attempts to reduce body image disturbance with thoughts of dieting. Thus, the authors suggested that the thin ideal, as portrayed through media, may lead to the activation of body-related schemas.

Several studies have also considered the impact of thin media images, as depicted in magazines, on body image. Dohnt and Tiggemann (2006) studied both peer and media influences as sociocultural means of influencing body image in young girls between the ages of 5 and 8. Results of their study found that as early as 6 years of age 46.7% of girls reported the desire for a thinner figure. Further, 43% of the sample reported that they would use a form of dietary restraint to control their weight if they started to gain weight. The authors point out that most girls did watch television, and though unable to read, were exposed to magazine images and did view them. It is also important to note that though the girls desired a thinner figure, body dissatisfaction presents differently in younger girls compared to older adolescents and

women. Young girls were generally satisfied with how they looked, and this was related to self-esteem. The relation between self-esteem and body dissatisfaction among older women is not as clear. However, it is important to consider that young girls have an understanding about societal beliefs about thinness and this may develop into increased body dissatisfaction at a later age. Other studies have also supported the notion that young girls report aspirations to achieve thinness (e.g., Champion & Furnham, 1999). Thus, it appears that at a young age, sociocultural pressures of the thin ideal influence girls. Finally, peers were also found to be important in relation to body dissatisfaction among young girls, suggesting that awareness of the thin ideal exists across peer groups (Dohnt & Tiggemann, 2006). Thus, body dissatisfaction and internalization of the thin ideal may be a normative issue among this age group. Additionally, given that there are reports of diagnoses of eating disorders at younger ages, it has been suggested that media influence prevention and intervention strategies need to begin at an early age, with an increased focus on parenting and control over children's exposure to the media (Derenne & Beresin, 2006).

Pinhas, Toner, Ali, Garfinkel, and Stuckless (1999) examined the impact of thin media images of supermodels on the mood and body satisfaction of female university students. Results showed that participants exposed to the images of thin models reported greater depressed mood and more feelings of anger. In addition, it was suggested that women with greater degrees of body dissatisfaction and eating disorder symptomology are more vulnerable to thin media images. Birkeland and colleagues (2005) exposed female college students to one of four conditions: media images of an attractive model with an appearance-related product; an appearance-related product alone; an attractive model with a neutral product; or a neutral product alone. Participants completed mood ratings prior to viewing images and after viewing images.

The study found that participants who viewed images with models reported an increase in negative mood and higher levels of body dissatisfaction compared to viewing advertisements with products alone. Thus, these findings support the notion that media images negatively impact women.

It has been established across studies that thin media images have led to increased body dissatisfaction. However, it is less clear about why this is. Ip and Jarry (2008) investigated the effect of thin media images in relation to body image investment. The researchers focused on two aspects of body image investment: self-definition and appearance management. Self-definition refers to the use of appearance as a means to define one's self and appearance management is the effort one puts in to improve or maintain a level of attractiveness. Thus, individuals who are high in each of these areas are thought to be more invested in their body image. Results showed that both types of body image investment were related to negative consequences of exposure to the images. It was also found that those invested in body image for self-definition purposes had greater body dissatisfaction compared to those with high appearance management and reported current-ideal discrepancies to be more important postexposure to the thin ideal (Ip & Jarry, 2008).

Yamamiya, Cash, Melnyk, Posavac, and Posavac (2005) studied the role of media-ideal internalization on body image states in young women. The results of their study supported negative body image states to be more salient among women exposed to thin media images when they displayed high levels of media-ideal internalization and social comparison tendencies. Similarly, Brown and Dittmar (2005) found that strong thin-ideal internalization and level of attention paid to thin images were related to increases in body-focused anxiety. They also found that weight-related anxiety postexposure to media images resulted in the activation of appearance

schemas among all females, but more so among those who had higher levels of thin-ideal internalization. Interestingly, Hawkins, Richards, Graney, and Stein (2004) found that exposure to the thin media images resulted in increases in body dissatisfaction, negative affect, lower self-esteem, and reporting of eating disorder symptomology, but not higher levels of internalization of the thin ideal. Thus, the results of these studies support that body image is a complex construct leading to different responses regarding exposure to thin media images.

Researchers have examined a variety of theories and variables in relation to exposure to the thin ideal through the media. A recent study examined the effect of a self-activation manipulation on body and weight satisfaction in restrained and unrestrained eaters postexposure to thin media images (Smeets, Jansen, Vossen, Ruf, & Roefs, 2010). Self-activation was defined as having an awareness of one's cognitions, feelings, behaviours, and goals. It was found that self-activated restrained eaters showed decreases in body and weight satisfaction postexposure to images compared to unrestrained eaters. Thus, self-activation and restrained eating had an effect on women's self-evaluations in relation to exposure to thin media images. Harper and Tiggemann (2007) examined the effects of thin media images on state self-objectification. The authors define self-objectification as the process whereby women adopt an observer's perspective of their physical selves, which they argue results from experiences of sexual objectification. Sexual objectification represents cultural and interpersonal experiences in which women's bodies are evaluated as a sexual object. Exposure to thin images resulted in higher levels of state self-objectification, negative mood, body dissatisfaction and weight-related appearance anxiety. The authors contend that these findings provide evidence for the stimulation of self-objectification in women through subtle cues such as media images. Further, it is

suggested that women do not need to focus on their own physical appearance in order to experience self-objectification.

Research has also examined the effect of positive attributes placed on thin models on body dissatisfaction, thin-ideal internalization and eating disorder symptoms (Ahern, Bennett, & Hetherington, 2008). Results showed that women who associated thin models with positive attributes were found to report higher levels of eating disorder symptoms. Also, positive attributes for thin models were related to drive for thinness, and this was greater for women who reported the media as an important source of information regarding attractiveness and fashion. In addition, measures of thin-ideal internalization were correlated with restrained eating, drive for thinness, and body dissatisfaction (Ahern et al., 2008). Certain personality traits have been found to moderate effects of exposure to media images on body satisfaction in women. More specifically, higher scores of neuroticism have been found to decrease reported body satisfaction in women exposed to thin images and increase body satisfaction in women exposed to images of heavier women (Roberts & Good, 2010). Thus, the results of these studies speak to the importance of different variables that impact the effect of thin media images on various aspects of women's health. Moreover, such studies illustrate the complexities of women's attitudes and schemas in relation to the thin ideal.

To date, several studies have examined the negative impact of the thin ideal portrayed by the media on women. Levine and Murnen (2009) reviewed studies examining research in the area of media influence on body image concerns and disordered eating in women. Their review suggests that the extent of exposure to media images does impact negative body image and disordered eating. Further, their review suggests that stronger support is rooted in experimental research and that research focusing on direct exposure (engagement) to media images is

important. Regarding the latter, overall it is suggested that engagement with media is a variable risk factor that may develop into a causal risk factor over time (Levine & Murnen, 2009). Meta-analyses provide an overall picture of the research in this area. Groesz et al. (2002) conducted a meta-analysis of 25 experimental studies examining the effect of media images on thin ideal as well as the moderating effects of body image disturbance. Their results support that women felt worse about their bodies after media exposure to the thin ideal in comparison to images of average and plus size models or cars and houses. Interestingly, some of the studies supported that this negative impact was shown to be strongest for women below the age of 19. An updated meta-analysis to Groesz et al. (2002) was conducted by Want (2009) where he investigated moderating effects for media induced social comparisons and decreased appearance satisfaction. His review included 47 research studies that included an experimental component. Results found preexisting appearance concerns and processing instructions for exposure to the images to be moderators with small to medium effect sizes. Regarding processing instructions, it was found that higher effects existed when participants were asked to focus on other aspects of the image or those that are unrelated to appearance rather than the model or appearance of the model. The author suggests that social comparison processes are automatic and can have adverse effects on appearance satisfaction; however, individuals are thought to make an effort to moderate these effects and restore self-image through conscious defensive reactions. Defensive reactions may include discounting ideas such as digital enhancement of images, use of make-up and lighting, and the fact that the women in the images are models (Want, 2009).

Grabe and colleagues (2008) conducted a meta-analysis of studies examining the thin media ideal and body image concerns in women. The authors reviewed a total of 77 studies that investigated media exposure, body dissatisfaction, internalization of the thin ideal, and eating

behaviours and beliefs. Though the majority of the studies in this area are experimental, which are supportive of a causal contribution of the media to eating pathology and body image disturbance, correlational studies were also included. The meta-analysis yielded four outcome variables; body dissatisfaction, self-consciousness/objectification, internalization of the thin ideal and drive for thinness, and eating behaviours and beliefs. Results support that exposure to thin ideals in the media is related to body image disturbance in women, consistent with the findings of Groesz et al. (2002). Further, relationships were found between media depiction and internalization of the thin ideal, women's eating behaviours, and beliefs. More specifically, the authors suggest that thin ideal media exposure is related to more frequent reports of bulimic and anorexic attitudes and behaviours. Additionally, findings support thin media exposure's influence on measures that assess bulimia and purging. Thus, the results of the meta-analysis found that media exposure to the thin ideal is related to body dissatisfaction, investment in appearance, and endorsement of eating disorder behaviours (Grabe et al., 2008).

Given that the majority of women are exposed to thin ideals put forth by the media, and few develop pathologies, the argument regarding the negative impact of the media may be weakened. Recently, media exposure effects on body dissatisfaction have been examined regarding peer influences and peer competition within an evolutionary framework (Ferguson, Winegard, & Winegard, 2011). These authors indicate that it is the influence of sociocultural forces on female competition that has a stronger negative impact on body dissatisfaction in comparison to media exposure. Further, researchers question why women purchase magazines or allow themselves to be exposed to thin ideals via the media if they present such adverse effects (Polivy & Herman, 2004). Though there is a substantial amount of evidence that supports the negative influence of media portrayals of thinness on women's self-esteem, body image, and

eating behaviour, recent studies have suggested that media images may also have a positive impact.

Positive Effects of the Media

Recently, some researchers have shifted focus and suggested that the media cannot be implicated as a causal factor in the development of negative health outcomes for women, at least not solely. One of the strongest arguments against negative media influences is that many women are exposed to media portrayed thin ideals, but only few go on to develop eating disorders (Polivy et al., 2008). Further, it has been suggested that exposure to thin media ideals is likely more complex involving internalization of ideals, appearance-related schemas, attitudes, values and beliefs, rather than exposure alone (Grabe et al., 2008). Researchers have examined self-schema activation through attentional and memory biases after priming body and appearance concerns among women with reported high thin ideal internalization (Cassin, von Ranson, & Whiteford, 2008). In this study, female undergraduate students viewed images of either sports cars or attractive swimsuit models followed by the completion of the Lexical Decision Test and a word recall test. Results suggest that even when body and appearance concerns are activated, women with high thin ideal internalization do not preferentially attend to and recall schema congruent information or avoid incongruent information. That is, women rated as having high thin ideal internalization did not display an attentional bias toward "fat" or "thin" words, rather it was found that these women selectively attended to "attractive" words. This suggests that an ideal appearance may be part of the self-schemas of women who value appearance ideals, or attractive models in the images may be viewed as inspirational. The authors highlight that results support existing research that cognitive biases differ between women with clinical eating disorders and women in the general population.

Radford (2007) sought to deconstruct 'myths' that focus on the media as negatively impacting women's well-being. The author outlines that research suggesting the Barbie doll is a role model for children and her body is viewed as the thin ideal is sparse and lacking evidence. It is suggested that much of the research presenting negative influences of the media is premised on assumptions rather than verified. With respect to thin media images, it is suggested that cause and effect relationships are complex and cannot be inferred from the existing literature. Moreover, methodological limitations must be considered when drawing conclusions based on such studies (Radford, 2007). Finally, the author suggests that more research is needed to understand what women consider to be beauty and appearance ideals, their relations to self-esteem and concerns about weight and shape.

One of the key studies examining positive effects of media images was conducted by Mills and colleagues (2002). The authors conducted a series of studies examining the effect of thin media images on eating, body image, and the mood of restrained and unrestrained eaters. Ninety-eight female undergraduate participants viewed 12 advertisements from popular women's magazines. Participants were randomly assigned to one of three conditions: advertisements showing thin bodies, large bodies, or no bodies. Restrained eaters were found to disinhibit and eat more in response to viewing thin images compared to unrestrained eaters. Restrained eaters also reported a thinner personal ideal and current body size following exposure to the thin images. Moreover, restrained eaters found the thin images to provide self-enhancement effects in that they reported wanting to be thinner along with reporting that they are thinner. Results of this study support the notion that thin media images may not be entirely negative and may have positive enhancing effects for women. However, results do not explain why restrained eaters still disinhibited and ate more. Furthermore, exposure to images in the absence of a comparison

threat may account for the images being viewed as self-enhancing, as well as reported aspirations to achieve thinness.

Joshi, Herman, and Polivy (2004) conducted a similar study to Mills et al. (2002) in which they examined the impact of thin media images on the mood, self-esteem, and self-image ratings of restrained and unrestrained eaters. Results indicated that restrained eaters exposed to thin images rather than neutral ones reported more favourable self-image and social self-esteem. Currently, there are mixed findings as to whether thin media images result in negative consequences or positive experiences for women.

Bola and Jarry (2006) conducted a preliminary study examining the impact of thin media images on the affect and candy consumption of binge eaters. Binge eaters and nonbinge eaters were exposed to either thin media images or neutral images of interior design. During the exposure, participants were asked to write about their perceptions in relation to the images and were offered M&Ms as food stimuli. Results showed that binge eaters ate more overall compared to nonbinge eaters. Further, binge eaters ate significantly more than nonbinge eaters when exposed to the thin media images. Interestingly, binge eaters were found to report an increase in positive affect after viewing thin media images, whereas nonbinge eaters reported a decrease in positive affect after viewing the thin images. The results of this study suggest that although binge eaters consumed more candy, they viewed the images in a positive light. However, it is unclear as to whether the images themselves caused the reports of positive affect or whether it had something to do with the act of eating itself. Further, it is unclear whether binge eaters and nonbinge eaters attended to the thin models or based their perceptions on other qualities of the image.

Previous studies have shown that women's reactions to the thin ideal vary as a function of their own body perception and dieting status (Henderson-King & Henderson-King 1997; Myers & Biocca, 1992). A meta-analysis conducted by Holmstrom (2004) yielded positive effects of media on body image. This review of 34 studies included both experimental and survey research that examined the relationship between media and body image. Studies were selected if they had a measure of media exposure as the independent variable and a measure of body image, feelings about thinness, or eating pathology as the dependent variable. Results supported a weak relationship between media and body image. Further, the idea that women feel bad after exposure to media images was not supported. Results are explained in relation to social comparison theory, in that women may not have been comparing themselves to the images in order to elicit negative effects. Positive effects of media images on body image were found for women exposed to images of overweight women. Further, longer exposure to images resulted in greater body satisfaction among women (Holmstrom, 2004). The results of this meta-analysis are inconsistent with other meta-analyses that have shown overall negative effects of media on body image (i.e., Grabe et al., 2008; Groesz et al., 2002). Thus, it is important to consider the theoretical standpoints of studies, as well as methodological differences and limitations in interpreting the research.

At present, there appears to be mixed findings regarding the impact of the media on women's health outcomes. More research is needed to understand the impact of the media on such variables and to outline why some women experience positive effects while others experience negative effects.

Plus Size Images

Many of the studies presented have focused on the portrayal of the thin ideal in the media. Less is known about the effects of plus size images and their relationship to media influence on women's health outcomes, such as eating behaviour, affect, self-esteem, and body dissatisfaction. Strahan, Spencer, and Zanna (2007) examined the influence of incorporating plus size images on the eating behaviour of women. Their research consisted of four studies. In the first study, women were exposed to television advertisements of thin women versus neutral objects. Results showed that women restricted their eating and ate less when exposed to the thin images. The second study included a third group who watched advertisements with relatively heavy women who were depicted to be successful. Results showed that women were less restrained in their eating in response to these images. In the subsequent study, women who were told that their peers did not endorse the idealized thin images were also less restrained in their eating. Finally, in the fourth study, exposure to thin images led to the activation of an association between weight and interpersonal rejection, which in turn led to restrained eating (Strahan et al., 2007). Thus, the results suggest that exposure to the thin ideal leads to restrained eating in women, but this effect can be reversed by including plus size women portrayed in a positive manner.

Smeesters and Mandel (2006) examined media exposure to both thin and plus size images. Their results suggest that women's reported self-esteem depends on the extent of comparisons made to the images. Also, the extremity of the comparison standard was found to be a crucial factor in determining assimilation and contrast effects. Assimilation effects occur when individuals see themselves as similar to the comparison target whereas contrast effects occur when individuals see themselves as dissimilar to the comparison target. Results also

supported that the self-evaluation method of free response or rating scale influences findings. An important finding of the study was that comparisons to moderate standards increased the accessibility of consistent self-knowledge regarding one's weight/shape in comparison to the model. However, comparison with an extreme standard increased the accessibility of inconsistent self-knowledge regarding one's weight/shape in comparison to the model. The accessibility to this type of self-referent knowledge impacts whether one will see the self as more similar or dissimilar to the model (Smeesters & Mandel, 2006). Thus, the results of this study suggest that exposure to average size models may yield consistent self-comparisons and positively impact self-esteem while extremely thin or overweight models may have more negative effects.

Most research to date has focused on thin models in examining media influences on women's health. Though different types of media have been used, a large portion of the literature has focused on magazine images. Plus size images have only been examined in a few studies. Some of these studies have examined differences in social comparisons made to plus size models and thin models, and have found that comparisons to plus size models do not alleviate body dissatisfaction (e.g., Lin & Kulik, 2002). However, other studies have found participants to report increased body dissatisfaction in response to thin images, and improved body satisfaction after viewing overweight images (Ogden & Mundray, 1996). Thus, it is important to understand the mechanisms behind and types of social comparisons to media images and how these differ with respect to thin and plus size models.

Social Comparison

Social comparison has been established as a ubiquitous social phenomenon and conceptualized as a central feature of human social life (Buunk & Gibbons, 2007). Since

Festinger's (1954) classic formulation of social comparison theory, much research has been done to expand on the basic principles of the theory in order to gain a better understanding of social comparison processes. Social comparison theory posits that individuals have a drive to evaluate themselves, which can be satisfied by engaging in social comparison with others. It has also been theorized that individuals seek out comparison targets that are similar to the self rather than dissimilar. Recent works have suggested that comparisons are sought based on three areas of opinion assessment: preference assessment as to whether one likes the stimulus, belief as to whether the stimulus is true, and preference prediction regarding whether one will like the stimulus (Suls, 2000).

Festinger's theory has been applied to body image wherein individuals are thought to compare themselves in terms of appearance, weight, and body shape. Studies examining the impact of the media predict that many individuals are vulnerable to making comparisons with thin images. Further, it is suggested that women in society are inundated with numerous messages and ideals through media channels such as magazines or television, which provide occasions for comparison (Thompson et al., 1999). Early theorizations suggest that individuals who view thin media images and engage in comparisons tend to be more motivated to look like the individuals in the images (Goethals, 1986). Moreover, it is suggested that such comparisons will result in the motivation to meet certain goals that may not be realistically attainable. In addition, it is thought that social comparisons occur at an automatic level and may occur frequently and across many situations (Buunk & Gibbons, 2007). Not only are comparisons thought to occur automatically, it has been demonstrated that they occur outside of awareness (Stapel & Blanton, 2004). Research supports that individuals make automatic comparisons when seeing media images without being consciously aware of doing so (Botta, 1999). Furthermore, it

has been found that women report difficulty in focusing on other qualities of images rather than the models when exposed to media images (Bola, 2007).

Thus, it appears that social comparisons occur often, automatically, and may not always be deliberate. Further expansion of classic social comparison theory has focused on upward and downward comparisons, which are likely important to the understanding of social comparison to media images and the related outcomes.

Upward and Downward Comparisons

Festinger's concept of upward drive is related to the notion that individuals prefer to compare with others who are thought to be better than the self (Festinger, 1954). This research was linked to comparisons of abilities. Studies have shown that upward comparisons occur more often in private, and when individuals feel that they are able to achieve self-improvement (Buunk & Gibbons, 2007). Moreover, research has shown that upward comparisons may be adaptive and have a positive impact. This may be strongly related to whether individuals assimilate or show a contrast effect to the comparison target (Buunk & Gibbons, 2007). However, it is important to consider that while there may be a positive adaptive function to engage in upward comparisons, there are also negative consequences. These negative consequences are more likely to occur when individuals are threatened by upward comparisons or become defensive (Buunk & Gibbons, 2007). This may be an important concept to consider in response to internalization of the thin ideal when it is unattainable.

The notion of downward comparison developed out of classic social comparison theory. It is suggested that individuals who are threatened by a certain variable will prefer to compare to others who are thought to be worse off on the same variable (Buunk & Gibbons, 2007). For example, individuals with eating disorders have been found to make comparisons to those with

more serious problems (as cited in Buunk & Gibbons, 2007). As a result, individuals will avoid upward comparisons because they are threatening and lead to negative outcomes, whereas downward comparisons have the propensity to make the individual feel better. Studies have supported that downward comparisons can lead to improvement in affective states (Buunk & Gibbons, 2007). Nevertheless, irrespective of type of threat, it is possible that individuals still prefer upward comparisons. In relation to exposure to media images, it may be that exposure to plus size images of models can alleviate the sociocultural pressure to internalize and achieve the thin ideal.

Another important concept to consider in relation to social comparison theory is self-evaluation. The focus of most research in this area has been on assimilative and contrast effects. That is, do individuals view themselves as similar or different to the comparison target? Research supports that individuals' responses to social comparison are related to their self-concept (Buunk & Gibbons, 2007).

Social comparison is a complex process, requiring an expansion of classical social comparison theory. The concepts discussed are important to the understanding of women's responses to media images. It is possible that upward social comparisons to thin media images result in negative consequences because of contrast effects. However, it is also possible that women choose such images as means of inspiration, which would support the idea that such images are positively influential. In addition, plus size images may provide stimuli for downward comparisons and result in positive consequences for women. Several studies have examined social comparison to media images on different variables. However, few studies have incorporated plus size images and to this author's knowledge, no studies have examined these concepts in binge eaters.

