BODY DISSATISFACTION AND ITS RELATIONSHIP WITH THE PERCEPTUAL EFFECTS OF EXPOSURE TO BODIES AND ATTENTIONAL BIASES TOWARD BODIES

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ABSTRACT

Socio-cultural processes are often cited as one of the main causes of body dissatisfaction amongst women. Numerous studies have found that exposure to thin, idealized images in the media increases women's body dissatisfaction. The central aims of this thesis are to investigate how exposure to thin and fat bodies alters women's perceptions of body normality and body ideals, whether body dissatisfaction is related to these changes, and whether body dissatisfaction is associated with an attentional bias toward thin bodies.

In Chapter 1 I review the main theories dominating body dissatisfaction research. In Chapter 2 I present two studies which investigate how exposure to thin and fat bodies influences perceptions of body normality and ideal body size. Women who varied on a measure of body dissatisfaction (Experiment 1 & 2) and awareness and acceptance of societal standards of beauty (Experiment 2) rated a range of computer generated bodies, varying in simulated BMI, for how normal (Experiment 1 & 2) and ideal they looked (Experiment 2). They were then exposed to either thin or fat bodies, and they re-rated the bodies. Increased levels of body dissatisfaction and internalisation of societal standards of beauty were related to a thinner most normal and ideal rated body, before any exposure, as well as a greater discrepancy between the most normal and ideal rated bodies.

Both Experiments 1 & 2 revealed that brief exposure to thin or fat bodies altered women's perceptions of body normality and body ideal, where exposure to fat bodies made women's perceptions of a normal and ideal body fatter, and exposure to thin bodies, made perceptions of the most normal and ideal rated body thinner. Experiment 1 found that exposure to thin bodies altered women's perceptions significantly more than exposure to fat bodies, and there was no relationship between body dissatisfaction and the effects of exposure to thin or fat bodies. In Experiment 2, where the exposure bodies were equated on perceptual saliency, both thin and fat bodies altered women's perceptions equally, and within the fat exposure condition, greater body dissatisfaction and internalisation of societal standards of beauty were related to a reduced effect of exposure to fat bodies. Together these studies suggest that, through exposure, it is easy to alter

what women consider normal and ideal in a body, and that reduced updating of perceptions of body normality and body ideals in response to experience may be one mechanism that maintains body dissatisfaction.

In Chapter 3 I present an experiment which extends Experiment 2 by examining whether exposure effects can be induced using photographs of real bodies. In line with Experiments 1 and 2, greater body dissatisfaction and greater internalisation of societal standards of beauty were related to thinner normal and ideal rated bodies. Exposure to fat bodies significantly altered women's perceptions of body normality and body ideal, making them fatter. However exposure to thin bodies did not significantly alter women's perceptions, possibly because the thin exposure bodies were not very thin. These results suggest that exposure to photographs of women can alter women's perceptions of body norms and ideals.

In Chapter 4 I present three studies which investigate whether body dissatisfaction is positively related to an attentional bias toward thin bodies, using a modified dot probe task. Selective attention toward thin bodies may be a mechanism that perpetuates the belief that thinner bodies are more normal, thus leading to greater levels of body dissatisfaction. In three studies I found that all women, regardless of levels of body dissatisfaction, were faster to discriminate the direction of an arrow cue when it appeared in the location previously occupied by a thin than a fat body. This attentional bias towards thin bodies was found using extreme stimuli (thin and fat bodies) presented for 500ms (Experiment 1), extreme stimuli presented for 150 ms (Experiment 2), and less extreme stimuli that were equated for perceived extremity, presented for 150 ms (Experiment 3). In the third experiment I also found that as body dissatisfaction and participants BMI increased, the attentional bias toward thin bodies decreased. No support was found for the hypothesis that body dissatisfaction was related to increased attention to thin bodies. Rather, the results indicate that all women have an attentional bias to thin bodies, which appears to be automatic, and the larger and more dissatisfied a woman is with her body, the more she may try to avoid attending to thin bodies.

In Chapter 5 I present normative data for the Body Shape Questionnaire-34 (a measure of dissatisfaction with body weight and shape) (Cooper et al, 1987) from an Australian university sample. Many researchers use university samples

when investigating body dissatisfaction, so it is useful to have normative data for such a sample. One thousand and fifty two women aged between 16 and 30 completed the BSQ-34. A mean score of 94.4 (SD = 34.5) was found, with a range of 34-203. My scores are comparable with those found in an American undergraduate sample, and are significantly higher than those found in community, undergraduate and clinical samples in the UK and Italy. Results indicate that levels of body dissatisfaction may be higher in Australia than in the UK and Italy.

Together, these studies provide some important new findings. 1) Body dissatisfaction and internalisation of societal standards of beauty are related to thinner body norms and ideals. 2) Women's perceptions of normal and ideal female body sizes can be readily altered by exposure to thin and fat bodies, and 3) women selectively attend to thin bodies, but the more dissatisfied she is with her own body, the less she attends to thin bodies. Potential implications of these results for the treatment of body dissatisfaction may include the incorporation of treatment programs which target not only unnaturally slim body ideals, but perceptions of what constitutes a normal body, as well as trying to alter selective attention toward thin bodies in the environment. The results may also highlight to the media that consistently showing ultra slim models will very likely affect women's perceptions of normal and ideal female body sizes.

CONTENTS

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For each experiment, I was the main contributor and responsible for the experimental design, data collection, statistical analyses and writing. Gillian Rhodes contributed to the experimental design, statistical analyses and writing, Sue Byrne gave guidance on literature, and Bernhard Fink and Karl Grammer supplied the stimuli and information on how it was created.

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Each author has given permission for all work to be included in this thesis

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CHAPTER ONE: INTRODUCTION

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1.1 BACKGROUND

Dissatisfaction with one's body is thought to play a key role in the onset and maintenance of eating disorders (Stice & Shaw, 2002). One of the defining features of anorexia nervosa is body dissatisfaction, and the diagnostic criteria for anorexia nervosa include "a disturbance in perception of body shape and weight" (DSM IV, pp 583). Body dissatisfaction is broadly defined as the negative subjective experience of one's own body (Stice & Shaw, 2002). More specifically, it is said to entail cognitive/affective, perceptual and behavioural aspects (Botta, 1999; Rosen, 1990), and is related to the desire for a thinner body. Body dissatisfaction is often measured as the discrepancy between a woman's perceived own body size, and her ideal body size (Williamson, Gleaves, Watkins & Schlundt, 1993).

Due to the firmly established relationship between body dissatisfaction, eating disorders (Polivy & Herman, 2002; Stice & Shaw, 2002; Stice, 2001), depression, and low self esteem (Paxton, Neumark-Sztainer, Hannan, & Eisenberg, 2006), research in the area of body dissatisfaction is prolific. While the estimated prevalence of eating disorders in females is 0.7 to 2% (Fairburn & Harrison, 2003), body dissatisfaction in general is so widespread that it is considered "normative" amongst women (Rodin, Silberstein & Striegel-Moore, 1985). Given the relationship between eating disorders and body dissatisfaction, and the widespread prevalence of body dissatisfaction amongst women, any advancement in finding factors that cause and maintain body dissatisfaction is very important.

The basic aims of the current thesis were to investigate whether the processes of attention to bodies, and the perceptual effects of exposure to bodies are related to levels of body dissatisfaction. Perceptions of one's own, and other women's, bodies may be central to the maintenance and cause of body dissatisfaction. Below I will briefly review some of the main theories dominating body dissatisfaction literature, and discuss how the processes of attention and perception may be implicated in the development and maintenance of body dissatisfaction.

1.2 SOCIO-CULTURAL THEORY

Although numerous factors have been implicated in the onset of eating disorders and body dissatisfaction, including BMI, parenting styles, weight related teasing, and perfectionism (Cattarin & Thompson, 1994; Fairburn & Harrison, 2003; Paxton, Wertheim, Gibbons, Szmukler, Hillier & Petrovich, 1991), much attention has been placed on the role of the media and its depiction of the "thin ideal" as one of the main causes for the high incidence of eating disorders and body dissatisfaction (Stice, Maxfield, & Wells, 2003; Stice & Shaw, 2002; Stice, 2002). Socio-cultural theory states that body dissatisfaction is caused and maintained by the pressures placed on women by a society which promotes an ultra thin female body as ideal (Levine & Smolak, 1996; Tiggemann & Rothblum, 1988). Thin women presented in the media are seen to be more attractive, successful and desirable than larger women (Evans, 2003; Hebl & Heatherton, 1998; Jackson, 1992). However, this thin ideal body is unobtainable for most women (Nemeroff, Stein, Diehl, & Smilack, 1994), without resorting to drastic measures such as excessive exercise or restraint from eating.

Until relatively recently, body dissatisfaction and eating disorders had been viewed as a predominantly Western cultural phenomenon because they were not observed to such a great extent in females from non-Western cultures (Altabe, 1998; McCarthy, 1990; Nassar, 1988; Wang, Byrne, Kenardy & Hills, 2005). However, the past decade has seen an increase in studies demonstrating that body dissatisfaction and eating disorders are becoming more widespread than previously thought (Lee & Lee, 1996; Li, Hu, Ma, Wu & Ma, 2005; Makino, Tsuboi & Dennerstein, 2004). For example, one study in Fiji found that levels of body dissatisfaction significantly increased once Western media (eg television) was introduced into the culture (Becker, 2004). Other studies have found similar effects after the introduction of the thin ideal female body shape into mainstream culture (Lee & Lee, 2000). These types of findings support claims that body dissatisfaction is related to socio-cultural factors (Fallon, 1990; Heinberg, 1996).

Central to socio-cultural theory is the idea that viewing thin images of females negatively impacts upon women. Exposure to photographs, films and advertisements of thin women can significantly increase women's levels of body dissatisfaction (Groesz, Levine, & Murnen, 2002), as well as increasing levels of

depression (Heinberg & Thompson, 1995) and decreasing self-esteem (Irving, 1990). Although the media may present unnaturally thin women as the current ideal, not all women go on to develop high levels of dissatisfaction with their bodies. It may be that some women are more susceptible to the effects of slim media images than others (Stice, Spangler & Agras, 2001). This increased susceptibility may be the result of increased attention to thin bodies, or distorted perceptions of bodies. In addition, the extent to which women "buy into" or internalise the thin Western ideal has been found to predict body dissatisfaction and eating disorders (Becker et al, 2002; Cusumano & Thompson, 1997; Harrison, 2003; Stice, 1994, 2002; Stice et al, 2003), as does the perceived pressure to be thin (Field, Camargo, Taylor, Berkiey, Roberts & Colditz, 2001; Stice & Bearman, 2001; Stice, Maxfield & Wells, 2003).

1.3 SOCIAL COMPARISON THEORY

Social comparison (Festinger, 1954) is one way in which thin media images can negatively impact upon women. This theory posits that when women view the thin women presented in the media, they make an upward comparison between themselves and those images, resulting in them feeling worse about themselves (Cattarin, Thompson & Thomas, 2000; Irving, 1990). Upward comparisons are comparisons made between an individual and someone "better off" on a certain dimension. In this case, an upward comparison would involve comparing ones body to bodies that are thinner than their own. Studies have shown that when exposed to thin media images, women rate themselves as feeling fatter afterwards, and in contrast, when exposed to fat images, women rate themselves as feeling thinner afterwards (Ogden & Mundray, 1996). Body comparisons are however, not limited to the images presented in the media. Studies have also reported that women compare themselves with their peers (Hesse-Biber & Marino, 1991; Striegel-Moore, Silberstein & Rodin, 1986). Due to the glorification of thin women by the media, women who place a heightened emphasis on weight and shape may be more likely than women not so concerned with weight related issues to engage in comparisons between themselves and the thin bodies presented not only in the media, but also in their surrounding environment.

1.4 BODY DISSATISFACTION AND THE PROCESSES OF PERCEPTION AND ATTENTION

Socio-cultural theory and social comparison theory can both be linked to perception and attention to bodies in eating disorders and body dissatisfaction. Perception and attention have been found to play a key role in a number of psychological disorders, for example, depression and anxiety. Numerous studies have found that highly anxious and depressed individuals display selective and prolonged attention to either threatening or negative information (Caseras, Garner, Bradley & Mogg, 2007; Mogg, Garner & Bradley, 2007). Both perception and attention can alter an individual's experience of the world, and play a role in causing and maintaining dysfunctional behaviours and thoughts. For example, an individual who is highly anxious toward spiders may demonstrate selective attention toward spiders, and therefore overestimate the perceived occurrence of them in the environment, and consequently, the risk of being bitten by one. Below I will briefly review ways in which the processes of both attention and perception might contribute to the development and maintenance of eating disorders and body dissatisfaction.

1.4.1 PERCEPTION

The disturbance in the perception of body weight and shape in women suffering from eating disorders has been investigated using body size estimation techniques (Collins, 1987; Collins, Beumont, Touyz, Krass, Thompson & Philips, 1987; Farrell, Shafran, & Fairburn, 2003; Probst, Vandereycken, Van Coppenolle, & Pieters, 1995; 1998; Shafran & Fairburn, 2002). These techniques typically involve participants estimating their body size, either from memory or a mirror image.

A number of different types of body estimation techniques have been employed in these studies, and yielded varying results. Although much debate still exists about the ecological and construct validity of these techniques, meta-analyses have revealed that despite the differences in techniques, a distinct overestimation of body size does exist in people with eating disorders (Smeets, Smit, Panhuysen & Ingleby, 1997; 1998). Some reviews have concluded that there is no evidence for a perceptual deficit, and rather more evidence pointing to attitudinal or cognitive factors (Cash & Deagle, 1997; Skrypek, Wehmeier, &

Remschmidt, 2001; Smeets, 1997). However, whether or not this overestimation is the result of a perceptual distortion or a disturbance in cognitive-evaluative and attitudinal factors is still to be determined. The overestimation of bodies may be related to perceptions of bodies in general.

1.4.1.1.Body Norms

Women with eating disorders and body dissatisfaction have thinner ideal body sizes than women who are more satisfied with their bodies (Murray, Touyz & Beumont, 1996; Striegel-Moore et al, 1986). However, the majority of studies investigating the perceptual aspect of body image disturbance in people with eating disorders have failed to investigate perceptions of others' body sizes. If individuals with body dissatisfaction and eating disorders do suffer from a "perceptual" distortion, then this distortion should extend to the perception of bodies other than their own.

In order to determine whether the "perceptual" disturbance extends to neutral objects, some studies have used size estimations techniques on objects such as blocks (Slade & Russell, 1973), and circles (Probst, Vandereycken, Van Coppenholle, & Pierters, 1995). These studies have failed to find evidence for a perceptual distortion on these neutral objects.

Very few studies have looked at perceptions of bodies in general, in women with eating disorders or body dissatisfaction. In one example, Smeets (1999) used a morphing movie that displayed a body moving along a continuum from thin to fat in order to determine whether anorexic individuals differed from controls when estimating the size of bodies. Participants were required to mark on the scale the points where they considered that bodies moved from thin to normal, normal to fat, and fat to obese. When asked to imagine the bodies as themselves, individuals with anorexia chose thinner bodies for each size (thin, normal, and fat) than did the controls. A comparable result was found when anorexic participants were choosing bodies for other women. The authors concluded that the anorexic participants made harsher judgments for body size than controls, and in fact, the results suggest that even anorexic women's perceptions of fat bodies were slimmer than controls.

Mikhail, Steiger and Taylor (1993), used a video-image technique and a silhouette technique to investigate the body sizes that anorexic, bulimic, and

control participants consider normal, average and ideal. In the video-image technique, participants were presented with images of a body on a TV screen. The images ranged on a continuum from 50% larger to 50% smaller than the objective body size. Participants were required to state which body size was most like their own, an average woman, a normal woman, and their ideal size. They found that eating-disordered participants chose slimmer references for all of these estimations than controls. Similarly, Mikhail et al (1993) presented anorexic, bulimic and control participants with a range of 23 silhouettes of female bodies ranging from emaciated to obese. Participants were again required to select the silhouette which they thought most closely represented their own size, the size of an average, a normal-healthy and ideal size female. Participants with eating disorders again chose slimmer references for all estimations than controls.

Perceptions of own and other women's bodies may be central to the maintenance and cause of body dissatisfaction. Distorted perceptions of bodies in general could lead to greater dissatisfaction with one's own body. These distortions in the perceptions of what "normal" and "ideal" bodies look like may be the result of numerous factors, including overexposure to thin idealised images in the media.

1.4.1.2. Adaptation

Adaptation may be one way in which the exposure of thin bodies in the media affects women's perceptions of bodies. Adaptation involves repeatedly exposing an individual to a certain set of stimuli (for example, faces with their internal features expanded towards the periphery of the face), and observing the effect this has on the perception of similar stimuli (e.g. normal faces) after exposure. It has been found that what looks normal shifts towards the adapting stimuli. For example, after exposure to expanded faces, the face judged to look most normal was more expanded than the face which was previously judged to look most normal (Webster & MacLin, 1999). Adaptation is a phenomenon typically associated with low-level perception. More recently, however, adaptation has been found for higher-level perception of stimuli such as faces.

Adaptation renormalises perception in response to the environment to which participants are exposed (Webster, 2003). For example, people brought up in an environment in which women have large bodies will find those bodies more

normal than someone brought up in an environment where women have slighter frames. Any two individuals who are exposed to the same stimuli should have the same perceptual experience, unless one has an increased susceptibility to, or pays more attention to certain stimuli. By using an adaptation paradigm to investigate the perception of bodies in individuals who vary on levels of body dissatisfaction, it is possible to investigate whether perceptual differences exist in women who are dissatisfied with their bodies, and those who are not. Specifically, it is possible to investigate whether exposure to bodies differentially affects both groups.

Winkler and Rhodes (2005) used a perceptual adaptation paradigm to investigate whether small amounts of exposure to different sized bodies could affect what one considers normal in a body. Participants were exposed to either thin or wide bodies (made by stretching or shrinking bodies along the horizontal axis, using Photoshop). Pre- and post-adaptation normality ratings were obtained to investigate whether there was any difference in the mean normality ratings before and after exposure to certain types of stimuli. It was found that participants' perceptions of what a "normal" body looked like shifted towards the adapting stimuli. Specifically, if participants were exposed to thin bodies, they would rate thinner bodies as more normal after adaptation than they did before adaptation, and vice versa for wide bodies. These results demonstrate that it is possible, through experience, to alter what one considers normal in a body, and provide important information into how exposure to thin female bodies in the media may affect women's perceptions. But how is it that the process of adaptation works to alter what people consider normal? One way to consider the effects of adaptation on people's perceptions is through prototype theory.

1.4.1.3. Prototype Theory

Prototype theory suggests that the most representative member of a category is stored in long-term memory (Nairne, 2003). For example, the best example or prototype of a bird may be a robin. The prototype of a particular category is often defined as the "exemplar with average values on all of the dimensions along which the category's exemplars vary" (Dopkins & Gleason, 1997, pp 213). The prototype is represented as the centre point in a psychological space. The dimensions of the space depend upon the perceptual dimensions along which the category exemplars vary, and to which people are sensitive (Dopkins &

Gleason, 1997). For example, a "bird" space might include dimensions such as feather colour and wing shape. The prototype, or central exemplar, depends upon an individual's experience (Palmer, 2002). If, for example, an individual spends a lot more time around eagles than robins, their bird prototype may become closer to an eagle than to a robin.

Research suggests that we may encode faces with reference to a prototype (Blanz, O'Toole, Vetter, & Wild, 2000; Leopold, O'Toole, Vetter, & Blanz, 2001). Further, we find prototypical members of a category to be attractive (Halberstadt & Rhodes, 2000). Bodies may also be coded with reference to a prototype. It is possible that there is a psychological "body space" whereby all the bodies an individual encounters in her life accumulate to create a "body prototype". Constant exposure to the thin bodies presented in the media may alter women's body prototype, making it smaller.

Individuals who display high levels of body dissatisfaction may be increasingly susceptible to the effects of thinner exemplars on their prototype. Thinner body 'norms' may be the result of an increased effect of thin bodies on women's body prototype. Therefore, adaptation and prototype theory can be linked to demonstrate another way in which constant exposure to thin females in the media might affect susceptible women. In other words, thin media images may actually *alter* what women perceive as being normal in a body.

