

THINK "THIN" AND FEEL BAD: THE ROLE OF APPEARANCE SCHEMA ACTIVATION, ATTENTION LEVEL, AND THIN-IDEAL INTERNALIZATION FOR YOUNG WOMEN'S RESPONSES TO ULTRA-THIN MEDIA IDEALS

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This study extends previous demonstrations that thin media models have a negative impact on young women's body image by examining *how* this effect occurs. In addition to thin-ideal internalization, shown to moderate this impact (Dittmar & Howard, 2004; Halliwell & Dittmar, 2004a), it investigates two further factors not previously explored together: first, the level of attention at which women process thin images and, second, appearance schema activation as an underlying process that mediates the exposure-anxiety link. Seventy-five women were exposed to either neutral advertisements (no models) or to thin models, at either low or high attention, manipulated by exposure time (10 s vs. 150 ms) and focus instructions. Thin models increase weight-related anxiety to the extent that women internalize the thin ideal, but anxiety is heightened further under conditions of high attention. These two effects are independent, and only the first is mediated fully by appearance schema activation. Research and intervention implications are discussed.

There is increasing concern about the negative impact of ultra-thin models commonly used in advertising on women's body satisfaction, as evidenced in the recent *Journal of Social and Clinical Psychology* special issue on body image (Vol. 23, No. 1, 2004). The body size of glamorous models is often more than 20% underweight (Spitzer, Henderson, & Zivian,

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1999)—exceeding a diagnostic criterion for anorexia nervosa of 15% underweight (DSM-IV-TR, American Psychiatric Association, 2000)—while the average weight of women has increased (Grogan, 1998). This widening gap between larger actual body sizes and the cultural obsession with an ultra-thin body size has been blamed for women's "normative" experience of body dissatisfaction, and it is this gap which is made salient to women every time they are exposed to thin ideals in the media. Yet, in contrast to the numerous demonstrations *that* exposure to ultra-thin media models has a negative effect on many women, there has been comparatively little systematic investigation of the moderators, the *when* and *who*, and even less of the mediators, the *why* and *how*, underlying this effect.

In this article, we aim to extend the understanding of why women come to feel bad about their own bodies after exposure to ultra-thin models. Internalizing the thin ideal as a personal appearance standard has already been identified as a particularly promising moderator of the impact of media images (e.g., Dittmar & Howard, 2004; Halliwell & Dittmar, 2004a), but—to our knowledge—no previous studies have examined the level of attention at which women process thin media models, although there is one examination of pre-attentive exposure (Jansen & deVries, 2002). Exposure to ultra-thin models in everyday life varies, sometimes involving little attention—women flicking through magazines, walking past billboards, or only half-watching the TV running in the background—and sometimes involving prolonged and thorough processing of images (which is characteristic of procedures in experimental exposure studies). We therefore examine level of attention as a possible further moderator of media effects, in addition to thin-ideal internalization. With respect to underlying processes, we draw on Hargreaves and Tiggemann (2002), who showed that appearance schema activation mediates partially the negative effect of viewing TV commercials on girls' body dissatisfaction. Thus, we propose that women thinking "thin" after exposure to thin ideals in the media may be the process that mediates the exposure-anxiety link. We extend previous research by examining appearance schema activation as a mediator, together with both level of attention and thin-ideal internalization as moderators.

EFFECTS OF EXPOSURE TO IDEAL MEDIA IMAGES AND THIN-IDEAL INTERNALIZATION

Correlational studies have linked exposure to media that contain ultra-thin ideals to increased body-dissatisfaction, thin-ideal internalization, self-discrepancies, and eating pathology (e.g., Harrison, 2001;

Harrison & Cantor, 1997), although their findings are not always consistent (for a recent review, see Levine & Harrison, 2004). Their weaknesses with respect to causal inferences—does thin ideal exposure cause body-dissatisfaction or are women with high body-dissatisfaction seeking ultra-thin images—are less evident in studies that employ randomized laboratory designs. The typical paradigm is experimental presentation of images containing thin, attractive models compared to neutral images, accompanied by measures of women's body-dissatisfaction (e.g., Irving, 1990; Posavac, Posavac, & Posavac, 1998). Although there are some contrary findings (e.g., Mills, Polivy, Herman, & Tiggemann, 2002), a meta-analytic review of 25 such studies found a moderate, yet significant, effect size ($d = -.31$), supporting the proposal that experimental exposure to thin media images leads to increased body-dissatisfaction (Groesz, Levine, & Murnen, 2002).