Empirical Evidence for Social Comparison

Corning, Krumm, and Smitham (2006) found that engaging in daily social comparisons is predictive of eating disorder symptomology. Participants were instructed to compare themselves in terms of appearance, body image and attractiveness to media images of women. Participants were also asked to complete a series of self-report measures related to body image, self-esteem, and eating disorder symptoms. The authors found that the tendency to socially compare to others was predictive of the presence of eating disorders among women. Also, it was found that women who endorsed pathological eating were more likely to engage in daily social comparisons. Further, negative body-related comparisons were predictive of eating disordered behaviours. Tiggemann and McGill (2004) studied the effects of social comparison to thin media images. It was found that exposure to magazine images of thin models led to increased negative mood and body dissatisfaction. In another study, it was found that exposure to media images via the Internet and social networking sites led to greater media internalization of the thin ideal, along with appearance comparison, weight dissatisfaction and increased drive for thinness among adolescent girls (Tiggemann & Miller, 2010). Similarly, affective responses of media exposure to thin images in women who were high or low on drive for thinness support that viewing images of the self in relation to media images yielded less pleasure and greater negative affect in women who reported a high drive for thinness (Hausenblas, Janelle, & Gardner, 2004). The authors suggest that these findings may be explained by upward comparisons. That is, women were likely engaging in upward comparisons given that the models had a lower body mass index and body fat percentage compared to the participants.

Studies examining social comparison to thin media images support that comparisons lead to increased body image disturbance and appearance-related dissatisfaction (Cattarin, Thompson,

Thomas, & Williams, 2000; Harrison & Cantor, 1997; Kozar & Damhorst, 2009; Shaw & Waller, 1995), and this relationship is mediated by levels of self-esteem (Corning et al., 2006; Martin & Kennedy, 1993). Similarly, a recent meta-analysis across 156 studies that assessed social comparison with most featuring media images found that unfavourable appearance-based comparisons were related to greater body dissatisfaction (Myers & Crowther 2009). In a study by van den Berg and colleagues (2007), it was found that body comparisons with media images led to higher levels of body dissatisfaction and low-self esteem and depressive mood were found to be associated with more comparisons with media images. Further, body satisfaction and self-esteem have been found to decrease among adolescent girls and female college students after exposure to thin and average size models. These findings were attributed to greater body dissatisfaction, accounted for by higher levels of awareness and internalization of attitudes toward appearance, social comparison to the models, and less satisfaction with one's own physical appearance (Clay, Vignoles, & Dittmar, 2005; Richins, 1991). Studies have also found that social comparisons to information about a peer's weight have contributed to body dissatisfaction and lower self-esteem among restrained eaters (Trottier, Polivy, & Herman, 2007). Thus, it appears that social comparisons regarding body image occur ubiquitously and across different stimuli. This is important to consider as exposure and comparisons to media images may generalize to a variety of alternative comparison targets, such as peer relationships.

Botta (1999) examined social comparison theory and thin ideal internalization. Females were found to compare themselves to images and strive to obtain the thin ideal, dislike their bodies, and engage in unhealthy eating behaviours (e.g., bulimic tendencies). Further, endorsing the thin ideal accounted for 8% of variance in body dissatisfaction, 18% for drive for thinness, and 9% for bulimic tendencies (Botta, 1999). Social comparisons with television models have

been found to predict eating disorder symptomatology and psychological phenomena associated with eating disorders such as drive for thinness, body dissatisfaction, and personal ineffectiveness (Harrison & Cantor, 1997). Further, social comparisons with celebrities have been associated with increased body dissatisfaction, increased bulimic behaviours, and an increased drive for thinness (Heinberg & Thompson, 1992).

Studies have also focused on upward and downward comparisons to media images. Recent studies have found that upward comparisons to media images have led to increased body dissatisfaction (Iu & Hou, 2009), as well as negative appearance comments and eating disturbances (Bailey & Ricciardelli, 2010). Upward comparisons to peers, rather than media images, have resulted in more positive affect and less guilt for body satisfied women, whereas the opposite effect was found for body dissatisfied women making downward comparisons to peers compared to media images (Leahy & Crowther, 2008). It was also found that body satisfied women experienced more guilt, less positive affect, and lower appearance esteem when exposed to media images. Similar results were not found for body dissatisfied women, suggesting that attainability of the body ideals portrayed in the images may affect the consequences of comparison to the models (Leahy & Crowther, 2008).

In a recent study by Tiggemann and Polivy (2010), participants were assigned to a control condition or instructed to either make appearance-based or intelligence-based comparisons to the women in the images. It was found that both sets of comparisons led to lower mood after exposure compared to the control condition. Irrespective of condition, results on self-reported processing suggested that appearance comparisons were related to negative outcomes for mood and body dissatisfaction, whereas intelligence processing was related to positive outcomes. Similarly, in a study by Tiggemann, Polivy, and Hargreaves (2009),

participants were exposed to media images and were assigned to a control condition, asked to compare themselves to the model, or engage in a fantasy comparison where they were asked to imagine what it would be like to be the woman in the image. It was found that exposure alone and social comparison to the thin media images led to negative mood and body dissatisfaction, whereas the fantasy instructions led to improvements in mood.

Jones and Buckingham (2005) examined self-esteem as a moderator of upward and downward social comparison and body image. Results showed that women with high self-esteem displayed an assimilation effect in that they reported more positive affect, less negative affect, lower scores of internalization of sociocultural norms, and lower contingencies of self-worth compared to women with low self-esteem who showed a contrast effect. Thus, women with low self-esteem displayed higher body esteem after comparing to an unattractive female rather than an attractive female. In a study that addressed cognitive processing of media images, social comparison, and body image disturbance, results showed that upward comparisons to media images were associated with internalization of the thin ideal and increased body dissatisfaction (Engeln-Maddox, 2005). Further, it was found that for some women, upward comparisons led to favourable self-views; however, negative outcomes were more frequent. The authors suggest that these positive outcomes may result from the challenging of media ideals.

Finally, research suggests that downward comparisons with media images with respect to non-appearance related dimensions can function as a protective factor for women with higher trait body dissatisfaction (Lew, Mann, Myers, Taylor, & Bower, 2007). Thus, it appears that the type of social comparison impacts the effect of exposure to media images on outcomes such as body image disturbance. However, few studies have examined social comparisons to media images in the specific population of binge eaters.

Bola (2007) explored the role of social comparison in the effect of thin media images on the affect and candy consumption of binge eaters and nonbinge eaters. Participants were exposed to thin media images and asked to engage in social comparison with the models or were asked to focus on the aesthetic qualities of the image. Results indicated that binge eaters ate more overall compared to nonbinge eaters. Additionally, it was found that binge eaters who were asked to self-compare to the thin media images ate more compared to binge eaters who were asked to focus on the aesthetic qualities of the image. It was found that binge eaters displayed more negative affect at two separate time points in the study compared to nonbinge eaters. Further, it was found that binge eaters reported more difficulty in avoiding the thin model when asked to focus on the aesthetic qualities of the image in comparison to nonbinge eaters. The results of this study supported social comparison as an important mechanism in relation to the outcomes for both food consumption and negative affect for binge eaters. However, the social comparison task was subjective and the specific nature of comparisons was not examined. The study incorporated thin media images and it is of interest to see how binge eaters would respond to exposure and social comparison to heavier or plus size models. Further, other variables in addition to negative affect such as state changes in self-esteem and body dissatisfaction are worthy of consideration. Thus, the current study sought to replicate and expand on the findings of this study in relation to these specific areas.

Collectively, the results of these studies support the notion that social comparisons with idealized media images have a negative impact on many women's body image and eating behaviour. Further, research supports that the type of comparisons and stimuli are important in relation to how thin media images impact women. Researchers have suggested that it is important to consider the methods of comparison to media images. Specifically, it has been

suggested that instructions to compare are an important component of the comparison process (Tiggemann & McGill, 2004). Also, studies have used different methods of comparison such as rating scales, self-portraits, checklists, and surveys. One interesting method, namely mirror exposure, offers an alternative method to heighten body and appearance comparisons.

Mirror Exposure

Mirror exposure or mirror confrontation is a technique used for body image exposure. Individuals observe themselves in a full-length mirror, with the objective of reducing body image-related anxiety (Key et al., 2002). Further, some theorists have proposed that individuals with body image concerns view their bodies as a phobic stimulus, thus the exposure technique allows for the opportunity to feel increasingly more comfortable with one's body and work through forthcoming negative cognitions (Delinsky & Wilson, 2006). To date, few studies have investigated the impact of mirror exposure on body image outside of treatment. Key and colleagues (2002) conducted a pilot study examining the role of mirror confrontation among females with AN in an inpatient setting. Results showed that mirror confrontation led to reductions in body dissatisfaction, and improvements on eating disorder scores. Further, the authors suggest that mirror confrontation is valuable in eliciting strong emotional responses and identification of affective and behavioral components of body dissatisfaction. Similarly, examination of mirror exposure treatment in college females found that it led to improvements in body checking, body image avoidance, body dissatisfaction, and weight and shape concerns (Delinksy & Wilson, 2006). Improvements with dieting, depression, and self-esteem were also found. Clinical case studies have also found support for the use of mirror exposure in reducing body dissatisfaction among eating disordered women (Stewart & Williamson, 2003). Finally, it has recently been found that pairing mirror exposure with neutral self-descriptions increased

body satisfaction and reduced anxiety among obese adolescents (Jansen et al., 2008). Thus, these studies support that mirror exposure is an effective technique for reducing body image disturbance in treatment programs. More importantly, these studies support that mirror exposure elicits strong emotional responses in terms of affect and body image concerns.

Hilbert and Tuschen-Caffier (2005) investigated body image in relation to cognitive aspects in individuals with BED and BN. Body exposure via a specialized mirror exposure was used to expose women to their physical appearance. That is, participants were asked to view themselves in the mirror and pay attention to their head, upper and lower parts of their bodies and arms from each side. Results supported that individuals with BED experience body image disturbances and negative body-related thinking more than controls (Hilbert & Tuschen-Caffier, 2005). Thus, results support that individuals with BED experience body image disturbance, which can be elicited through the use of mirror exposure techniques.

Overall, some studies have found that women report positive outcomes when comparing to media images, whereas others report negative outcomes. It has been hypothesized that upward and downward comparisons may yield different results based on discrepancy between the model and the self. Mirror exposure is a new technique that is being used in the treatment of body image disturbance, and has also been used to assess body image in individuals with BED. Further, mirror exposure is thought to elicit emotional and cognitive content in relation to body dissatisfaction. As a result, mirror exposure may be useful in heightening social comparisons to media images, and understanding discrepancies between one's actual and ideal self. It is important to consider that reported self-discrepancy may have implications for how women respond to thin media images.

Self-Discrepancy

Self-discrepancy theory (Higgins, 1987) posits that individuals experience psychological discomfort as a result of incompatible beliefs about the self. There are three domains of the self according to self-discrepancy theory: (a) the actual self, which represents attributes that the person believes that he or she actually possesses; (b) the ideal self, which represents attributes that the person would like to possess; and (c) the ought self, which represents attributes that the person believes he or she should possess. These self-representations are not only considered from the individual's perspective, but also from the perspective of important people in the person's life (e.g., significant other, friends, and parents). Thus, 'self' and 'other' representations constitute the two standpoint dimensions of self-discrepancy theory (Tangney, Niedenthal, Covert, & Barlow, 1998). Perhaps sociocultural perspectives can be conceptualized as "other" representations and as a result, influence women's self-representations. It has been suggested that combining the three domains of the self result in six types of self-discrepancies, of which, most attention has focused on actual/own and ideal/own (actual/ideal) discrepancies in relation to emotional discomfort (Bruch, Rivet, & Laurenti, 2000).

Higgins (1987) theorized that emotional discomfort resulting from self-discrepancies may motivate individuals to reduce such discrepancies in order to relieve discomfort. Studies have found support for self-discrepant responses predicting negative affect, agitation, and dejection (Philips & Silvia, 2005). Additionally, actual-ideal self-discrepancies were related to key components of depressive mood such as low affect, feelings of sadness, and feeling discouraged (Bruch et al., 2000). Further, self-discrepant responses have been found in relation to feelings of shame (Tangney et al., 1998). Thus far, it has been established that self-discrepant responses have an impact on mood and affect. Moreover, individuals experiencing discrepancy between

their actual and ideal self may attempt to make their actual self and ideal self more congruent by trying to achieve standards of the ideal self in order to reduce the discomfort arisen from the initial discrepancy (Higgins, 1987). Alternatively, it has been suggested that in relation to pathological eating behaviours, self-regulatory behaviours may be employed in order to reduce emotional distress (Harrison, 2001). Binge eating may function as an example of such a self-regulatory behaviour.

Self-discrepancy has been considered to be a useful framework for studying body image in women given that discrepancies in self-concept have been proposed to increase risks of developing anxiety, depression, body dissatisfaction, and eating disorder behaviour (Halliwell & Dittmar, 2006). Self-discrepancies have been found to predict depression and anxiety among individuals who are more likely to engage in self-monitoring (Gonnerman, Parker, Lavine, & Huff, 2000). Also, it has been hypothesized that discrepancies can lead to an undesired state, and an inability to achieve the ideal self may lead to motivation to escape or engage in avoidance behaviours (Carver, Lawrence, & Scheier, 1999). Such findings may have important implications for body image research in that individuals with body image concerns likely engage in more frequent self-monitoring and may experience undesired states as a result of discrepancies between actual and ideal selves. Though sparse, studies have examined self-discrepancy in relation to social comparison theory, media-depicted thin ideals, affective states, and body dissatisfaction.

Jung, Lennon, and Rudd (2001) examined women's actual and ideal discrepancies upon exposure to attractive media images in relation to body image, mood, and self-esteem. Results showed that appearance self-discrepancy was related to higher body dissatisfaction and lower social and global self-esteem, but not to measures of affect. Studies have also found that

perceived discrepancies in relation to actual ideals and media image ideals have led women to experience heightened weight concerns (Posavac & Posavac, 2002). These studies support that self-discrepancies between actual and ideal selves have implications for body image disturbance and weight concerns.

A study by Harrison (2001) examined the underlying relationships of exposure to thin media ideals and eating disorder symptomatology in two studies. In the first study, participants were asked to fill out a series of questionnaires including a discrepancy measure that asked them to generate adjectives describing themselves. The self-report questionnaires measured media exposure, body specific ideal and ought discrepancies, and eating disorder symptomatology. Self-discrepancies were hypothesized to mediate the relationship between media ideals and eating disorder symptoms. Results of the study supported that ideal discrepancies mediated the relationship between the thin-ideal, television exposure, and eating disorder symptoms. In the second study, televised images were used for exposure. Participants viewed one of three videos and then completed a questionnaire. One video was used for the control group and showed a girl camping with her stepbrother and father. The other two videos were used for the experimental groups. One of these videos showed a girl being socially rewarded in connection with her thinness while the other showed a girl being socially punished for her fatness. Results showed that thin media ideals that were rewarded were interpreted favourably by participants and activated ideal discrepancies. In contrast, portrayals of overweight images that were punished activated ought discrepancies. Nevertheless, both types of discrepancies were associated with increased negative affect, which in turn, is predictive of eating disordered behaviour (Harrison, 2001). Similar studies have found support for the influence of individual's own and society-

mediated body image discrepancies on disordered eating traits such as bulimic symptomatology and body dissatisfaction (Snyder, 1997).

Bessenoff (2006) explored body image self-discrepancy as a moderating factor and social comparison as a mediating factor related to the effects of thin-ideal media exposure on negative outcomes in women. Results found that self-discrepancy moderated the influence of exposure to the thin ideal on women's weight concerns, mood, self-esteem, and depression. Women with high body image discrepancies experienced at postexposure higher levels of dejection and agitation mood states, lowered self-esteem, and increased depressive cognitions. These effects were not found for women with low body image discrepancies. Further, women with high body image discrepancies were found to be twice as likely to engage in social comparison with the images. It was also found that women's mood reactions to the media images were dependent on level of self-discrepancy. Interestingly, women with low levels of self-discrepancy reported self-enhancement effects after viewing the images. Finally, it was found that women with high body image self-discrepancy had lower appearance self-esteem and higher weight-related concerns compared to women with lower body image self-discrepancy (Bessenoff, 2006). Previous studies have also shown that exposure to social information regarding the thin ideal may make self-discrepancies more accessible to individuals and lead to increased negative affect and disordered eating. These findings have been understood in relation to social comparison processes and are suggestive of the compatibility of media ideal effects on negative outcomes in women and the self-discrepancy framework (Harrison, 2001). Given that self-discrepancy has not been examined in relation to media exposure effects on binge eaters specifically, it is of interest as to whether the degree of self-discrepancy reported differs between binge and nonbinge eaters, which has important implications for the present study.

Goals of the Present Study

At present, there is a general consensus in the literature that negative affect is a proximal antecedent of binge eating (Davis & Jamieson, 2005; Deaver et al., 2003; Hilbert & Tuschen-Caffier, 2007; Wegner et al., 2002). Studies have also supported that body dissatisfaction (Masheb & Grilo, 2000) and self-esteem (Jacobi et al., 2004; Masheb & Grilo, 2003) are key factors associated with binge eating. The sociocultural pressure to attain the thin ideal has been widely studied, with much attention focusing on the media's portrayal of the thin ideal. This ideal plays a role in body image disturbance (Bell et al., 2007), negative mood (Birkeland et al., 2005) and disinhibited eating (Aubie & Jarry, 2009; Bola & Jarry, 2006). However, a few studies have supported that the media leads to positive effects for women (Joshi et al., 2004; Mills et al., 2002). Furthermore, social comparison has been suggested to mediate the relationship between exposure to the thin ideal and negative outcomes in women in general (Corning et al., 2006; Tiggemann & McGill, 2004), and specifically in binge eaters (Bola, 2007).

To date, there are no published studies examining the impact of the media on the eating behaviour, affect, self-esteem, and body image concerns of binge eaters and nonbinge eaters. As described earlier, experimental studies have been successful in measuring the eating behaviour of binge eaters and nonbinge eaters in response to mood induction procedures (e.g., Aubie & Jarry, 2009; Telch & Agras, 1996). A preliminary study has found that binge eaters ate more in response to thin media images compared to neutral images (Bola & Jarry, 2006). Further, there are no published studies examining the role of social comparison in relation to thin media images on outcome variables such as body image, affect, self-esteem, and eating disordered behaviour among binge eaters. However, a preliminary study found that binge eaters ate more when asked to socially compare to the model in a thin media image versus focusing on the aesthetic quality

of an image (Bola, 2007). Finally, studies incorporating plus size images are sparse, and have not been explored with the population of binge eaters.

The goals of the present study were to build on previous research examining the impact of thin media images on eating behaviour, affect, self-esteem, and body image disturbance specifically with binge eaters. Further, the current study used social comparisons to both thin and plus size media images in order to assess whether upward and downward comparisons occur, respectively. Additionally, the amount of reported self-discrepancy between one's actual and ideal self is examined as a characteristic that may differentiate binge eaters from their nonbinge counterparts. That is, binge eaters may report a greater amount of discrepancy, thus lending them to be more vulnerable to internalization of media portrayed ideals especially when exposed to thin images. In the present study, media images were projected onto a full screen in order to enhance exposure and allow for full body comparisons. Furthermore, the use of mirror exposure was used to increase self-awareness and heighten the comparison task. Mirror exposure techniques have been used in treatment of (Delinksy et al., 2006) and research related to body image (Hilbert & Tuschen-Caffier, 2005). Such techniques have been found to increase self-awareness to assist recognition of self-discrepancies (Philips & Silvia, 2005). The taste test format (Herman et al., 2003) was used to determine the impact of thin media images on eating behaviour. Participants were told that they were taking part in a taste test and asked to rate different types of food stimuli. They were instructed to feel free to help themselves, as there was "plenty left" (Herman et al., 2003, p. 17). The researcher measured the candy both before and after the taste test to determine the amount of candy consumed. Consistent with previous research that binge eaters objectively exhibit abnormal eating behaviour in a laboratory setting

(Walsh & Boudreau, 2003), eating behaviour was measured by candy consumed as an analogue to binge eating behaviour.

Hypotheses

The following primary predictions were hypothesized for the current study:

1. With respect to candy consumption, binge eaters would eat more than the nonbinging comparison group during the taste test; thus, a main effect for binge status (binge vs. nonbinge) was predicted. It was also predicted that this binge main effect would be qualified by the existence of an interaction with image type (thin vs. plus size); thus, a Binge Status x Image Type interaction was predicted. Specifically, relative to nonbinge eaters who were not expected to be differentially affected by image type, binge eaters who were asked to self-compare to the thin media images would eat more than binge eaters who were asked to self-compare to the plus size media images.

2. Given the sociocultural pressure to attain the thin ideal and the notion that binge eaters are more susceptible to such pressures, it was predicted that binge eaters exposed to thin media images would show greater negative outcomes. No predictions were made for nonbinge eaters; however, for binge eaters:

a) Exposure to thin media images would result in an increase over baseline in negative affect. No prediction was made for binge eaters exposed to plus size images.

b) Exposure to thin media images would result in a decrease over baseline in appearance-related self-esteem and body satisfaction. No prediction was made for binge eaters exposed to plus size images.

These predictions were premised on social comparison mediating the relationship between exposure to media images and the dependent variables of interest. The nature of the comparison, whether upward or downward, is considered to have contingent effects on the outcome variables. More specifically, exposure to thin media images would lead to an upward comparison whereby the model is seen as more favourable on a given attribute as compared to the self.

In addition, measures of self-discrepancy, media internalization, disordered eating attitudes and behaviours and psychological distress were collected to explore differences between binge eaters and nonbinge eaters.