1.4.2 Attention

Research conducted on attention and vision suggests that we attend to the most relevant source of information in our environment (Fox, 2005). It has also been suggested that attention can 'prioritize socially relevant objects" (Fox, 2005, pp 3). Given that women who display high levels of body dissatisfaction or 'eating disordered' symptoms place a heightened emphasis on body weight and shape information, they may also pay more attention to body related information than body satisfied women.

Cognitive theories of eating disorders suggest that individuals with eating disorders have maladaptive and dysfunctional attitudes about body appearance and eating. These maladaptive attitudes may bias information processing, so that these individuals may attend to attitude-congruent information, such as thin

bodies, which serve to maintain their eating disorders (Hargraves & Tiggemann, 2003; Vitousek & Hollon, 1990). A similar argument has been used for the maintenance of body dissatisfaction (Hargraves & Tiggemann, 2002; Hargraves & Tiggemann, 2003; Heinberg & Thompson, 1995).

Studies that have examined cognitive and attentional biases in women who were 'eating symptomatic' have found that women high on eating symptomatology display selective processing for information related to body concerns (Flynn & McNally, 1999). They have also found that women who display 'eating disordered' symptoms have a tendency to focus more on the "beautiful" body parts of other women, and the 'ugly" body parts of themselves, whereas the reverse was found for women without dysfunctional eating behaviours (Jansen, Nederkoorn & Mulkens, 2005). These results suggest that women who are high on eating disorders symptoms may scan their environments and focus on attractive bodies, rather than unattractive bodies. It has been suggested that selective attention to appearance-related information might be a maintenance factor in eating disorders (Jansen et al., 2005). This may also be true for body dissatisfaction.

Selective attention to thin bodies could, therefore, increase body dissatisfaction, and may be encouraged by the fact that thin female bodies are frequently presented and glorified in the media. It would make intuitive sense that if an individual attended more to a certain type of body, their prototype (average) would reflect that bias. For example, if an individual looked only at slim bodies, the average of their exemplars (prototype) would necessarily be thinner than if they attended to both thin and fat bodies. It is possible that people who suffer from eating disorders and body dissatisfaction attend more to thinner bodies in everyday life, which would serve to validate their idea that the normal or ideal body is really very thin. This would also result in a reduction in their exposure to bodies that are typically considered normal by body-satisfied individuals.

1.5 Thesis Approach And Aims

This thesis adopted two novel paradigms in its aim to explore the relationship between body dissatisfaction and the processes of attention to, and perception of, bodies. Specifically, I aimed to investigate whether body dissatisfaction, as measured by the Body Shape Questionnaire (BSQ)(Cooper,

Taylor, Cooper & Fairburn, 1987), is related to the perceptual effects of exposure to thin and fat bodies, and whether women who are more dissatisfied with their bodies attend more to slimmer bodies than women who are less body dissatisfied. Body dissatisfaction is a significant problem affecting a large number of women. Therefore, any advancement in the understanding of the processes that are involved in either causing or maintaining it is extremely useful.

My specific aims and hypotheses were:

i. To investigate whether exposure to computer-generated images and photographs of thin and fat bodies can alter women's perceptions of what looks normal and ideal in a body. In line with the findings by Winkler and Rhodes (2005), I propose that exposure to thin and fat bodies will alter women's perceptions of what looks normal and ideal in a body. Specifically, I hypothesize that exposure to thin bodies will make women's perceptions of the most normal and ideal body thinner, and exposure to fat bodies will make women's perceptions of the most normal and ideal body fatter.

ii. To investigate whether body dissatisfaction and acceptance and awareness of societal standards of beauty are related to how women's perceptions of body normality and body ideals are affected by exposure to thin and fat bodies. I propose that women with increased levels of body dissatisfaction and awareness and acceptance of societal standards of beauty may demonstrate either an increased effect of exposure to thin bodies or a decreased effect of exposure to fat bodies, on their perceptions of body normality and body ideals. Thinner perceptions of bodies may be related to differential effects of exposure to thin or fat bodies.

iii. To investigate whether body dissatisfaction and acceptance and awareness of societal standards of beauty are related to judgements of thinner bodies as most normal and ideal. Based on the fact that women with eating disorders have slimmer ideal bodies, and seem to have slimmer bodies standards in general (Mikhail et al, 1993; Murray, et al 1996; Smeets, 1999; Striegel-Moore, et al, 1986), I propose that women who are dissatisfied with their bodies may have a thinner idea of what constitutes a "normal" and ideal body than individuals who are less dissatisfied with

their bodies. Having a smaller "normal" and ideal body may be the result of increased attention to thin bodies, and/or a bias which increases the effect of thin bodies, or decreases the effects of fat bodies, on women's body prototypes. Having perceptions of normal and ideal bodies that are thin may influence the way women judge their own, and others', body size and shape.

iv. To investigate whether body dissatisfaction is related to attentional biases toward thin female bodies. Based on previous findings suggesting that women who are high on eating symptomology display selective attention to "beautiful" body parts of other women, I propose that women who are dissatisfied with their bodies will attend more to thin than to fat bodies.

v. To gather normative data for the Body Shape Questinnaire-34 (Cooper et al, 1987) from a large Australian university population.

1.6 THESIS ORGANIZATION

Chapter 2 describes two studies that used an adaptation type paradigm to test whether exposure to thin and fat computer-generated bodies alters women's perceptions of body normality (Experiments 1 & 2) and body ideals (experiment 2). Additionally, Chapter 2 investigates whether increased body dissatisfaction and increased awareness and acceptance of societal standards of beauty are related to the effects of exposure to thin and fat bodies, and are related to thinner body norms and ideals. This chapter addresses the first three aims of my thesis. Chapter 3 presents an extension of Experiment 2 in Chapter 2, using exposure to thin and fat photographs of female bodies, rather than computer-generated images. Chapter 4 examines attention to thin bodies. It reports three studies in which I used a modified dot probe task to determine whether increased body dissatisfaction was related to increased selective attention to thin bodies. This chapter addresses the fourth aim of my thesis. Chapter 5 reports a large questionnaire-based study that provides normative data on the BSQ-34 for an Australian undergraduate university population, and addresses the fifth aim of my thesis. Finally, Chapter 6 provides a brief discussion of the entire thesis and considers the implications of my findings.

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CHAPTER 2: BODY DISSATISFACTION AND THE EFFECTS OF EXPOSURE TO THIN AND FAT COMPUTER-GENERATED BODIES

2.1 Abstract

Objective: Body dissatisfaction is of high prevalence amongst women all over the Western world. It is often suggested that socio-cultural processes are the main cause of such widespread dissatisfaction. Here we consider how perceptual effects may influence ideas of body normality and body ideals. **Method:** Women who varied on a measure of body dissatisfaction rated a range of bodies for how normal and ideal they looked. They were exposed to either thin or fat bodies, and then they re-rated the bodies. **Results:** Women's perceptions of body normality and ideal were easily malleable by exposure. In addition, greater body dissatisfaction and internalisation of the thin Western ideal were related to (i) a smaller most normal and ideal body, (ii) a greater discrepancy between the most normal and most ideal rated body, and (iii) a reduced effect of exposure to fat bodies. **Conclusions:** Reduced updating of perceptions of body normality and body ideals in response to experience may be one mechanism that maintains body dissatisfaction.

CHAPTER TWO: BODY DISSATISFACTION AND THE EFFECTS OF EXPOSURE TO THIN AND FAT COMPUTER-GENERATED BODIES.

2.2 BACKGROUND

Body dissatisfaction is defined as a "negative subjective evaluation of one's physical body" (Stice & Shaw, 2002, pp 985), and is of such high prevalence amongst women in Western societies (Charles & Kerr, 1986; Furnham & Greaves, 1994; Silberstein, Striegel-Moore, Timko & Rodin, 1988) that it is often acknowledged as a "normative discontent" (Rodin, Silberstein & Striegel-Moore, 1985). The high proportion of women who are unhappy with their bodies is a concern given the established relationship between body dissatisfaction and the development of eating disorders (Stice, 2001; Stice & Shaw, 2002), low self esteem and depression (Paxton, Neumark-Sztainer, Hannan, & Eisenberg, 2006).

Although the causes of body dissatisfaction are multi-faceted, socio-cultural theory dominates causative explanations. This theory asserts that peer, media, family and fashion pressures placed on Western women to be thin result in dissatisfaction with their own bodies (Levine & Smolak, 1996; Powell & Kahn, 1995; Sypeck, Gray, Etu, Ahrens, Mosimann & Wiseman, 2006; Thompson, Heinberg, Altabe & Tantleff-Dunn, 1999; Tiggemann & Rothblum, 1988). Not only do Western media portray the "ideal" female to be at a level of slimness that is unobtainable for most women, but thin women are also depicted by the media to be more attractive, more desirable and more successful than their larger counterparts (Evans, 2003; Hebl & Heatherton, 1998; Jackson, 1992).

A meta-analysis of studies investigating the effects of viewing Western idealized images concluded that exposure to those images induces and enhances body dissatisfaction (Groesz, Levine & Murnen, 2001). In addition, it has been found that the extent to which women internalize the Western ideal predicts body dissatisfaction (Becker, Burwell, Gilman, Herzog & Hamburg, 2002; Stice, 1994, 2002; Stice, Maxfield & Wells, 2003; Thompson & Stice, 2001), and that women who do not adopt the Western view of the "body ideal" are less likely to develop

eating disorders and body dissatisfaction (Pate, Pumariega, Hester & Garner, 1992; Akan & Grilo, 1995; Furnham & Alibhai, 1983).

One way in which frequent exposure to thin idealized bodies may impact women is in their perceptions of bodies. Constantly viewing thin bodies may alter women's perceptions of what normal and ideal bodies look like. Studies have found that larger differences between a woman's current and ideal body shape result in greater body dissatisfaction (Dunkley, Wertheim & Paxton, 2001; Gardner & Boice, 2004). Hence, frequent viewing of thin bodies may be considered to be a risk factor for body dissatisfaction.

Studies on face perception have found that viewing distorted faces alters what people consider to be a normal face (Rhodes, Jeffery, Watson, Clifford & Nakayama, 2003; Webster & MacLin, 1999). The same mechanisms may be at work when women view bodies. To date, no studies have investigated perceptions of body normality in relation to body dissatisfaction.

One way to investigate the effects of exposure on women's body ideals and norms is through a procedure called adaptation. Adaptation is commonly used in vision research and more recently, in face processing research (Clifford & Rhodes, 2005). It usually involves repeatedly exposing someone to certain stimuli and observing the effects on the perception of similar stimuli after exposure.

Winkler and Rhodes (2005) used perceptual adaptation to investigate how small amounts of exposure to different sized bodies affects what one considers a "normal" body. When participants were exposed to thin bodies, they rated thinner bodies as more normal after adaptation than they did before adaptation. In contrast, when participants were exposed to fat bodies, they rated fatter bodies as more normal after adaptation than before adaptation. These results demonstrate that it is possible, through experience, to alter what one considers normal in a body.

Since we know that it is possible to alter people's perceptions of body normality through relatively brief amounts of exposure, we sought to investigate whether exposure to different sized bodies differentially affects women, based on their current levels of body dissatisfaction. The finding that the effects of exposure to different sized bodies is moderated by body dissatisfaction may highlight one way in which media exposure would contribute to the development and maintenance of body dissatisfaction in vulnerable women.

In the present studies we examined women's pre-existing perceptions of body norms and body ideals, and, using an adaptation procedure similar to that used by Winkler & Rhodes (2005), we examined the effects of exposure to bodies of different BMIs (Body Mass Indices) on perceptions of body normality (Experiment 1 & 2), and body ideals (Experiment 2). Additionally, we examined whether pre-existing body norms and ideals, as well as the effects of exposure on body normality and body ideals, were moderated by levels of pre-existing body dissatisfaction and/or internalisation of Western ideals.

2.3 EXPERIMENT 1

The aims of this experiment were to investigate whether body dissatisfaction is related to the effects of exposure to fat and thin bodies on women's perceptions of body normality. We also included a control condition with common objects (coke bottles) to ensure that any relationship between body dissatisfaction and perceptions of body normality and body ideal is specific to bodies. We expected that prior to exposure to thin or fat bodies, body dissatisfaction would be related to a thinner most normal body. Additionally, we expected that brief amounts of exposure to thin and fat bodies would alter women's perceptions of body normality. We hypothesised that body dissatisfaction would be related to a greater effect of exposure to thin bodies, a reduced effect of exposure to fat bodies, or both. We did not expect to find any relationships between body dissatisfaction and initial coke bottle normality ratings. Nor did we expect to find a relationship between body dissatisfaction and the effects of exposure to thin or fat coke bottles. Participants' own BMI was measured because numerous studies have found that BMI is significantly related to levels of body dissatisfaction (Ackard, Croll & Kearny-Cook, 2002; Lunner, Werthem, Thompson, Paxton, McDonald & Halvaarson, 2000; Paxton, Wertheim, Gibbons, Szmukler, Hillier & Petrovich, 1991; Yates, Edman & Arugete, 2004), and we wanted to measure the effects of body dissatisfaction, independent of BMI.

2.3.1 Method

Participants

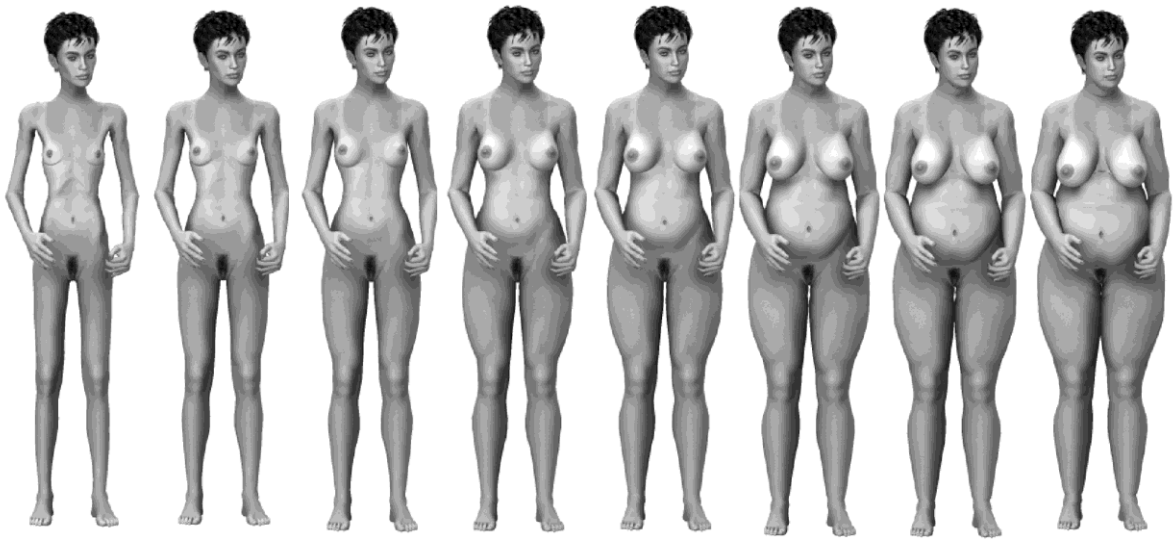
Sixty-two adult Caucasian females participated. Participants' ages ranged from 17 to 31 years (M = 19.8, SD = 3.6). All participants were recruited from a first year psychology cohort from the University of Western Australia. Forty-eight participants received course credit for their participation. The remaining fourteen were paid $15 to cover their transport costs.

Measures

The Body Shape Questionnaire -34 (BSQ-34) (Cooper, Taylor, Cooper & Fairburn, 1987) is a 34 item self-report questionnaire assessing an individual's thoughts and feelings about their weight and shape. The BSQ has high test-retest reliability and validity (Rosen, Jones, Ramirez, & Waxman, 1996). Participant's height and weight were measured in order to obtain their BMI (measured by dividing weight in kg/height^2 in cms).

Stimuli and Apparatus

Bodies. Nineteen front-facing images of computer-generated nude female Caucasian bodies, ranging in BMI from 12 to 30, were used as stimulus figures (see Figure 1). These were created in 3ds max, using standard targets "emaciated" and "heavy" supplied with Victoria 2.0. Photorealistic textures were applied and the images rendered with global illumination using Poser 4. BMIs were estimated using the formula, BMI= volume*1.1/height^2 (i.e., one cubic cm of mesh was equal to 1.1 gram body mass). Volume was estimated using Metris (Metris Inc., Leuven, Belgium) and height was defined as 165 cm. The height of the images on the screen was 18cm. The stimuli were displayed on a Power Macintosh 720/120 computer with a 15-inch monitor using SuperLab Pro v1.75. Responses were made on a computer keyboard.



BMI 12 BMI 14 BMI 16 BMI 20 BMI 22 BMI 25 BMI 27 BMI 30.4

(Thin exposure image) (Fat exposure image)

Figure 1. Example of some of the bodies used in Experiment 1. The two exposure bodies are on either end of the scale.

Coke bottles. A single photograph of a 600ml Coca Cola bottle was taken with a Kodak DC290 Zoom 2.1 mega pixel digital camera. The photograph was standardized in Photoshop 6.0 by creating a standard canvas size (425 pixels wide x 567 pixels high), and making the background white. Using Photoshop 6.0 the width of the coke bottle was expanded and contracted in 10% increments from +50% to -50%, while keeping the height of the image constant. This resulted in eleven images of coke bottles (i.e. -50%, -40%, -30%, -20%, -10%, 0%, +10%, +20%, +30%, +40%, +50% of the original image width) ranging from thin to fat (See Figure 2). The height of the bottles on the screen was 17cm.

Figure 2. Example of some of the coke bottle stimuli used. The end bottles were the exposure stimuli

2.3.2 General Procedure

Participants first completed the BSQ-34 and their height and weight were measured. They were then randomly assigned to either a "thin" or "fat" condition in which they adapted to thin bodies and thin coke bottles or fat bodies and fat coke bottles. The order of stimulus type (coke bottles or bodies) was counterbalanced across participants, half of the participants adapted to bodies first, and the other half adapted to coke bottles first.

2.3.2.1 Body Exposure

Pre-exposure rating phase. The pre-exposure rating phase was conducted to obtain baseline normality ratings. Normality ratings were obtained for all nineteen images of the bodies. Each image was presented ten times, giving 190 pre-ratings. Body normality was rated on a nine-point scale (1= too thin, 5 = normal, 9 = too fat). Each trial began with a body presented for 1000 milliseconds. The question, "for a woman aged between 17 and 25, how normal did that body look to you?" then appeared on the screen along with the nine-point rating scale. Participants were required to make their responses using a keyboard.

After a response was recorded, the next trial began. All pre-adaptation images were presented in a random order. Before any ratings were made participants were verbally briefed to explain that "normal" was the same as "average".

Exposure phase. Following the pre-exposure phase, there was a one-minute period of exposure. The exposure body was presented repeatedly for 1000 milliseconds, with a 200-ms inter-stimulus interval. Participants assigned to the "thin" condition saw a body with a BMI of 12, and participants assigned to the "large" condition saw a body with a BMI of 30. Participants were instructed to pay close attention to the body presented.

Post-exposure phase. After the exposure phase, participants were required to rate the normality of the test bodies a second time. The procedure in the post-exposure phase was identical to that in the pre-exposure phase, except that prior to each test body, the exposure body was presented for six seconds. This ensured that exposure was maintained throughout the post-test period. There was a 200 ms inter-stimulus interval between the presentation of the exposure image and the test image. The order of test images was randomised for each participant..

2.3.2.2 Coke Bottle Exposure

Pre-exposure rating phase. This phase was identical to the pre-exposure phase with the bodies, except that the test bottles were presented for 1500[1] milliseconds, and a total of 110 pre-ratings were made. Participants were asked, "How normal did that coke bottle look to you'?

