

Body Dissatisfaction and Attentional Bias to Thin Bodies

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ABSTRACT

Objective: Evidence for attentional biases to weight- and shape-related information in women with eating concerns is inconclusive.

Method: We investigated whether body dissatisfaction is associated with an attentional bias toward thin bodies using a modified dot probe task.

Results: 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 toward 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.

Discussion: 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. © 2009 by Wiley Periodicals, Inc.

Keywords: attentional bias; body dissatisfaction; social comparison; socio-cultural attitudes; dot probe

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Introduction

Body dissatisfaction is defined as a, “negative subjective evaluation of one’s physical body,”¹ and is associated with decreased self esteem,² excessive dieting,³ and increased chance of development of eating disorders.^{4,5}

At the core of body dissatisfaction is a discrepancy between a person’s ideal body, and their perceptions of their own body.⁶ Socio-cultural theory attributes this discrepancy to pressure placed on women in Western societies to live up to an “ideal” that is unnatural and unattainable for most women.⁷ Unrealistic ideals may reflect media depictions of the “ideal” female, which have

become increasingly slimmer over the past few decades.⁸ This decrease in body size has coincided with a significant increase in body dissatisfaction among women.⁷ Moreover, viewing ultra thin women in media formats increases body dissatisfaction in women.^{9,10}

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.^{11–14} 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.”¹⁵ For women who are dissatisfied with their bodies, these would be thin bodies. We hypothesized, therefore, that body dissatisfaction would be associated with an attentional bias toward thin bodies in the visual environment. Perceptions of body ideals are influenced by visual experience,^{16,17} 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.¹ However, they have yielded mixed and inconclusive results.

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Jansen et al.¹⁸ 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 symptomatology 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.¹⁸ This may also be true for body dissatisfaction.

Stroop¹⁹ studies have demonstrated that women high on eating disorder symptomatology show enhanced processing of negative weight- and shape-related words.^{20–23} 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 Stroop¹⁹ task has been criticized because delayed color naming of words could reflect avoidance, or suppression, rather than enhanced processing of the words’ meanings.²⁴

A better test of biases in selective attention is the dot probe task.²⁴ In this task, two stimuli are displayed simultaneously, one above the other, for a short period. They are then replaced by a probe that appears in the location of one of the stimuli, about which participants have to make some decision. If participants were attending to the location where the probe appeared, then their reaction times would be shorter than if they had been attending elsewhere.

Rieger et al.²⁵ 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.¹⁸ Although Rieger et al.²⁵ found that eating symptomatic women attend to negative words denoting large physiques, Jansen et al.¹⁸ 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 this study is the viewing of other women’s bodies in Jansen et al.¹⁸ In that condition, women high on eating symptomatology showed a looking bias toward beautiful body information. This looking bias seems consistent with our hypothesis of an attentional bias toward thin bodies in body dissatisfied women.

Less consistent with our hypothesis are recent findings from Shafran et al.²⁶ 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 toward 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.

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-34, would demonstrate a greater attentional bias toward thin bodies, than women who were less dissatisfied. We also measured participant BMIs, which may be related to body dissatisfaction,^{27–29} and we wanted to see whether any attentional bias associated with body dissatisfaction would be independent of BMI.

Method

Participants. Fifty female undergraduates participated for course credit. One participant was eliminated 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)³⁰ 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 (.88, $p < .001$) and validity.³¹ BSQ scores range from a minimum of 34 (indicating no body dissatisfaction) to a maximum of 204 (indicating severe body dissatisfaction). Rosen et al.³¹ have shown that the average score for university undergraduate females is 96.3 ($SD = 32.8$). Participant's height and weight were also measured in order to obtain their BMI (measured by dividing weight in kg/height² in cms).

Stimuli and Apparatus. Two images of computer generated nude female bodies, one thin and one fat, were used (see Fig. 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, $BMI = \text{volume} \times 1.1 / \text{height}^2$ (i.e., one cubic cm of mesh was equal to 1.1 g body mass). Volume was estimated using Metris (Metris, Leuven, Belgium), and height was defined as 165 cm. Each body could occur in three different poses: front on (0°), facing 25° to the right (25°), and facing 45° to the right (45°). Three poses were used 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 7,200/120 with a 15-inch monitor using SuperLab Pro 1.75.

Procedure. Participants were tested individually. Each participant first completed the BSQ, and had their BMI measured, they then commenced the

FIGURE 1. The thin and fat bodies used in experiments 1 and 2. [Color figure can be viewed in the online issue, which is available at www.interscience.wiley.com.]



experiment. Each trial began with three fixation crosses (1 cm × 1 cm) presented side by side in the middle of the screen. Participants were instructed to attend to the crosses. The crosses appeared for 1,000 ms and were then replaced by the fat and thin bodies, presented one above the other in the middle of the screen (see Fig. 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 a 1 cm long arrow on it. The arrow appeared

in the position previously occupied by one of the bodies and was pointing either left or right. It remained on the screen until the participant responded, using a keyboard, whether it was pointing left or right. There were six 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 randomized for each participant.

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), $t(48) = 11.02$, $p < .001$. 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 ($M = 2.5$, $SD = 2.2$), $t(48) = 3.38$, $p < .01$.