Method

Experimental Design

The study implemented a two-between (binge status, image type) one-within (time) mixed factorial experimental design. The two primary independent variables explored in this study were binge status (binge eater, nonbinge eater) and exposure to image type (thin, plus size). The primary dependent variables examined were candy consumption and changes in affect, self-esteem, and body image from baseline to postexposure.

Participants

For the current study, only females were asked to participate. This was an inclusion criteria given the goals of the present study to expand on previous research examining the effects of media exposure on outcomes such as eating behaviour, affect, and body image among women who do and do not engage in binge eating behaviour. In addition, several studies have examined social comparison and media effects in female college and university students, specifically. Although valuable to include a sample of men, this was beyond the scope of the current study.

Screening Phase. The first part of the study included a screening phase whereby female participants interested in the study were asked to respond to several screening questions in the format of an online questionnaire (See Appendix A for the participant cover letter, consent form, and screening questionnaire). Screening questions for recruitment purposes in this study were as follows: (a) "During the last 6 months, have there been times when you felt you have eaten what other people would regard as an unusually large amount of food given the circumstances (e.g., a quart of ice cream)? If yes, how often did this occur?" (b) "If you did experience times when you ate an unusually large amount of food, did you experience a loss of control (feel that you couldn't stop eating or control what or how much you were eating)?"

The screening questionnaire was also used to ensure that participants did not present with any food aversions or allergies to chocolate and/or peanut butter. Further, participants were screened out for any current treatment of depression, anxiety and/or an eating disorder in the interest of not causing psychological distress in such individuals through participation in this study.

On the basis of students' responses to the above screening questions, the researcher generated a list of potential participants. A separate list for participants who responded affirmatively to the two screening questions was generated as was a similar list of participants who responded negatively to both screening questions. Once the lists were developed, participants were contacted and asked to participate in the current study. Participants who agreed to take part in the study were then randomly selected for exposure to either the plus size images or thin images. Potential participants' responses to these initial screening questions were not the sole determinant in assignment to the comparison or binge eater group, but rather served as a screening measure to help the researcher more effectively target the desired group of binge

eaters. Assignment to the binge group was based on participants' responses during the study to two specific questions on the Binge Scale which asked how often participant's engaged in binge eating (never to almost everyday) and whether there is a perceived loss of control during binge episodes. Thus, participants who responded to these two items by indicating engagement in binge eating once or twice a week or almost everyday, as well as experiencing some loss of control were then assigned to the binge group. Those participants who reported that they never or sedolmy engaged in binge episodes and did not experience a loss of control over eating were assigned to the nonbinge group. For greater accuracy, these responses were further verified with corroborating responses on the Eating Disorder Examination-Questionnaire by looking at two specific items which addressed the number of objective binge episodes over the past 28 days by asking whether the participant had times where she ate what others would regard as an unusually large amount of food, as well as the number of times there was a perceived loss of control over eating during the reported episodes (see questionnaires below). If these responses were consistent, then the participant was assigned to the respective group.

Participants who reported binge eating "at least once or twice a week" or "almost every day" and feeling at least "somewhat out of control" on the Binge Scale were assigned to the binge group. The nonbinge comparison group was comprised of individuals who reported that they either do not binge eat or do so on a seldom basis, and do not experience loss of control over their eating.

Based on the results of the screening phase, one hundred and one females enrolled in the first year undergraduate psychology course at Lakehead University were recruited to participate in the study. All participants received course credit (one bonus mark) and a gift certificate

valued at 5 dollars for Tim Hortons for their participation in the study. Results of the screening questionnaire and flow of participants are presented in Figure 1.

Sample Characteristics. Of the 101 participants who completed the experiment, 51 were classified as binge eaters. Of the 50 nonbinge eaters, 16 (32%) endorsed "seldom" binge eating to the binge eating screening item. The decision to include this subgroup into the nonbinge eating classification was grounded in the fact that very few eligible participants endorsed "never" to the binge eating screening item[1].

The mean age of the participants was 19.65 (SD = 3.16). The majority of participants were Caucasian (88.1%) followed by Native-Canadian (3%), South Asian (2%), East Asian (1%), African-Canadian (1%), and other (5.0%) descent. A small number of participants were married or in a common law relationship (12.9%) or reported being either divorced or separated (1%). The remainder of the sample (86.1%) reported being single. Of the 101 participants, 98 (97%) were enrolled in a full-time academic program, while two (2%) participants reported enrollment in part-time studies. One participant did not report on student status.

Materials

Food stimuli. Three flavors of chocolate candies were used as the food stimuli in this study; M&M's, Smarties, and Reese's Pieces. Each of the three bowls presented to participants contained 150 candies for a total of 450 per participant. Each bowl of candies was counted and weighed with a standard digital scale (Denver Instrument, S-2002) both before and after being presented to the participant. Recent taste test studies used these three types of chocolate candies as food stimuli (Aubie & Jarry, 2009; Bola, 2007). Previous research has used M&M's as food stimuli in eating studies (Bola & Jarry, 2006; Cavallo & Pinto, 2001; Copeland, Woods, &

[1] This "seldom" binge eating group reported on the EDE-Q their previous 28-day frequency of objective binge episodes as M = 0.19 (SD = .054), Mdn = 0. Frequencies of objective binge episodes in the previous 28 days were 0 (88%), 1 (6.3%), 2 (6.3%).

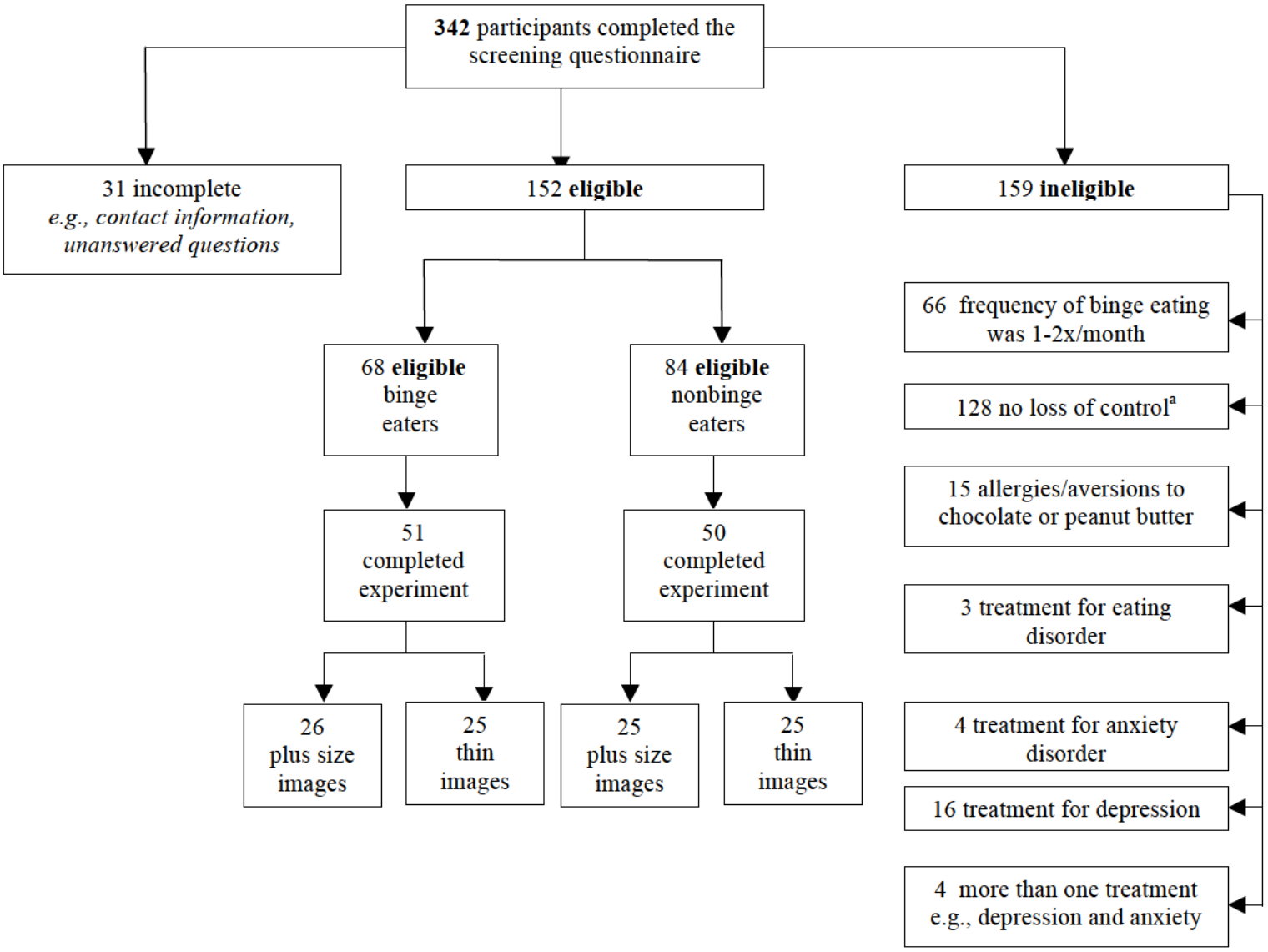

Figure 1. Flow of participants through the screening process.
[a]The group of participants excluded for no perceived loss of control over eating overlapped with other excluded groups and thus reflective of the number of ineligible participants (based on this criterion) out of the total number screened.

Hursey, 1995). Binge eaters have been found to select foods high in sugar, and/or carbohydrates for their binge episodes, and they also show a preference and/or craving for chocolate (Anderson, Williamson, Johnson, & Grieve, 2001). Thus, the current study used the three types of candies to build on existing findings.

Thin media images. Ten media images selected from various popular women's magazines and used in prior studies by the researcher were used in the current study (Bola, 2007; Bola & Jarry, 2006). Magazines were selected based on popularity and accessibility to the public. Among the magazines are Glamour, Bazaar and Flare. The images selected are of women representing the thin ideal as rated by other researchers in the study lab. Researchers viewed over 20 images and, based on the ratings, 10 images were selected. An attempt was made to choose images with the least amount of advertisements and images of everyday women, not just models and/or celebrities. The images were selected of women that were rated as both attractive and thin with all ads being generally appealing to viewers, as done in previous research (Mills et al., 2002). All images are full body portraits and were projected onto a full screen in real size (projection screen with a diagonal of 3.05m). See Appendix B for a sample of the thin media images.

Plus size media images. Ten media images selected from women's plus size magazines were used in the current study. Magazines were selected based on availability and accessibility to the public. Importantly, plus size images were not readily found among common fashion magazines. Thus, the magazines used for the current study were Plus Model Magazine and Lou Lou Magazine. Researchers in the study lab selected 10 images of women representing plus size models. Selected images had minimal advertisements and were of everyday women. However, images were selected so that they are comparable to the thin media images in terms of fashion

and an appealing look. Selected images were of women rated as both attractive and plus size with all ads being generally appealing to viewers, as done in a previous study (Mills et al., 2002). As in the thin image condition, all images were full body portraits and projected onto a full screen (projection screen with a diagonal of 3.05m). See Appendix C for a sample of the plus size media images.

Full-length mirror. A full-length mirror was present in the laboratory and was used to enhance self-awareness and facilitate self-comparisons to the media images. Full-length mirrors have been used in studies to enhance self-awareness without exposure (Philips & Silvia, 2005), as well as in treatment to facilitate comparisons by exposing one's body to a mirror (Delinksy & Wilson, 2006).

Binge Scale (BS). The BS assesses both behaviour and attitudes associated with binge eating, such as frequency of binge eating, and feelings associated with binge eating (Hawkins & Clement, 1980). This is a nine-item self-report scale that uses a multiple choice format and includes questions such as, "How often do you binge? (a) Seldom, (b) Once or twice a month, (c) Once a week, or (d) Almost every day", and "How much are you concerned about your binge eating? (a) Not bothered at all, (b) Bothers me a little, (c) Moderately concerned, or (d) Major concern." The binge scale has been reported as having good internal consistency (Fairburn & Wilson, 1993), good construct validity and has been demonstrated to have one month test-retest reliability greater than .88 (Hawkins & Clement, 1980). In the present study, the BS was used to confirm the frequency of binge eating and loss of control over eating. See Appendix D for the BS.

Primary Dependent Measures. The set of primary dependent measures in the current study were analyzed as repeated measures, assessing changes in negative affect, self-esteem, and body image satisfaction from baseline to postexposure to the media images.

Positive and Negative Affect Schedule (PANAS). The PANAS (Watson, Clark, & Tellegen, 1988) was used to assess negative affect when viewing the media images. The PANAS is a 20-item self-report measure that is divided into two subscales; Positive Affect (PA) and Negative Affect (NA). For the current study, the NA scale was used. Using a 5-point Likert scale, respondents indicate the extent to which they experience certain emotions. Sample items from the NA subscale include: "upset," "hostile," and "ashamed." Higher scores reflect greater negative affect levels. External validity studies have found that correlations between the NA subscale and various measures of distress and psychopathology ranged from .51 to .94, indicating that the PANAS is a good measure of negative affect (Watson et al., 1988). The PANAS can also be used to examine affect at different times, including moment to moment in the same day. Internal consistency reliability for the two subscales are as follows: PA (alpha = .89) and NA (alpha = .85; Watson et al., 1988). See Appendix E for the PANAS.

State Self-Esteem Scale (SSES). The SSES (Heatherton & Polivy, 1991) is a 20-item self-report measure designed to assess temporary changes in self-esteem. It is comprised of three scales: Social, Performance, and Appearance. Items are scored on a 5-point likert-type scale, ranging from "not at all" to "extremely." A sample item from the Appearance scale is "I feel unattractive." The SSES is considered psychometrically sound with a high degree of construct validity and internal consistency (alpha = .92). Also, the SSES is able to detect momentary changes in self-esteem resulting from laboratory manipulations (Heatherton & Polivy, 1991). See Appendix F for the SSES.

Body Image States Scale (BISS). The BISS (Cash, Fleming, Alindogan, Steadman, & Whitehead, 2002) is a six-item self-report measure that assesses state body image satisfaction. Items are presented on a 9-point likert-type scale ranging from extremely dissatisfied to extremely satisfied. The domains of body image assessed are body shape and size, weight, feelings of attractiveness, feelings about one's looks relative to how one usually feels, and evaluation of one's appearance relative to how the average person looks. A higher score on the scale is indicative of a high state of body satisfaction. Cash et al. (2002) report the internal consistency of the measure to be acceptable, Cronbach's alphas range from 0.77 to 0.90. See Appendix G for the BISS.

Secondary Dependent Measures. The set of secondary dependent measures were used in the current study to assess for group differences among binge eaters and nonbinge eaters.

Body Image Ideals Questionnaire (BIQ). The BIQ (Cash & Szymanski, 1995) was used to assess for discrepancies between actual and ideal appearance with respect to 10 appearance characteristics. Some examples of these characteristics include height, facial features, body proportions, and weight. For each of the 10 attributes, participants are asked to think about their personal ideal and evaluate how well their body matches this ideal. In the current study, an 11th item was added to address a global attribute of appearance. Discrepancy is rated as follows: -1 (*exactly as I am*), +1 (*almost as I am*), +2 (*fairly unlike me*), and +3 (*very* unlike me). Each attribute is also rated for its importance as follows: 0 (*not important*), 1 (*somewhat important*), 2 (*moderately important*), and 3 (*very important*). Appearance self-discrepancy is calculated by multiplying discrepancy scores by importance scores for each characteristic and then summing up the 11 scores. Internal consistency for the measure is good with an alpha of 0.77 (Cash & Szymanski, 1995). See Appendix H for the BIQ.

Beck Depression Inventory-Second Edition (BDI-II). The BDI-II (Beck, Steer, & Brown, 1996) is a 21-item self-report instrument that measures depressive symptoms present during the two weeks prior to administration. Items are assessed on a 4-point likert-type scale with items scores ranging from 0 to 3. Sample items assess irritability, fatigue, and eating disturbances. The BDI-II has good concurrent validity with other depression measures (Beck et al. 1996). Further, it has good internal consistency in non-psychiatric (alpha = 0.81) and psychiatric samples (alpha=0.86; Beck et al., 1996). See Appendix I for the BDI-II.

Rosenberg Self-Esteem Scale (RSES). The RSES (Rosenberg, 1965, 1979) is a 10-item self-report measure that assesses global self-esteem. Responses are given on a 4-point likert-type scale, ranging from "strongly disagree" to "strongly agree." A sample item is "I feel that I am a person of worth." The RSES has been found to have high internal consistency with Cronbach's alpha of 0.92 (Rosenberg, 1979). See Appendix J for the RSES.

Social Attitudes Toward Appearance Questionnaire-3 (SATAQ-3). The SATAQ-3 (Thompson, van den Berg, Roehrig, Guarda, & Heinberg, 2004) is a 30-item scale that measures areas of societal influence on personal body image standards. The scale uses a 5-point likert-type response set ranging from "definitely disagree" to "definitely agree." The subscales of the SATAQ-3 have excellent convergent validity (Thompson et al., 2004) and excellent internal consistencies (Calogero, Davis, & Thompson, 2004). See Appendix K for the SATAQ-3.

Eating Disorder Examination-Questionnaire (EDE-Q 4.0). The EDE-Q is a self-report measure of eating disorder psychopathology and focuses participants' responses on the past 28 days (Fairburn & Beglin, 1994; Fairburn & Cooper, 1993). The measure assesses the main behavioural tenets of eating disorders (e.g., dietary restriction, episodes of binge eating, vomiting) and generates four subscales that assess Dietary Restraint, Eating Concern, Shape

Concern and Weight Concern. It uses a seven-point forced-choice rating scheme for these subscales. Frequencies of key eating disorder behaviours are measured based on the number of days on which each particular behaviour occurs. Cronbach's alpha coefficients for the four subscales ranged from .78-.93, and Pearson coefficient correlations for the reliability ranged from .81-.94 across the subscales (Luce & Crowther, 1999). For the purposes of the current study, the global score was used used to provide a more comprehensive picture of participants' eating pathology. In addition to assessing for group differences between binge and nonbinge eaters, this questionnaire was used in conjunction with the Binge Scale to estimate participants' number of binge episodes in the last four weeks. See Appendix L for the EDE-Q.

Revised Restraint Scale (RRS). The RRS was used to measure dietary restraint (Polivy, Herman, & Warsh, 1978). The scale is comprised of 12 items that assess diet and weight history and concern with food and eating (Heatherton et al., 1988). It consists of two subscales; Weight fluctuation and Concern for Dieting. Sample items of the Concern for Dieting subscale include "How often are you dieting?" and "Do you have feelings of guilt after overeating?" A sample item from the Weight Fluctuation subscale is "Would a weight fluctuation of 5 lbs. affect the way you live your life?" Individuals with scores of 14 and below are classified as "unrestrained" eaters and those who score 15 and above are classified as "restrained" eaters, as has been used in research using female undergraduates (Herman et al., 2003). The Revised Restraint Scale has been demonstrated to have high test-retest reliability (.95) and internal consistency (.82; Allison, Kalinsky, & Gorman, 1992). See Appendix M for the RRS.

Procedure

Participants selected after being screened for their binge status along with food aversions/allergies and treatment of depression/eating disorders were contacted by the

researcher. Participants were asked to participate in a taste test study investigating the effects of perception, mood, body image, and memory on taste ratings. This cover story was used to mask the real intent to measure candy consumption. Participants were instructed to eat a moderate amount of food between 1 and 3 hours before their appointment in the lab. This was done to help assure some uniformity and a relatively neutral state of hunger for all participants. In addition, participants were asked at the time of initial contact if they present with any allergies and/or aversions to either chocolate or peanut butter. This was to ensure participant's safety and ability to participate in the taste test (see Appendix N for the contact script).

All participants were tested individually by the same investigator, a doctoral candidate in clinical psychology. Individual testing appointments were booked between the hours of 12 and 6 p.m., as is standard procedure in "taste test" style eating studies (McFarlane, Polivy, & Herman, 1998). The complete study took approximately 50-60 minutes to complete. For steps of the experimental procedure, see Appendix O. Upon arrival in the lab, participants were asked to read the letter of information and sign the consent form and were also given a copy for their own records (see Appendix P). At this time, participants were reminded that the (bogus) purpose of the study was to investigate the manner in which individual perception, mood, body image, and memory affect taste perception. Further, they were informed that they would be taste testing three kinds of candy. After consenting to participate, participants were asked to complete the demographic questionnaire (see Appendix Q), and the baseline primary dependent measures of the PANAS, SSES, and BISS.

Participants were randomly assigned to exposure to the thin media images or plus size media images. Participants were exposed to a set of 10 images corresponding to the type of image to which they were randomly assigned. All images were projected onto the full screen as

part of a timed slideshow. Participants were exposed to each image for 15 seconds. Once the show was completed, participants were able to navigate back and forth to look at the images again, or specifically choose images to view while completing the task. Also, they were asked to stand in front of the screen, next to a full-length mirror. They were instructed to view themselves in relation to the model in the image and complete the comparison checklist. The comparison checklist was developed based on specific comparisons that were being elicited through exposure to the media images. Further, given that there is no specific measure or checklist that has been used in previous studies, the first part of the list was developed by combining single statements that ask women to compare their body in general to media images (Corning et al., 2006) and items from the Body Checking Questionnaire (BCQ; Reas, Whisenhunt, Netemeyer, & Williamson, 2002). The latter is a scale that asks individuals to report on the frequency of specific checking behaviours related to body image. For the purposes of this study, specific body parts from the scale were used as comparison targets that would enhance exposure to the media images and provide a concrete set of instructions for participants to follow during the experimental task. The second part of the list was developed based on statements made by previous participants in a similar research study (see Bola, 2007). These statements were taken from the qualitative data, and were also used to elicit specific comparisons that were not captured by the first checklist (see Appendix R for task instructions and the comparison checklist). During this time (15 min), the investigator left the room to allow the participants to view the images and complete the social comparison rating task in private.