Exposure phase. The exposure phase was identical to the exposure phase with the bodies. Participants assigned to the "thin" condition were shown a coke bottle that had been distorted by -50%. Participants assigned to the "fat" condition were shown a coke bottle that had been distorted by +50%. Each adapting image was displayed for 1000 milliseconds with a 200-millisecond interval, this was repeated for one minute.

[1] Due to a programming oversight, the coke bottles were displayed for 500 milliseconds longer than the bodies.

Post-exposure phase. The post exposure phase was identical to the post-exposure phase with the bodies, except that (as in the pre-exposure phase with the bottles), the test bottles were presented for 1500 milliseconds, and a total of 110 post-ratings were made.

2.3.3 Results and Discussion

One participant was removed from the analysis because her BMI was more than 3 standard deviations above the mean, resulting in a total of 61 participants being included in the final analysis.

2.3.1 Bodies

The dependent variables were the BMI rated as most normal before exposure, and the shift (in the expected direction) in the BMI rated as most normal after exposure. In order to measure the shift, each participant's mean pre- and post-exposure normality ratings for the bodies were plotted as a function of BMI. A second order polynomial function ($y= ax^2 + bx + c$) was fitted to each curve, and the BMI corresponding to the point at which the y axis was crossed at 5 (most normal rating) was obtained graphically, and used to calculate the difference in BMI's before and after exposure. For the thin condition, the shift score was calculated by subtracting the most normal pre-exposure score from the most normal post-exposure score, and for the fat condition it was calculated by subtracting the most normal post-exposure score from the most normal pre-exposure score. This resulted in absolute shift scores from pre to post, in the expected direction. The fits of the polynomial functions to the data were as follows; pre-exposure mean $R^2 = 0.98$ (SD = 0.01, range 0.93 – 1.0); post-exposure mean $R^2 = 0.99$ (SD = 0.01, range 0.96 – 1.0).

The most normal rated BMI, before any exposure, was 19.0 (SD = 1.5). After exposure to thin bodies, the most normal rated BMI was reduced to 16.9 (SD = 1.6), and after exposure to fat bodies, the most normal rated BMI increased to 20.1 (SD = 1.8).

Participants' own BMIs were significantly positively related to the BMI they rated as most normal, $r(57) = 0.40$, $p = 0.002$. In congruence with numerous other studies, participant BMI was also significantly related to levels of body dissatisfaction, $r(58) = 0.31$, $p< 0.015$. Therefore, we controlled for BMI because

we wanted to investigate body dissatisfaction, independent of BMI.When participant's BMI was controlled for, BSQ-34 was significantly negatively related to the BMI rated as most normal, $r(58) = -0.43$, $p < 0.002$ (zero-order correlation $r(57) = -0.25$, $p < 0.05$).

One-sample t-tests were conducted on the shift scores for each exposure condition. Shifts for both the fat (M= 0.9, SD= 0.9), and thin (M= 1.9, SD= 1.0) exposure conditions were significantly greater than zero, $t(29)= 5.33$, $p <$ .0001(one-tailed), $r = 0.58$ and $t(30)= 10.53$, $p< .0001$ (one-tailed), $r = 0.80$ respectively, indicating that brief amounts of exposure to the thin and fat bodies significantly alter women's perceptions of body normality.

An independent-samples t-test was conducted on the shifts (in the expected direction) after exposure. Exposure to thin bodies (M= 1.9, SD= 1.0) had a significantly greater impact than exposure to fat bodies (M=0.9, SD=0.9), $t(59) = 4.03$, $p < 0.001$ (two-tailed), $r = 0.46$.

With participant BMI controlled for, BSQ-34 scores were not significantly related to the effects of exposure to fat, $r(27) = -0.12$, $p= 0.52$, or thin bodies, $r(28) = -0.14$, $p = 0.46$. Therefore, based on this result, and the previous result where we found that exposure to thin bodies had a greater impact than exposure to fat bodies, it seems that all women, regardless of body dissatisfaction, were more affected by exposure to thin than fat bodies. There are a number of ways to view this finding. The asymmetry may be the result of increased attention to, or a general preference for, thin bodies. Alternatively, the thin exposure body may have been perceptually more salient than the fat exposure body. The more extreme an exposure stimulus is, the greater the effect on people's subsequent perceptions (Robbins, McKone & Edwards, 2007). The perceived extremity of the two exposure stimuli will be equated in Experiment 2, in order to rule out this possible explanation.

2.3.2 Coke Bottles

The dependent variables were the bottle width rated as most normal before exposure, and the shift (in the expected direction) in width rated as most normal following exposure. The method used to calculate the shift between pre and post exposure was the same as that used with the bodies. The fits of the polynomial

functions to the data were as follows: pre-exposure mean; $R^2 = 0.98$ (SD = 0.01, range 0.94 – 0.99); post exposure mean $R^2 = 0.97$ (SD = 0.02, range 0.93- 1.0).

As expected, with BMI controlled for, no significant relationship emerged between BSQ-34 score and pre-normality ratings for coke bottles, $r(57) = -0.19$, $p = 0.15$, suggesting that body dissatisfaction is not related to any general bias in shape perception. Additionally, there was no relationship between BMI and the pre-normality ratings for coke bottle, $r(61) = 0.10$, $p = 0.42$.

One sample t-tests were conducted on the shift scores for each condition. In each case, means of both the fat (M= 0.06, SD= 0.05), and thin (M= 0.09, SD= 0.07) exposure conditions were significantly greater than zero, $t(29)= 6.41$, $p < .0001$ (one-tailed), $r = 0.65$, and $t(30)= 7.66$, $p< .0001$ (one-tailed), $r = 0.67$, respectively. This result indicates that our exposure stimuli significantly altered women's perceptions of what a normal coke bottle looks like.

An independent samples t-test was conducted on the shift in the most normal rated coke bottle following exposure (See Table 3). The between subjects factor was exposure condition (exposure to thin or fat coke bottles). There was no difference in the shifts after exposure to thin coke bottles (M=0.09, SD= 0.07) and fat coke bottles (M= 0.06, SD = 0.05), $t(59)= 1.84$, $p= 0.07$ (two-tailed), $r = 0.24$, implying that participants' perceptions of bottle normality were equally affected by exposure to thin and fat coke bottles.

Body dissatisfaction was not significantly related to the effects of exposure to thin bottles, $r(26) = -0.29$, $p = 0.127$, or fat bottles, $r(27) = -0.02$, $p= 0.918$. This result suggest that the effects of exposure to thin or fat coke bottles are not influenced by body dissatisfaction, further indicating that body dissatisfaction is not related to any general perceptual distortion.

Summary

We found that as body dissatisfaction increases, a woman's perception of what is a normal BMI decreases. In addition, the larger a woman's own BMI, the larger the BMI she considers most normal. However, neither BMI nor body dissatisfaction were related to the most normal rated coke bottle, suggesting that pre-rating differences in body normality are not the result of an overall perceptual bias, but are specific to bodies.

We also found that brief amounts of exposure to a thin body or coke bottle shifted women's perceptions of the most normal sized body and coke bottle, making them thinner. The opposite was true after exposure to fat bodies and bottles, a result consistent with those found in typical shape aftereffects (Clifford & Rhodes, 2005; Winkler & Rhodes, 2005). Body dissatisfaction was not significantly related to the effects of exposure to bodies or coke bottles. However, we did find that exposure to the thin bodies had more of an effect on women's perceptions of body normality than exposure to the fat bodies. This finding may reflect greater perceptual salience of the thin than fat exposure bodies used here. We sought to rule out this possibility in Experiment 2.

2.4 EXPERIMENT 2

In this experiment we sought to equate the perceptual salience of the thin and fat exposure bodies, by using bodies that looked equally extreme (too thin or too fat) relative to the BMI rated as most normal. Additionally, we sought to investigate the effects of exposure to fat and thin bodies on perceptions of body ideals as well as body norms, and how this might be related to body dissatisfaction. We also assessed participants' internalisation of the thin Western ideal, in order to test whether this would be associated with normal and ideal bodies with smaller BMI's. In congruence with Experiment 1, we predicted that greater body dissatisfaction would be related to a smaller BMI being perceived as most normal. We also predicted that greater body dissatisfaction would be related to a smaller BMI being perceived as most ideal. Equating the exposure stimuli allowed us to be sure that any differences in the effects of exposure we might find are not due to differences in the salience of the stimuli.

2.4.1 METHOD

Participants

Sixty-two adult Caucasian females from the University of Western Australia took part in this study. Ages ranged from 16 to 31 years (M = 19.15, SD = 3.82). Thirty-two participants received course credit for their participation. The remaining thirty were paid $15 to cover their transport costs.

Measures

The internalisation-general subscale from the SATAQ-3 (Thompson, Van den Berg, Roehrig, Guarda & Heinberg, 2004) was administered to all participants. This subscale contains 9 items that measure the extent to which women have internalised Western standards of beauty. The scores range from 9 to 45, with higher scores indicating greater internalisation of societal standards of beauty. The internalisation subscale has excellent psychometric characteristics (Thompson et al, 2004). The BSQ-34 was also used, as in Experiment 1, and participant BMIs were measured.

Stimuli

The pre-normality ratings from the first experiment were used to select exposure stimuli that were perceived as equally perceptually distant from the 'most normal' body. A polynomial function was used to find the bodies that had been rated 3 and 7 on the normality scale. Three and seven were chosen because they were equally distant from the most normal rated body (five). The resulting exposure images were a body with a BMI of 15 as the thin exposure image, and a body with a BMI of 24.0 as the fat exposure image. In Experiment 1 the test bodies ranged from BMIs 12 through to BMI 30. In this experiment we decreased that range from 13 to 27. This was done to reduce the time it took for participants to complete the task. With the inclusion of Ideal ratings, the task took longer than the previous experiment, and we did not want to fatigue participants too much.

Procedure

The procedure was the same as for body exposure in Experiment 1, except that the perceived extremity of the thin and fat exposure stimuli was equated based on the normality ratings from the first experiment, and the range of test bodies was reduced to BMI's of 13 through to BMI 27. Participants were also required to rate the bodies for body ideals, as well as body norms. Participants did all of the pre-ratings for body ideals and norms at the beginning of the experiment. This was done in blocks. Thus, at the beginning of each block the participant was told that the subsequent bodies would have to be rated for either normality or ideal. Order was counterbalanced across participants. Each block contained 75 bodies (five from each BMI) and trials were randomised for each

participant. Participants rated each body ten times, resulting in a total of 150 ratings for normality, and 150 ratings for ideal. Post-exposure ratings were done in exactly the same ways as for the first experiment, except that blocks of ideal ratings were counterbalanced with blocks of normality ratings.

2.4.2 RESULTS

Three participants were excluded from the analyses. One did not complete the questionnaires, one's results were not recorded due to a computer problem, and the final participant was found to have a pre-norm rating score that was more than 3 standard deviations below the mean. This resulted in a total of 59 participants being included in the final analysis.

2.4.2.1 Body normality

There were two dependent variables: the BMI rated as most normal before exposure, and the shift (in the expected direction) in BMI rated as most normal after exposure. These shifts were calculated in exactly the same way as for Experiment 1. The R^2 fits of the polynomial functions to the data were for the pre-exposure and post-exposure ratings were as follows: Pre-exposure mean $R^2 = 0.98$ (SD = 0.02, range 0.93 - 1.0); post-exposure mean $R^2 = 0.97$ (SD = 0.03, range 0.85 -1.0).

The most normal rated BMI, before any exposure, was 18.1 (SD = 1.3). After exposure to thin bodies, the most normal rated BMI was reduced to 17.2 (SD = 1.2), and after exposure to fat bodies, the most normal rated BMI increased to 19.4 (SD = 1.6).

When controlling for BMI, body dissatisfaction was significantly related to the BMI considered most normal before exposure, $r(56) = -0.29$, $p = 0.03$. This finding is consistent with the results from Experiment 1, and supports the hypothesis that women who are more dissatisfied with their bodies have a thinner body "norm" than women who are less dissatisfied (see Table 1 for zero order correlations).

Table 1. Zero-order Pearson product moment correlations between BSQ, BMI, Internalisation, and most normal and ideal rated bodies.

	Pre-norm	BSQ	BMI	Pre-ideal
BSQ	-0.21^ (p < 0.06)			
BMI	0.30* (p <0.03)	0.21 (p < 0.12)		
Pre-ideal	0.85** (p< 0.002)	-0.30^* (p < 0.02)	0.41** (p < 0.002)	
Internalisation	-0.15 (p < 0.26)	0.48** (p < 0.002)	-0.27* (p < 0.05)	-0.32* (p < 0.02)

^=1tailed test, *=Significant at 0.05 level, **=Significant at 0.001 level

One-sample t-tests were conducted on the shift scores for each condition. In each case, means of both the fat (M= 1.3, SD= 0.9), and thin (M= 0.9, SD= 0.9) exposure conditions were significantly greater than zero, $t(29)= 8.20$, $p < .0001$ (one-tailed), $r = 0.71$, and $t(28)= 5.47$, $p< .0001$ (one-tailed), $r = 0.58$, respectively. Again, this finding replicates the results from the first study, and indicates that even with less extreme exposure bodies, brief amounts of exposure to thin and fat bodies significantly alter women's perceptions of body normality.

An independent samples t-test was conducted on the absolute shift in BMI normality ratings before and after exposure (the amount participant's ratings shifted after exposure). There was no difference in the amount of shift after exposure to thin (M= 0.9, SD= 0.9) or fat bodies (M=1.3, SD=0.9), $t(57) = 1.63$, $p = 0.108$ (two-tailed), $r = 0.22$. This result suggests that the bigger effect we found for thin bodies in Experiment 1 was an artifact of failing to equate the perceived extremity of the stimuli.

When controlling for BMI, BSQ-34 scores were significantly negatively related to the effect of exposure to fat bodies, $r(27) = -0.40$, $p= 0.31$, but not thin bodies, $r(26) = 0.13$, $p= 0.51$ (See Table 1 for zero-order correlations). This finding suggests that the more dissatisfied a woman is with her body, the less

likely it is that her perceptions of body normality will be affected by exposure to fat bodies.

2.4.2.2 Body ideals

There were two dependent variables: the BMI rated as most ideal before exposure, and the shift in BMI rated as most ideal following exposure. The method used to calculate the amount of shift between pre and post exposure was the same as that used in the first experiment. The fits of the polynomial functions to the data for both the pre and post ratings were as follows. Pre-exposure R^2 mean = 0.98 (SD = 0.01, range 0.94-1.0; post exposure R^2 mean= 0.97 (SD = 0.02, range 0.90-1.0).

The most ideal rated BMI, before any exposure, was 17.7 (SD = 1.4). After exposure to thin bodies, the most ideal rated BMI was reduced to 16.7 (SD = 1.2), and after exposure to fat bodies, the most ideal rated BMI increased to 18.8 (SD = 1.8).

Body dissatisfaction was significantly negatively related to women's ratings of their ideal body, before exposure, $r(56) = -0.43$, $p < 0.001$. Thus, the more dissatisfied a woman is with her body, the smaller her ideal body will be.

One-sample t-tests were conducted on the shift scores for each condition. Means of both the fat (M= 1.0, SD= 0.9), and thin (M= 0.9, SD= 0.9) exposure conditions were significantly greater than zero, $t(29)= 6.66$, $p < .0001$ (one-tailed), $r = 0.78$, and $t(28)= 5.55$, $p < .0001$ (one-tailed), $r = 0.72$, respectively. This indicates that brief amounts of exposure to thin and fat bodies significantly altered women's body ideals.

An independent-samples t-test was conducted on the shift in BMI ideal ratings (in the expected direction) before and after adapting. There was no difference in the shifts after exposure to thin (M= 0.9, SD= 0.9) or fat bodies (M=1.3, SD=0.9), $t(57) = 1.63$, $p = 0.11$ (two-tailed), $r = 0.22$.

When controlling for BMI, body dissatisfaction was significantly negatively correlated with the effects of exposure to fat bodies, $r(27) = -0.56$, $p < 0.001$, but not thin bodies, $r(26) = -0.01$, $p= 0.97$. This pattern of results is in line with those found with body normality, and suggests that the more dissatisfied a woman is with her body, the less likely it is that her perceptions of body ideals will be affected by exposure to fat bodies.

Comparisons between Norms and Ideals

A paired-samples t-test was conducted on pre-exposure scores for most normal and ideal bodies. Pre-exposure ideals (M= 17.7, SD = 1.4) were significantly smaller than pre-exposure norms (M= 18.1, SD = 1.3), $t(58) = 4.42$, $p < 0.001$ (one-tailed), $r = 0.50$.

We hypothesised that greater body dissatisfaction would be related to a greater discrepancy between a woman's body ideals and body norms. In order to investigate this relationship, a difference score was calculated whereby the BMI an individual rated as most ideal was subtracted from the BMI an individual rated as most normal. Thus, if an individual's ideal body were thinner than their most normal body, this would result in a positive value.

Correlational analyses revealed that, when controlling for BMI, BSQ-34 was significantly correlated with the difference between ideals and norms, $r(56) = 0.27$, $p < 0.05$. Thus, the more dissatisfied a woman is, the greater the discrepancy between her perceptions of body norms and body ideals, with body ideals being smaller than body norms.

Internalisation

When controlling for BMI, internalisation scores were significantly negatively related to the body rated most ideal, $r(56) = -0.24$, $p < 0.04$ (one-tailed), and the difference between a woman's norm and ideal, $r(56) = -0.28$, $p < 0.02$ (one-tailed). They were not, however, significantly related to a woman's body norm, $r(56) = -0.08$, $p = 0.56$. These findings suggest that the more a woman internalises the Western ideal, the thinner her ideal body will be, and the greater the discrepancy between her perceptions of body normality and body ideal.

When controlling for BMI, internalisation scores were significantly negatively correlated with the effects of exposure to fat bodies when rating body ideals, $r(27) = -0.43$, $p < 0.03$, but not when rating body norms, $r(27) = 0.03$, $p = 0.87$. There were no significant correlations between internalisation scores and the effects of exposure to thin bodies when rating body ideals, $r(26) = 0.01$, $p = 0.99$, or body norms, $r(26) = 0.24$, $p = 0.23$. These findings suggest that the more a woman internalises the Western ideal, the less affected her perceptions of body ideals will be when exposed to fat bodies.

In summary, the second experiment revealed that, in line with Experiment 1, body dissatisfaction was related to thinner body norms. Additionally, it showed that body dissatisfaction and internalisation of the thin Western ideal were related to thinner body ideals, as well as a greater discrepancy between body norms and body ideals. We also found that the more dissatisfied a woman was with her body, the less her perceptions of body norms and body ideals were affected by exposure to fat bodies. Similarly, the more a woman internalised Western standards of beauty, and the more dissatisfied she was with her body, the less her perceptions of body ideals were affected by exposure to fat bodies.

2.5 General Discussion

These studies revealed three important sets of results. First, we found that body dissatisfaction and internalization of the thin Western ideal affected perceptions of body norms and ideals. Specifically, the more dissatisfied a woman was with her body, the thinner her ideal and most-normal rated bodies were, and the more a woman internalised the thin western stereotype, the thinner her ideal body was. Additionally, we found that as body dissatisfaction and internalisation increased, so did the discrepancy between what a woman considered to be her ideal body, and her perceptions of a normal body. Second, we found that brief amounts of exposure to thin and fat bodies significantly altered women's perceptions of body normality and body ideals. Specifically, when women were exposed to thin bodies, what they considered normal and ideal became thinner. The reverse was true when women were exposed to fat bodies. Finally, we found that greater body dissatisfaction and internalisation of the Western ideal body were related to a reduced exposure effect for fat bodies. We will now discuss each major finding and its implications in turn.

To date, research has focused mainly on the relationship between body dissatisfaction and women's perceptions of body ideals (Lamb, Jackson, Cassidy, & Priest, 1993; Tiggemann & Pennington,1990), but our first set of results suggests that the distorted perception extends even to what is considered normal in a body. It is also interesting that these perceptual distortions are specific to bodies. We found no relationship between body dissatisfaction and perceptions of what a normal coke bottle looks like. Hence, there does not appear to be any general perceptual distortion associated with body dissatisfaction.