Although this appears to be compelling evidence for the claim that the media fuel increases in women's body dissatisfaction, diverse individual difference variables have been shown to moderate exposure effects, including trait body dissatisfaction (Posavac et al., 1998), self-monitoring (Henderson-King & Henderson-King, 1997), disordered eating symptomatology (Pinhas, Toner, Ali, Garfinkel, & Stuckless, 1999), and social comparison tendency (Dittmar & Howard, 2004). These findings are consistent with the results of the meta-analysis (Groesz et al., 2002) that identified "significant body issues" as the main moderator of the detrimental effects of thin images. Conceptually, it stands to reason that the negative impact of ultra-thin models would depend on the degree to which women have internalized the thin ideal as their own personal beauty standard because the unrealistically thin models in the media cannot fail but make it salient for them how far away they are from their ideal. Those who most aspire to being thin should be worst affected, and this was indeed demonstrated in various studies (e.g., Dittmar & Howard, 2004; Halliwell & Dittmar, 2004a; Heinberg & Thompson, 1995). Dittmar & Howard (2004) showed that negative reactions to thin images are conditional on an average level of thin-ideal internalization, that is, the scale midpoint of the commonly used and well-validated internalization subscale of the SATAQ (Sociocultural Attitudes toward Appearance Questionnaire; Heinberg, Thompson, & Stormer, 1995). The present study therefore incorporated this measure of thin-ideal internalization, with the expectation that it would act as a moderator of the effect that ultra-thin images have on women's body-focused anxiety. Specifically, we expected that only high internalizers would be vulnerable to negative exposure effects.

ATTENTION LEVEL AND PROCESSING OF MEDIA IMAGES

Experimental exposure studies vary in the stimuli they use to prime participants with ultra-thin images, such as advertisement stills (e.g., Halliwell & Dittmar, 2004a) or TV commercials (Hargreaves & Tiggemann, 2002), but their procedures regarding women's processing of media images are fairly uniform. Respondents are exposed to the images long enough so that they look at them intently, and they are usually also asked to engage in additional tasks (such as evaluating the advertisements) to ensure concentrated and thorough processing of each image. Although this inducement of high attention may be beneficial with regard to experimental control, it may not reflect adequately women's everyday exposure to ultra-thin images. Although high attention processing does undoubtedly occur at times, women often pay little attention to the images and advertisements they encounter in magazines, on TV, or on billboards.

Systematic investigation of the effects of varied attention to media images could be valuable in understanding the processes underlying the negative influence exposure has on women's body dissatisfaction. To our knowledge, there is only one previous study that considered level of processing at all (Jansen & de Vries, 2002), but it focused on pre-attentive, subliminal presentation of ultra-thin media images, examining whether such implicit processing—outside conscious thought—could raise body-focused anxiety in women. The study tested women's responses to either images of ultra-thin models, obese models, or neutral slides, using subliminal exposure (15 milliseconds) outside of conscious attention. They concluded that pre-attentive exposure to the thin female beauty ideal does not activate changes in women's mood, self-esteem, or eating behavior. This study did not consider any individual vulnerability factors, such as thin-ideal internalization, but this absence of negative effects outside conscious attention may be uninformative, because subliminal presentation of thin models is not an accurate or adequate representation of everyday exposure.

One of the aims of the present study was to attempt to create a reasonable experimental analogue of low attention, everyday exposure to thin models in the media. Women do not always fully process the thin images they are exposed to on a daily basis. For example, flicking through a magazine or having TV advertisements running in the background and only glancing at them occasionally entails comparatively little attention or processing, although women do perceive the images, at least fleetingly. This low attention form of processing entails some conscious engagement with the stimuli, but without deep—elaborated and prolonged—processing of them.