Following completion of the task, participants were asked to complete the second administration of the primary dependent measures consisting of the PANAS, SSES, and BISS. This second administration was used to measure changes on these attributes from baseline to

postexposure of media images. While the participants completed this part of the study, the experimenter left the room to prepare for the taste test. The experimenter then re-entered the room, this time carrying a tray with the three bowls of candies and a bottle of water. Participants were given the candy rating forms and were informed that they were going to sample three flavours of candies. The candies were presented to the participant as either candy "A," "B," or "C", the order of which was randomly determined. Each small bowl contained 150 candies. Each bowl of candies was weighed before and after presentation to the participant.

Participants were given the entire instructions for the taste test before being left alone in the room to complete this part of the study. Participants were instructed to begin by taking a sip of water to cleanse their palate and then to begin testing candy "A." They were further instructed to eat as many of the candies as necessary to complete their ratings. Participants were told that once they were satisfied with their ratings of candy "A," they are to proceed to candy "B," following the same protocol. Participants were told that once they move to candy "B," that they not go back and change their ratings of candy "A." Next, they were told that once candy "B" is rated, they take another sip of water and continue on to candy "C." After these instructions, the experimenter left the room and informed the participants that she would return in 10 min which is the standard time period in taste test studies (McFarlane et al., 1998). In addition, the researcher informed participants that once their ratings were complete, they should feel free to have as many candies as they please as there were "plenty" left. See Appendix S for taste test instructions and rating forms.

Following the taste test period, the experimenter removed the three bowls of candies and asked the participants to complete the battery of secondary dependent measures that included the RSES, BIQ, RRS, EDE-Q, SATAQ-3, and BDI-II. The questionnaire battery also included a

few postexperimental questions to determine the credibility of the media representation of the images, the social comparison manipulation, and the use of the mirror during the exposure task (see Appendix T). The questionnaires presented in this battery were randomized for each participant by creating a randomization formula in Microsoft Excel. This was done to minimize the impact of responses on specific questionnaires with the remaining questionnaires. During this time, the candies were counted to determine participant's candy consumption. The candies were also weighed in order to verify accuracy in measurement. This procedure replicated previous studies (Aubie & Jarry, 2009; Bola, 2007; Bola & Jarry, 2006).

Once the questionnaires were completed, participants were reminded that they would be contacted via email or telephone after approximately two months once data collection has been completed. After the completion of data collection, participants were emailed a full debriefing (see Appendix U for the script) in which the true purpose of the study was explained to the participant. The debriefing took place after all of the data was collected in order to prevent contamination of results and to protect the internal validity of the study. At the time of debriefing, participants were asked to answer a final postexperimental question assessing their belief in the cover story for the study.

Results

Analytical Strategy

To test hypothesis 1, group difference in binge status (binge vs. nonbinge) by image type (thin vs. plus size) for the amount of candy consumed was analyzed by univariate analysis of variance (ANOVA). The primary dependent measures for affect and body image satisfaction

were obtained at two different time points in the study[2]. A possible change across these measures as a function of exposure to the images and binge status was assessed by conducting a repeated measures multivariate analysis of variance (MANOVA) in order to test hypothesis 2. A series of exploratory analyses was also conducted as follows. A principal components factor analysis with orthogonal rotation (varimax) was conducted on the 35 items of the comparison checklist which yielded four separate factors measuring comparisons related to personal feelings, body parts, appearance and satisfaction, and facial features. Differences between groups (binge vs. nonbinge) and image type (thin vs. plus size) on these factors were analyzed by conducting a MANOVA. Both ANOVAs and MANOVAs were used to analyze group differences on a secondary set of dependent measures evaluating disordered eating attitudes and behaviours and psychological distress, as well as self-discrepancy scores as measured by the BIQ. Independent samples *t* tests were used to analyze differences as a function of one's binge status on body mass index. Further analyses were conducted by comparing means as a function of binge status and image type (independent samples *t* tests) on single items that were included as the manipulation checks for media image representation, task compliance, mirror exposure, and belief in the cover story.

Data Preparation

Data was entered into SPSS v.18 and examined for missing values. The data screening revealed a few missing data points. Data was missing for one item for one individual for the PANAS and BIQ; for the SSES and BS there were two individuals contributing one missing response each; four individuals contributing one missing responses each on the RSES; five individuals across five missing items on the comparison checklists; one individual missed 4

[2] The first set of state measures were obtained as baseline measures, the second set of state measures were obtained after exposure to the images and completion of the comparison task.

items on the BDI-II; five individuals across six missing items on the SATAQ-3; 11 individuals across 17 missing values on the EDE-Q; and 10 individuals contributing to 16 missing responses on the taste test rating forms. Missing data was replaced with prorated scores for the items within individuals on the scale or subscales in question. All missing data points accounted for less than 1 percent of the total data points.

Data was also examined for outliers defined as $z > 3.29$. The analysis revealed one outlier for each of the following measures: the NA subscale of the PANAS administered at baseline, BDI-II, and the total count of candies consumed. Outliers were replaced with the next highest score not meeting outlier criteria, plus one (Field, 2009).

Psychometric Variables

Descriptive information pertaining to the psychometric variables is presented in Table 1. Internal consistency indices of Cronbach's α ranged from .76-.95. Five of the 12 psychometric variables listed in the table had distributions of data that possessed significant positive skew where $z_{skewness}$ (Skewness – $0/SE_{skewness}$) exceeded the convention of 1.96 consistent with $p < .05$; PANAS:NA, SATAQ-3, BDI-II, BIQ:Discrepancy and BIQ:Weighted Discrepancy. These five variables were subjected to a variety of transformations (i.e., square root, reciprocal) but only the natural log transformation produced $z_{skewness} < 1.96$ for the BDI-II, with improvement on the PANAS:NA, $z_{skewness} = 3.55$. Hence, the natural log transformed scores of these two variables were utilized in all subsequent analyses.

Hypothesis 1

With respect to candy consumption, it was predicted that binge eaters would eat more than the nonbinge comparison group during the taste test. An interaction between binge status (binge eater vs. nonbinge eater) and image type (thin vs. plus size) was also predicted.

Table 1

Reliability Coefficients and Descriptive Statistics of the Psychometric Variables

Variables	*M*	*SD*	α	No. of items	Range		$z_{Skewness}$
					Potential	Actual	
PANAS NA	13.90	3.94	.76	10	10-50	10-27	5.89
SSES Appearance	18.69	4.61	.84	6	6-30	7-30	1.27
RSES	28.95	5.33	.88	10	10-40	15-40	0.48
BISS	23.45	7.39	.78	6	0-48	6-40	0.36
BIQ							
Discrepancy	10.37	6.54	.82	11	-22-66	-8.09-25.27	2.05
Importance	16.18	5.43	.83	11	22-66	2-27.27	1.14
Weighted	179.25	130.15	.79	11	-363-1089	-95.21-607.44	2.03
RRS	16.64	7.30	.84	11	0-39	2-33	0.20
EDEQ Global	2.27	1.34	.95	22	0-6	0-5.62	0.89
SATAQ-3 Total	97.82	23.83	.95	30	30-150	31-143	2.63
BDI-II	13.26	8.53	.89	21	0-63	2-47	5.33

Note. $N = 101$. PANAS-NA = Positive and Negative Affect Schedule-Negative Affect; SSES= State Self-Esteem Scale; RSES=Rosenberg Self-Esteem Scale; BISS=Body Image States Scale; BIQ= Body Image Ideals Questionnaire; RRS=Revised Restraint Scale; EDE-Q= Eating Disorder Examination Questionnaire; SATAQ-3=Social Attitudes Toward Appearance Questionnaire (Third Edition); BDI-II=Beck Depression Inventory (Second Edition).

Specifically, binge eaters who were asked to self-compare to the thin media images would eat more than binge eaters who were asked to self-compare to the plus size media images: nonbinge eaters were predicted to not be differentially affected by image type.

Amount consumed in g was summed over the three different types of candy. Participants consumed $M = 28.04$ ($SD = 20.64$) g candy; range = 5.06 – 91.46 g, $z_{skewness} = 5.60$, $p < .001$. Subsequent natural log transformation of g produced $z_{skewness} = -0.28$, $p = .39$, which corrected the significant positive skew in the data.

A two-way, between-groups ANOVA on the natural log of g produced a significant main effect for binge status, $F(1, 97) = 5.07$, $p = .03$, $\eta_p^2 = .05$, wherein binge eaters consumed more candy than their nonbinge counterparts. A significant main effect was also observed for image type, $F(1, 97) = 4.31$, $p = .04$, $\eta_p^2 = .04$, indicating that participants viewing thin images consumed more candy compared to those participants viewing plus size images. Importantly, there was a significant Binge Status x Image Type interaction, $F(1, 97) = 11.50$, $p = .001$, $\eta_p^2 = .11$. The interaction is depicted in Figure 2 where, for ease of interpretation of the graph, the original untransformed amount of candy consumed in g is displayed. A simple effects analysis of image type revealed that binge eaters consumed more candy when viewing thin versus plus size images, $F(1, 49) = 13.26$, $p = .001$, $\eta_p^2 = .21$, whereas image type exerted no differential effect on consumption among nonbinge eaters $F(1, 48) = 1.00$, $p = .32$, $\eta_p^2 = .02$.

Hypothesis 2

It was predicted that for binge eaters compared to nonbinge eaters, exposure to thin media images would result in an increase over baseline in negative affect. It was further predicted that exposure to thin media images would result in a decrease over baseline in

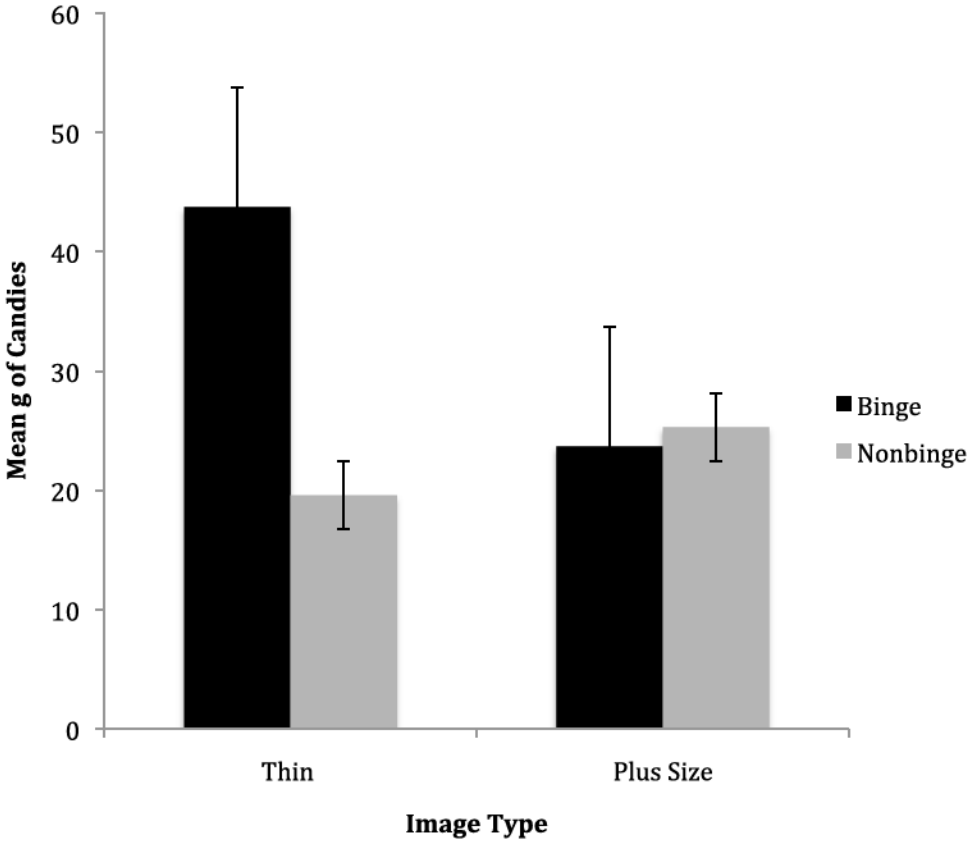

Figure 2. Mean g of candies consumed (± *SE*) for binge and nonbinge groups exposed to thin and plus size images.

appearance-related self-esteem and body satisfaction for binge eaters. No predictions were made for binge eaters exposed to plus size images.

Preliminary analyses revealed that the SSES, Appearance-Related Self-Esteem and the BISS body image measure were highly correlated both at baseline ($r = .78$, $p < .001$) and after exposure to the media images ($r = .91$, $p < .001$) for the entire sample $N = 101$. Thus, both questionnaires are essentially measuring the same construct of body image. As a result, a body image composite was calculated by merging both the Appearance-Related Self-Esteem scale scores and BISS scores by averaging their z transformed raw scores on each scale. This merging was done separately at each of the time points at baseline and at postexposure. This composite score was labelled Body Satisfaction (BS) where higher scores are indicative of higher body satisfaction. The BS was used in all subsequent analyses investigating state changes in body image over the course of the experiment.

A repeated measures multivariate analysis of variance (MANOVA) was performed on two dependent measures; negative affect (NA) and BS. The two between-subjects independent variables were binge status (binge vs. nonbinge) and image type (thin vs. plus size). The within-subjects independent variable was time; baseline and postexposure. Table 2 displays the means (*SD*s) of the two dependent variables as a function of the three independent variables; binge status, image type and time. Table 3 displays the MANOVA results of the information presented in Table 2.

Multivariate tests using Wilks' lambda (Λ) statistic revealed that the three-way interaction between binge status, image type, and time was not significant (see Table 3). However, there was a significant multivariate main effect of binge status, $\Lambda = 0.92$, $F(2, 96) =$

Table 2

Mean Scores for Negative Affect and Body Satisfaction as a Function of Binge Status and Image Type Over Time

	Binge Status		Image Type	
	Binge[a]	Nonbinge[b]	Thin[b]	Plus Size[a]
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)
PANAS NA				
Baseline	14.12 (4.03)	13.68 (3.80)	13.54 (3.87)	14.25 (4.00)
Postexposure	15.57 (5.62)	12.74 (3.32)	14.72 (4.82)	13.63 (4.80)
BS				
Baseline	-0.25 (.88)	0.25 (.95)	0.13 (.92)	-0.12 (.96)
Postexposure	-0.22 (.95)	0.23 (.96)	-0.08 (.98)	0.08 (.97)

Note. [a]$n = 51$. [b]$n = 50$. PANAS NA= Positive and Negative Affect Schedule-Negative Affect; BS = Body Satisfaction. Baseline measurement was taken at the beginning of the experiment and postexposure was measured immediately after viewing the media images and completing the comparison task.

Table 3

MANOVA Results for Negative Affect and Body Satisfaction as a Function of Binge Status and Image Type Over Time

Effect	Statistical Result
Binge Status	$\Lambda = 0.92$, $F(2, 96) = 4.05$, $p = .02$, $\eta_p^2 = .08$
Image Type	$\Lambda = 1.00$, $F(2, 96) = 0.14$, $p = .87$, $\eta_p^2 = .00$
Binge Status x Image Type	$\Lambda = 1.00$, $F(2, 96) = 0.07$, $p = .94$, $\eta_p^2 = .00$
Time	$\Lambda = 1.00$, $F(2, 96) = 0.02$, $p = .98$, $\eta_p^2 = .00$
Time x Binge Status	$\Lambda = 0.90$, $F(2, 96) = 5.19$, $p = .007$, $\eta_p^2 = .10$
Time x Image Type	$\Lambda = 0.89$, $F(2, 96) = 5.74$, $p = .004$, $\eta_p^2 = .11$
Time x Binge Status x Image Type	$\Lambda = 1.00$, $F(2, 96) = 0.26$, $p = .78$, $\eta_p^2 = .00$

4.05, $p = .02$, $\eta_p^2 = .08$. This main effect was qualified by a significant interaction with time; a Time x Binge Status interaction, $\Lambda = 0.90$, $F(2, 96) = 5.19$, $p < .01$, $\eta_p^2 = .10$.

Follow-up univariate tests of the Time x Binge Status interaction proved to be not significant for the dependent variable of BS, $F(1, 99) = 0.12$, $p = .73$, $\eta_p^2 < .001$. However, the interaction was significant for the dependent variable of NA, $F(1, 99) = 7.79$, $p < .01$, $\eta_p^2 = .07$. Figure 3 displays the untransformed means for NA. Binge eaters and nonbinge eaters were found not to be statistically different with regard to reported scores for NA at baseline, $F(1, 99) = 0.35$, $p = .55$, $\eta_p^2 < .01$. A simple effects analysis of binge status revealed that nonbinge eaters displayed statistically significant decreases in NA after exposure to the media images regardless of image type $F(1, 48) = 4.08$, $p = .05$, $\eta_p^2 = .08$. In contrast, binge eaters showed a statistical trend toward increase in negative affect from baseline to exposure regardless of image type, $F(1, 49) = 3.42$, $p = .07$, $\eta_p^2 = .06$. An ANCOVA was conducted on NA to compare binge groups at postexposure by covarying out preexposure levels. This was statistically significant, $F(1, 99) = 9.87$, $p = .002$, $\eta_p^2 = .09$. Thus, these results indicate that media exposure differentially influenced NA depending upon one's binge status with salubrious and deleterious effects upon nonbingers and bingers, respectively.

The MANOVA described above also yielded a significant Time x Image Type interaction, $\Lambda = 0.89$, $F(2, 96) = 5.74$, $p < .01$, $\eta_p^2 = .11$. Follow-up univariate tests revealed a significant Time x Image Type interaction for the log transformed dependent variable of NA, $F(1, 99) = 6.99$, $p = .01$, $\eta_p^2 = .07$. Figure 4 displays the untransformed means for NA. Group differences for exposure to image type were not found to be statistically different with regard to reported scores for NA at baseline, $F(1, 99) = 1.12$, $p = .29$, $\eta_p^2 = .01$. A simple effects analysis of image type revealed that, collapsed across binge status groups, participants who viewed thin

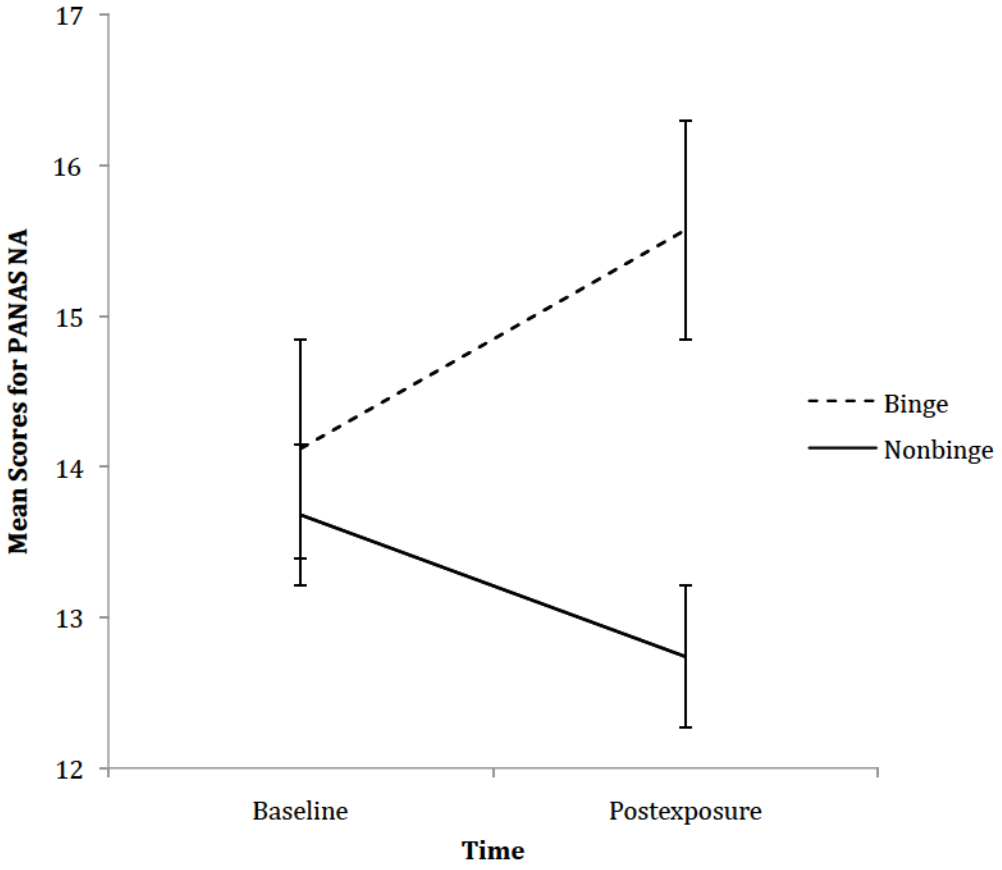

Figure 3. Mean scores for PANAS NA (± *SE*) for binge and nonbinge groups at baseline and postexposure to thin and plus size images.