Body dissatisfaction is often measured by the difference between a woman's ideal body and her perceptions of her actual body (Gruber, Pope, Lalonde & Hudson, 2001; Williamson, Gleaves, Watkins & Schlundt, 1993). To date, no studies have looked at the differences between women's perceptions of body ideals and body norms. In experiment 2, we found that the more dissatisfied a woman was with her body, the greater the difference in her perceptions of body ideals and body norms, with ideals smaller than norms. This suggests that it may not only be a woman's *actual* body size that creates body dissatisfaction, but her perceptions of body norms and ideals. Smaller body norms and ideals would result in a greater discrepancy between perceptions of a woman's own body size, and body norms and ideals, potentially causing dissatisfaction.

Social comparison theory suggests that women who are dissatisfied with their bodies engage in an upward comparison process whereby they compare themselves to thin women, and find themselves lacking (Cattarin, Thompson, Thomas, & William, 2000; Wheeler & Miyake, 1992). Through this process, it is possible that women who think a thin body is normal and ideal may end up comparing themselves to overly thin women, leading to an increase in body dissatisfaction.

Our findings suggest that vulnerable women's perceptions of body normality may need to be challenged, and they may need to learn skills to help them develop more realistic views of what normal and ideal bodies look like. Having a more realistic perception of what normal and ideal bodies look like would likely reduce the feelings of dissatisfaction associated with constant comparisons with overly thin bodies. More realistic perceptions of bodies may be created through manipulating women's visual exposure to bodies.

Our second set of findings demonstrate that even brief amounts of exposure to consistently thin or fat bodies significantly alters women's perceptions of body normality and body ideals. Our results extend the findings of Winkler and Rhodes (2005), by using more realistic images of bodies that varied in simulated BMI rather than simple image width. If such a small amount of exposure can change women's ideas of body normality and body ideals, then concerns about the effect of media bias to show thin women on body image and eating disorders seem well placed.

Effects of exposure on body ideals have also been demonstrated in cross-cultural research. Tovee, Swami, Furnham and Mangalparsad (2006) found that males and females from the UK considered a curvaceous body with a lower BMI to be most attractive compared to South African Zulus, who considered a higher BMI and a less curvaceous body to be most attractive. Most importantly however, they found that South African Zulus who had moved to the UK had attractiveness preferences that were in-line with the UK raters' preferences. These findings provide additional evidence that social norms are affected by experience. Our results also show that while everybody's perceptions of bodies are affected by experience, the degree to which they are affected may be moderated by individual differences in internalisation of ideals and in levels of body dissatisfaction.

We do not know how long the exposure effects observed in our studies last. Previous research with faces suggests that the effects of brief exposure are brief, but that their duration increases with increasing exposure (Rhodes, Jeffery, Clifford & Leopold, 2007). Therefore, if daily experience continuously 'tops up' exposure to certain body types (eg thin or fat), these effects may be quite durable and could potentially result in more realistic body norms and ideals. Therefore, our findings about the effects of exposure on women's perceptions of body norms and ideals may have important implications for the treatment of body dissatisfaction. Future research should examine the duration of these effects.

Our third set of findings revealed that the more dissatisfied a woman was with her body, and the more she internalised socio-cultural standards of beauty, the less her perceptions of body norms and ideals were affected by exposure to fat bodies. These findings may have important implications for clinical interventions for body dissatisfaction. If we can target dysfunctional beliefs about bodies and internalisation of Western ideals of beauty, then it may be possible to increase the effects of exposure to fat bodies, therefore creating more realistic perceptions of body norms and ideals.

The use of a university sample of restricted age range limits our ability to generalise the results to the wider population. Therefore, future studies should extend upon this research using a non-university sample with a greater age range. It would also be useful to replicate our finding using photographs of real bodies, varying in BMI. One of the advantages of using computer-generated images was that the bodies varied only on BMI. Given that fat and muscle can be distributed

in any number of ways over a body, real bodies of the same BMI may have quite different shapes. Nevertheless, replication with photographs of real bodies would be useful.

In conclusion, our results highlight potential mechanisms that may drive and maintain body dissatisfaction. They suggest that the constructs of body ideals and body norms are easily malleable, and that exposure to fat bodies may be a useful intervention for alleviating body dissatisfaction and distorted perceptions of bodies.

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CHAPTER 3: THE PERCEPTUAL EFFECTS OF EXPOSURE TO PHOTOGRAPHS OF FEMALE BODIES

3.1 Abstract

The purpose of the current experiment was to investigate whether brief amounts of exposure to photographs of thin and fat bodies significantly alters women's perceptions of body normality and body ideals. Additionally, we sought to investigate whether body dissatisfaction and the degree of internalisation to socio-cultural attitudes towards appearance are associated with perceptions of a thinner normal and ideal body. Women rated a large number of bodies, varying in BMI for how "normal" and "ideal" they looked. They were then briefly exposed to photographs of either thin or fat female bodies, and they re-rated the bodies. Greater levels of body dissatisfaction and internalisation of socio-cultural attitudes towards appearance were related to thinner ideal and normal bodies. Exposure to fat bodies significantly altered women's perceptions of body normality and body ideal, making them fatter. However, exposure to thin bodies did not significantly alter women's perceptions. The amount women's perceptions shifted was related to their initial pre-normality ratings, and indicated that the thin exposure bodies were not thin enough to create an exposure effect. These results indicate that exposure to photographs of women can alter women's perceptions of body norms and ideals, but the photographs must be thinner or fatter than women's initial perceptions of what a normal body looks like.

CHAPTER THREE: THE PERCEPTUAL EFFECTS OF EXPOSURE TO PHOTOGRAPHS OF FEMALE BODIES.

3.2 BACKGROUND

The mass media has been implicated as one of the major causes of body dissatisfaction and eating disorders amongst women and young girls (Dohnt, & Tiggemann, 2006; Posavac, Posavac & Posavac, 1998; Sinton & Birch, 2006). Studies have consistently shown that increased media consumption involving the thin Western idealised woman is associated with greater eating disorder symptomotology (Harrison & Cantor, 1997; Stice, Shupak-Neuberg, Shaw & Stein, 1994), and increased body dissatisfaction (Fallon & Hausenblas, 2005; Harrison & Cantor, 1997). Most studies looking at the effects of exposure to thin media images have taken measures of body dissatisfaction before making women read magazines depicting the thin ideal female (Hamilton, Mintz, & Kashubeck-West, 2007), watch music video clips (Bell, Lawton & Dittmar, 2007) or simply look at thin images presented in the media (Fallon & Hausenblas, 2005; Posavac et al, 1998). After the women have been exposed to these types of images, their levels of body dissatisfaction are re-assessed. These studies have consistently found that exposure to thin idealised images of women significantly increases women's levels of body dissatisfaction (Groesz, Levine & Murnen , 2002).

Although it has been shown that thin media images increase levels of body dissatisfaction amongst women, little is known about the perceptual effects of exposure to thin bodies. The perceptual effects of exposure to bodies may be another way that thin media images affects women and their levels of body dissatisfaction.

Glauert, Rhodes, Byrne, Fink and Grammer (2008a) (Chapter 2) adopted an adaptation paradigm in order to investigate whether it was possible, through exposure to thin and fat bodies, to alter women's perceptions of body normality and body ideals. In two experiments, women rated a large number of bodies for how normal and ideal they looked. They were then exposed to computer-generated images of either thin or fat bodies, and subsequently re-rated the bodies. Women's perceptions of body normality and body ideals were easily malleable by brief exposure to thin and fat computer-generated bodies. Specifically, when

exposed to fat bodies, what women considered normal and ideal in a body became fatter, and when exposed to thin bodies, what women considered normal and ideal became thinner. The studies also revealed that greater levels of body dissatisfaction and internalisation of societal standards of beauty, eg the thin ideal, were related to ratings of thinner bodies as most normal and ideal. The stimuli used as test and exposure bodies were computer-generated images. Therefore, it would be interesting to extend those studies with the use of photographs of real bodies for the exposure stimuli as this would provide greater ecological validity to the findings.

The motivation behind the current experiment, therefore, was to determine whether the effects found with exposure to computer-generated images also occur when photographs of real female bodies are used as the exposure stimuli. We made use of an existing database of photographs of female bodies (see Appendix B for more information on the bodies), and used the most extreme rated bodies from that database. One of the advantages of using these photographs was that they were all taken under exactly the same conditions, with the bodies in the same pose, and the BMI's for the bodies were known. The range of BMIs of the bodies available was not very large. Therefore we used the most extreme rated photographs. The most extreme photographs were used because we had predicted that the use of bodies with BMIs that were not extreme enough may result in a reduced exposure effect. Additionally, the photographs of females seen in the media are usually very thin, and we needed to use the thinnest possible bodies we had in order for our stimuli to be comparable to viewing the thin idealised images used in the media.

We expected that exposure to photographs of fat bodies would result in women's perceptions of body normality and body ideals becoming fatter, and that the reverse would be true after exposure to photographs of thin bodies. In addition, we expected that our results would replicate those reported by Glauert et al (2008a), and before exposure, increased levels of body dissatisfaction, and increased internalisation of societal standards of beauty would be related to thinner body norms and ideals, and a greater difference between perceptions of body norms and ideals, where ideal rated bodies are smaller than normal rated bodies.

3.3 METHOD

PARTICIPANTS

Sixty-four undergraduate females from the University of Western Australia participated in this study. Forty participated for course credit, and the remaining twenty-four were reimbursed $15 for their time. The mean age of participants was 18.3 years (SD = 1.0), with a range of 17 to 23 years.

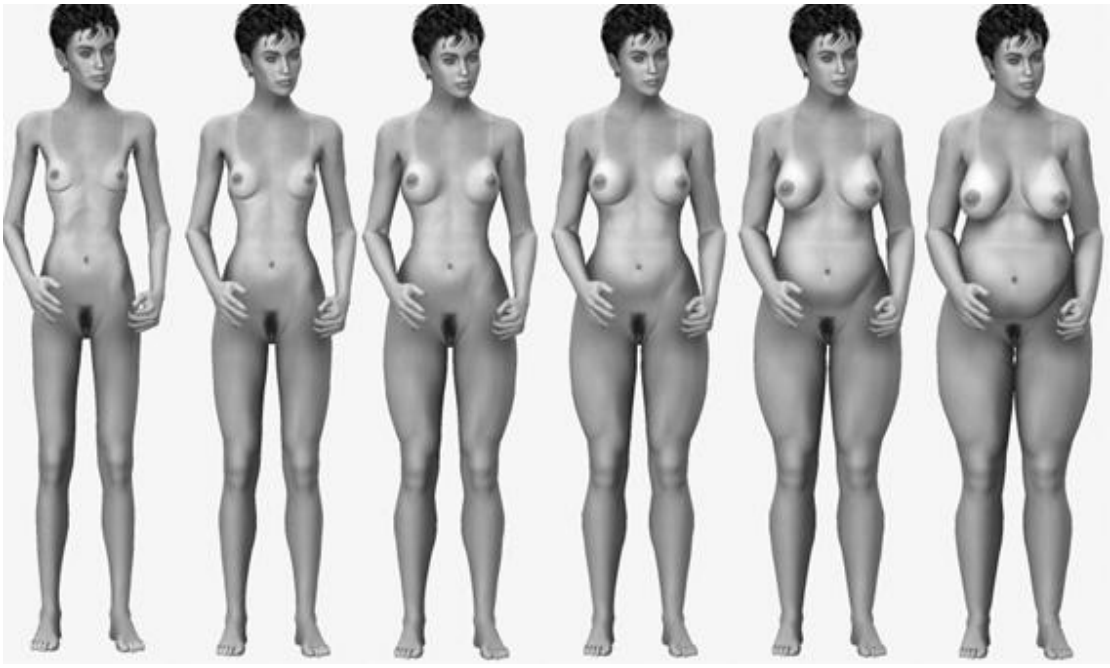
MEASURES

The Body Shape Questionnaire -34 (BSQ-34) (Cooper, Taylor, Cooper & Fairburn, 1987) was administered to all participants. The BSQ-34 is a 34 item self-report questionnaire assessing an individual's thoughts and feelings about their weight and shape. Scores on the BSQ range from 34 to 204, with larger scores indicating greater levels of body dissatisfaction. The BSQ reports high test-retest reliability and validity (Rosen, Jones, Ramirez, & Waxman, 1996). The internalisation-general subscale from the SATAQ-3 (Thompson, Van den berg, Roehrig, Guarda & Heinberg, 2004) was administered to all participants. This subscale contains 9 items which measure the extent to which women have internalised Western standards of beauty. The scores range from 9 to 45, with higher scores indicating greater internalisation of societal standards of beauty. Participant's height and weight were measured in order to obtain their BMI (measured by dividing weight(kg)/height^2(cm)).

STIMULI AND APPARATUS

Test Bodies

Fifteen front-facing computer generated images of female Caucasian bodies, ranging in simulated BMI from 13 to 27, were used as test figures (see Figure 1), this was the same range of bodies used in experiment 2 by Glauert et al (2007). The bodies were generated in Poser 4. For more detailed information on stimulus creation see Glauert, Rhodes, Fink and Grammer (2008b) (Chapter 4). The height of the images on the screen was 18cm. The stimuli were displayed on a Power Macintosh 720/120 computer with a 15-inch monitor using SuperLab Pro v1.75. Responses were made on a computer keyboard.



BMI 13 BMI 15 BMI 18 BMI 20 BMI 23 BMI 27

Figure 1. Example of some of the test bodies, this is not the entire set used.

Exposure Bodies

Ten colour photographs of female bodies, wearing fitting clothes, with arms and legs showing, were used as exposure bodies. The ratings from a pilot study, designed to find the ten most extreme rated bodies from a set of seventy-one (see Appendix B), we used to obtain the exposure stimuli. Five of the photographs were used as the "fat" exposure bodies, with a mean BMI of 26.3 (SD = 1.4), and five were used as the "thin" exposure bodies, with a mean BMI of 18.4 (SD = 0.3). The height of the images on the screen was 18cm. The most extreme bodies were used because the bodies from the available database did not have a huge range. The largest of the bodies was quite large (BMI of 28.4), while the smallest body only had a BMI of 18.2 which, when compared with the BMIs of models commonly used in the media, is not very small. Because of our restricted range, if we had used bodies that were equated on perceived extremeness, the exposure stimuli would not have been very extreme. See Figure 2 for examples of the exposure stimuli.

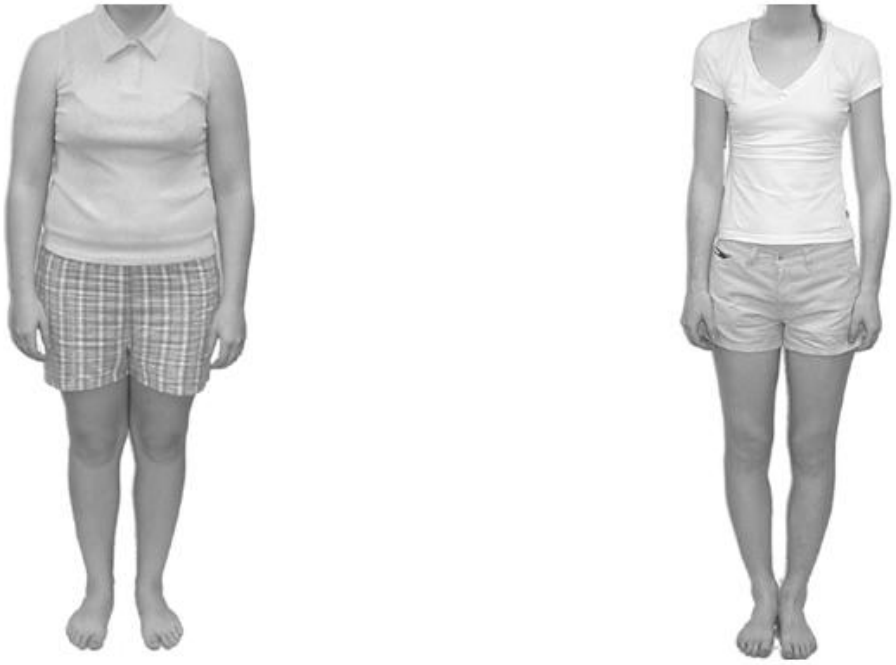


Figure 2. Example of a fat (left) and thin (right) exposure body.

PROCEDURE

Participants first completed the BSQ-34, the internalisation subscale, and their height and weight were measured. They were then randomly assigned to either a "thin" or "fat" condition in which they were exposed to thin or fat bodies. The order of rating type (normality or ideal) was counterbalanced across participants, with half of the participants rating normality first, and the other half rating ideals first. First, all participants rated a range of bodies, then they were exposed to either thin or fat bodies, and they subsequently re-rated the bodies.

Pre-exposure rating phase

The pre-exposure rating phase was conducted to obtain baseline normality and ideal ratings. All pre-ratings were done first, with the rating type (normality or ideal) done in blocks. There were two normality rating blocks and two ideal rating blocks. Thus, at the beginning of each block the participant was told that the subsequent bodies would have to be rated for either normality or ideal. Each block contained 75 bodies (five from each BMI) and trials were randomised for

each participant. Participants rated each body ten times, resulting in a total of 150 ratings for normality, and 150 ratings for ideal. Order was counterbalanced across participants. Body normality and ideal were rated on a nine-point scale (1= too thin, 5 = normal, 9 = too fat). Each trial began with a body presented for 1000 milliseconds. The question, "for a woman aged between 17 and 25, how normal did that body look to you?", or "how ideal did that body look to you" appeared on the screen along with the nine-point rating scale. Participants were required to make their responses using a keyboard. After a response was recorded, the next trial began.

Exposure phase

Following the pre-exposure phase, there was a one-minute period of exposure. The five exposure bodies were presented repeatedly, in a random order for 1000 milliseconds each, with a 200-ms inter-stimulus interval. The exposure bodies were presented fifty times, ten times each. Participants assigned to the "thin" condition saw the five "thin" exposure bodies, and participants assigned to the "fat" condition saw the five "fat" exposure bodies. Participants were instructed to pay close attention to the bodies presented.

Post-exposure phase

After the exposure phase, participants were required to rate the normality and ideals of the test bodies a second time. The procedure in the post-exposure phase was identical to that in the pre-exposure phase, except that prior to each test body, one of the exposure bodies was presented for six seconds to ensure that exposure was maintained throughout the post-test period. There was a 200 ms inter-stimulus interval between the presentation of the exposure image and the test image. The order of test images was randomised for each participant.

3.4 RESULTS

3.4.1 MEASURES

Means, standard deviations and ranges for participants' age, BMI, BSQ and internalisation scores are presented in Table 1.

Table 1. Means, standard deviations and ranges of participants' Age, BMI, BSQ and internalisation scores.

	N	Mean	SD	Range
Age	64	18.3	1.0	17-23
BMI	64	21.0	2.5	16.1- 28.2
BSQ	64	96.0	34.4	38-175
Internalisation	64	31.0	8.7	9 - 44

3.4.2 BODY NORMALITY

There were two dependent variables, the BMI rated as most normal before exposure, and the shift (in the expected direction) in BMI rated as most normal body after exposure (see Table 2). In order to measure the shift, each participant's mean pre- and post-exposure normality ratings for the bodies were plotted as a function of BMI. A second-order polynomial function ($y= ax^2 + bx + c$) was fitted to each curve (pre and post), and the BMI corresponding to where the y axis was crossed at 5 (most normal rating) was obtained graphically, and was used to calculate the shift in BMI's before and after exposure. For the thin condition, the shift score was calculated by subtracting the most normal rated BMI before exposure from the most normal rated BMI after exposure, and for the fat condition it was calculated by subtracting the most normal rated BMI after exposure from the most normal rated BMI before exposure. This resulted in absolute shift scores after exposure, in the expected direction (see Table 1). The R^2 fits of the polynomial functions to the data for both the pre and post ratings were excellent: Mean R^2 before exposure = 0.97 (SD = 0.02), with a range of 0.93 to 1.0, and mean R^2 after exposure = 0.97 (SD = 0.03), with a range from 0.86 to 1.0.