We decided to simulate this kind of processing in the present study by creating an experimental situation in which participants pay little attention to the images, but are consciously aware of their presence. Due to the research gap of previous studies examining the effect of low attention to thin media images, we can formulate our hypotheses only in an exploratory manner. We expected that participants in the low attention condition would nevertheless experience some effects from the exposure. It is assumed that respondents in the low attention condition undergo less deep processing of the thin models than those who are induced to concentrate on each image and process it thoroughly. We therefore expected that this reduction of deep processing may curb the effect the thin models have on women's body dissatisfaction, when compared to the high attention respondents. Low attention can be controlled first and foremost by exposure time, where flashing images up sufficiently briefly makes it impossible to pay prolonged attention to them (e.g., Chen & Bargh, 1997). This can be reinforced by instructions to participants, asking them not to pay any attention to the flashed images, making use of a credible cover story. It is, of course, advisable to check through self-report how clearly participants were able to see the images.

THINK "THIN" AND FEEL BAD: APPEARANCE SCHEMA ACTIVATION AS THE UNDERLYING PROCESS

In addition to studying potential moderating factors, such as thin-ideal internalization and attention level, it is important to understand the processes through which ultra-thin images come to have an effect on women's body image. It has been proposed that the processing of thin, female images leads the majority of women to engage in direct, upward social comparisons (e.g., Cattarin, Thompson, Thomas, & Williams, 2000), which then lead to the perception of a discrepancy between ideal and actual attractiveness (Harrison, 2001), causing increased body dissatisfaction and negative body-focused affect (Thompson, Heinberg, & Tantleff, 1991).

The cognitive processing model of body image disturbance is different in emphasis, drawing on self-schema theory (Markus, 1977) to suggest the presence of appearance schemata in our cognition (Hargreaves & Tiggemann, 2002; Heinberg & Thompson, 1995). An appearance schema refers to a cognitive structure that organises and determines the processing of appearance-related information that is relevant to the self (Cash & Labarge, 1996). Ultra-thin models would clearly constitute stimuli that are relevant to women's appearance schemata, and are likely to lead to appearance schema activation when they are exposed to them. This

priming is thought to heighten awareness and salience of additional schema-relevant information, resulting in cognitive-affective processing consequences, such as body dissatisfaction (Hargreaves & Tiggemann, 2002). It has been suggested that some individuals place a greater importance on appearance with respect to the self and have more complex, developed appearance-related schemata; they have been labelled appearance-schematics (Labarge, Cash, & Brown, 1998). Hargreaves and Tiggemann (2002) found that only appearance-schematics exhibited negative body-esteem effects after exposure to appearance-related commercials. Their definition of appearance-schematicity is closely linked to the concept of thin-ideal internalization, because both highlight appearance as central to the self-concept, as well as the importance of appearance- and thinness-related comparisons and evaluations. We would therefore expect that only high internalizers show heightened appearance schema activation after exposure to ultra-thin images, that is, that thin-ideal internalization acts again as a moderator. We also propose that schema activation mediates the exposure-anxiety link: ultra-thin models make young women think "thin" which, in turn, leads them to feel bad about their body size, that is, to experience weight-related anxiety.

THE PRESENT STUDY

This experiment uses three exposure conditions: ultra-thin models processed at high attention, ultra-thin models processed at low attention, and neutral control images. Two comparisons between these three conditions are of central interest: first, exposure to ultra-thin models compared to the control condition and, second, prolonged compared to very short exposure to ultra-thin models (i.e., processing ultra-thin models at a high compared to a low level of attention). In line with previous studies (Dittmar & Howard, 2004; Halliwell & Dittmar, 2004a), it is hypothesized that women who have internalized the thin ideal will report increased weight-focused anxiety after viewing ultra-thin media images, but not low internalizers. Women in the high attention condition are expected to engage in deep and thorough processing of the images, whereas low attention to the images should elicit a more implicit type of processing. Therefore, it is possible that even greater weight-focused anxiety is experienced in the high, as opposed to the low, attention condition. Women in the control condition are predicted to have the lowest level of anxiety concerning appearance, as the lack of exposure to thin images—or any appearance-related stimuli—should prevent the immediate activation of any processes leading to heightened body-related anxiety.

With respect to schema activation related to appearance and thinness, we hypothesized that exposure to thin images will elicit increased appearance-related schema activation. Just as we predicted for weight-focused anxiety, we expect that schema activation is moderated by level of internalization, in the sense that only women who have internalized the thin ideal should exhibit increased appearance-schema activation, after being exposed to thin models. The effect of attention level on schema activation is a matter of empirical examination, given the lack of previous research. Finally, we propose that schema activation is an underlying process that mediates the impact of thin images on women's weight-focused anxiety.