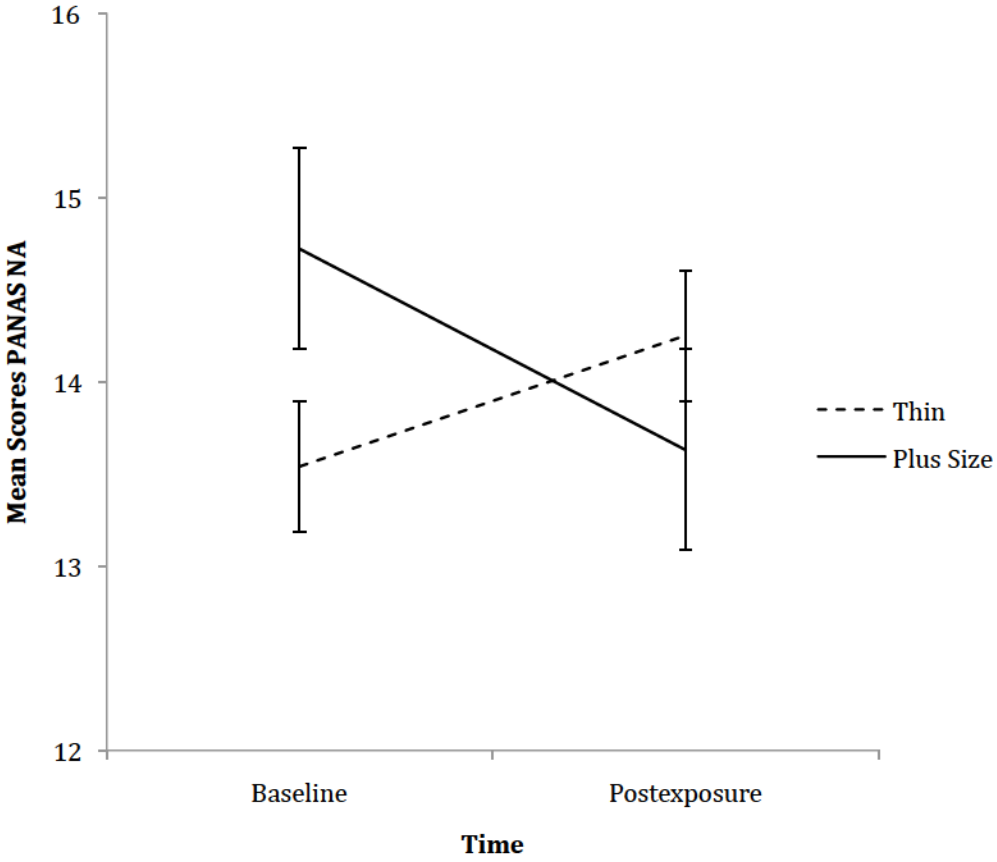

Figure 4. Mean scores for PANAS NA (± *SE*) as a function of exposure to thin and plus size images at baseline and postexposure for binge and nonbinge participants.

media images displayed a significant increase in NA, $F(1, 48) = 5.25$, $p = .03$, $\eta_p^2 = .10$; however, exposure to plus size media images did not reveal statistically significant changes in NA, $F(1, 49) = 0.09$, $p = .16$, $\eta_p^2 = .04$. An ANCOVA was conducted on NA to compare effects of image type at postexposure by covarying out preexposure levels. This was statistically significant, $F(1, 99) = 5.22$, $p = .03$, $\eta_p^2 = .05$. Thus, these results indicate that media exposure differentially influenced NA depending upon the type of image to which one is exposed. That is, thin images elicited greater negative affect whereas plus size images had no effect.

Follow-up univariate tests also revealed a significant Time x Image Type interaction for the dependent variable of BS, $F(1, 99) = 9.28$, $p < .01$, $\eta_p^2 = .09$ (see Figure 5). Group differences for exposure to image type were not found to be statistically different with regard to reported scores for BS at baseline, $F(1, 99) = 1.78$, $p = .19$, $\eta_p^2 = .02$. A simple effects analysis of image type revealed that, regardless of binge status, participants who viewed thin media images displayed a decrease in BS scores, $F(1, 48) = 5.22$, $p = .03$, $\eta_p^2 = .10$. Furthermore, exposure to plus size media images revealed a significant increase in BS scores $F(1, 49) = 4.33$, $p = .04$, $\eta_p^2 = .08$. An ANCOVA was conducted on BS to compare effects of image type at postexposure by covarying out baseline levels. This was statistically significant, $F(1, 99) = 7.67$, $p = .007$, $\eta_p^2 = .07$. Thus, these results indicated that media exposure differentially influences body image satisfaction depending upon the type of image to which one is exposed. That is, exposure to thin images resulted in a decrease in body satisfaction whereas exposures to plus size images resulted in an increase in body satisfaction.

Taken together, these results suggest that effects exist for negative affect as a function of one's binge status and the type of image the individual is exposed to. More specifically, binge eaters and nonbinge eaters differ in their response to exposure to media images, regardless of

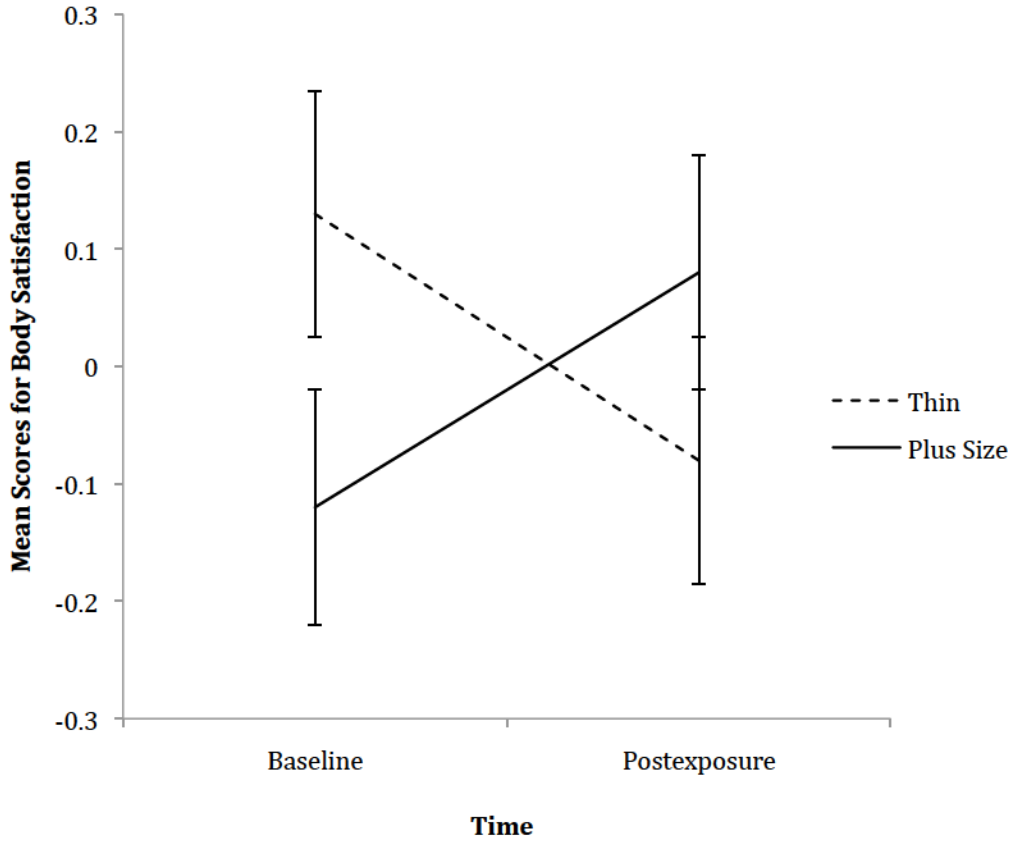

Figure 5. Mean scores for Body Satisfaction (± *SE*) as a function of exposure to thin and plus size images at baseline and postexposure.

image type, whereby binge eaters tend to show an increase in negative affect and nonbinge eaters show a decrease in negative affect postexposure. With regard to image type, regardless of one's binge status, exposure to thin media images elicit greater negative affect and plus size images have no effect. In addition, exposure to thin media images led to a decrease in body satisfaction whereas exposure to plus size images led to an increase body satisfaction.

Exploratory Analyses

A series of exploratory analyses were conducted to further investigate the impact of social comparison to media images on a number of attributes. That is, an exploratory factor analysis was conducted on the Comparison Checklist (Appendix R) in order to identify a subset of factors and to examine whether differences existed as a function of one's binge status and/or exposure to a specific image type. Further, secondary dependent measures of theoretical interest were used to examine group differences between binge eaters and nonbinge eaters. These measures were found to fit into two categories; disordered attitudes and behaviours, and psychological distress. Self-discrepancy and body mass index were also analyzed for group differences between binge eaters and nonbinge eaters. Finally, analyses were conducted on a series of experimental manipulation checks.

Factor analysis of the Comparison Checklist. A principal component analysis (PCA) was conducted on the 35 items from the Comparison Checklist with orthogonal rotation (varimax). Of the 35 items presented on a likert-type scale, 11 items that were originally worded in a negative direction were recoded given that the scale was reversed, thus indicating a downward comparison where participants viewed themselves in a more positive manner compared to the model. Thus, after these items were recoded, higher scores on all items represented a negative comparison indicating that the model was rated more favourably

compared to oneself on the measured attributes. The Kaiser-Meyer-Olkin measure verified the sampling adequacy for the analysis, KMO = .83, and all KMO values for individual items were > .5, although the majority (85.7%) of the items fell between .7 and .9 which is above the acceptable limit of .5 (Field, 2009). Bartlett's test of sphericity, χ^2 (595) = 2,568.89, $p < .001$, indicated that correlations between items were sufficiently large for PCA. An initial analysis was run to obtain eigenvalues for each factor in the data. Eight factors had eigenvalues over Kaiser's criterion of 1, however only four of these factors were sufficient in magnitude and thus resulted in explaining 58.7% of the variance. The scree plot was consistent with this finding, suggesting the presence of four factors. Given the sample size, the convergence of the scree plot and Kaiser's criterion on the four factors, this is the number of factors that were retained in the final analysis. Table 4 shows the factor loadings after Varimax rotation. The items that cluster on the same factors suggest that Factor 1 represents comparisons made related to personal feelings, Factor 2 are comparisons related to specific parts of the body, Factor 3 are comparisons made regarding feelings about physical appearance and satisfaction and Factor 4 are comparisons related to facial features.

The Personal Feelings and Body Parts factors on the Comparison Checklist had high reliability, Cronbach's α = .95 and .91, respectively. The Appearance and Satisfaction, and comparisons related to Facial Features factors had reliability within the recommended range of .70 to .80 (Field, 2009); specifically Cronbach's α = .71 for both.

The means and standard deviations of the raw score item totals reflected in the four factors of the Comparison Checklist are presented in Table 5. A multivariate analysis of variance (MANOVA) was performed on the four derived factors; Personal Feelings, Body Parts, Appearance and Satisfaction and Facial Features. The two-between subjects independent

Table 4

Summary of Exploratory Factor Analysis Results for the Comparison Checklist

Item Number and Descriptor	Rotated Factor Loadings			
	Personal Feelings	Body Parts	Appearance and Satisfaction	Facial Features
32. Dissatisfied[c+]	**-.83**	-.26	.17	-.06
30. Discouraged[c+]	**-.82**	-.18	.15	-.004
29. Sad[c+]	**-.82**	-.09	.23	-.03
28. Confident[c]	**.82**	.21	-.02	.07
31.Self-Conscious[c+]	**-.81**	-.22	.26	-.06
26. Happy[c]	**.81**	.13	.09	.02
35. Bad[c+]	**-.80**	-.18	.32	-.07
34. Proud[c]	**.72**	.28	-.11	.22
33. Comfortable[c]	**.67**	.32	-.06	.23
9. Lower Arms[a]	.01	**.80**	-.07	-.02
17. Legs[a]	.36	**.77**	-.01	.09
10. Wrists[a]	-.02	**.72**	-.07	-.04
16. Thighs[a]	.37	**.70**	.01	.08
12. Upper Back[a]	.19	**.69**	-.05	.21
8. Upper Arms[a]	.50	**.67**	.26	.06
7. Shoulders[a]	.27	**.67**	.04	.15
14. Stomach[a]	.42	**.63**	.13	.01
15. Buttocks[a]	.28	**.60**	-.04	.27
1. Body Overall[a]	.37	**.59**	-.09	.28
11. Hands[a]	-.03	**.57**	-.35	-.03
22. Happier[b+]	-.08	.03	**.83**	-.09
23. Satisfied-Life[b+]	-.09	.08	**.82**	-.04
21. Successful[b+]	-.24	-.03	**.73**	.004

(continued)

Item Number and Descriptor	Rotated Factor Loadings			
	Personal Feelings	Body Parts	Appearance and Satisfaction	Facial Features
20. Beautiful[b+]	-.19	.06	**.72**	-.31
24. Sex Appeal[b+]	-.18	-.19	**.55**	-.29
27. Inspired[c]	.46	-.002	**.51**	.02
13. Chest[a]	-.14	.09	**-.50**	.45
18. Feet[a]	.19	.28	**-.41**	.22
4. Cheeks[a]	.26	.22	.03	**.65**
2. Hair[a]	-.09	-.11	-.15	**.65**
3. Face[a]	.14	.20	-.32	**.64**
5. Chin[a]	.17	.27	.05	**.61**
19. Skin[a]	.01	-.01	-.28	**.53**
25. Glamorous[b+]	-.11	-.06	.46	**-.47**
Eigenvalues	11.15	4.58	3.01	1.81
% variance	20.88	16.78	12.49	8.54
α	.95	.91	.71	.71

Note. [+] Items have been reverse-coded.
[a] Items read "Compared to my own (item), this woman's (item) is…"
[b] Items read "Compared to myself, this woman is/has more (item)."
[c] Items read "Comparing myself to this woman, makes me feel (item)."

Table 5

Raw Score Item Totals Reflected in the Four Factors of the Comparison Checklist as a Function of Binge Status and Image Type

	Binge Status		Image Type	
	Binge[a]	Nonbinge[b]	Thin[c]	Plus Size[d]
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)
Comparison Checklist				
Personal Feelings	34.69 (14.73)	31.84 (11.89)	37.06 (12.40)	29.57 (13.44)
Body Parts	50.67 (12.19)	46.88 (10.81)	53.98 (10.35)	43.71 (10.59)
Appearance/ Satisfaction	32.94 (7.83)	31.82 (7.47)	30.48 (6.95)	34.26 (7.88)
Facial Features	30.55 (5.03)	28.90 (4.42)	29.58 (4.66)	29.88 (4.95)

Note. [a]$n = 51$. [b]$n = 50$. [c]$n = 50$. [d]$n = 51$.

variables were binge status (binge vs. nonbinge) and image type (thin vs. plus size). Significant differences did not emerge as a function of one's binge status, $\Lambda = 0.95$, $F\ (4, 94) = 1.31$, $p = .27$, $\eta_p^2 = .05$ nor the Binge Status x Image Type interaction, $\Lambda = 0.95$, $F\ (4, 94) = 1.19$, $p = .32$, $\eta_p^2 = .05$. However, the MANOVA did produce a statistically significant main effect for image type, $\Lambda = 0.64$, $F\ (4, 94) = 13.51$, $p < .001$, $\eta_p^2 = .37$. Subsequent univariate ANOVAs revealed that compared to participants viewing plus size images, those viewing thin images reported (a) greater negative comparisons on Personal Feelings, $F\ (1, 99) = 8.49$, $p = .004$, $\eta_p^2 = .08$, and (b) greater negative comparisons on Body Parts, $F\ (1, 99) = 24.95$, $p < .001$, $\eta_p^2 = .21$. In addition, participants viewing plus size images in comparison to thin images reported greater negative comparisons on Appearance and Satisfaction, $F\ (1, 99) = 6.37$, $p = .01$, $\eta_p^2 = .06$. No significant differences were found in relation to comparisons made on Facial Features, $F\ (1, 99) = .08$, $p = .77$, $\eta_p^2 = .001$.

Taken together, these results suggest that the social comparison experimental manipulation produced intended effects. Specifically, comparisons made to thin media images elicited negative ratings in relation to personal feelings such as satisfaction, comfort, and self-consciousness. Similarly, comparisons made in the thin image condition led to negative ratings for body parts where the model was seen to possess the better body part (e.g., stomach, buttocks). Finally, comparisons made to plus size media images led to greater negative ratings with regard to one's appearance and satisfaction such that the model was rated as better on the given attribute (e.g., happier, more successful).

Self-discrepancy and body mass index. Data were analyzed in order to assess for group differences between binge eaters and nonbinge eaters as a function of the amount of self-discrepancy reported between one's actual and ideal self as measured by the BIQ (Appendix H).

This analysis was exploratory given that studies have not specifically investigated self-discrepancy in binge eaters and nonbinge eaters. Also, previous studies that have examined self-discrepancy in relation to media image exposure have found differential effects on outcome variables such as negative affect and eating disorder symptoms (Harrison, 2001), as well as appearance self-esteem and mood (Bessenoff, 2006). On the BIQ, for each attribute, participants rated themselves on their personal ideal (how they prefer to be) and how well they match this ideal on the given attribute. In addition, participants rated the importance they place on each ideal for each attribute. Thus, two primary scores are derived from the measure: Discrepancy and Importance. The Discrepancy score is the calculated mean of the rated self-ideal discrepancies on the given attribute and the Importance score is the mean of the rated importance of the personal ideal for the given attribute. A Weighted-Discrepancy score is then calculated by multiplying the mean of the Discrepancy and Importance scores (Cash, 1995). In the present study, the difference between binge eaters ($M = 5.59$, $SD = .92$) and nonbinge eaters ($M = 5.32$, $SD = .54$) regarding reported self-discrepancy was not found to be statistically significant, $t(99) = -1.85$, $p = .07$, $r = .18$.

Group differences in body mass index (BMI) as a function of binge status were also analyzed. It was important to rule out BMI as a potential confounding factor for participants' reaction to the media images as well as their reported self-discrepancy scores. Given that exposure to thin images can lead to negative outcomes such as restrained eating and low self-esteem for average sized women (Polivy & Herman, 2002), it is possible that differential effects could exist for women with a higher BMI. In a recent study, Smeesters, Mussweiler, and Mandel (2010) examined differential effects for BMI on a series of outcomes after exposure to media images portraying models of different sizes. It was found that social comparison processes and

both self-evaluative (e.g., self-esteem) and behavioural (e.g., food consumption) outcomes differed as a function of BMI. In the present study, a statistical trend was observed for binge eaters to have a higher BMI (M = 25.38, SD = 5.56) than nonbinge eaters, (M = 23.46, SD = 4.35, $t(96)$= -1.90, p = .06, r = .19.

Disordered attitudes, behaviours and psychological distress. A series of secondary dependent measures was included in the analyses to help understand differences between binge eaters and nonbinge eaters. Table 6 displays the means (*SD*s) of the five dependent variables (SATAQ-3, EDE-Q, RRS, BDI-II, and RSES) as a function of the independent variable binge status. Table 7 presents the intercorrelations among these measures. The first category of measures represented disordered eating attitudes and behaviours. The first measure examined differences in media internalization. A one-way, between-groups ANOVA on the measure of media internalization defined by the total score of the SATAQ-3 produced a significant main effect for binge status, F (1, 99) = 10.38, p = .002, η_p^2 = .10, wherein binge eaters reported higher scores of media internalization compared to nonbinge eaters. A second pair of measures examined group differences in relation to eating attitudes and behaviours. More specifically, a multivariate analysis of variance (MANOVA) was computed to assess for significant differences between binge eaters and nonbinge eaters on the measure of eating attitudes and behaviours contained within the global score of the EDE-Q along with the measure of restrained eating (RRS). The multivariate Wilks' statistic was significant, indicating an overall pattern of differences in scores as a function of binge status, Λ = 0.76, F (2, 98) = 15.32, p <.001, η_p^2 = .24. Binge eaters reported a higher global (total) score on the EDE-Q compared to nonbinge eaters, F (1, 99) = 27.79, p <.001, η_p^2 = .22. Furthermore, binge eaters were found to be more restrained on the RRS compared to nonbinge eaters, F (1, 99) = 24.46, p <.001, η_p^2 = .20.

Table 6

Mean Scores on the Psychometric Variables Tapping Disordered Eating Attitudes, Behaviours and Psychological Distress as a Function of Binge Status

	Binge[a]	Nonbinge[b]
Variable	*M (SD)*	*M (SD)*
Disordered Eating Attitudes and Behaviours		
SATAQ-3 Total	105.16 (18.92)	90.48 (26.08)
EDE-Q Global	2.89 (1.18)	1.64 (1.20)
RRS	19.84 (6.32)	13.38 (6.81)
Psychological Distress		
BDI-II[c]	16.15 (8.46)	10.63 (7.01)
RSES	17.31 (5.27)	20.62 (4.90)

Note. [a]$n = 51$. [b]$n = 50$. [c]Untransformed means. SATAQ-3 = Social Attitudes Toward Appearance Questionnaire (Third Edition); EDE-Q = Eating Disorder Examination Questionnaire; RRS = Revised Restraint Scale; BDI-II = Beck Depression Inventory (Second Edition); RSES = Rosenberg Self-Esteem Scale.

Table 7

Intercorrelations Among the Secondary Dependent Variables

Variable	*1*	*2*	*3*	*4*	*5*
1. SATAQ-3	__	.65	.53	.48	-.48
2. EDE-Q	.65	__	.76	.53	-.47
3. RRS	.53	.76	__	.51	-.33
4. BDI-II	.48	.53	.51	__	-.62
5. RSES	-.48	-.47	-.33	-.62	__

Note. N = 100-101; p values for all correlation coefficients < .001. SATAQ-3 = Social Attitudes Toward Appearance Questionnaire (Third Edition); EDE-Q = Eating Disorder Examination Questionnaire; RRS = Revised Restraint Scale; BDI-II = Beck Depression Inventory (Second Edition); RSES = Rosenberg Self-Esteem Scale.

The second category of measures represents psychological distress. A multivariate analysis of variance (MANOVA) was computed to assess for differences between binge eaters and nonbinge eaters on the depression measure BDI-II (natural log transformed) and trait self-esteem measured by the RSES. The multivariate Wilks' statistic was significant, indicating an overall pattern of differences in scores as a function of binge status, $\Lambda = 0.88$, $F\ (2, 98) = 6.89$, $p = .002$, $\eta_p^2 = .13$. Binge eaters reported higher total scores for depression compared to nonbinge eaters, $F(1, 99) = 12.03$, $p = .001$, $\eta_p^2 = .11$. In addition, binge eaters were found to report lower scores in the trait self-esteem measure, indicating that their overall self-esteem is lower than that of their nonbinge counterparts $F(1, 99) = 10.64$, $p = .002$, $\eta_p^2 = .10$.

Manipulation Checks

A series of manipulation checks were conducted to examine key elements of the experimental design as well as possible group differences as a function of binge status and image type.

Thin media images. In order to assess whether the images were thought to portray the thin ideal as presented in the media, all participants exposed to thin images were asked, "Did you think that the images that you viewed were an accurate representation of the thin ideal portrayed by the media?" Participants responded to a 9-point likert-type scale with 1 anchored as *strongly disagree* and 9 anchored as *strongly agree*. The average score of 50 respondents was 7.64 (SD=2.16). Analyses did not reveal any significant differences in ratings of the images as a function of binge status, $t(48)= .13$, $p = .90$, $r = .02$.