Pre-ratings

When controlling for BMI, BSQ-34 was significantly negatively related to women's ratings of the most normal body before exposure, $r(61)= -0.41$, $p < 0.01$ (zero-order correlation = $r(62) = -0.31$, $p < 0.02$). This finding is consistent with

the results reported by Glauert et al (2007), and supports the hypothesis that women who are more dissatisfied with their bodies have a thinner body "norm" than women who are less dissatisfied. BMI was controlled for because numerous studies have found a significant correlation between BMI and body dissatisfaction (Ackard, Croll & Kearny-Cook, 2002; Lunner, Werthem, Thompson, Paxton, McDonald & Halvaarson, 2000; Paxton, Wertheim, Gibbons, Szmukler, Hillier & Petrovich, 1991; Yates, Edman & Arugete, 2004), and we wanted to investigate body dissatisfaction, independent of BMI.

Shift after exposure

One-sample t-tests were conducted on the shift scores for each condition in order to test whether exposure significantly altered women's perceptions of what a normal body looks like. The mean shift in BMI in the fat (M= 0.45, SD= 0.9) exposure condition was significantly greater than zero, $t(31)= 2.82$, $p < .005$, (two-tailed) (effect size r = 0.45). However, the mean shift in BMI in the thin exposure condition (M = 0.01, SD = 0.64) was not significantly greater than zero, $t(31)= 0.08$, $p= .93$ (two-tailed) (effect size r = 0.01). These findings indicate that participant's perceptions of the most normal BMI were significantly increased after exposure to fat bodies, but were not significantly decreased after exposure to thin bodies.

An independent samples t-test was conducted to compare the absolute shift in BMI normality ratings after exposure, for the thin and fat exposure conditions (see Table 2). Exposure to fat bodies altered participants normality ratings significantly more than exposure to thin bodies $t(62) = 2.35$, $p < 0.03$ (two-tailed) (effect size r = 0.29). This is unsurprising, given the finding reported above that exposure to fat bodies significantly altered women's perceptions, but exposure to thin bodies did not.

In order to test whether these exposure effects were related to the BMIs rated as most normal before exposure, we correlated the pre-rated most normal BMI and the shift scores. Participants' initial most normal rated BMI were significantly negatively related to the amounts of shift after exposure to fat bodies, $r(32) = -0.39$, $p < 0.04$, and significantly positively related to the amounts of shift after exposure to thin bodies, $r(32) = 0.36$, $p < 0.05$. These results indicate that the

larger a woman's most normal rated body, before exposure, the less her perceptions of body normality shifted after exposure to the fat bodies, and conversely, the smaller a woman's most normal rated body (before exposure) the less her perceptions of body normality shifted after exposure to thin bodies. Therefore, the amount participants' perceptions shift after exposure is dependent upon their initial perceptions of body normality. The closer a woman's initial perception of what a normal body looks like is to the exposure bodies, the less extreme the exposure bodies would appear.

Inspection of the most normal rated body revealed it had a BMI of 18.4, and the mean BMI of the thin exposure bodies was also 18.4. This indicates that our failure to find a significant shift after exposure to thin bodies may simply have been due to the fact that women's initial perceptions of the most normal rated BMI were close to, or the same as, the BMI's of the exposure bodies, making the exposure bodies not thin or extreme enough to induce a perceptual change.

BSQ and the effects of exposure

When controlling for BMI, BSQ-34 scores were not significantly related to the shift after exposure to fat bodies, $r(29) = 0.33$, $p = 0.07$, or thin bodies, $r(29) = -0.28$, $p = 0.12$. Therefore, body dissatisfaction is not related to how much a woman's perceptions of body normality shift when exposed to thin or fat bodies.

BMI and the effects of exposure

Zero order correlations (see Table 3) indicate that a woman's own BMI is significantly negatively related to the amount of shift for fat bodies, $r(32) = -0.41$, $p < 0.03$. Therefore, the larger a woman's own body, the less likely it will be that her perceptions of body normality will be shifted by exposure to fat bodies.

Table 2. Means and standard deviations of BMIs rated as most normal and most ideal before and after exposure, and mean shifts, in the expected direction, in BMI rated as most normal and ideal after exposure to thin and fat bodies.

Rating Type	Exposure Condition	n	Before Exposure M	Before Exposure SD	After Exposure M	After Exposure SD	Shift M	Shift SD
Normality	Fat	32	18.6	1.6	19.0	1.5	0.4	0.9
	Thin	32	18.3	1.3	18.3	1.2	0.0	0.6
Ideal	Fat	32	18.0	1.5	18.4	1.6	0.3	0.8
	Thin	32	17.7	1.3	17.7	1.1	0.1	0.6

3.4.3 BODY IDEALS

The analyses for body ideals were the same as the analyses for body normality. There were two dependent variables, the BMI rated as most ideal before exposure, and the shift in the most ideal rated BMI following exposure (see Table 2). The method used to calculate the amount of shift in body ideals before and after exposure was the same as that used to calculate the shift in norms. The fits of the polynomial functions to the data for both the pre and post ratings were as excellent: mean of pre-exposure $R^2 = 0.97$ (SD = 0.02), with a range of 0.92 to 0.99; mean of post exposure $R^2 = 0.97$ (SD = 0.02), with a range of 0.89 to 0.99.

Pre-ratings

When controlling for BMI, body dissatisfaction was significantly negatively related to women's ratings of their ideal body, before exposure, $r(61) = -0.43$, $p < 0.001$ (zero-order correlation, $r(62) = -0.34$, $p < 0.007$). This finding supports the hypothesis that the more dissatisfied a woman is with her body, the smaller her ideal body will be.

Table 3. Zero-order correlations between participants' BMI and BSQ score, and the shift (in the expected direction) in the most normal and ideal rated BMI after exposure to thin and fat bodies.

		BSQ	Shift Norms	Shift Ideals
Fat	BMI	0.28 (p = 0.12)	-0.41* (p = 0.02)	0.02 (p = 0.92)
	BSQ		0.17 (p = 0.35)	0.20 (p = 0.28)
Thin	BMI	0.22 (p = 0.24)	0.08 (p = 0.67)	0.12 (p = 0.5)
	BSQ		-0.26 (p = 0.15)	-0.26 (p = 0.16)

* Significant at the 0.05 level

Shift after exposure

One-sample t-tests were conducted on the shift scores for each condition in order to test whether exposure had significantly altered women's perceptions of body ideals. The mean of the shift in BMI in the fat exposure condition (M= 0.34, SD= 0.77) was significantly greater than zero, $t(31)= 2.51$, $p < 0.02$, (two-tailed) (effect size r = 0.41). However, the mean of the shift in BMI in the thin exposure condition (M = 0.05, SD = 0.59) was not significantly greater than zero, $t(31)= 0.50$, $p = 0.62$ (two-tailed) (effect size r = 0.09). Brief amounts of exposure to fat bodies made women's most ideal rated body significantly fatter, but brief amounts of exposure to thin bodies did not make women's ideal bodies significantly thinner. An independent samples t-test was conducted to compare the absolute shift in BMI ideal ratings after exposure, for the thin and fat exposure conditions (see Table 2). There was no difference between the amount of shift after exposure to thin or fat bodies, $t(62) = 1.69$, $p = 0.10$ (two-tailed) (effect size r = 0.21).

In order to test whether these exposure effects were related to the BMIs rated as most ideal before exposure, we correlated the pre-rated most ideal BMI with the shift scores. Participants' most ideal rated body was significantly related to the amount of shift after exposure to thin bodies, $r(32) = 0.60$, $p < 0.002$, but not significantly related to the amount of shift after exposure to fat bodies, $r(32) = -0.11$, $p = 0.56$. Therefore, the larger a woman's most ideal rated body, the more her perceptions of body ideals will shift after viewing the thin exposure bodies.

BSQ-34 and the effects of exposure

Body dissatisfaction, when controlling for BMI, was not significantly correlated with the effects of exposure to fat bodies, $r(29) = 0.20$, $p = 0.28$ (zero-order correlation, $r(31) = 0.20$, $p = 0.28$), or thin bodies, $r(29) = -0.29$, $p = 0.11$ (zero-order correlation, $r(31) = -0.26$, $p = 0.16$). Therefore, body dissatisfaction is not related to the effects of exposure to thin or fat bodies.

3.4.4 Comparison between Body Norms and Body Ideals

A paired samples t-test was conducted on participants pre-rating scores for most normal and most ideal rated bodies. This was done to test the hypothesis that women's body ideals would be thinner than their body norms. It was found that the bodies rated as most ideal (M= 17.9, SD = 1.4) were indeed significantly smaller than the bodies rated most normal (M= 18.4, SD = 1.4), $t(63) = 6.60$, $p < 0.001$ (one-tailed) (effects size r = 0.64).

We also hypothesised that, in line with the findings reported in Experiment 2 by Glauert et al, (2008a), greater body dissatisfaction would be related to a greater discrepancy between a woman's body ideals and body norms. In order to investigate this relationship, a difference score was calculated whereby the BMI an individual rated as most ideal was subtracted from the BMI an individual rated as most normal. Thus, if an individual's ideal body were thinner than their most normal body, this would result in a positive value. A correlational analysis was then performed in order to investigate whether body dissatisfaction was indeed related to the difference between women's body norms and body ideals. When controlling for BMI, body dissatisfaction was not significantly correlated with the difference between ideals and norms, $r(61) = -0.03$, $p = 0.80$. This finding is in contrast to that found by Glauert et al (2008a) in Experiment 2.

3.4.5 Internalisation and perceptions of body normality and ideals

When controlling for BMI, internalisation of societal standards of appearance was significantly negatively related to the BMI rated most ideal, $r(61) = -0.40$, $p < 0.003$ (zero-order correlation $r(62) = -0.38$, $p < 0.01$), and the BMI rated most normal, $r(61) = -0.34$, $p < 0.009$ (zero-order correlation $r(62) = -0.32$, $p < 0.01$). These findings indicate that the more a woman internalises the Western ideal, and buys into socio-cultural values of beauty, the thinner her ideal and normal bodies will be. However, in contrast to the findings reported by Glauert et al (2008a), these scores were not significantly related to the difference between a woman's most normal and ideal rated bodies, $r\ (62) = 0.12$, $p = 0.41$.

3.4.6 Socio-cultural attitude scores and the effects of exposure

When controlling for BMI, the amount that women internalised societal standards of appearance was not significantly correlated with the effects of exposure to fat bodies when rating body ideals, $r(29) = 0.01$, $p = 0.98$, or when rating body norms, $r(29) = 0.03$, $p = 0.89$. There were also no significant correlations between internalisation scores and the effects of exposure to thin bodies when rating body ideals, $r(29) = -0.21$, $p = 0.26$, or body norms, $r(29) = 0.10$, $p = 0.59$. These findings indicate that the extent to which a woman internalises the Western ideal is not related to the effects of exposure to thin or fat bodies on ratings of either body ideals or body norms.

3.5 Discussion

The aims of the current experiment were to investigate whether women's perceptions of body ideals and body normality could be altered by exposure to photographs of thin and fat bodies. Additionally, we sought to investigate whether levels of body dissatisfaction and internalisation of societal standards of appearance were related to women's pre-conceptions of body ideals and body norms. We found that exposure to photographs of fat female bodies significantly altered women's perceptions of both body norms and body ideals, making them fatter. However, exposure to photographs of thin bodies did not have any significant effect on women's perceptions of body norms and body ideals. Further exploration revealed that the BMIs a woman rated as most normal and ideal, before exposure, were related to how much her perceptions of the most normal and ideal rated body changed, after exposure. In line with our predictions, we also

found that women's body dissatisfaction and internalisation of societal values of appearance were related to her perceptions of both a "normal" and ideal body, before any exposure. These findings will be discussed in turn.

Effects of exposure to thin and fat bodies

The main purpose of this experiment was to investigate whether the effects of exposure we saw when using artificially created bodies (Glauert et al, 2008a) could be extended to photographs of real bodies We expected that exposure to photographs of thin and fat bodies would alter women's perceptions of body ideals and body normality, in the direction of the exposure bodies. We found that exposure to photographs of fat bodies did indeed make women's most normal and ideal rated bodies fatter. However, exposure to photographs of thin bodies failed to make women's perceptions of body normality and body ideal significantly thinner.

It is possible that the thin exposure bodies were simply not extreme enough to create an exposure effect, and upon further exploration of the results, we found that initial perceptions of body normality (pre-ratings) were significantly related to the extent to which women's perceptions shifted after exposure. We found that the smaller a woman's most normal rated body, the less her perceptions of body normality and body ideal shifted after exposure to thin bodies. The mean BMI of the bodies used in the thin exposure condition was 18.4, which is the same as the mean most normal rated body for this experiment. The fat exposure bodies, however, had a mean of 26.3, which was substantially greater than the mean most normal rated body (BMI of 18.4). These results indicate that the closer a woman's initial most normal rated body was to the size of the exposure bodies, the less likely it was that her perceptions of body normality or body ideal would change. Indicating that the degree of shift, after exposure, is a function of, or is related to, initial perceptions of body normality. Therefore, it seems logical to infer then that our failure to find an exposure effect for thin bodes was not because photographs of thin bodies cannot alter women's perceptions of body normality and ideals, but because the bodies we used were not thin enough to induce a change in perception.

The thin and fat exposure bodies we used had been previously rated, in a pilot study, to be the most extreme from a pre-existing database. We used the

most extreme rated bodies because there was not a huge range of BMIs in that database. Even though the pictures of bodies available to us from the database had a restricted range, we chose them because they were all photographed under identical lighting conditions, in a standard pose, and we had the actual BMIs of the bodies. If we had used pictures of models from magazines and other media forms, while we may have succeeded in finding images of bodies that were small enough to induce perceptual changes, we would not have had their BMIs, and the conditions under which the photographs were taken would have varied greatly. Therefore, although it is unfortunate that our thin bodies were not extreme enough to induce a perceptual change in women's ratings of most normal and ideal bodies, we have still, based on the results of exposure to fat bodies, extended the findings from Glauert et al (2008a), and shown that photographs of women's bodies can alter women's perceptions of body normality and body ideal.

Future experiments should ensure that the thin and fat exposure bodies are sufficiently extreme to induce a perpetual change. Specifically, the exposure bodies should be significantly greater than the most normal rated bodies. An interesting extension of these studies would be to use images such as those used in the media, for which there is information available about the models' BMIs. It is expected that these photographs would be thin enough to alter women's perceptions of body norms and body ideals.

PRE-RATINGS

Our secondary aim was to replicate Glauert et al's (2008a) finding that body dissatisfaction and internalisation of socio-cultural values of appearance are related to smaller most normal and ideal rated bodies, before exposure. In line with Glauert et al (2008a), the more dissatisfied a woman was with her body, and the more she internalised Western standards of beauty, the smaller the BMI of her most normal and ideal rated bodies.

While previous studies have shown that body dissatisfaction is related to thinner ideal bodies (Williamson, Gleaves, Watkins, & Schlundt, 1993), none have shown that it is also related to perceptions of body norms that are thinner. This makes our finding an important and novel one. It is possible that thin body norms may create and maintain body dissatisfaction. Targeting perceptions of body norms as well as body ideals in intervention programs may be helpful in

reducing body dissatisfaction. If women are taught to have more realistic ideas about what constitutes a normal and ideal body, it may reduce their levels of dissatisfaction with their own bodies.

Discrepancy between normality and ideal ratings

In line with the findings of Glauert et al (2008a), we predicted that the BMI rated as most ideal would be significantly smaller than the BMI rated as most normal. Our findings support our predictions, suggesting that women may want their bodies to be thinner than a normal or average sized body. We also expected to replicate the finding from Experiment 2 in Glauert et al (2008a), that body dissatisfaction would be related to the discrepancy between the most ideal and most normal rated BMI. Surprisingly, our results did not support this prediction. We found no relationship between these variables. The BMI's of the most normal and ideal rated bodies in the current experiment and those reported by Glauert et al (2008a) are comparable, as are the mean and range of body dissatisfaction scores. Thus, our failure to replicate their findings cannot be attributed to differences in the most normal and ideal rated bodies between the two experiments, but suggest that the finding is not robust.

In conclusion, we have demonstrated that it is possible, through exposure to photographs of female bodies, to alter women's perceptions of body normality and body ideals. These findings indicate that the effects found by Glauert et al (2008a), using computer-generated images, do extend to more real life images, giving these studies real life applicability. These findings have important implications for the media, as they demonstrate that exposure to photographs of bodies that are very different from the conception a woman holds of what a "normal" sized body looks like, will very likely alter her perceptions of what a normal and ideal body looks like in the future. In addition, we have managed to replicate many of the results found by Glauert et al (2008a). The more dissatisfied a woman is with her body, and the more she internalises societal values of beauty, the smaller her most normal and ideal rated body. These findings have potential implications for intervention as they indicate that perceptions of bodies in general should be targeted in order to improve body satisfaction, not just perceptions of body ideals.

3.6 APPENDIX B

3.6.1 BACKGROUND

The purpose of this pilot study was to gather normality ratings from seventy-one photographs of female bodies. We did this to find the most extreme rated bodies (fat and thin) from an available dataset. The five fattest and five thinnest rated bodies were going to be used in a subsequent experiment.

3.6.2 METHOD

Participants

Nineteen female undergraduate students from the University of Western Australia participated in this study. Fifteen participants received course credit, and the remaining four were reimbursed $10 for their time. The mean age for all participants was 18.6 years (SD = 2.9) with a range of 17 to 30 years.

Stimuli

Seventy-one standardized colour photographs of female bodies, varying in BMI, front facing and wearing tight fitting clothes were obtained from a pre-existing database in our laboratory. The arms and legs of the bodies were exposed. The mean age of the female posers was 20.4 years (SD = 2.2 years), with an age range from 18 to 25.

Procedure

Participants were required to complete a simple computer-rating task. At the beginning of the experiment, participants were instructed that they would have to rate the bodies for "how normal they looked for a female aged between 17 and 25" on a seven-point rating scale, where "normal" was rated as 4, too thin as 1, and too fat as 7. Prior to any ratings, participants were shown all of the bodies that they were going to have to rate. Each body was presented for 1000 ms, and there was a 200 ms inter-stimulus interval. The purpose of this was to give participants a sense of the range of bodies that were going to be presented to them, in order for them to effectively use the whole range of the scale. After presentation of the bodies, participants were given 6 practice trials to rate the bodies, this was done to familiarise them with the process. Each body was presented for 1000 ms. The

rating scale then appeared on the screen, and participants rated the body. There was a 200 ms inter-stimulus interval before the next body appeared on the screen. Each body was rated three times. Presentation of bodies was randomised for each participant.

3.6.3 Results

Mean ratings for each body were calculated. The five bodies with the highest and lowest ratings were chosen as the adapting stimuli for Experiment 5. The mean rating for the thin bodies was 2.2 (SD = 0.3), and the mean rating for the fat bodies was 6.5 (SD = 0.2). The mean BMI of the five thin exposure bodies was 18.4 (SD = 0.3) with a range from 18.2 to 18.8, and the mean BMI of the five fat bodies was 26.3 (SD = 1.4), with a range from 24.9 to 28.4.

3.7 Acknowledgements

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CHAPTER 4: BODY DISSATISFACTION AND ATTENTIONAL BIAS TO THIN BODIES

4.1. ABSTRACT

Evidence for attentional biases to weight- and shape-related information in women with eating concerns is inconclusive. We investigated whether body dissatisfaction is associated with an attentional bias towards thin bodies using a modified dot probe task. In three studies we found that undergraduate females were faster to discriminate the direction of an arrow cue when it appeared in the location previously occupied by a thin than a fat body. This attentional bias towards thin bodies was found using extreme stimuli (thin and fat bodies) presented for 500 ms (Experiment 1), extreme stimuli presented for 150 ms (Experiment 2), and less extreme stimuli that were equated for perceived extremity, presented for 150 ms (Experiment 3). When the stimuli were equated on perceptual extremity, the more dissatisfied a woman was with her body, and the larger her own BMI, the less of an attentional bias she showed toward thin bodies. Our results indicate that women have an attentional bias to thin bodies, which appears to be automatic. Contrary to prediction, this bias was weaker in women with greater BMI and body dissatisfaction. This result offers no support for the view that selective attention to thin bodies is causally related to body dissatisfaction.