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), $r(47) = 0.09$, $p = .56$. BMI did not correlate with either BSQ or attentional bias (both r 's < 0.20 , p 's $> .16$).

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

Experiment 2

In Experiment 2, we reduced exposure time of the bodies to 150 ms. Neither eye movements nor stra-

tegic control of attention is possible at such a short duration, so that any bias would indicate automatic attention toward 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 this is related to greater attention to thin bodies.

Method

Participants. Fifty female undergraduate students participated in this experiment for course credit. None had participated in Experiment 1. 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 internalization-general subscale from the SATAQ-3³² was administered. This subscale contains nine items, which measure the extent to which women have internalized Western standards of beauty. The scores range from 9 to 45, with higher scores indicating greater internalization of societal standards of beauty. The SATAQ-3 has excellent psychometric characteristics.³² The BSQ-34³⁰ 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 to 150 ms.

Results and Discussion

Mean reaction times 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), $t(49) = 14.21$, $p < .001$. 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 ($M = 1.98$, $SD = 1.86$), $t(49) = 1.81$, $p = .08$.

An attentional bias score was calculated as in Experiment 1. Contrary to predictions, no significant correlations emerged between attentional bias scores and either body dissatisfaction, $r(48) = -0.05$, $p = .74$, or internalization of Western standards of beauty, $r(48) = 0.02$, $p = .89$. 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 internalization 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.

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. A follow-up analysis of perceived distortion ratings (see Method below) indicated that the thin body was perceived to be more extreme than the fat body. 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 Fig. 2), so that we could further test the generality of any attentional bias toward 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.

Method

Participants. Fifty female undergraduates participated for course credit. Mean age was 18.3 (SD = 1.1), with a range of 17 to 23 years. None had participated in Experiments 1 or 2. Mean BMI 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-34³⁰ and the internalization-general subscale from the SATAQ-3³² were administered to all participants, as in Experiment 2.

Stimuli. BMIs of 15.1 and 24.0 were used as stimuli (see Fig. 2). These were equally perceptually extreme, as determined by ratings from 64 female undergraduates (mean age = 20.5, SD = 4.3, range = 17–35, mean BSQ score = 97.4, SD = 35.32, range = 42–163, and mean BMI = 21.3, SD = 2.5, range = 17.9–29.8). They rated 19 computer-generated bodies, created by interpolating (using Poser 4) between the thin and fat bodies used in Experiments 1 and 2. These bodies were rated for how

FIGURE 2. The thin and fat bodies used in Experiment 3. [Color figure can be viewed in the online issue, which is available at www.interscience.wiley.com.]



“normal” they looked for a woman aged between 17 and 25 (1, too thin; 5, normal; 9, too fat). Each participant’s ratings were plotted as a function of BMI, and a second order polynomial function ($y = ax^2 + bx + c$) was fitted to the resulting curve. The BMIs corresponding to ratings of 3 and 7 (equally distant from the normal rating of 5, assuming an interval scale) were obtained graphically and averaged across participants to select the thin and fat stimuli used in this experiment (thin BMI, 15.1; fat BMI, 24.0), (see Fig. 2). These BMIs were also less extreme than those used in Experiments 1 and 2. Finally, we calculated the average deviation from a normal rating (absolute difference from 5) for the thin and fat bodies used in Experiments 1 and 2.

The thin body (BMI = 11.7) was rated as significantly more extreme ($M = 3.8$, $SD = 0.3$) than the fat body (BMI = 30.4) ($M = 3.5$, $SD = 0.5$), $t(63) = 4.46$, $p < .001$.

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

Results and Discussion

Mean reaction times 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 ($M = 436.1$, $SD = 49.0$), $t(49) = 9.90$, $p < .001$. 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 ($M = 1.28$, $SD = 1.73$), $t(49) = 4.13$, $p < .001$.

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 internalization, $r(48) = -0.21$, $p = .89$. However, attentional bias was significantly negatively correlated with both body dissatisfaction, $r(48) = -0.30$, $p < .05$, and BMI, $r(48) = -0.32$, $p < .04$. The significant correlation between attentional bias and body dissatisfaction was eliminated when BMI was controlled, $r(47) = -0.19$, $p = .20$, and the significant correlation between BMI and attentional bias was also eliminated when body dissatisfaction was controlled, $r(47) = -0.22$, $p = .13$. These results reflect the strong correlation between BMI and BSQ, $r(48) = 0.43$, $p < .01$.

Discussion

Our results indicate that women selectively attend to thin as opposed to fat bodies. This was found when using extreme stimuli presented for 500 ms (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.^{33–38} Perhaps, this general idealization 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-34³⁰ 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 because of the use of extreme bodies, and/or fat and thin bodies that were not perceived as equally extreme. 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 toward thin bodies, and women with greater body dissatisfaction were no exception. However, relative to less-dissatisfied women, they showed a reduced bias toward thin bodies, contrary to our expectation. This relative avoidance of thin bodies may provide 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 toward 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.¹⁸ 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.²⁵ 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.²⁶ 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.^{20–23,25,26} 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 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 may limit the generality of our results to the wider population. Future studies should investigate whether the results generalize to non-student populations, to non-Western women, 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 behavior, 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.

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