Plus size media images. In order to assess whether the images were thought to portray plus size images as presented in the media, all participants exposed to plus size images were asked, "Did you think that the images that you viewed were an accurate representation of plus

size models as portrayed by the media?" Again, participants responded to a 9-point likert-type scale with 1 anchored as *strongly disagree* and 9 anchored as *strongly agree*. The average score of 51 respondents was 7.10 (*SD*=1.96). Analyses did not reveal any significant differences in ratings of the images as a function of binge status, $t(49)= .22$, $p = .83$, $r = .03$.

Social comparison task compliance. All participants were asked to rate a single item "To what extent did you compare yourself to the images that you were shown as per the instructions given?" Participants responded to a 9-point likert-type scale with 1 anchored as *did not compare at all* and 9 anchored as *fully compared*. This question was used to assess if participants followed the instructions of the task. The average score of the 101 respondents was 7.39 (*SD*=1.74). Analyses did not reveal any significant differences in ratings of the degree of social comparison to the model in the image as a function of binge status, $t(99)= .26$, $p = .79$, $r = .03$, or image type, $t(99)= .88$, $p = .38$, $r = .09$.

Mirror exposure. All participants were asked to rate a single item "Was the presence of the mirror helpful in making comparisons to the images?" Participants responded to a 9-point likert-type scale with 1 anchored as *strongly disagree* and 9 anchored as *strongly agree*. Given that mirror exposure was used in the current study to heighten the social comparison experience, it was important to evaluate whether participants found it to be a useful. The average score of the 101 respondents was 7.39 (*SD*=1.85). Analyses did not reveal any significant differences in ratings as a function of binge status, $t(99)= 1.37$, $p = .17$, $r = .14$, or image type, $t(99)= -.03$, $p = .97$, $r < .01$.

Cover story. Upon completion of the study and once all data was collected, participants were debriefed via email after two months. At this time, participants were asked to answer a final question "At the time of the study, did you believe the 'cover' story that you were told?"

Participants responded on a 9-point likert-type scale with 1 anchored as *did not believe at all* and 9 anchored as *totally believed*. Of the 101 participants in the study, 76 responded to the email. Participant's mean answer to the item was 8.18 (SD = 1.25) and 97% of participants answered 5 or above to the item. Of the 76 respondents, 42 respondents were assigned to the plus size images group and 34 respondents were assigned to the thin images group. Independent samples t tests were computed to examine whether there were differences in belief in the cover story as a function of binge status as well as image type. Analyses revealed no significant differences as a function of binge status, $t(74)= 0.40$, $p = .69$, $r = .05$. However, a main effect of image type was revealed, such that participants viewing the thin images reported less belief in the cover story ($M = 7.85$, $SD = 1.62$) compared to those viewing the plus size images ($M = 8.45$, $SD = .77$), $t(74)= -2.13$, $p =.04$, $r = .24$. Although statistically different, the actual means indicated that both groups strongly believed in the cover story.

Discussion

The current study sought to investigate the impact of exposure to thin and plus size media images via a social comparison task on the candy consumption, NA, and BS among binge and nonbinge eaters. To date, much of the research in this area has focused on restrained eaters where less is known about binge eaters. The current study not only expands on previous media related research by focusing on binge eaters, but it also examines effects of exposure to plus size images. Recent studies (Bola, 2007; Tiggemann & Polivy, 2010) have examined social comparison to media images based on the notion that it is the reaction to images and not mere exposure alone that leads to negative outcomes for women postexposure. Further, the present study included an objective social comparison task made highly salient through the use of full size body comparisons and mirror exposure.

Regarding candy consumption, it was predicted that binge eaters would eat more than the nonbinge comparison group, particularly while under experimental instructions to engage in social comparison to thin media images. This was confirmed in the present study. This finding is consistent with previous findings (Bola & Jarry, 2006) where binge eaters ate more than nonbinge eaters postexposure to thin images, and when engaging in social comparison to thin images versus focusing on the aesthetic quality of thin images (Bola, 2007).

That binge eaters ate more compared to nonbinge eaters following exposures can begin to be interpreted in light of the affect regulation models: comfort and escape. Regarding the comfort model (Polivy & Herman, 1999), consuming more candy postexposure to the comparison task may have reflected an attempt to regulate negative emotions and seek comfort through consuming the candy. Similarly, binge eaters' candy consumption can be explained by escape theory (Heatherton & Baumeister, 1991) whereby binge eaters may have been in a state of aversive self-awareness during the comparison task, thereby leading them to eat more as a mechanism of escaping from such self-awareness. Further, binge eaters in the current study were found to be more restrained on the Restraint Scale compared to nonbinge eaters. It is possible that exposure to the images led to greater sociocultural pressure to internalize the thin ideal, thereby causing a disruption in cognitive restraint resulting in temporary disinhibition of eating. Similar results have also been found for restrained eaters (e.g., Mills et al., 2002) who have been observed to disinhibit and eat more compared to unrestrained eaters when viewing thin media advertisements.

In the current study, binge eaters also reported higher scores on the EDE-Q regarding disordered eating attitudes and behaviour, which point to more concerns with weight, shape, eating, and dietary restraint. Recent studies (e.g., Calado et al, 2010) have shown that greater

eating disturbance may lead to increased viewing of media images and thus result in more media internalization. This could possibly create a cycle between disordered eating and media internalization. That is, preexisting disordered eating attitudes and behaviour including weight and shape concerns, as well as eating disturbance such as restrained eating may lend one to be more vulnerable to internalizing thin ideals. Thin ideal internalization, in turn, is likely to perpetuate disordered eating attitudes and behaviour.

The obtained significant interaction whereby binge eaters ate more than nonbinge eaters following exposure to thin images rather than plus size images can also be understood in terms of media internalization. Differences in the degree of media internalization would have an impact on the type of comparisons made (upward vs. downward). Further, greater media internalization would lead to more specific comparisons and the size of the model would be a critical component of the social comparison mechanism. In the current study, binge eaters were found to report higher media internalization scores on the SATAQ-3 compared to nonbinge eaters. Moreover, thin media images were found to elicit negative comparisons for women regarding ratings of their own body parts and personal feelings. Taken together, these observations support that exposure and social comparison to thin media images elicits a negative reaction among binge eaters who, as a result, show disinhibition in their eating. This selective appetitive response of binge eaters points to the importance of upward comparisons to the models rather than mere exposure alone and indicates that social comparison to thin images leads to negative outcomes for women who binge eat.

Regarding psychological responses to the social comparison task, it was predicted that binge eaters would display increases in NA and decreases in BS from baseline to postexposure

for thin media images. Results supported changes in NA as a function of binge status and image type. Further, it was found that changes in BS were impacted by image type only.

Regarding differences as a function of binge status, results supported that binge eaters reported an increase in NA postexposure to media images whereas nonbinge eaters reported decreases in NA. This finding provides support for the affect regulation models in suggesting that exposure to media images can result in NA, which is regarded as a common antecedent for binge eating (Abraham & Beumont, 1982; Baucom & Aiken, 1981; Greeno, 2000; Heatherton & Baumeister, 1991; Paxton & Diggens, 1997; Telch & Agras, 1996). There was no effect of image type on the changes in NA for binge and nonbinge eaters. It is possible that changes in NA postexposure to the images may then result from binge eaters' predisposition to negative affect. For example, binge eaters were found to report higher depression scores in the current study. Thus, there may be an increased vulnerability to changes in NA among binge eaters compared to nonbinge eaters.

In addition, reported self-esteem may also play a role in responding to media images in general. Studies have supported that binge eaters report more body image disturbance, which in turn has been found to be related to lower self-esteem (Hrabosky et al, 2007; Masheb & Grilo, 2003). Also, low self-esteem has been found to mediate, to varying degrees, the relationship between self-evaluation (Pratt et al., 2001), self-criticism (Dunkley & Grilo, 2007) and depressive symptoms among binge eaters. In the current study, binge eaters were found to report lower global scores for self-esteem, which likely impacted their responses to the media images and negatively impacted postexposure scores for NA.

As previously mentioned, binge eaters have been found to internalize media ideals more than nonbinge eaters and, as a result, comparing themselves to the images may have led to

greater internalization irrespective of image type when compared to nonbinge eaters. The amount of internalization may have also impacted comparisons made to the images, whereby the comparisons for binge eaters were stronger or the type of comparison varied (e.g., upward vs. downward).

For nonbinge eaters then, it is possible that decreases in NA stem from positive effects of the images. This may have manifested in simple pleasure in viewing the images, but given the comparison task, it is possible that comparisons were not threatening or that the plus size images balanced out reactions to the thin images, where the plus size images elicited positive (downward) comparisons. Interestingly, comparison ratings pointed toward the plus size model having better appearance and satisfaction compared to oneself. Perhaps downward comparisons for plus size models only exist for specific body part comparisons and personal feelings rather than overall appearance and satisfaction. This would support that while women see thin models as better in terms of their body and comparisons elicit more negative personal feelings; plus size models are seen as having a better appearance and being more satisfied. This may in turn, be related to the attainability of a media portrayed thin ideal that is not realistic for all women. No differential effects were found for BS as a function of one's binge status. Thus, changes in BS are likely contingent on the type of image to which one is exposed.

With respect to differences in NA as a function of image type, our results found significant increases in NA postexposure to thin media images, irrespective of one's binge status. No differential effects were found postexposure to plus size images. This finding is consistent with the plethora of research supporting that exposure to thin media images leads to negative outcomes such as NA for some women such as those who engage in binge eating behaviour (Bola, 2007; Birkeland et al., 2005; Grabe et al., 2008; Groesz et al., 2002; Hausenblas et al.,

2004; Hawkins et al, 2004; Pinhas et al, 1999; Tiggemann & Polivy, 2010; Tiggemann et al, 2009). It is likely that thin media images highlight an unattainable ideal for women leading to increases in NA.

As discussed, women in this study were required to compare themselves to the models in the images, which likely led to upward comparisons. Results also indicated that women viewing the thin images reported negative comparisons for specific body parts and negative personal feelings. That is, the models were viewed to have better physical appearances and viewing the images led participants to report more negative feelings such as "sad" and "dissatisfied."

Comparisons made to plus size images did not produce significant changes in NA. Thus, viewing and comparing oneself to plus size images do not make women feel worse or better. This finding can be interpreted in relation to media internalization. That is, viewing and comparing oneself to the plus size images likely did not result in media internalization given that exposure to the plus size images did not lead to the sociocultural pressure to attain an ideal. Further, the nature of the plus size images themselves is important to consider. Given the limited availability of plus size images seen in comparable media outlets such as fashion magazines, one could interpret the plus size images to represent a range of women spanning from average to large in size. Such a variation in interpretation would impact women's responses to the images and reported NA.

Results yielded significant changes in BS among participants postexposure as a function of image type. That is, participants in the thin image condition reported decreases in BS whereas exposure to plus size images led to increases in BS. Research has supported that exposure and comparisons made to thin images have led to body dissatisfaction for women (Cattarin et al., 2000; Kozar & Damhorst, 2009; Myers & Crowther, 2009). In the current study, BS was likely

affected by the nature of the comparison task, in which women were asked to make comparisons to the models with regard to specific body parts.

For women viewing thin images, portrayal of the thin ideal likely led to upward comparisons given that women felt worse about their bodies and reported decreases in BS. In contrast, viewing plus size images led women to report increases in BS indicating a downward comparison. This finding is supported by the results of the analysis on the Comparison Checklist. Specifically, participants exposed to the thin images rather than the plus size images reported negative comparisons in relation to specific body parts, indicating that the model was seen as better on the given attribute. This further supports that the thin images elicited upward comparisons resulting in decreased BS.

Moreover, changes in body satisfaction postexposure to the images were also likely affected by the nature of the experimental task itself. That is, attempts were made to heighten the exposure and comparison process. Participants were required to make objective comparisons using a checklist that required them to specifically focus on their body parts. In addition, the images were full body images projected onto a full size screen to make them as close to their real size as possible. This would make the body parts comparison more salient as compared to viewing the image on paper and in letter size. Finally, the presence of, and instructions to use, the full-length mirror enabled participants to view themselves in vivo and make comparisons rather than relying on their imagination. These components of the study allow for greater confidence in the BS results regarding both thin and plus size images.

It is important to note that in the current study, a statistical trend was found indicating that binge eaters reported higher BMI compared to nonbinge eaters. Although BMI is not a perfect measure, it has been widely used in similar research and it has been suggested that it is

accurately reported among binge eaters (White, Masheb, & Grilo, 2010). Reported differences in BMI may have affected comparisons made to the images and candy consumption given that binge eaters consumed more candy postexposure to thin media images. However, results also suggest that differences between binge eaters and nonbinge eaters in BMI did not affect BS given that participants reported changes in BS as a function of image type and not binge status. In addition, significant differences were not found regarding reported self-discrepancy. One would expect that differences in BMI would also impact self-discrepancy. In the current study, results based on the comparisons made in relation to BS are not attributable to differences in reported self-discrepancy between binge and nonbinge eaters. Reported self-discrepancy from ideals was also important to rule out so that results for binge eaters were not premised on a preexisting discrepancy between their actual and ideal selves.

Taken together, social comparison to thin and plus size media images was found to differentially affect candy consumption, NA, and BS among binge and nonbinge eaters. More specifically, results supported that binge eaters consumed more candy when exposed to thin media images as compared to plus size media images. Binge eaters also reported increases in NA postexposure to media images whereas nonbinge eaters reported decreases in NA, irrespective of image type. In addition, exposure to thin images led to increases in NA compared to exposure to plus size images, which had no differential effect. These results indicate that for binge eaters, exposure to a certain type of image specifically impacts candy consumption whereas type of image did not impact NA. In line with affect regulation models (Heatherton & Baumeister, 1991; Polivy & Herman, 1999), it would be expected that binge eaters report greater NA postexposure to thin images specifically leading to a greater amount of candy consumed within that experimental condition. This was partially supported, however, as binge eaters reported

increases in NA irrespective of image type. Thus, the restraint model may better explain the finding that binge eaters ate more postexposure to thin media images. Further, it may be that the items on the PANAS may not have tapped into the affective states associated with viewing media images specifically, as items reflected an overall state of negative affect. For example, negative items such as afraid, scared and hostile may not have captured reactions to the images, whereas items such as sadness and inferiority may have been more suitable. Finally, it was found that participants exposed to thin images reported decreases in BS whereas exposure to plus size images led to increases in BS.

Manipulation Checks

Given the importance of the experimental manipulation in the current study, a series of manipulation checks were analyzed to better understand the representation of media mages used, compliance with the social comparison task and the overall internal validity of the study. Participants were asked to rate the extent to which they believed that the thin and plus size media images were representative of the images they see in everyday media. Participant ratings confirmed that the images used in the study were an accurate representation of both thin and plus size media images. There were no differences in the ratings between binge eaters and nonbinge eaters. This suggests that the images were representative to both groups, thus ruling out accuracy of media representation as a potential confounding factor. Group differences in media representation would negatively impact the comparison task and results would not be attributable to differences between binge eaters and nonbinge eaters. Further, given that plus size images are sparse, it was important to have representative images for the generalizability of results.

Participants responded that they complied with the social comparison task and no group differences were noted regarding task compliance. Given that previous research supports that

social comparison is a key component of exposure to media images (Bola, 2007; Tiggemann & Polivy, 2010), it was important to assess that participants in the current study were following task instructions and engaged in social comparisons. The use of the comparison checklist was also an objective measure of social comparison whereby participants were forced to make specific comparisons of themselves relative to the images. In addition, the salience of comparison task was heightened with the use of a full-length mirror, which was used to allow participants to see themselves and the image simultaneously while making ratings. Participants responded that the mirror was helpful during the task and there were no group differences regarding this rating. Thus, according to participant ratings, both groups complied with task instructions and the use of the mirror was considered to be helpful in making objective comparisons.

Finally, participants were asked via email after the debriefing to rate their belief in the cover story. A majority of the participants completed this rating. Results supported that participants strongly believed in the cover story. Group differences in belief of the cover story were found as a function of image type. That is, participants viewing thin images reported less belief in the cover story. Overall, the ratings strongly suggest that both groups believed the cover story and participants in both groups did not know the true purpose of the study.

Limitations

The present study is not without limitations. A number of participants were dropped from the original screening in order to adhere to the strictest inclusion criteria for binge eating. The nonbinge group included participants (32%) who responded that they engage in binge eating on a "seldom" basis. It was difficult to find participants in the university population who reported that they "never" engage in any binge behaviour. Based on these reports, it may seem like a

common behaviour among university students. Importantly, of these participants who endorsed "seldom" binge eating, 88% reported that they did not engage in any binge episodes over the past 28 days. Further, these participants did not report perceived loss of control over eating during these reported objective episodes. In addition, significant differences were found between the binge and nonbinge groups with regard to objective eating in laboratory during the current study as measured by amount of candy consumed. The current study relied on self-report in order to determine the presence or absence of binge eating among participants. It has been shown the self-report rates of binge eating are higher than those identified through structured interview processes (Fairburn & Beglin, 1994). Thus, the use of a structured interview would have been valuable in determining participants binge status along with resolving the limitation regarding the inclusion of "seldom" binge eaters. Although an attempt was made to apply the strictest binge criteria in line with the DSM-IV-TR (APA, 2000), generalizability is still an issue. The results of this study are generalizable to other female university samples, but further research would need to be done in order to match a clinical sample. Future studies may also want to include men and individuals from different age groups. It may also be of value to compare individuals who show no restrained eating and/or binge eating with individuals who engage in frequent binge eating. This would be beneficial given that binge eaters are found to be highly restrained in their eating. Further, it would be of interest to better understand the effects of media exposure and social comparison within a clinical sample.

Another limitation of the study was related to measurement. The battery of secondary measures was collected postexposure to the media images. Thus, responses to the questionnaires may have been affected by exposure to the type of media image (e.g., thin or plus size) and the comparison task, or as a function of responses to other questionnaires in the battery. Regarding

the latter, efforts were made to randomize the order of the questionnaires to limit this potential influence.

Finally, it was of interest to examine the role of self-esteem in exposure to media images. Our results suggested that our state measures of body image (BISS) and appearance-related self-esteem (SSES) were essentially measuring the same construct of body image and, as a result, they were combined into one measure of BS. It would have been valuable to use a global measure of self-esteem as a state measure so that it was not specifically related to appearance in order to examine the influence of media exposure upon self-esteem.

Strengths and Future Directions

A strength of the present study is that to the author's knowledge, it is the first to examine the role of social comparison to thin and plus size media images with a sample of the binge eating population. The current study is also one of the first studies (besides Bola, 2007; Bola & Jarry, 2006) to examine the impact of media images on the eating behaviour and affect of binge eaters. Next, the current study adopted strict inclusion criteria and a comprehensive screening process. The binge group was comprised of individuals who met binge criteria as outlined in the DSM-IV-TR (APA, 2000). The current study is also the first to incorporate plus size media images in examining the effects of both upward and downward comparisons with binge eaters on the outcome variables. Also, the study used an objective comparison task and a checklist was created for specific comparisons rather than simply going on the assumption that social comparison to the media images took place. The use of full size projections and a mirror allowed for heightened exposure and more detailed comparisons.

The findings of the present research are important in several respects. First, it is critical to not only understand that media images do influence women's eating behaviour, mood, and body

image; but also, the mechanism behind this. That is, the current study supports that it is not mere exposure alone, but the act of comparing oneself to the model that has a negative impact on health outcomes in women. The results of this study with regard to media influence on participant's mood and body image concerns could be important in treatment for eating disorders. The impact of thin and plus size media images can be incorporated into psychoeducation models in treatment. Second, this information is important for the prevention of eating disorders. Eating disorders are becoming increasingly prevalent and at a young age, thus media awareness could be taught in schools at an early age as a prevention tool. Such research is important for the development of prevention programs that educate young women about the realities of thin media images (e.g., airbrushing) and information that highlights that the women in these images do not necessarily represent a healthy norm for all women. A focus of both treatment and prevention should be on the processing of media images in relation to unrealistic and often unattainable social comparisons.

The current study has important implications for the type of media to which we are exposed. Exposure to thin media images in the current study was shown to have negative effects on some women's eating behaviour, affect, and body image satisfaction. Although exploratory in nature, plus size images in the current study did not differentially impact candy consumption or NA. However, it did yield a positive effect on body satisfaction. Thus, results support that shifts in the types of images we see through the media would be beneficial. Perhaps viewing women of various shapes and sizes in the media does alleviate some of the sociocultural pressures to be thin and allows for women to find themselves making realistic or positive comparisons. Future studies may want to also look at different channels of media to examine the impact of the thin ideal on the eating behaviour and affect of binge eaters and nonbinge eaters.

For example, studies may want to investigate television or media depictions through the Internet (e.g., social networking sites) that include thin and plus size women. Future research may benefit from comparing clinical samples and nonclinical samples of binge eaters to assess for differences in responses to thin media images on similar variables such as eating behaviour and affect. In addition, recent studies have examined the influence of media on mood and eating behaviour in children (Goldschmidt, Tanofsky-Kraff, & Wilfley, 2011; Harris & Bargh, 2009), thus it would be beneficial to look at different age groups and conduct longitudinal studies to see the effects of media exposure over time.

Additionally, future studies may want to consider the effect of comorbid disorders such as anxiety disorders, which have been associated with binge eating (Telch & Stice, 1998). Specifically, it would be interesting to see if social comparison to media images induces anxiety in binge eaters and nonbinge eaters and what effect this has on the outcomes variables. It would also be of interest to examine the role of personality factors in relation to binge eating. Personality traits such as perfectionism, impulsivity and sensation seeking have been found to be associated with binge eating (Cassin & von Ranson, 2005). It would be of interest to examine potential relationships between such underlying traits, social comparison processes and media internalization. The inclusion of such variables may be helpful in providing more insight into the role of media influence on binge behaviour, affect, and body image. Finally, it would be interesting to know binge eaters' responses on the dependent variables of interest after completion of the study. For example, how long do the reported effects of comparison to the images last? What are binge eaters' eating behaviours like after the study is completed? These questions would be important in addressing the long-term impact of social comparison to media images on the dependent variables of interest.