CHAPTER FOUR: BODY DISSATISFACTION AND ATTENTIONAL BIAS TO THIN BODIES.

4.2 BACKGROUND

Body dissatisfaction is defined as a, "negative subjective evaluation of one's physical body" (Stice & Shaw, 2002, pp 985), and is associated with decreased self esteem (Tiggemann, 1997), excessive dieting (Stice, Mazotti, Krebs, & Martin, 1998), and increased chance of development of eating disorders (Leon, Fulkerson, Perry, & Cudeck, 1993, Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999).

At the core of body dissatisfaction is a discrepancy between a person's ideal body, and their perceptions of their own body (Furnham & Greaves, 1994). Socio-cultural theory suggests that this discrepancy is a result of the pressure placed on women in Western societies to live up to an "ideal" that is unnatural and unattainable for most women (Spitzer, Henderson & Zivian, 1999). Unrealistic ideals may reflect media depictions of the "ideal" female, which have become increasingly slimmer over the past few decades (Sypeck, Gray, Etu, Ahrens, Mosimann & Wiseman, 2006). This decrease in body size has coincided with a significant increase in body dissatisfaction amongst women (Spitzer et al, 1999). Moreover, the presentation of ultra thin women in media formats has consistently been found to increase body dissatisfaction in women (Anderson, Huston, Schmitt, Linebarger, & Wright, 2001; Stice, Schupak-Neuberg, Shaw, & Stein, 1994).

Women who are dissatisfied with their bodies appear to engage in an upward comparison process whereby they compare themselves to thin women, and find themselves lacking (Cattarin, Thompson, Thomas, & William, 2000; Heinberg & Thompson, 1992; Schutz, Paxton & Wertheim, 2002; Wheeler & Miyake, 1992). Here we consider the possible role of visual attentional biases in this process. An important function of visual attention is to, "prioritize socially relevant objects" (Fox, 2005, pp 3). For women who are dissatisfied with their bodies, these would be thin bodies. We hypothesised, therefore, that body dissatisfaction would be associated with an attentional bias towards thin bodies in the visual environment. Perceptions of body ideals are influenced by visual

experience (Glauert, Rhodes, Byrne, Fink & Grammer, 2008; Tovée, Swami, Furnham & Mangalparsad, 2006), so any such attentional bias would result in thinner norms, thus contributing to body dissatisfaction.

No studies have investigated attentional biases to body size in women with body dissatisfaction, although several have examined biases to weight- and shape related information in women with eating disorders. These studies are relevant given that such women generally experience body dissatisfaction (Stice & Shaw, 2002). However, they have yielded mixed and inconclusive results.

Jansen, Nederkoorn and Mulkens (2005) used eye movement registration to investigate selective visual attention in women who were eating symptomatic and in control women. They found that women high on eating symptomotology demonstrate a tendency to focus more on the "beautiful" body parts of other women, and the "ugly" body parts of themselves, whereas the reverse was found for control women. These results suggest that women who are high on eating disorder symptoms may scan their environments and focus on beautiful bodies, rather than ugly bodies. They may then use these as a comparison to their own bodies, thus increasing dissatisfaction with themselves. It has been suggested that selective attention to appearance-related information might be a maintenance factor in eating disorders (Jansen et al., 2005). This may also be true for body dissatisfaction.

Several researchers have employed modified Stroop tasks (Stroop, 1935) to test whether women with eating pathology demonstrate selective attention toward weight- and shape-related information (Boon, Vogelzang & Jansen, 2000; Flynn & McNally, 1999; Jansen, Huygens & Tenney, 1998). In a typical Stroop task, participants are presented with words that have high or low importance to them. The words are displayed in various colours, and rather than read the word, participants are required to say aloud the colour of the text of the word. It is proposed that longer reaction times to name the colour of the words reflect enhanced processing of the meanings of the words.

Stroop studies have demonstrated that women high on eating disorder symptomotology show enhanced processing of negative weight-and shape-related words (Cooper, Anastasiades & Fairburn, 1992; Cooper & Fairburn, 1992; Fairburn, Cooper, Cooper, McKenna & Anastasiades, 1991; Flynn & McNally, 1999). However, they have several limitations. First, they use verbal stimuli.

Second, they have generally used only negatively valenced words, such as “fat”, “diet”, and “thighs”, and thus provide little information about selective attention to negative versus positive information. Finally, the Stroop task has been criticized because delayed colour naming of words could reflect avoidance, or suppression, rather than enhanced processing of the words’ meanings (MacLeod, Matthews & Tata, 1986).

A better test of biases in selective attention is the dot probe task (MacLeod et al, 1986). This task involves displaying two stimuli, simultaneously, one above the other, for a short period of time. The stimuli are then replaced by a probe that appears in the location of one of the stimuli. Participants have to respond to where the probe appeared. If participants had been attending to the location where the probe appeared, then their reaction times would be shorter than if they had been attending elsewhere.

Rieger, Schotte, Touyz, Beaumont, Griffiths and Russell (1998) have employed a modified dot probe task using positive words (e.g. those denoting a thin physique) and negative words (those denoting a large physique) with women with eating disorders and controls. They found that women with eating disorders demonstrate an attentional bias toward words denoting large physiques, and attention away from words denoting thin physiques. The opposite was found for women without eating disorders.

These results appear to conflict with those of Jansen et al. (2005). Whereas Rieger et al. (1998) found that eating symptomatic women attend to negative words denoting large physiques, Jansen et al (2005) found that similar women attend to beautiful body parts. There are numerous procedural differences between these studies (e.g., words versus body images; dot probe task versus eye movements), which make comparisons difficult. The most relevant condition to the present study is the viewing of other women’s bodies in Jansen et al. In that condition, women high on eating symptomotology showed a looking bias towards beautiful body information. This looking bias seems consistent with our hypothesis of an attentional bias towards thin bodies in body dissatisfied women.

Less consistent with our hypothesis are recent findings from Shafran and colleagues (Shafran, Lee, Cooper, Palmer and Fairburn, 2007). Using a dot probe task they found that women with eating disorders demonstrated an attentional bias toward negative eating-related and neutral weight-related pictorial stimuli, and

negative as well as neutral shape-related pictorial stimuli. They found no attentional bias towards positive weight-related stimuli (cf thin bodies).

These studies have yielded mixed results and none have directly examined attentional biases to thin and fat bodies in body dissatisfied women. Here we present three studies that investigate attentional biases toward body-related information in women who varied on levels of body dissatisfaction. The finding of a relationship between body dissatisfaction and increased attention toward thin bodies would identify a potential mechanism through which high levels of body dissatisfaction could be maintained.

We used a modified pictorial dot probe task to test the hypothesis that body dissatisfaction is associated with an attentional bias toward thin bodies. In this task pairs of computer-generated female bodies, one thin and one fat, appeared one above the other, followed by an arrow in the position previously occupied by one of the bodies. Participants had to indicate as quickly as possible whether the arrow was pointing left or right. If participants were attending to thin bodies, then their reaction times to probes in the location of the thin bodies should be faster than their reaction times to the probes in the location of fat bodies. The difference in reaction times to the two probe locations (fat – thin, normalized for overall speed) therefore provides a measure of attentional bias to thin bodies.

In Experiment 1, we used extreme stimuli (thin and fat bodies) presented for 500 ms. In Experiment 2, the exposure duration was reduced to 150 ms, to determine whether any attentional bias reflects automatic processing. In Experiment 3 we used bodies that were equated for perceived extremity, to ensure that any bias did not reflect a bias in the stimuli. Body dissatisfaction was measured using the Body Shape Questionnaire (BSQ-34) (Cooper, Taylor, Cooper & Fairburn, 1987).

4.3 EXPERIMENT 1

Using the modified dot-probe task, we tested whether women who were more dissatisfied with their bodies, as indicated by higher scores on the BSQ, would demonstrate a greater attentional bias toward thin bodies, than women who were less dissatisfied. We also measured participants' own BMIs. Numerous studies have found a correlation between BMI and body dissatisfaction (Ackard,

Croll & Kearny-Cook, 2002; Lunner, Werthem, Thompson, Paxton, McDonald & Halvaarson, 2000; Yates, Edman & Arugete, 2004) and we wanted to see whether any attentional bias associated with body dissatisfaction would be independent of BMI.

4.3.1 METHOD

Participants

Fifty female undergraduate psychology students participated for course credit. One participant was removed from the analysis because her age was more than 3 SD from the mean, leaving a total of 49 participants. Mean age was 20.2 years (SD = 4.1, range = 17-35). Mean BMI was 21.5 (SD = 2.8, range 17.9- 30.8) and Mean BSQ was 95.0 (SD= 32.4, range= 38-164).

Measures

The Body Shape Questionnaire (BSQ-34) (Cooper et al., 1987) is a 34-item questionnaire that focuses on an individual's thoughts and feelings about their weight and shape. Questions are scored on a six-point Likert scale ranging from 1 (never) to 6 (always). The BSQ-34 reports high test-retest reliability (0.88, $p < 0.001$) and validity (Rosen, Jones, Ramirez & Waxman, 1996). BSQ scores range from a minimum of 34 (indicating no body dissatisfaction) to a maximum of 204 (indicating severe body dissatisfaction). Rosen et al. (1996) have shown that the average score for university undergraduate females is 96.3 (SD = 32.8).

Stimuli and Apparatus

Two images of computer generated nude female bodies, one thin and one fat, were used in the current study (see Figure 1). These were created in 3ds max, using standard targets "emaciated" and "heavy" supplied with Victoria 2.0. Photorealistic textures were applied and the images rendered with global illumination using Poser 4. BMIs for the thin and fat bodies were estimated as 11.7 and 30.4, respectively, using the formula, BMI= volume*1.1/height^2 (i.e., one cubic cm of mesh was equal to 1.1 gram body mass). Volume was estimated using Metris (Metris Inc., Leuven, Belgium) and height was defined as 165 cm. Each body could occur in 3 different poses: front on (0º), facing 25˚ to the right

(25˚), and facing 45˚ to the right (45˚). The three poses were chosen so that participants would not get bored with the repeated exposure of a single pose. The images were 10.5 cm high and 3 cm wide on the screen. The stimuli were presented on a Power Macintosh computer 7200/120 with a 15-inch monitor using SuperLab Pro 1.75.

Figure 1. The thin and fat bodies used in experiments 1 and 2.

Procedure

Participants were tested individually. Each participant first completed the BSQ, and then commenced the experiment. Each trial began with three fixation crosses (1 x 1 cm) presented side by side in the middle of the screen. Participants were instructed to attend to the crosses. The crosses appeared for 1000 ms and were then replaced by the fat and thin bodies, presented one above the other in the middle of the screen (see Figure 1). On a given trial, both bodies were presented in the same pose (0°, 25° or 45°). The images remained on the screen for 500 ms, and were then replaced by a blank screen with an arrow on it. The arrow appeared in the position previously occupied by one of the bodies and was pointing either to the left or right of the screen and was 1cm in length. It remained on the screen

until the participant responded, using a keyboard, whether the arrow was pointing to the left or the right of the screen. The arrow appeared in the position of each body type on an equal number of trials. The direction of the arrow was also counterbalanced with body type to ensure that it appeared in each direction for each body type on an equal number of trials. Reaction times (in ms) were measured.

There were 6 trials for each position of the thin body (top or bottom), probe position, arrow direction (left or right), and body pose (0˚, 25˚, and 45˚), making a total of 144 trials. All trials were randomised for each participant.

4.3.2 Results and Discussion

Mean reaction times for probes in the thin or fat body positions were calculated for correct responses. Reaction times more than three standard deviations from the mean were removed (M = 2.2 per participant, SD = 0.9). A paired-samples t-test revealed that reaction times to probes in the location of the thin bodies (M= 413.0 ms, SD= 55.5 ms) were significantly faster than reaction times to probes in the location of the fat bodies (M= 448.4 ms, SD= 56.6 ms), $t(48) = 11.02$, $p < 0.001$. A paired-samples t-test on error rates showed no evidence for a speed-accuracy trade-off as error rates were also significantly lower for trials where the probe was in the position of the thin body (M = 1.5, SD = 1.7) than the fat body (M = 2.5, SD = 2.2), $t(48) = 3.38$, $p < 0.01$.

An attentional bias score was calculated for each participant by subtracting the mean reaction time for probes in the location of the thin body from the mean reaction time for probes in the location of the fat body and dividing it by the average of the two (normalizing for overall response times). Thus, if there was an attentional bias toward thin bodies, the score would be positive, and if there was an attentional bias toward fat bodies, the score would be negative. Contrary to what was predicted, there was no significant correlation between attentional bias scores and body dissatisfaction (BSQ scores), $r(47) = 0.09$, $p = 0.56$. BMI did not correlate with either BSQ or attentional bias (both r's < 0.20, p's > 0.16).

This study showed that women were faster to respond to probes located in the position of a thin body than a fat body. This attentional bias existed regardless of how dissatisfied women were with their bodies. It is possible that attention

towards thin bodies does not play a part in women's body dissatisfaction, but instead, is a normative feature of women's behaviour.

4.4 EXPERIMENT 2

In Experiment 2 we reduced exposure time of the bodies to 150 ms. Neither eye movements nor strategic control of attention is possible at such a short duration, so that any bias would indicate automatic attention towards thin bodies. We re-examined the hypothesis that women who are more dissatisfied with their bodies will display a greater attentional bias toward thin bodies. Participants also completed a measure of internalization of the thin ideal so that we could investigate whether internalization of the thin Western ideal would be related to greater attention to thin bodies

4.4.1 METHOD

Participants

Fifty female undergraduate students participated in this experiment for course credit. Mean age was 19.3 (SD = 3.0, range = 16-31), mean BMI was 20.9 (SD = 2.8, range = 16.5-26.9), and Mean BSQ was 82.2 (SD = 26.8, range = 35-150).

Measures

The internalisation-general subscale from the SATAQ-3 (Thompson, Van den Berg, Roehrig, Guarda & Heinberg, 2004) was administered to all participants. This subscale contains 9 items, which measure the extent to which women have internalised Western standards of beauty. The scores range from 9 to 45, with higher scores indicating greater internalisation of societal standards of beauty. The SATAQ-3 has excellent psychometric characteristics (Thompson et al, 2004).The BSQ (Cooper et al., 1987) was also used, as in the first experiment, and BMI was calculated.

Procedure

The procedure was exactly as in Experiment 1, except that the presentation time for the bodies was reduced from 500 ms to 150ms.

4.4.2 Results and Discussion

Mean reaction times when the probe was in either the thin or fat body position were calculated for correct responses, as in Experiment 1. Reaction times that were more than three standard deviations from the mean were removed (M = 2.3, per participant, SD = 1.2). A paired-samples t-test revealed that reaction times for probes in the location of thin bodies (M= 398.0 ms, SD= 58.8 ms) were significantly faster than reaction times for probes in the location of fat bodies (M= 436.6 ms, SD= 57.9 ms), $t(49) = 14.21$, $p < 0.001$. Once again we found no evidence for a speed-accuracy trade-off as a paired-samples t-test on the number of incorrect responses revealed no significant difference between probes in the position of the fat body (M = 2.46, SD = 1.93), or the thin body (M = 1.98, SD = 1.86), $t(49) = 1.81$, $p = 0.08$.

An attentional bias score was calculated in the same way as in Experiment 1. Contrary to predictions, no significant correlations emerged between attentional bias scores and either body dissatisfaction, $r(48) = -0.05$, $p = 0.74$, or internalisation of Western standards of beauty, $r(48) = 0.02$, $p = 0.89$. This time BMI correlated significantly with body dissatisfaction, $r(48) = 0.29$, $p < .05$, but not attentional bias scores, $r(48) = 0.07$, ns.

The results for this experiment corroborate those from Experiment 1, and suggest that women, regardless of body dissatisfaction or internalisation of Western standards of beauty, attend more to thin than fat bodies. Additionally, these results suggest that the attentional bias toward thin bodies occurs when eye movements are not possible, and at exposure durations that tap automatic attentional processes.

4.5 Experiment 3a

We wanted to rule out the possibility that the attentional bias observed in Experiments 1 and 2 resulted from the thin body being more perceptually extreme, and thus more salient, than the fat body. Therefore, the purpose of this experiment (3a) was to determine whether the stimuli used in Experiments 1 and 2 were perceived as equally extreme, and if not, to identify stimuli that were matched in perceptual extremity, which could be used to provide a fairer test for attentional biases.

4.5.1 METHOD

Participants

Sixty-four women participated in the study for course credit. Mean age was 20.5 (SD = 4.3, range = 17-35). Mean BSQ score was 97.4 (SD = 35.32, range = 42-163), and mean BMI was 21.3 (SD = 2.5, range = 17.9- 29.8).

Stimuli

Nineteen computer-generated bodies were created by interpolating (morphing) between the thin and fat bodies used in Experiments 1 and 2 using Poser 4. The estimated BMIs ranged from 11.7 to 30.4.

Procedure

The nineteen computer generated bodies were each presented ten times, giving a total of 190 rating trials. Each trial began with a body presented for 1000 milliseconds, followed by the question, "for a woman aged between 17 and 25 how normal did that body look?", along with a 9-point rating scale (1= too thin, 5 = normal, 9= too fat). Before any ratings were made participants were verbally briefed to explain that "normal" was the same as "average".The bodies were rated for that specific age range because the majority of participants fell between these two ages. Participants made their responses using the number keys on a keyboard. After a response was recorded, the next trial began. All bodies were presented in a random order.

4.5.2. RESULTS AND DISCUSSION

The mean normality ratings for each body were calculated. In order to determine whether the thin and fat stimuli used in Experiments 1 and 2 (BMI of 11.7 and 30.4) were rated as equally extreme, a "deviation from the norm" score was calculated. A nine point rating scale was used, with a score of 5 indicating the "most normal" body, 9 indicating "large" and 1 indicating "small". We derived the average normality rating, per individual, for the thin and fat bodies used in Experiments 1 and 2.. For the thin body (BMI 11.7), we subtracted that average rating from 5, and for the fat body (BMI 30.4), 5 was subtracted from the average rating. A paired-samples t-test was conducted on these deviation scores. It was found that the thin body was rated as significantly more extreme (Mean = 3.8, SD

= 0.28) than the fat body (Mean = 3.5, SD = 0.54), $t(63) = 4.46$, $p < 0.001$. This finding suggests that the stimuli used in experiments 1 and 2 were not perceived as equally extreme, and it may have been this asymmetry in the extremity of the stimuli that drove the attentional bias toward thin bodies.

In order to find stimuli that were matched on perceptual extremity, the mean normality ratings for each body were plotted as a function of BMI for each participant. A second order polynomial function ($y= ax^2 + bx + c$) was fitted to each curve, and the BMIs corresponding to the points at which the y-axis crossed 3 and 7 (based on an interval scale of normality ratings,1 to 9) were obtained graphically. These were averaged across participants to obtain the stimuli used for Experiment 3. The points three and seven represent points equally distant from the most normal rated body at point 5, thus giving us bodies which were rated as equally perceptually extreme. The BMI rated three on the rating scale was 15.1 (SD = 1.0), and the BMI rated seven on the rating scale was 24.0 (SD = 2.2). These two bodies were used as the stimuli in Experiment 3.

4.6 EXPERIMENT 3

In Experiment 3 we sought to rule out the possibility that the attentional bias observed in Experiments 1 and 2 resulted from the thin body being perceived as more extreme than the fat body. An analysis of perceived distortion ratings of the stimuli indicated that the thin body was indeed perceived to be more extreme than the fat body (See Experiment 3a for details). Therefore, in Experiment 3 we used thin and fat bodies that were equated on perceived extremity. These were also less extreme than those used previously (see Figure 2), so that we could further test the generality of any attentional bias towards thin bodies. Again, we examined whether there is any association between attentional bias toward thin bodies and either body dissatisfaction or internalization of the thin ideal.

Figure 2. The thin and fat bodies used in Experiment 3.