In conclusion, the present study found that the process of social comparison specifically to thin media images leads to negative outcomes for females who engage in binge eating behaviour. Further, differential effects exist for thin and plus size media images whereby there is a tendency for thin images to elicit upward comparisons and plus size images to elicit downward comparisons. These comparisons have contingent effects for eating behaviour, affect, and body image satisfaction. Collectively, the present study helps us to understand differential factors for binge and nonbinge eaters, as well as the complexity of exposure and social comparison to media images in relation to negative outcomes for women.

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Appendix A

Participant Cover Letter, Consent Form, and Screening Questionnaire

Participant Cover Letter

Dear Potential Participant:

Thank you for your interest in participating in a research study about how different factors such as perception, mood, and memory influence taste ratings. This study is being conducted by Sabreena Bola, a Doctoral candidate in Clinical Psychology, and supervised by Dr. Ron Davis from the Psychology department at Lakehead University.

In order to participate in this study, we require that participants meet specific eligibility criteria. As a result, this part of the study requires individuals to complete a brief questionnaire. Based on the answers to these questions, the researcher will contact eligible participants to be invited to the laboratory to complete the full study, which will take approximately 1 hour. Eligible participants will be contacted and individual appointments will be made to complete the study.

Thus, the purpose of this brief questionnaire is to help select participants based on pre-selected criteria for the study.

If you volunteer to participate in completing this phase of the study, you will be asked to do the following:

1. Fill out the brief questionnaire that contains 7 questions.

This questionnaire will only take a few minutes to complete.

All eligible participants will be contacted via email or telephone within approximately 1 week to schedule an appointment to complete the study.

Should you be selected and participate in the study, you will receive 1 bonus mark for Psychology 1100 and a 5 dollar gift certificate for Tim Horton's.

You will be asked a variety of questions, which may be personal in nature. A risk associated with this questionnaire is the possibility that thinking about these personal issues may raise some psychological and emotional concerns for you. If during or after completing the questionnaire, you have concerns you wish to discuss, please feel free to contact the Student Health and Counselling Centre at 343-8361 (UC 1007), or via email at health&counselling@lakeheadu.ca.

Any information that is obtained in connection with this questionnaire and that can be identified with you will remain confidential and will be disclosed only with your permission. Any information you provide will be used for research purposes only. Your contact information will

be removed from the data. The data you supply will only be identified by number. Data will be stored securely for 5 years in the department of Psychology.

Participation in this research study is completely voluntary. If for any reason you wish to withdraw from the study, you may do so at any time without penalty.

If you have any questions or concerns about this study, please do not hesitate to contact myself or Dr. Ron Davis. You may also contact the Lakehead University Research Ethics Board at 343-8283.

Thank you,

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Consent Form

I have read and understand the cover letter and information provided for the study entitled "What influences taste perception?" This study is being conducted by Sabreena Bola, a doctoral student and supervised by Dr. Ron Davis in the Department of Psychology. My questions have been answered to my satisfaction, and I agree to participate in this study. I understand that my participation is conditional on the following:

1. I am aware that I will be completing a brief questionnaire assessing my eligibility to participate in the study.

2. I am aware that I will only receive 1 bonus mark for Psychology 1100 and a 5 dollar gift certificate for Tim Hortons should I be selected and participate in the study.

3. I realize that some of the questions are of a personal nature and may arouse feelings of discomfort.

4. I am a volunteer and may withdraw at any time from the study.

5. I am aware that I have the option of not answering any questions that I do not feel comfortable answering as part of this research questionnaire.

6. All information that I provide will remain anonymous, and be securely stored at Lakehead University for 5 years.

7. My name, or any other identifying information, will not appear on any of the data I provide or any future publications.

_____ _____

Name of participant (please print) Date

_____ _____

Signature of participant Date of birth

_____

Email

_____

Telephone number

Screening Questionnaire

How do you prefer to be contacted? Email □ Phone □

What is your preferred time to be contacted? Day/time_____

Please circle your answer:

1. Do you currently smoke cigarettes? YES or NO

2. During the last 6 months, have you taken oral contraceptives, or are you currently taking oral contraceptives? YES or NO

3. During the last 6 months, have there been times when you felt you have eaten what other people would regard as an unusually large amount of food given the circumstances (e.g., a quart of ice cream)? YES or NO

   If YES, how often did this occur?

A. Never B. Seldom C. Once or twice a month D. Once or twice a week E. Almost every day

   Did you experience a loss of control (feel that you couldn't stop eating or control what or how much you were eating)? YES or NO.

4. During the last 6 months, have there been times where you have consumed a large number of alcoholic drinks (e.g., more than 5 drinks) in a short period of time? YES or NO

5. Do you have any food aversions or allergies to chocolate? YES or NO

6. Do you have any food aversions or allergies to peanut butter? YES or NO

7. Are you currently being treated by a health care professional for any of the following:
   (a) Depression? YES or NO
   (b) Eating disorder? YES or NO
   (c) Anxiety disorder? YES or NO

Appendix B

Sample Thin Media Images

Appendix C

Sample Plus Size Media Images

Appendix D

BS

Binge eating is a rapid consumption of a large amount of food in a period of time usually less than two hours.

Read the items carefully and check the option (a, b, c, d, or e) that best applies to your binge eating.

1. How often do you binge eat?
    A. Never
    B. Seldom
    C. Once or twice a month
    D. Once or twice a week
    E. Almost every day

If you answered "Never" to this question, please go to the next questionnaire.

2. What is the average length of a binge episode?
    A. Less than 15 minutes
    B. 15 minutes to one hour
    C. One hour to four hours
    D. More than four hours

3. Which of the following statements best applies to your binge eating?
    A. I eat until I have had enough to satisfy me
    B. I eat until my stomach feels full
    C. I eat until my stomach feels painfully full
    D. I eat until I can't eat anymore

4. Do you vomit after a binge?
    A. Never
    B. Sometimes
    C. Usually
    D. Always

5. Which of the following best applies to your eating behaviour when binge eating?
    A. I eat more slowly than usual
    B. I eat about the same as usual
    C. I eat very rapidly

6. How much are you concerned about your binge eating?
    A. Not bothered at all
    B. Bothers me a little
    C. Moderately concerned
    D. Major concern

7. Which best describes your feelings **during** a binge?
    A. I feel that I could control the eating if I chose
    B. I feel that I have at least some control
    C. I feel completely out of control

8. Which of the following describes your feelings **after** a binge?
    A. I feel fairly neutral, not too concerned
    B. I am moderately upset
    C. I hate myself

9. Which of the following describes your feelings after a binge?
    A. Not depressed at all
    B. Mildly depressed
    C. Moderately depressed
    D. Very depressed

Appendix E

The PANAS

This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you feel this way *right now*, that is, at the *present moment*. Use the following scale to record your answers.

1	2	3	4	5
very slightly or not at all	a little	moderately	quite a bit	Extremely

_____ interested	_____ irritable
_____ distressed	_____ alert
_____ excited	_____ ashamed
_____ upset	_____ inspired
_____ strong	_____ nervous
_____ guilty	_____ determined
_____ scared	_____ attentive
_____ hostile	_____ jittery
_____ enthusiastic	_____ active
_____ proud	_____ afraid

Appendix F

The SSES

This is a questionnaire designed to measure what you are thinking at this moment. There is of course, no right answer for any statement. The best answer is what you feel is true of yourself at this moment. Be sure to answer all of the items, even if you are not certain of the best answer. Again, answer these questions as they are true for you **RIGHT NOW.**

	Not at all	A little bit	Somewhat	Very much	Extremely
I feel confident in my abilities.	1	2	3	4	5
I am worried about whether I am regarded as a success or failure.	1	2	3	4	5
I feel satisfied with the way my body looks right now.	1	2	3	4	5
I feel frustrated or rattled about my performance.	1	2	3	4	5
I feel that I am having trouble understanding things that I read.	1	2	3	4	5
I feel that others respect and admire me.	1	2	3	4	5
I am dissatisfied with my weight.	1	2	3	4	5
I feel self-conscious.	1	2	3	4	5
I feel as smart as others.	1	2	3	4	5
I feel displeased with myself.	1	2	3	4	5
I feel good about myself.	1	2	3	4	5
I am pleased with my appearance right now.	1	2	3	4	5
I am worried about what other people think about me.	1	2	3	4	5
I feel confident that I understand things.	1	2	3	4	5
I feel inferior to others at the moment.	1	2	3	4	5
I feel unattractive.	1	2	3	4	5
I feel concerned about the impression I am making.	1	2	3	4	5
I feel that I have less scholastic ability right now than others.	1	2	3	4	5
I feel like I'm not doing well.	1	2	3	4	5
I am worried about looking foolish.	1	2	3	4	5

Appendix G

BISS

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

BIQ

Each item on this questionnaire deals with a different physical characteristic. For each characteristic, think about how you would describe yourself as you **actually are.** Then think about you **wish you were**. The difference between the two reveals how close you come to your personal ideal. In some instances, your looks may closely match your ideal. In other instances, they may differ considerably. On Part A of each item, you will rate how much you resemble your personal physical ideal by circling the number on the 0 to 3 scale.

Your physical ideals may differ in how important they are to you, **regardless** of how close you come to having them. You may feel strongly that some ideals embody the way you want to look or to be. In other areas, your ideals may be less important to you. On Part B of each item, rate **how important** your ideal is to you by circling the number on the 0 to 3 scale.

1. A. My ideal height is:

0	1	2	3
Exactly As I Am	Almost As I Am	Fairly Unlike Me	Very Unlike Me

B. How important to you is your ideal height?

0	1	2	3
Not Important	Somewhat Important	Moderately Important	Very Important

2. A. My ideal skin complexion is:

0	1	2	3
Exactly As I Am	Almost As I Am	Fairly Unlike Me	Very Unlike Me

B. How important to you is your ideal skin complexion?

0	1	2	3
Not Important	Somewhat Important	Moderately Important	Very Important

3. A. My ideal hair texture and thickness are:

0	1	2	3
Exactly As I Am	Almost As I Am	Fairly Unlike Me	Very Unlike Me

B. How important to you are your ideal hair texture and thickness?

0	1	2	3
Not Important	Somewhat Important	Moderately Important	Very Important

4. A. My ideal facial features (eyes, nose, ears, face shape) are:

0	1	2	3
Exactly As I Am	Almost As I Am	Fairly Unlike Me	Very Unlike Me

B. How important to you are your ideal facial features?

0	1	2	3
Not Important	Somewhat Important	Moderately Important	Very Important

5. A. My ideal muscle tone and definition is:

0	1	2	3
Exactly As I Am	Almost As I Am	Fairly Unlike Me	Very Unlike Me

B. How important to you is your ideal muscle tone and definition?

0	1	2	3
Not Important	Somewhat Important	Moderately Important	Very Important

6. A. My ideal body proportions are:

0	1	2	3
Exactly As I Am	Almost As I Am	Fairly Unlike Me	Very Unlike Me

B. How important to you are your ideal body proportions?

0	1	2	3
Not Important	Somewhat Important	Moderately Important	Very Important

7. A. My ideal weight is:

0	1	2	3
Exactly As I Am	Almost As I Am	Fairly Unlike Me	Very Unlike Me

B. How important to you is your ideal weight?

0	1	2	3
Not Important	Somewhat Important	Moderately Important	Very Important

8. A. My ideal chest size is:

0	1	2	3
Exactly As I Am	Almost As I Am	Fairly Unlike Me	Very Unlike Me

B. How important to you is your ideal chest size?

0	1	2	3
Not Important	Somewhat Important	Moderately Important	Very Important

9. A. My ideal physical strength is:

0	1	2	3
Exactly As I Am	Almost As I Am	Fairly Unlike Me	Very Unlike Me

B. How important to you is your ideal strength?

0	1	2	3
Not Important	Somewhat Important	Moderately Important	Very Important

10. A. My ideal physical coordination is:

0	1	2	3
Exactly As I Am	Almost As I Am	Fairly Unlike Me	Very Unlike Me

B. How important to you is your ideal physical coordination?

0	1	2	3
Not Important	Somewhat Important	Moderately Important	Very Important

11. A. My ideal overall physical appearance is:

0	1	2	3
Exactly As I Am	Almost As I Am	Fairly Unlike Me	Very Unlike Me

B. How important to you is your overall physical appearance?

0	1	2	3
Not Important	Somewhat Important	Moderately Important	Very Important

Appendix I

BDI-II

Instructions: This questionnaire consists of 21 groups of statements. Please read each group of statements carefully, and then pick out the one statement in each group that best describes the way you have been feeling during the **past two weeks, including today**. Circle the number beside the statement you have picked. If several statements in the group seem to apply equally well, circle the highest number for that group. Be sure that you do not choose more than one statement for any group, including Item 16 (Changes in Sleeping Pattern) or Item 18 (Changes in Appetite).

1. Sadness

0 I do not feel sad.
1 I feel sad much of the time.
2 I am sad all the time.
3 I am so sad or unhappy that I can't stand it.

2. Pessimism

0 I am not discouraged about my future.
1 I feel more discouraged about my future that I used to be.
2 I do not expect things to work out for me.
3 I feel my future is hopeless and will only get worse.

3. Past Failure

0 I do not feel like a failure.
1 I have failed more than I should have.
2 As I look back, I see a lot of failures.
3 I feel I am a total failure as a person.

4. Loss of Pleasure

0 I get as much pleasure as I ever did form things I enjoy.
1 I don't enjoy things as much as I used to.
2 I get very little pleasure form the things I used to enjoy.
3 I can't get any pleasure form the things I used to enjoy.

5. Guilty Feelings

0 I don't feel particularly guilty.
1 I feel guilty over many things I have done or should have done.
2 I feel quite guilty most of the time.
3 I feel guilty all of the time.

6. Punishment Feelings

0 I don't feel I am being punished.
1 I feel I may be punished.
2 I expect to be punished.
3 I feel I am being punished.

7. Self-Dislike

0 I feel the same about myself as ever.
1 I have lost confidence in myself.
2 I am disappointed in myself.
3 I dislike myself.

8. Self-Criticalness

0 I don't criticize or blame myself more than usual.
1 I am more critical of myself than I used to be.
2 I criticize myself for all of my faults.
3 I blame myself for everything bad that happens.

9. Suicidal Thoughts or Wishes

0 I don't have any thoughts of killing myself.
1 I have thought of killing myself, but I would not carry them out.
2 I would like to kill myself.
3 I would kill myself if I had the chance.

10. Crying

0 I don't cry anymore than I used to.
1 I cry more than I used to.
2 I cry over every little thing.
3 I feel like crying, but I can't.

11. Agitation

0 I am not more restless or wound up than usual.
1 I feel more restless or wound up than usual.
2 I am so restless or agitated that it's hard to stay still.
3 I am so restless or agitated that I have to keep moving or doing something.

12. Loss of Interest

0 I have not lost interest in other people or activities.
1 I am less interested in other people or things than before.
2 I have lost most of my interest in other people or things.
3 It's hard to get interested in anything.

13. Indecisiveness

0 I make decisions about as well as ever.
1 I find it more difficult to make decisions than usual.
2 I have much greater difficulty in making decisions than I used to.
3 I have trouble making any decisions.

14. Worthlessness

0 I do not feel I am worthless.
1 I don't consider myself as worthwhile and useful as I used to.
2 I feel more worthless as compared to other people.
3 I feel utterly worthless.

15. Loss of Energy

0 I have as much energy as ever.
1 I have less energy than I used to have.
2 I don't have enough energy to do very much.
3 I don't have enough energy to do anything.

16. Changes in Sleeping Pattern

0 I have not experienced any change in my sleeping pattern.
1a I sleep somewhat more than usual.
1b I sleep somewhat less than usual.
2a I sleep a lot more than usual.
2b I sleep a lot less than usual.
3a I sleep most of the day.
3b I wake up 1-2 hours early and can't get back to sleep.

17. Irritability

0 I am no more irritable than usual.
1 I am more irritable than usual.
2 I am much more irritable than usual.
3 I am irritable all the time.

18. Changes in Appetite

0 I have not experienced any change in my appetite.
1a My appetite is somewhat less than usual.
1b My appetite is somewhat greater than usual.
2a My appetite is much less than usual.
2b My appetite is much greater than usual.
3a I have no appetite at all.
3b I crave food all the time.

19. Concentration Difficulty

0 I can concentrate as well as ever.
1 I can't concentrate as well as usual.
2 It's hard to keep my mind on anything for very long.
3 I find I can't concentrate on anything.

20. Tiredness or Fatigue

0 I am not more tired or fatigued than usual.
1 I get more tired or fatigued more easily than usual.
2 I am too tired or fatigued to do a lot of the things I used to do.
3 I am too tired or fatigued to do most of the things I used to do.

21. Loss of Interest in Sex

0 I have not noticed any recent change in my interest in sex.
1 I am less interested in sex than I used to be.
2 I am much less interested in sex now.
3 I have lost interest in sex completely.

Appendix J

RSES

Please answer these questions honestly according to the way you ***usually*** feel. Please answer each question carefully by placing an "**x**" in the appropriate box.

	Strongly Agree	Agree	Disagree	Strongly Disagree
I feel that I'm a person of worth, at least on an equal basis with others.				
I feel that I have a number of good qualities.				
All in all, I am inclined to feel that I am a failure.				
I am able to do things as well as most people.				
I feel I do not have much to be proud of.				
I take a positive attitude toward myself.				
On the whole, I am satisfied with myself.				
I wish I could have more respect for myself.				
I certainly feel useless at times.				
At times I think am no good at all.				

Appendix K

SATAQ-3

Please read each of the following items carefully and circle the number that best reflects your ***agreement*** with the statement.

	Definitely Disagree DD	Mostly Disagree MD	Neither Agree Nor Disagree NA/ND	Mostly Agree MA	Definitely Agree DA
TV programs are an important source of information about fashion and "being attractive."	1	2	3	4	5
I've felt pressure from TV or magazines to lose weight.	1	2	3	4	5
I do not care if my body looks like the body of people who are on TV.	1	2	3	4	5
I compare my body to the bodies of people who are on TV.	1	2	3	4	5
TV commercials are an important source of information about fashion and "being attractive."	1	2	3	4	5
I do not feel pressure from TV or magazines to look pretty.	1	2	3	4	5
I would like my body to look like the models who appear in magazines.	1	2	3	4	5
I compare my appearance to the appearance of TV and movie stars.	1	2	3	4	5
Music videos on TV are not an important source of information about fashion and "being attractive."	1	2	3	4	5

	DD	MD	NA/ND	MA	DA
I've felt pressure from TV and magazines to be thin.	1	2	3	4	5
I would like my body to look like the people who are in movies.	1	2	3	4	5
I do not compare my body to the bodies of people who appear in magazines.	1	2	3	4	5
Magazines are not an important source of information about fashion and “being attractive”	1	2	3	4	5
I've felt pressure from TV or magazines to have a perfect body.	1	2	3	4	5
I wish I looked like the models in music videos.	1	2	3	4	5
I compare my appearance to the appearance of people in magazines	1	2	3	4	5
Magazine advertisements are an important source of information about fashion and "being attractive."	1	2	3	4	5
I've felt pressure from TV or magazines to diet.	1	2	3	4	5
I do not wish to look as athletic as the people in magazines.	1	2	3	4	5
I compare my body to that of people in "good shape."	1	2	3	4	5
Pictures in magazines are an important source of information about fashion and "being attractive."	1	2	3	4	5
I've felt pressure from TV or magazines to exercise.	1	2	3	4	5
I wish I looked as athletic as sports stars.	1	2	3	4	5
I compare my body to that of people who are athletic.	1	2	3	4	5
Movies are an important source of information about fashion and "being attractive."	1	2	3	4	5
I've felt pressure from TV or magazines to change my appearance.	1	2	3	4	5
I do not try to look like the people on TV.	1	2	3	4	5
Movie starts are not an important source of information about fashion and "being attractive."	1	2	3	4	5
Famous people are an important source of information about fashion and "being attractive."	1	2	3	4	5
I try to look like sports athletes.	1	2	3	4	5

Appendix L

EDE-Q

The following questions are concerned with the **PAST FOUR WEEKS ONLY** (**28 DAYS**). Please read each question carefully and circle the number on the right. Please answer ALL the questions.

EXAMPLES: ON HOW MANY DAYS OUT OF THE PAST 28 DAYS…….	No days	1-5 Days	6-12 Days	13-15 days	16-22 days	23-27 days	Every day
…Have you tried to eat vegetables?	0	1	2	(3)	4	5	6
…How many times have you walked to school?	0	1	(2)	3	4	5	6

ON HOW MANY DAYS OUT OF THE PAST 28 DAYS…..	No days	1-5 Days	6-12 Days	13-15 days	16-22 days	23-27 days	Every day
1. …Have you been deliberately trying to limit the amount of food you eat to influence your shape or weight?	0	1	2	3	4	5	6
2. …Have you gone for long periods of time (8 hours or more) without eating anything in order to influence your shape or weight?	0	1	2	3	4	5	6
3. …Have you tried to avoid eating any foods which you like in order to influence your shape or weight?	0	1	2	3	4	5	6
4. …Have you ever tried to follow definite rules regarding your eating in order to influence your shape or weight; for example, a calorie limit, a set amount of food, or rules about what or when you should eat?	0	1	2	3	4	5	6
5. …Have you wanted your stomach to be empty?	0	1	2	3	4	5	6
6. …Has thinking about food or its calorie content made it much more difficult to concentrate on things you are interested in; for example, read, watch TV, or follow a conversation?	0	1	2	3	4	5	6

7. …Have you been afraid of losing control over your eating?	0	1	2	3	4	5	6
8. …Have you had episodes of binge eating?	0	1	2	3	4	5	6

ON HOW MANY DAYS OUT OF THE PAST 28 DAYS…..	No days	1-5 Days	6-12 Days	13-15 days	16-22 days	23-27 days	Every Day
9. …Have you eaten in secret? (Do not count binges.)	0	1	2	3	4	5	6
10. …Have you definitely wanted your stomach to be flat?	0	1	2	3	4	5	6
11. …Has thinking about shape or weight made it more difficult to concentrate on things you are interested in; for example, read, watch TV, or follow a conversation?	0	1	2	3	4	5	6
12. …Have you had a definite fear that you might gain weight or become fat?	0	1	2	3	4	5	6
13. …Have you felt fat?	0	1	2	3	4	5	6
14. …Have you had a strong desire to lose weight?	0	1	2	3	4	5	6

OVER THE PAST FOUR WEEKS (28 DAYS)…….