4.6.1 METHOD

Participants

Fifty female undergraduate students participated in the experiment for course credit. Mean age of the participants was 18.3 (SD = 1.1), with a range of 17 to 23 years. The mean BMI of participants was 21.0 (SD = 2.4, range = 16.1-28.2), and Mean BSQ was 95.1 (SD = 35.6, range = 35-150).

Measures

The BSQ-34 (Cooper et al., 1987) and the internalization-general subscale from the SATAQ-3 (Thompson et al., 2004) were administered to all participants, as in Experiment 2.

Stimuli

The stimuli were two computer-generated bodies that looked equally distorted, but in opposite directions, from the most normal rated body (See

Experiment 3a for details). They were also less extreme than the bodies used in Experiments 1 and 2, with estimated BMIs of 15.1 (cf 11.7) and 24.0 (cf 30.4), respectively (see Figure 2).

Procedure

The procedure was exactly the same as in Experiment 2, except that the target bodies were equated on perceptual saliency.

4.6.2 Results and Discussion

Mean reaction times to probes in the thin and fat body positions were calculated for correct responses, as in Experiments 1 and 2. Reaction times that were more than three standard deviations from the mean were removed (M = 1.9, SD = 1.0). A paired-samples t-test revealed that reaction times for probes in the location of the thin bodies (M= 400.6, SD= 43.8) were significantly faster than reaction times for probes in the location of the fat bodies (M= 436.1, SD= 49.0), $t(49) = 9.90$, $p < 0.001$. In line with the results of Experiments 1 and 2, we found no evidence of a speed accuracy trade-off with a paired-samples t-test on the number of incorrect trials showing a significantly larger number of incorrect trials when the probe was in the location of the fat bodies (M = 2.36, SD = 2.15) than the thin bodies (M = 1.28, SD = 1.73), $t(49) = 4.13$, $p < 0.001$.

An attentional bias score was calculated in the same way as Experiments 1 and 2. No significant correlation was found between the attentional bias scores and internalisation, $r(48) = -0.21$, $p = 0.89$. However, attentional bias was significantly negatively correlated with both body dissatisfaction, $r(48) = -0.30$, $p < 0.05$, and BMI, $r(48) = -0.32$, $p < 0.04$. The significant correlation between attentional bias and body dissatisfaction was eliminated when BMI was controlled for, $r(47) = -0.19$, $p = 0.20$, and the significant correlation between BMI and attentional bias was also eliminated when body dissatisfaction was controlled for, $r(47) = -0.22$, $p = 0.13$. These results reflect the strong correlation between BMI and BSQ, $r(48) = 0.43$, $p < .01$.

4.7 General Discussion

Our results indicate that women selectively attend to thin as opposed to fat bodies. This was found when using extreme stimuli presented for 500ms

(Experiment 1), extreme stimuli presented for 150 ms (Experiment 2), and less extreme stimuli that were equated on perceived extremity, presented for 150 ms (Experiment 3). The results obtained with very short exposure durations (Experiments 2 and 3) show that, even when there is not enough time to shift eye gaze, or to initiate strategic control of attention, women's attention is still drawn toward thin as opposed to fat bodies, suggesting that the attentional bias is automatic. Experiment 3 also showed that when the fat and thin bodies were equated for perceived extremity, providing the fairest test for any attentional bias, the bias toward thin bodies persisted. In this case we also found that as body dissatisfaction and BMI increased the attentional bias toward thin bodies decreased.

The attentional bias toward thin bodies, found in all three experiments, may reflect a general preference for thin bodies. Numerous studies have demonstrated that both men and women rate thinner bodies as more attractive than normal or overweight bodies (Fallon & Rozin, 1985; Rozin & Fallon, 1988; Puhl & Boland, 2001; Swami, Knight, Tovee, Davies & Furnham, 2007; Tovee, Reinhardt, Emery & Cornelissen, 1998; Wilson, Tripp, & Boland, 2005). Perhaps this general idealisation of thin bodies drives selective attention toward thin bodies.

In Experiments 1 and 2, the absence of any association between attention to thin bodies and body dissatisfaction cannot be attributed to a limited range of body satisfaction in our sample. BSQ-34 scores can range between 34 and 204, and the scores of our participants ranged between 35 and 164. Although 164 is below the maximum possible score, it nevertheless represents substantial body dissatisfaction. Rather, a lack of association may have been attributed to the use of extreme bodies, and the use of stimuli that were not perceptually equal, where the thin body captured participants' attention because it was perceived as more extreme than the fat body. Both of these factors could potentially have swamped small individual differences in attentional biases. In Experiment 3, when less extreme, perceptually equated stimuli were used, we found a negative association between body dissatisfaction and attention to thin bodies.

All the women in our studies showed an attentional bias towards thin bodies and women with greater body dissatisfaction were no exception. However, relative to less dissatisfied women they showed a reduced bias towards thin

bodies, contrary to our expectation. It is possible that this relative avoidance of thin bodies provides a mechanism to protect self esteem in more dissatisfied women. More generally, however, our results offer no support for the idea that an attentional bias towards thin bodies contributes to body dissatisfaction, because the women with the largest bias had the least dissatisfaction.

The attentional bias toward thin bodies found here is consistent with Jansen et al's (2005) finding that women with eating disorders demonstrate an attentional bias toward the beautiful body parts of other women's bodies. However, it contrasts with their finding that control women focused on the ugly body parts of other women.

Rieger et al. (1998) found that women with eating disorders demonstrate an attentional bias toward words denoting a large physique, and attention away from words denoting a thin physique. Similarly, Shafran et al (2007) found that women with eating disorders demonstrate an attentional bias toward negative (or neutral) shape-related pictorial stimuli. We found no such bias in women with body dissatisfaction. It is possible, that these women have different attentional biases from those with eating disorders. However, numerous procedural differences between these studies and ours make comparison difficult.

Most studies investigating attentional biases in women who are eating symptomatic have paired positive or negative words or images with neutral words, not with each other (e.g. Cooper et al., 1992; Cooper & Fairburn, 1992; Fairburn, Cooper, Cooper, McKenna & Anastasiades, 1991; Flynn & McNally, 1999; Rieger et al., 1998; Shafran et al., 2007). Our study paired positive (thin) and negative (fat) stimuli together to investigate whether women attend more to thin than fat bodies. This gives us an indication of what really captures women's attention, when faced with both types of bodies. Additionally, the use of pictorial stimuli, and whole bodies, as opposed to body parts, gives our study increased ecological validity.

We have demonstrated a general bias toward thin bodies, and a reduced attentional bias toward thin bodies in women with greater levels of body dissatisfaction. However, the use of a university sample of restricted age range limits our ability to generalise the results to the wider population. Therefore, future studies should investigate whether the results generalise to non-student populations, to women in non-Western countries, to older women and to men. It

would also be useful to replicate our findings using photographs of real bodies, and with less extreme BMIs to test the limits of attentional biases to thin bodies. Finally, it would be interesting to assess whether similar biases occur in looking behaviour, by monitoring eye movements.

In conclusion, we have shown that women display a general attentional bias toward thin bodies that persists when the stimuli are presented for different amounts of exposure time, and when the stimuli are more and less extreme. We have also shown that when the body stimuli are equated on perceptual extremity, the more dissatisfied a woman is with her body, and the larger her own BMI, the *less* she demonstrates an attentional bias toward thin bodies. These results are inconsistent with the notion that attentional biases toward thin bodies may be a causal or maintenance factor for body dissatisfaction.

4.8 Acknowledgements

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CHAPTER 5: NORMATIVE DATA FOR THE BODY SHAPE QUESTIONNAIRE FROM A LARGE AUSTRALIAN UNIVERSITY SAMPLE

5.1 ABSTRACT

Body dissatisfaction is a common problem for women around the world. It is so common it has been labelled a “normative discontent”. Research in the area of body dissatisfaction has reached an all time high, making normative data on commonly used samples very useful. The purpose of the current study was to gather normative data for the Body Shape Questionnaire-34 (Cooper, Taylor, Cooper & Fairburn, 1987) from an Australian university sample. One thousand and fifty two women aged between 16 and 30 completed the BSQ-34. We found a mean score of 94.4 (SD = 34.5) with a range of 34-203. Our scores are comparable with those found in an American undergraduate sample, and are significantly higher than those found in community, and undergraduate samples in the UK and Italy.

CHAPTER FIVE: NORMATIVE DATA FOR THE BODY SHAPE QUESTIONNAIRE FROM A LARGE AUSTRALIAN UNIVERSITY SAMPLE

5.2 BACKGROUND

Body dissatisfaction is a widespread concern for women in Western countries. In fact, it is so prevalent that it has even been labelled a "normative discontent" (Rodin, Silberstein & Striegel-Moore, 1985). Body dissatisfaction is often defined and measured as the discrepancy between a woman's perceptions of her own body, and her perceptions of her ideal body (Tiggemann & Ruutel, 2001; Tiggemann, Verri & Scaravaggi, 2005; Williamson, Gleaves, Watkins & Schlundt, 1993). Research interest in body dissatisfaction has increased due to its established links with low self-esteem, depression, and eating disorders (Abell & Richards, 1996; Gilbert & Meyer, 2005; Paxton, Neumark-Sztainer, Hannan, & Eisenberg, 2006; Stice, 2001; Stice & Shaw, 2004).

The pervasiveness of body dissatisfaction has naturally lead to an increase of research in this area. Numerous researchers use body dissatisfaction measures, such as the Body Shape Questionnaire-34 (Cooper, Taylor, Cooper & Fairburn, 1987), in order to get a quick measure of women's levels of body dissatisfaction. The BSQ is a 34-item self- report questionnaire that asks questions about a woman's subjective feelings toward her weight and shape. The BSQ has been used in numerous studies since its development (De Berardis et al, 2007; Evans & Dolan, 1993; Rosen, Jones, Ramirez and Waxman, 1996), and has high test-retest reliability (0.88) and concurrent validity with a number of other body image measures (Rosen et al, 1996).

The BSQ has been used to assess clinical and non-clinical populations in several countries. One study looking at British women with Bulimia and a non-clinical community sample reported that the Bulimic group has a significantly higher mean BSQ score (M = 136.9, SD = 22.5) than the non-clinical community sample (M =81.5, SD = 28.4) (Cooper et al, 1987). On another non-clinical sample of 342 British women, Evans and Dolan (1993) found a mean BSQ score of 85.1 (SD 35.1), and a range of 34 to 192. An Italian sample of undergraduate university females had a reported mean BSQ of 75.7 (SD = 35.5) (De Berardis, et

al, 2007), and an Italian sample of Bulimic and Anorexic patients had reported means of 132.81 (SD = 37.67) and 116.52 (SD = 42.7) respectively (Troisi, Di Lorenzo, Alcini, Croce Nanni, Di Pasquale & Siracusano, 2006). Similarly, Rosen, et al (1996) conducted a study of validity and reliability on the BSQ using American university undergraduates, university staff, and body image therapy subjects. They found that the body image therapy group scored significantly higher (M = 129.9, SD = 29.0) than the undergraduate students (M = 96.3, SD = 32.8), who in turn scored higher than university staff (M = 75.8, SD = 28.4).

More recently, a study comparing body image attitudes between Caucasian-Australian and Pakistani female university students found that the Australian sample displayed significantly higher levels of body dissatisfaction (mean BSQ score of 100.84, SD = 31.73) compared to the Pakistani Urdu-medium sample (mean BSQ of 59.1, SD = 22.81) and the Pakistani English-medium sample (mean BSQ of 68.62, SD = 26.02) (Mahmud & Crittenden, 2007).

As evidenced by the scores presented above, all of the clinical groups reported significantly higher BSQ scores than the non-clinical groups, indicating that the BSQ is a valid tool for assessing clinical and non-clinical levels of body dissatisfaction. Many researchers use university samples in their studies, as they are an easy population to obtain. Having normative data for a large Australian university sample will be useful as a comparative tool. Therefore, the aim of the current study was to gather normative scores on the BSQ-34 for a large Australian university sample. The size of this sample is much larger than any of the known previous studies that have used the BSQ. Normative data for this population can be used as a guide by fellow researchers, giving indications as to how dissatisfied individuals are, in relation to specific university populations, as well as enabling researchers to track changes in levels of body dissatisfaction, over time.

5.3 METHOD

PARTICIPANTS

One thousand and fifty-two female undergraduate students from the University of Western Australia volunteered to take part in this study. One thousand eight hundred and eight-five female first year Psychology students were

approached during a class session at the beginning of first semester, for four years running, to take part in this study. Fifty-six percent of students approached, completed the questionnaire. Assuming there were no biases in who completed the questionnaire, and based on details regarding the country of birth of the students, we can assume that approximately 72% of participants were born in Australia, 14% were born in Asian countries, 4% were born in the United Kingdom, 4% were born in African countries, and the remaining 6% were from other European countries. The mean age of participants who completed the questionnaire was 18.2 years (SD = 1.7) with a range from 16 to 30 years. A sub-sample of 184 women were approached either through first year psychology classes or they volunteered. These women participated in other experiments, and data concerning their BMI and BSQ were obtained. The mean age of this sub-sample was 19.1 (SD = 2.7), with a range of 16 to 31 years.

MEASURES

The Body Shape Questionnaire -34 (BSQ) (Cooper et al, 1987) was administered to all participants. The BSQ-34 is a 34 item self-report questionnaire that assesses an individual's thoughts and feelings about their weight and shape for the previous four weeks. Responses are recorded on a 6 point likert scale, ranging from 1= never, to 6 = always. The possible range of scores on the BSQ is 34 to 204. The BSQ reports high test-retest reliability and validity (Rosen et al, 1996). Height and weight were measured for the sub-set of women, and their BMIs were calculated.

PROCEDURE

Over a period of 4 years, female students from the University of Western Australia were given the opportunity to complete the BSQ-34 (Cooper et al, 1987) in a class setting. All participants' responses remained anonymous and were collected at the end of the class session. The age of each participant was recorded.

5.4 RESULTS

Questionnaire data, along with participants' ages were collected from 1052 women. Mean BSQ scores were calculated. The average BSQ score across all participants was 94.5 (SD = 34.5) with a range of 34-203. The median score was 91, and the mode was 70. See Figure 1 for the frequencies of BSQ scores.

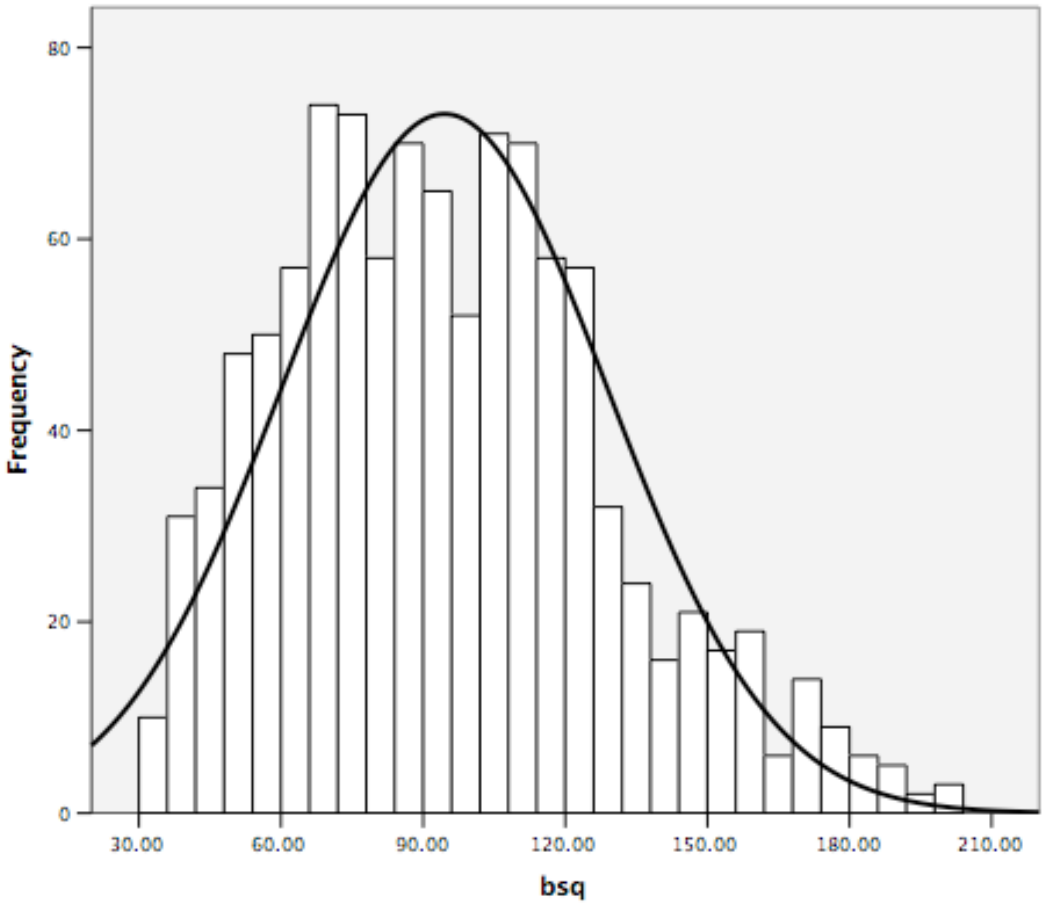

Figure 1. Frequencies of BSQ scores In order to determine whether our scores are comparable to those reported from other countries and populations, independent samples t-tests were conducted. There were no differences between the scores from American undergraduates (Rosen et al, 1996) and our sample, $t(1213) = 0.62$, $p = 0.53$ (effect size r = 0.03). Our scores were significantly lower than those reported by Mahmud & Crittenden (2007) on an Australian undergraduate university sample $t(1199) = 2.12$, $p < 0.05$ (effect size r = 0.09). Cooper at al's (1987) community sample in Britain reported significantly lower scores than our sample, $t(1585) = 7.52$, $p < 0.001$ (effect size r = 0.2), as did Evans and Dolan's (1993) community sample in Britain, $t(1392) = 4.36$, $p < 0.001$ (effect size r = 0.13). Italian undergraduate females (De Berardis et al, 2007) had scores that were significantly lower than ours, $t(1338) = 8.14$, $p < 0.001$ (effect size r = 0.26). Comparisons between our results and the results from clinical populations show that the clinical groups have significantly higher means than our undergraduate sample. For example, bulimic patients tested by Cooper et al, (1987), $t(1088) = 7.52$, $p < 0.001$ (effect size r =0.59) , and anorexic and bulimic

patients tested by Trosi et al, (2006), $t(1081) = 3.48$, $p < 0.05$ (effect size r = 0.27), and $t(1115) = 8.64$, $p < 0.001$ (effect size r = 0.47), respectively. In our sample, one hundred and forty five participants (13.8% of the sample) had a mean BSQ score above 130 (around the mean for clinical populations as stipulated by Cooper et al, (1987); Rosen et al, (1996), and Troisi et al, (2006). This sub population had a mean of 155.48 (SD = 17.49).

Based on the results obtained from our sample of 184 women that we had BMI data for, we found a mean BSQ score of 92.7 (SD = 33.6). The mean BMI of those participants was 21.0 (SD = 2.5). Correlational analyses revealed that BSQ was significantly correlated with BMI, $r(183) = 0.27$, $p < 0.001$.

5.5 DISCUSSION

The aim of the current study was to gather normative data for the BSQ on a large Australian university sample. We found an average BSQ score of 94.5, with a standard deviation of 34.5. Our scores are in line with those found by Rosen et al (1996) on American undergraduates (M = 96.3, SD = 32.8), and they are lower than those found by Mahmud and Crittenden (2007) on a smaller sample of Australian undergraduates (M = 100.84, SD = 31.73). It must be noted however, that the effect size for the comparison with Mahmud & Crittenden (2007) was very small, indicating a real but small difference. This difference may be accounted for by the fact that our sample includes approximately 14% Asian and 4% African participants. Studies have shown that non-white females display lower levels of body dissatisfaction than white females (Wildes & Emery, 2001), so this needs to be taken into account when examining our scores. However, given that Australia is a largely multicultural society, it seems important to include participants from diverse backgrounds, as a true reflection of the undergraduate Australian population.