15. …On what proportion of times that you have eaten have you felt guilty because the effect on your shape or weight? (Do not count binges.) (Circle the number which applies.)
    0. None of the times
    1. A few of the times
    2. Less than half the times
    3. Half the times
    4. More than half the times
    5. Most of the times
    6. Every time

16. … Over the past four weeks (28 days), have there been any times when you have eaten what other people would regard as an unusually large amount of food given the circumstances? (Please circle appropriate number). **0- NO 1- YES**

17. …How many such episodes have you had over the past four weeks? (Please write the appropriate number.) _____

18. ….During how many of these episodes of overeating did you have a sense of having lost control? _____

19. ….Have you had other episodes of eating in which you have had a sense of having lost control and eaten too much, but have not eaten an unusually large amount of food given the circumstances?	**0- NO** **1- YES**
20. … How many such episodes have you had over the past four weeks?	

21. ….Over the past four weeks have you made yourself sick (vomit) as a means of controlling your shape or weight?	**0---NO** **1--- YES**
22. ….How many times have you done this over the past four weeks?	
23. ….Have you taken laxatives as a means of controlling your shape or weight?	**0 ---NO** **1 ---YES**
24. ….How many times have you done this over the past four weeks?	
25. ….Have you taken diuretics (water tablets) as a means of controlling your shape or weight?	**0 ---NO** **1 ---YES**
26. ….How many times have you done this over the past four weeks?	
27. ….Have you exercised hard as a means of controlling your shape or weight?	**0 ---NO** **1 ---YES**
28. ….How many times have you done this over the past four weeks?	

OVER THE PAST FOUR WEEKS (28 DAYS).....
(Please circle the number which best describes your behaviour)

	NOT AT ALL		SLIGHTLY		MODERATELY		MARKEDLY
29. ....Has your weight influenced how you think about (judge) yourself as a person?	0	1	2	3	4	5	6
30. ....Has your shape influenced how you think about (judge) yourself as a person?	0	1	2	3	4	5	6
31. ....How much would it upset you if you had to weigh yourself once a week for the next four weeks?	0	1	2	3	4	5	6
32. ....How dissatisfied have you felt about your weight?	0	1	2	3	4	5	6
33. ....How dissatisfied have you felt about your shape?	0	1	2	3	4	5	6

34. ….How concerned have you been about other people seeing you eat?	0	1	2	3	4	5	6

OVER THE PAST FOUR WEEKS (28 DAYS).....
(Please circle the number which best describes your behaviour)

	NOT AT ALL		SLIGHTLY		MODERATELY		MARKEDLY
35 ....How uncomfortable have you felt seeing your body; for example, in the mirror, in shop window reflections, while undressing or taking a bath or shower?	0	1	2	3	4	5	6
36....How uncomfortable have you felt about others seeing your body; for example, in shared changing rooms, when swimming or wearing tight clothes?	0	1	2	3	4	5	6

37. What is your height? _____inches or _____cm (guess if you do not know)

38. What is your weight? _____lbs or _____kg (guess if you do not know)

Appendix M

RRS

The following questions refer to your normal eating patterns and weight fluctuations.

1. How often are you dieting?
   a. Never b. Rarely c. Sometimes d. Usually e. Always

2. What is the maximum amount of weight (in pounds) you have ever lost within a month?
   a. 0-4 b. 5-9 c. 10-14 d. 15-19 e. 20+

3. What is the maximum weight you have gained within a week?
   a. 0-1.0 b. 1.1-2.0 c. 2.1-3.0 d. 3.1-5.0 e. 5.1+

4. In a typical week, how much does your weight fluctuate?
   a. 0-1.0 b. 1.1-2.0 c. 2.1-3.0 d. 3.1-5.0 e. 5.1+

5. Would a weight fluctuation of 5 pounds affect the way you live your life?
   a. Not at all b. Slightly c. Moderately d. Very much

6. Do you eat sensibly in front of others and splurge alone?
   a. Never b. Rarely c. Often d. Always

7. Do you give too much time and thought to food?
   a. Never b. Rarely c. Often d. Always

8. Do you have feelings of guilt after overeating?
   a. Never b. Rarely c. Often d. Always

9. How conscious are you of what you are eating?
   a. Not at all b. Slightly c. Moderately d. Extremely

10. How many pounds over your desired weight were you at your maximum weight?
    a. 0-1 b. 1-5 c. 6-10 d. 11-20 e. 21+

11. What is your maximum weight ever?

12. When you break your diet, do you react by?
    a. Going right back on the diet
    b. Compensating by eating less for a while
    c. Continuing to eat non-diet foods and start the diet another day
    d. Get rid of the food by vomiting or taking laxatives
    e. Not applicable

Appendix N

Contact Script

You are receiving this email/phone call because you filled out a brief questionnaire and indicated that you are interested in participating in a research study for bonus points and a gift certificate for Tim Hortons.

I am a graduate student in psychology and am currently looking for females to participate in research that is looking at how perception, mood, and memory influence people's sense of taste and will be conducting a taste test with 3 different types of candies. Because this is a taste test, I want to make sure you do not have any food allergies that would affect your participation (chocolate & peanut butter). Also, I would like you to eat a moderate amount of food between 1 and 3 hours before you come in for the taste test.

This study is worth 1 bonus point and can be put toward your introductory psychology course. In addition, you will receive a gift certificate for Tim Hortons in the amount of 5 dollars for your participation in this study. The study will last for approximately 60 minutes. I am listing the available time slots for participating in this study below. Participants are run individually so if you are interested in a particular time slot, please be aware that I am offering these slots on a first-to-respond basis. Please email me back as soon as possible to reserve a time slot that is good for you.

If you are interested in participating in this research study, please reply to this email (sbola@lakeheadu.ca).

Thank you,

Sabreena Bola, MA
Doctoral Student in Clinical Psychology
Department of Psychology
Lakehead University
sbola@lakeheadu.ca

Appendix O

Steps of the Experimental Procedure

Baseline & Random Assignment **10 minutes**	**Consent, Demographics** **1st PANAS, SSES, BISS** **Random assignment: Thin/Plus Size Images**
Experimental Task **15 minutes**	**Exposure to Thin or Plus Size Images** **Task: Self-compare to images and complete Comparison Checklist**
2nd Administration of Measures **5 minutes**	**2nd PANAS, SSES, BISS**
Taste Test **10 minutes**	**Taste test of 3 candies** **Rating Forms**
Administration of Battery **20 minutes**	**Questionnaire Battery** **Post-experimental questions**
Total Time **60 minutes**	**Debriefing via email upon completion of data collection**

Appendix P

Participant Cover Letter and Consent Form

Dear Potential Participant:

Thank you for your interest in participating in a research study about how mood and perception influence taste ratings. This study is being conducted by Sabreena Bola, a Doctoral candidate and supervised by Dr. Ron Davis from the psychology department at Lakehead University.

The purpose of the study is to examine the impact of viewing and perceiving various images, and affect on taste ratings.

If you volunteer to participate in this study, you will be asked to do the following:

1. You will be randomly assigned to one of two tasks in which you will view a series of images. These images will be of models and will be presented to you on a full size screen. You will be asked to provide your perceptions of these models by comparing yourself to the models in the images by looking in a mirror and completing a checklist of specific items.
2. You will also be asked to participate in a taste test of three different types of candies. You will be provided with instructions on how to complete the taste test and will be given forms to fill out for your ratings.
3. You will also be asked to answer a few questionnaires at different times during the study.

The entire study will take approximately 60 minutes to complete. All participants will be contacted via email or telephone in approximately two months when the study is completed in order to receive information about the results of this study.

You will be asked a variety of questions, which may be personal in nature. A risk associated with this study is the possibility that thinking about these personal issues may raise some psychological and emotional concerns for you. Further, a possible risk to participation may involve the experience of a degree of psychological discomfort that one might normally experience when looking at fashion media models and/or one's reflection in a mirror. If during or after the study, you have concerns you wish to discuss, please feel free to contact the Student Health and Counselling Centre at 343-8361 (UC 1007), or via email at health&counselling@lakeheadu.ca.

If you participate, you will receive one bonus mark toward your introductory course in psychology and a 5 dollar gift certificate for Tim Hortons.

Any information that is obtained in connection with this study and that can be identified with you will remain confidential and will be disclosed only with your permission. Any information you provide will be used for research purposes only, which may eventually include publication in a research article. Your name will not appear on any of the questionnaires you fill out or in any

future publications. The data you supply will only be identified by number. Data will be stored securely for 5 years.

If you volunteer to be in this study, you may withdraw at any time without any consequences. You may also exercise the option of removing your data from the study. The investigator may withdraw you from this research if circumstances arise that warrant doing so.

If you have any questions or concerns about this study, please do not hesitate to contact myself or Dr. Ron Davis. You may also contact the Lakehead University Research Ethics Board at 343-8283.

Thank you,

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Consent Form

I have read and understand the cover letter and information provided for the study entitled "What influences taste perception?" This study is being conducted by Sabreena Bola, a doctoral student and supervised by Dr. Ron Davis in the Department of Psychology. My questions have been answered to my satisfaction, and I agree to participate in this study. I understand that my participation is conditional on the following:

1. I am aware of what I will be required to do as a participant in this study, as outlined by in the letter of information. Namely, that I will be completing a task, a taste test, and a series of questionnaires.

2. I am aware that I will receive 1 bonus mark for Psychology 1100 for my participation in this study and a 5 dollar gift certificate for Tim Hortons.

3. I realize that some of the questions are of a personal nature and may arouse feelings of discomfort.

4. I am a volunteer and may withdraw at any time from the study.

5. I am aware that I have the option of not answering any questions that I do not feel comfortable answering as part of this research questionnaire.

6. All information that I provide will remain anonymous, and be securely stored at Lakehead University for 5 years.

7. My name, or any other identifying information, will not appear on any of the data I provide or any future publications.

8. I will receive a report of the results, to be sent to me upon completion of the study.

_____ _____

Name of participant (please print) Date

_____ _____

Signature of participant Student number (for Psychology 1100 bonus point)

_____

Email of participant

_____

Name of Psychology 1100 professor

Appendix Q

Demographic Questionnaire

Age: _____

Marital status:

Married/common law □ Divorced/separated □ Single □ Widowed □

What is your ethnic background?

Caucasian □ South Asian □ Hispanic □
African-Canadian □ European □ Native-Canadian □
East Asian □ Other (please specify):_____

School Enrolment:

Full time student □ Part time student □

What academic program(s) are you in?_____

What is/are your major(s)?_____

Do you restrict your caffeine intake? _____

What time of day did you last:

drink a caffeinated beverage?_____

have something to eat?_____

Are you living away from home? Yes □ No □

If yes, is this your first time living away from home? Yes □ No □

How often do you engage in physical activity?

Very often □
Often □
Sometimes □
Rarely □
Never □

Appendix R

Social Comparison Task Instructions and Comparison Checklist

For all participants:

The next thing you will be doing today is looking a slideshow containing a series of 10 images. These images will run as a timed slideshow. You will view each image for 15 seconds before automatically viewing the next image. As you view the images, I would like you to try to compare yourself to the models in terms of appearance, body shape and weight along with any other appearance-related perceptions you may have in comparing yourself to the images. When you get to the final image, you will be prompted to stand up in front of the screen. Next to you, you will see that there is a full-length mirror. You are also provided with a checklist and pen on a clipboard. Please complete the items on the checklists by viewing the images and yourself in the mirror, and then making your rating. There is also space provided should you choose to write any additional thoughts that you feel are important. You will be able to scroll back through the images. You do not need to number the images or write about all 10 independently. If there are certain images that you would like to focus more on, feel free to do so. You will have 15 minutes to complete this task. Once you are finished this part of the study, I will bring in the candies for the taste test part of the study. Do you have any questions?

Comparison Checklists

Now, that you have viewed the images, please rate each of these items. Read each item carefully. Keep in mind that you are to answer the questions in relation to comparing yourself to the women in the images that you have viewed.

Circle your answer using the following scale:

1	2	3	4	5	6	7
Much Worse Than Mine			About the Same As Mine			Much Better Than Mine

Compared to my own ***body (overall)***, this woman's ***body overall*** is…	1	2	3	4	5	6	7
Compared to my own ***hair***, this woman's ***hair*** is…	1	2	3	4	5	6	7
Compared to my own ***face***, this woman's ***face*** is…	1	2	3	4	5	6	7
Compared to my own ***cheeks***, this woman's ***cheeks*** are…	1	2	3	4	5	6	7
Compared to my own ***chin***, this woman's ***chin*** is…	1	2	3	4	5	6	7
Compared to my own ***neck***, this woman's ***neck is***…	1	2	3	4	5	6	7
Compared to my own ***shoulders***, this woman's ***shoulders*** are…	1	2	3	4	5	6	7
Compared to my own ***upper arms***, this woman's ***upper arms*** are…	1	2	3	4	5	6	7
Compared to my own ***lower arms***, this woman's ***lower arms*** are…	1	2	3	4	5	6	7
Compared to my own ***wrists***, this woman's ***wrists*** are …	1	2	3	4	5	6	7
Compared to my own ***hands***, this woman's ***hands*** are…	1	2	3	4	5	6	7
Compared to my own ***upper back***, this woman's ***upper back*** is…	1	2	3	4	5	6	7
Compared to my own ***chest***, this woman's ***chest*** is …	1	2	3	4	5	6	7
Compared to my own ***stomach***, this woman's ***stomach*** is …	1	2	3	4	5	6	7
Compared to my own ***buttocks***, this woman's ***buttocks*** is …	1	2	3	4	5	6	7
Compared to my own ***thighs***, this woman's ***thighs*** are…	1	2	3	4	5	6	7
Compared to my own ***legs***, this woman's ***legs*** are…	1	2	3	4	5	6	7
Compared to my own ***feet***, this woman's ***feet*** are…	1	2	3	4	5	6	7
Compared to my own ***skin***, this woman's ***skin*** is…	1	2	3	4	5	6	7

Now, please circle your answer to the following items using the following scale:

1	2	3	4	5	6	7
Totally Agree			Neutral			Totally Disagree

Compared to myself, this woman is ***more beautiful***	1	2	3	4	5	6	7
Compared to myself, this woman is ***more successful***	1	2	3	4	5	6	7
Compared to myself, this woman ***is happier***	1	2	3	4	5	6	7
Compared to myself, this woman is ***more satisfied with life***	1	2	3	4	5	6	7
Compared to myself, this woman has ***more sex appeal***	1	2	3	4	5	6	7
Compared to myself, this woman is ***more glamorous***	1	2	3	4	5	6	7
Comparing myself to this woman, makes ***me feel happy***	1	2	3	4	5	6	7
Comparing myself to this woman, makes ***me feel inspired***	1	2	3	4	5	6	7
Comparing myself to this woman, makes ***me feel confident***	1	2	3	4	5	6	7
Comparing myself to this woman, makes ***me feel sad***	1	2	3	4	5	6	7
Comparing myself to this woman, makes ***me feel discouraged***	1	2	3	4	5	6	7
Comparing myself to this woman, makes ***me feel self-conscious***	1	2	3	4	5	6	7
Comparing myself to this woman, makes ***me feel dissatisfied***	1	2	3	4	5	6	7
Comparing myself to this woman, makes ***me feel comfortable***	1	2	3	4	5	6	7
Comparing myself to this woman, makes ***me feel proud***	1	2	3	4	5	6	7
Comparing myself to this woman, makes ***me feel bad***	1	2	3	4	5	6	7

In the space provided, please provide any additional thoughts or comments regarding this comparison task:

Appendix S

Taste Test Instructions and Rating Form

Instructions for the Candy Taste Test:

There are 3 different types of candies for you to taste today. I will explain how I would like you to go about doing the taste test, and then I will leave you alone to complete your ratings. I would like you to taste the candies in order, so, taste candy A, then candy B and then candy C. Before you taste candy A, please have a drink of the water to cleanse your palate, then taste candy A. You may have as many candies from bowl A as you need to make your taste ratings. Once you have finished rating candy A, take another drink of water to cleanse your palate, then move on to candy B. Make your taste ratings for candy B, have a drink of water again and move onto candy C. It is important that once you have finished rating a candy that you not go back to it and change your ratings.

Once you are all finished making your taste ratings, you can feel free to have as many candies as you like. These are set-aside for only you and there are plenty. I will be back in 10 minutes.

Candy Taste Rating Form

Please complete the ratings for each candy by circling your answer to the following items using the following scale:

1	2	3	4	5	6	7
Terrible			Average			Excellent

Candy A

Texture	1	2	3	4	5	6	7
Flavour	1	2	3	4	5	6	7
Fragrance	1	2	3	4	5	6	7
Sweetness	1	2	3	4	5	6	7
Crunchiness	1	2	3	4	5	6	7
Melting properties	1	2	3	4	5	6	7
Overall rating	1	2	3	4	5	6	7
How much did you like this candy?	1	2	3	4	5	6	7

Candy B

Texture	1	2	3	4	5	6	7
Flavour	1	2	3	4	5	6	7
Fragrance	1	2	3	4	5	6	7
Sweetness	1	2	3	4	5	6	7
Crunchiness	1	2	3	4	5	6	7
Melting properties	1	2	3	4	5	6	7
Overall rating	1	2	3	4	5	6	7
How much did you like this candy?	1	2	3	4	5	6	7

Candy C

Texture	1	2	3	4	5	6	7
Flavour	1	2	3	4	5	6	7
Fragrance	1	2	3	4	5	6	7
Sweetness	1	2	3	4	5	6	7
Crunchiness	1	2	3	4	5	6	7
Melting properties	1	2	3	4	5	6	7
Overall rating	1	2	3	4	5	6	7
How much did you like this candy?	1	2	3	4	5	6	7

Appendix T

Post-experimental Questions

Did you think that the images that you viewed were an accurate representation of the thin ideal portrayed by the media?

1	2	3	4	5	6	7	8	9
strongly disagree								strongly agree

Did you think that the images that you viewed were an accurate representation of plus size models as portrayed by the media?

1	2	3	4	5	6	7	8	9
strongly disagree								strongly agree

To what extent did you compare yourself to the images that you were shown as per the instructions given?

1	2	3	4	5	6	7	8	9
did not compare at all								fully compared

Was the presence of the mirror helpful in making comparisons to the images?

1	2	3	4	5	6	7	8	9
strongly disagree								strongly agree

Appendix U

Debriefing Script

[Insert a brief summary of results]

There is more to this study than I have told you about so far. But before I tell you exactly what it is, I would like to explain why it is necessary for some kinds of psychological studies not to tell people about the purpose of the study at the very beginning. In some kinds of studies, if we tell people what the purpose of the experiment is and what we predict about how they will react under particular conditions, they might deliberately do whatever they think we want them to do, just to help us out and give us the results that they think we want. If that happened, their reactions would not be a good indication of how they might react in a situation in everyday life, where they did not think they were being studied. It is also possible that the opposite might occur where people may deliberately act in a way that would contradict what we predict. This would also make the results invalid, because again, what the people would be responding to is what they thought we were looking for rather than responding naturally.

Now I would like to explain exactly what we are trying to get at in this study. We told you that we were looking at how individual perception might affect people's taste ratings. We told you that you would be completing a taste test so you would be aware that there would be an eating component to this study. However, the study that you participated in looked at the effect that exposure to media images has on the amount people eat. Further, there were two conditions. In one group we asked participants to engage in social comparison to thin media images and in the other we asked them engage in social comparison to plus size media images. There is research that suggests that sometimes when people are upset by something, like thin media images, they consume more food. However, some research also shows that though people eat more in response to these images, they also report positive mood. So, this study was interested in looking at how people react to thin media images in terms of how much they eat and how they feel. There is a lack of research on plus size images, and we were interested in looking at whether these images result in people eating less and also feeling better.

The other part of the study was looking to see if there are differences between the amounts of candies eaten by people who binge eat and those who do not binge eat. When you were given the screening questionnaire in class, you were asked to answer a number of screening questions. Two of those questions were about binge eating. Some of the participants in this study answered questions saying that they sometimes engaged in binge eating, where they felt their eating was out of control. The other participants in the study answered that they did not binge eat.

Binge eating is a common behaviour. It also occurs frequently among female university students. It is important to research this behaviour and try to gain a better understanding of the different factors that influence binge eating. We were afraid that if we told you that we would be paying attention to the amount you ate after viewing the images that you might have changed the

amount you would have eaten, or paid more attention to the number of candies you ate than you normally would in everyday circumstances.

As in most psychological research, we are interested in how the average person reacts in this situation. We need to test many people and combine their results in order to get a good indication of how the average person reacts under the different conditions.

Your participation in research is very important. In a study like this where we didn't give you all the information up front, we want to make sure you are satisfied with your participation and that you wish to keep your data in the study. If you tell me that you do not want your data to be used, we will remove it from our pool or data.

We hope you found your experience of participating in this study interesting. I would be glad to answer any questions or address any concerns that you might have.

Please reply to this email indicating that you have received this information. If you could also answer the following question, it would be greatly appreciated:

At the time of the study, did you believe the 'cover' story that you were told?

1	2	3	4	5	6	7	8	9
Did not believe at all								Totally believed

Thank you very much for your participation.

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