Our scores are significantly higher than those reported on community samples in Britain (M = 81.5, SD = 28.4) (Cooper at al, 1987), (M = 85.1, SD = 35.1) (Evans & Dolan, 1993). They are also significantly higher than those reported from an Italian undergraduate sample (M = 75.7, SD = 35.5) (De Berardis, et al, 2007). The mean scores from our sample were also significantly lower than the mean scores of clinical populations reported by Cooper at al, 1987, Rosen et al, 1996, and Troisi et al, 2006. Based on the mean scores from the

studies using clinical populations, we would suggest that approximately 14% of our undergraduate sample had body dissatisfaction levels at, or close to, a clinical level.

Our sub-sample of 184 women, for which BMIs were available, revealed a significant correlation between BSQ scores and BMI. As a woman's body mass increases, so does her level of dissatisfaction with her body. This result is consistent with those from other studies (Ackard, Croll & Kearny-Cook, 2002; Lunner, Werthem, Thompson, Paxton, McDonald & Halvaarson, 2000; Yates, Edman & Arugete, 2004).

Our study uses a much larger sample than all of those reported above, and will therefore be useful as a comparative tool. In addition, the statistics provided by Cooper et al (1987) and Evans and Dolan (1993) may be somewhat out of date. As noted above, body dissatisfaction is becoming more and more prevalent, so statistics that are more than 10 years old may not accurately reflect the current state of affairs. It would be useful for researchers to gather more recent normative data for the BSQ on a number of large samples from countries around the world; these could be used to compare current levels of body dissatisfaction across populations, and to monitor any changes over time. Our statistics support the fact that body dissatisfaction is in fact, a 'normative discontent" amongst young women.

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CHAPTER 6: GENERAL DISCUSSION

CHAPTER 6: GENERAL DISCUSSION

6.1 EXPOSURE TO THIN AND FAT BODIES

The first aim of this thesis was to investigate whether exposure to computer generated images and photographs of thin and fat bodies alters women's perceptions of what looks normal and ideal in a body. Chapters 2 and 3 described three exposure studies which addressed this question. The first study had female participants complete the BSQ-34, and they were then assigned to either a "thin" or "fat" exposure condition. Participants were presented with 190 computer-generated bodies, ranging in BMI from 12 to 30, which they rated for how "normal" they looked. They were then exposed to either thin or fat bodies, and they re-rated the range of bodies. I found that exposure to both thin and fat bodies altered women's perceptions of body normality and body ideals. Specifically, exposure to thin bodies made the body women rated as most normal smaller, and the opposite was true after exposure to fat bodies. In addition, I found that exposure to thin bodies altered women's perceptions of body normality significantly more than exposure to the fat bodies.

Experiment 2 described an extension of experiment 1. Due to the fact that the thin exposure body was more extreme than the fat exposure body in experiment 1, the second experiment used exposure stimuli that were equated on perceptual extremity. In addition to measuring levels of body dissatisfaction, participants also completed a measure of their internalisation of societal values towards beauty. Participants were also required to rate the computer-generated test bodies for how ideal they looked, as well as how normal they looked. In line with the results from experiment 1, I found that exposure to both thin and fat bodies significantly altered women's perceptions of body normality, as well as body ideals. However, once the perceptual extremity of the fat and thin exposure stimuli was equated, I found that there was no difference in the effects of exposure to either body type, confirming that I had managed to equate the stimuli effectively.

One of the main findings from these two studies was that brief amounts of exposure to thin and fat computer-generated bodies alters women's perceptions of what looks "normal" and "ideal" in a body. Winkler and Rhodes (2005) had previously found that exposure to bodies that had been stretched and shrunk

altered people's perceptions of body normality and body attractiveness. However, I have shown that in addition to altering perceptions of body norms, it is very easy to alter perceptions of body ideals. This is a significant finding. If women are susceptible to re-evaluation of 'normal' and 'ideal' body forms after exposure to laboratory-generated images, this would certainly indicate that such perceptions are influenced by exposure to ultra-thin images from the various media sources in the everyday environment, the effects of which one would expect to be cumulative. One of the defining features of body dissatisfaction is having an ideal body that is slimmer than one's perceived own body (Dunkley, Wertheim & Paxton, 2001; Gardner & Boice, 2004; Williamson, Gleaves, Watkins & Schlundt, 1993). The fact that body ideals are so easily malleable highlights one way in which the media may cause women to be more dissatisfied with their own bodies.

Prototype theory states that we constantly update our prototypes, or "best examples" to match what we see (Dopkins & Gleason, 1997). I have shown in these studies that this is true for bodies. A diet of overly thin female bodies, as presented in the media, would bias a woman's body prototype, making it thinner than if she had a more varied diet of body types. The fact that body "norms" can also be made slimmer might be another way that media exposure can cause women to feel worse about their own bodies. Slim body norms could affect how a woman perceives her own body because not only will a woman's actual body not meet her ideal body standard, but it may not even meet her conception of what a "normal" body looks like. This feeling of discontent with one's body is a major factor which drives women to engage in dysfunctional, and often dangerous compensatory behaviours such as extreme dieting, excessive exercise, or purging (Stice, Mazotti, Kebs, & Martin, 1998; Stice & Shaw, 2002) Altering a woman's perceptions of body norms and body ideals may exacerbate this problem.

Chapter 3 described an extension of experiment 2 in which photographs of real bodies served as the exposure stimuli, instead of computer-generated images. I found that exposure to the fat photographs significantly altered women's perceptions of body normality and body ideals, making them fatter, but I found no effect for exposure to the thin bodies. I believe the lack of an effect for exposure to thin bodies was simply because the thin exposure bodies were not extreme enough to induce a perceptual change. An examination of the pre-ratings women made for normal bodies (i.e. before exposure), revealed that the BMI rated as

most normal was very close to the BMIs of the bodies used as the thin exposure stimuli. Therefore, I conclude from this study that it is possible to alter women's perceptions of body normality and body ideals through exposure to photographs of real bodies, so long as the exposure stimuli differ from the bodies rated as most normal. Given that the images repeatedly shown in the media depict women who are ultra-thin, I would suggest that those images used in the media would be slim enough to induce a perceptual change. An interesting follow-up study would use examples of photographs used in the media as exposure stimuli, in order to see whether they are in fact slim enough to induce a perceptual effect. In conclusion, regarding the first aim, I have demonstrated that women's perceptions of body normality and body ideals are easily manipulated following (even brief) exposure to thin and fat images.

6.2 Relationship between body dissatisfaction, acceptance of societal standards of beauty and the effects of exposure

The second aim of this thesis was to investigate whether body dissatisfaction and awareness, acceptance and internalisation of Western standards of beauty influence the extent to which women's perceptions of body normality and body ideals are affected by exposure to thin and fat bodies. Experiment 1 in chapter 2 found no relationship between levels of body dissatisfaction and the effects of exposure to thin or fat bodies. The fact that the bodies serving as the exposure stimuli were not equated on perceptual extremity may account for this. Because the thin exposure body was more extreme than the fat exposure body, it may have "washed" out any effects with body dissatisfaction. When the exposure stimuli were equated in experiment 2, I found that the more dissatisfied a woman was with her body, and the more she accepted, was aware of, and internalised, Western standards of beauty, the less her perceptions of body normality and body ideal were affected by exposure to fat bodies, although there was no relationship between these variables and exposure to thin bodies. This is a very important finding because it suggests that a woman's perceptions of bodies will not be equally affected by exposure to thin and fat bodies, to create a balanced/realistic perception of an ideal and normal body. As mentioned previously, prototype theory suggests that our norm or average is made up of all of the exemplars we experience. If perceptions are less affected by fat bodies, then the norm will be

less affected by fat bodies, resisting any shift in that direction and biasing the norm toward a thinner body. This finding highlights one area that should be targeted during a comprehensive intervention approach. It is possible that the glorification of thin bodies, and the denigration of large bodies, somehow de-motivates women to attend to, and be influenced by, the fat bodies they see. Women who are less satisfied with their bodies, and more aware of societal standards of beauty are more likely to hold positive views for thin bodies, and negative views for fat bodies, which may in turn motivate and de-motivate attention to these types of bodies, respectively.

The study presented in chapter 3 failed to replicate these findings. The exposure stimuli used in the study in chapter 3 were not as extreme as those used in chapter two, and the resulting perceptual affects were quite reduced because of this. It may be that the perceptual effects were too small to correlate with the varying measure of body dissatisfaction and levels of adherence to societal concepts of beauty. Further studies are needed to establish whether or not the findings in chapter 2 are robust.

In conclusion, I have found that increased levels of body dissatisfaction and awareness and acceptance of societal standards of beauty may be related to a reduced effect of exposure to fat bodies on women's perceptions of body norms and body ideals. This resistance to shifting perceptions after viewing fat bodies may be a maintenance factor for body dissatisfaction due to its effect of biasing body perceptions toward thin bodies.

6.3 JUDGEMENTS OF BODY NORMS AND BODY IDEALS

The third aim of this thesis was to investigate whether body dissatisfaction and acceptance and awareness of societal standards of beauty were related to judgements of thinner bodies as most normal and ideal. In the three studies presented in chapters 2 and 3, I conclusively found that as women's levels of body dissatisfaction and their awareness, acceptance and internalisation of Western standards of beauty increased, the BMI they rated as most "normal" and ideal, before any exposure, decreased. This is a very important and novel finding, as it shows that not only do women who are unhappy with their bodies and who comply with Western standards of beauty, have slim body ideals for themselves,

they also have slim body norms. Further, the more dissatisfied they are, the slimmer these concepts are.

A number of studies have demonstrated that women who are more dissatisfied with their bodies have a smaller ideal body (Murray, Touyz & Beumont, 1996; Striegel-Moore, Silberstein & Rodin, 1986) but perceptions of body norms or averages have received little attention. The finding that increased body dissatisfaction is also linked with distorted perceptions for what looks normal or average in a body points to another potential mechanism for the maintenance of body dissatisfaction. If women with increased body dissatisfaction believe that the normal or average body is thinner than women without body dissatisfaction, then they would likely judge themselves less harshly if they compared their own bodies with a larger average or normal body, rather than a thinner one.

It is not known whether having a slimmer concept of body normality or ideal causes body dissatisfaction, or whether body dissatisfaction causes these concepts to be smaller. However, the discovery of these relationships is novel and important because they highlight the fact that body perceptions in general are distorted in individuals with body dissatisfaction.

Experiments 1 and 2 from chapter 2 also revealed that the more dissatisfied a woman was with her body, and the more she internalised, was aware of, and accepted Western standards of beauty, the greater the discrepancy between her perceptions of what was normal and ideal in a body. Specifically, as a woman become more dissatisfied with her body, her ideal rated body became increasingly smaller than her normal rated body. This, too, is a unique and important finding. It fits with the finding that the greater the difference between a woman's current and ideal body shape, the more dissatisfied she is with her own body (Dunkley, Wertheim & Paxton, 2001; Gardner & Boice, 2004). However, I have extended those findings, and shown that the greater the difference between a woman's perceived most normal body and her ideal body, the greater her levels of body dissatisfaction. In experiment 1 I used a control condition (coke bottles) to investigate whether body dissatisfaction was related to any general perceptual differences. I found no relationship between body dissatisfaction and the most normal rated coke bottle. This finding highlights the fact that perceptual

differences related to body dissatisfaction appear to not extend to objects beyond bodies, suggesting that it is body specific.

The study presented in chapter 3, however, failed to replicate those findings. It is not clear why, when the effect was so strong in chapter 2, that it was not replicated. The same bodies were used as stimuli, and the range of body dissatisfaction and acceptance and awareness of societal standards of beauty were also comparable. Thus this finding does not appear to be robust.

In conclusion, increased levels of body dissatisfaction and awareness and acceptance of societal standards of beauty are related to perceptions of thinner bodies as normal and ideal. These findings highlight mechanisms which may maintain body dissatisfaction, and also shed light on the fact that perceptions of bodies in general need to be targeted at an intervention level, in order for them to become more realistic.

6.4 Body dissatisfaction and attentional biases

The fourth aim of this thesis was to investigate whether body dissatisfaction was related to attentional biases toward thin female bodies. In three modified dot probe studies described in chapter 4, I found that all women, regardless of their levels of body dissatisfaction, demonstrate an attentional bias toward thin female bodies. This attentional bias was found when the bodies were extreme (BMI's of 11.7 and 30.4), and were presented for 500 ms and 150 ms, and also when the bodies were less extreme (BMI's of 15.1 and 24.0), were equated on perceptual extremity, and were presented for 150 ms. These results suggest that women display an automatic attentional bias to thin bodies. When the stimuli were presented for 150 ms, which gives women enough time to shift their attention, they showed a bias toward the thin bodies. When the exposure duration was shortened to 50 ms, which is not enough time to shift eye gaze, women still displayed a bias to attend to the thin bodies.

However, conclusions for the first two studies were difficult to make because the bodies had not been previously rated for how extreme they looked, and the bias may have reflected the fact that the thin bodies used as stimuli were simply more extreme than the fat bodies, therefore capturing more attention. An exploration of subsequent ratings of the stimuli used found that, when taking into consideration how "normal" the bodies looked for a female aged between 17 and

25, the thin body did in fact look more extreme than the fat body. With this in mind, the third study sought to remedy the differences in how perceptually extreme the stimuli were by using bodies that had been rated as equally distant, in opposite directions, from the most normal rated body. Once the stimuli were equated, I found that women still attended more to the thin than fat bodies presented, and that this bias appeared to be automatic. In addition, and contrary to predictions, I also found that, as body dissatisfaction and participants' own BMI increased, the attentional bias toward thin bodies decreased. This finding suggests that the larger a woman's own body, and the more dissatisfied she is with it, the less likely it will be that she attends to thin bodies. It is possible that women simply attend more to the bodies that are similar to their own, or that larger women, and women who are unhappy with their bodies, try to avoid attending to thinner bodies.

The finding that women attend more to thin than fat bodies in general is very interesting, and this may affect their perceptions of bodies in general. If women do selectively attend more to thin than fat bodies, then thin bodies may have a greater impact on their "body prototype" than fat bodies, causing them to view thinner bodies as more normal and common than fat bodies.

The more an individual attends to something, the more common and normal they will believe it is. The availability heuristic (Tversky & Kahneman, 1973) may help explain this phenomenon. People often estimate the likelihood of something based on how easily it comes to mind. If a person selectively attends to thin bodies, then when considering the types of bodies in the environment, it is likely that they will overestimate the likelihood of a slim body being normal, or common, in the environment. This bias may increase women's dissatisfaction with their bodies because it may lead them to believe that slim bodies are normal, and are everywhere. Therefore, if they themselves do not have a slim body, then they will become even further from normal than if they attended to a wider variety of bodies. This may be another mechanism in which attention to thin bodies affects body dissatisfaction.

In my studies, I only used one body, thus the results are limited. Using bodies that are closer to each other in terms of BMI, and a greater number of examples of bodies varying in BMI, as well as photographs of real bodies, may actually reveal more of a relationship with body dissatisfaction.

It is unknown why women attend more to thin than fat bodies, but it is likely that beliefs and opinions about bodies may drive this. The media commonly present thin bodies in a positive light, whilst fat bodies are often associated with negative attributes, such as being lazy or unattractive. Given that males, females, and even newborn babies, selectively attend to attractive female faces (Maner et al, 2003; Slater et al, 1998), perhaps people also prefer to pay attention to attractive female bodies, and things that have positive attributes, rather than those with negative attributes. Therefore, it may be women's attitudes that drive selective attention to thin bodies. Future studies should attempt to manipulate attitudes toward thin and fat bodies, and investigate whether these attitudes play a part in selective attention.

6.5 Normative data for the BSQ

The final aim of this thesis was to gather normative data for the Body Shape Questionnaire-34 (Cooper, Taylor, Cooper & Fairburn, 1987) from a large Australian university population. Chapter 6 reports data from 1052 females aged between 16 and 31. I found that Australian university students have an average BSQ score of 94.4 (SD = 34.5) with a range of 34-203. These scores are comparable with those found in an American undergraduate sample (Rosen, Jones, Ramirez & Waxman, 1996), and are significantly higher than those found in community and undergraduate samples in the UK (Cooper et al, 1987; Evans & Dolan, 1993) and Italy (De Berardis et al, 2007). These results indicated that levels of body dissatisfaction in undergraduate females in Australia are relatively high, and the mean scores suggest that body dissatisfaction may be normative amongst this sample. In a sub-sample of 184 women, for which BMIs were available, I also found that the higher a woman's BMI, the greater her levels of body dissatisfaction. This finding is in line with that by other researchers (Ackard, Croll & Kearny-Cook, 2002; Lunner, Werthem, Thompson, Paxton, McDonald & Halvaarson, 2000; Yates, Edman & Arugete, 2004).

6.6 General conclusions

In conclusion, this thesis has revealed a number of novel and important findings that suggest that that the processes of perception and attention to bodies may be important contributors to the development or maintenance of body

dissatisfaction. I have found that it is easy to alter women's perceptions of body normality and body ideals through exposure to computer generated images, and photographs, of thin and fat bodies. I also found that body dissatisfaction is related to a reduced effect of exposure to fat bodies on women's perceptions of body norms and body ideals, suggesting that women's body prototype, or norm, will be less updated by fat bodies, biasing their norm toward thin bodies. However, further replication of this finding is needed in order for it to be considered robust. I found that the more dissatisfied a woman is with her body, and the more she is aware of, accepts and internalises societal standards of beauty, the smaller the BMI she rates as most normal and most ideal. I found that all women, regardless of levels of body dissatisfaction, demonstrate an attentional bias toward thin bodies. However, once the stimuli are equated on perceptual extremity, as participants' own BMI, and levels of body dissatisfaction increase, the attentional bias toward thin bodies decreases. Finally, I found that female Australian university students have higher levels of body dissatisfaction than similar samples in the UK and Italy.

6.7 IMPLICATIONS FOR TREATMENT

Intervention programs aimed at reducing body dissatisfaction in individuals often focus on cognitive behavioural techniques to encourage those suffering from negative body image to become aware of and challenge their dysfunctional body beliefs, appearance assumptions, negative internal dialogues, and the over importance they place on being thin (Cash, 1991; Cash & Lavalle, 1997; Grant & Cash, 1995; Rosen, Saltzberg & Srebnik, 1989). In addition, these therapies also involve exposure and body estimation techniques, which encourage clients to estimate their body sizes more realistically. The findings from this thesis suggest that perceptions of bodies in general, not just perceptions of one's own body, should be targeted at an intervention level. Women who are overly concerned with their bodies demonstrate that they have distorted perceptions for what looks 'normal' in a body, as well as what looks ideal. Distorted perceptions of bodies in general may increase body dissatisfaction. Therefore, they too should be targeted. The findings from the current thesis also indicate that the more dissatisfied a woman is with her body, the less likely her perceptions of body ideals and body norms will be shifted by exposure to fat bodies. What drives this

reduced effect of exposure has not been investigated. However, it is possible that negative attitudes towards larger bodies somehow de-motivate women to shift their perceptions. Current intervention programs will possibly help with this as they target negative attitudes towards bodies, and the over-glorification of thinness. An interesting future study would be to investigate the perceptual effects of exposure to bodies both before and after participants attend a treatment program.

6.8 Future research

The findings from the current thesis have opened up a plethora of possible future studies. The exposure studies presented in chapters 2 and 3 could be followed up by using photographs of real bodies as the test and exposure stimuli. Additionally, photographs of models seen in the media should be used as the exposure stimuli in order to ascertain whether they are thin enough to induce perceptual changes. Investigations into the duration of the perceptual effects found in these studies would clarify any cumulative aspect. The attentional bias studies presented in chapter 4 could be followed up on by using bodies that are closer together in terms of their BMI. This may reveal slight differences in attentional biases for women with and without body dissatisfaction. Furthermore, using photographs of a wider range of bodies, varying on BMI, would add to the ecological validity of these studies. And finally, collecting longitudinal data on the levels of body dissatisfaction in Australia and other countries would be very useful in tracking changes in body dissatisfaction over time.

6.9 REFERENCES

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