METHOD

PARTICIPANTS

The final sample consisted of 75 women students at the University of Sussex, UK, who volunteered to participate in the study: 27 took part in the control condition, and 23 and 25 participants formed the low and high attention conditions, respectively. Their average age was 21.23 years ($sd = 2.13$, range 18–31), and over 95% were white. Body Mass Index (BMI, calculated as weight in kg/height in m^2) is a measure of weight relative to height and the average in this sample was 21.51 ($sd = 2.22$, range 16.03–27.18), which is normal according to population-relevant guidelines (British Heart Foundation, 1994); 8.1% were classified as underweight, 86.5% as normal weight, and 5.4% as overweight. There were no pre-existing differences between the women in the three exposure conditions in terms of age ($F_{2,72} = 1.21$, ns) or BMI ($F_{2,71} = .07$, ns).

MATERIALS AND MEASURES

Images. All the images for the three exposure conditions were taken from leading UK fashion magazines aimed at young women (*Marie Claire* and *Elle*). The ten control images, advertisements for cars and drinks, were chosen so that they contained no images of people or any cues to body image. The five experimental advertisements featured women models who were good examples of the ultra-thin ideal typically displayed in the media, and they were selected on the basis of a pilot study.

Pilot Study. Ten women students were recruited at the University of Sussex, that is, from the same population as the participants in the study proper, and asked to rate ten female models featured in different advertisements. They used two 10-point Likert-type rating scales; the first as-

essed the perceived attractiveness of the models, ranging from very unattractive (1) to very attractive (10), and the second examined the extent to which the model was seen to epitomize the thin, attractive ideal, ranging from not at all representative of the thin, attractive ideal (1) to very representative of the thin, attractive ideal (10). Out of the ten models, those five models with the highest mean scores on both attractiveness and epitomy of the thin ideal were chosen for the experiment. Their attractiveness mean was 7.90 and the thin ideal mean was 8.23, thus confirming that these models were seen as highly attractive and representative of the thin ideal.

Measures. Respondents completed three measures related to thinness, administered after exposure to media images: schema activation, weight-related anxiety, and thin-ideal internalization. It does not seem problematic to measure internalization after exposure. A recent experiment, which counterbalanced the order in which women were exposed to ideal media images and completed the thin-ideal internalization measure, demonstrated that internalization is a stable psychological variable that is unaffected by media exposure (Dittmar, Stirling, & Halliwell, 2005).

Appearance schema activation was tested by using Hargreaves and Tiggemann's (2002) word-stem completion task, but shortening it to ten items so as to keep the length of the survey manageable, given the other measures and the need to use filler items (see procedure). Respondents were presented with 3-letter word-stems that could be completed to form either a word that is related to appearance and thinness, or a word that is unrelated. For example, the stem *SLE*..... can be completed as *SLEnder* (thinness-related) or *SLEep* (unrelated). The rationale behind this task is that women whose appearance schemata have been activated will produce more appearance-related words than women for whom schema-activation has not occurred. Respondents' scores could range from 0 to 10, with higher numbers indicating stronger appearance schema activation.

Weight-focused anxiety was measured using the Physical Appearance State and Trait Scale: state (PASTAS; Reed, Thompson, Brannick, & Sacco, 1991). The state version of the scale asks participants to rate on five-point Likert-type scales how anxious, nervous, or tense they feel "right now" about various body sites (0 = not at all to 4 = exceptionally so). For the purpose of this study, six weight-related body sites were selected (such as waist, hips or thighs). Original reliabilities for the full body-focused state anxiety scale range from .82 to .92 (Reed et al., 1991), and Halliwell & Dittmar (2004a) report .94 for a shortened scale, including only weight-related body sites. Cronbach's alpha in the present study was .93.

Thin-ideal internalization was measured using the 8-item internalization sub-scale of the Sociocultural Attitudes Towards Appearance Questionnaire (SATAQ; Heinberg, Thompson, & Stormer, 1995). Internalization was assessed using statements, such as "I believe that clothes look better on thin models" or "Photographs of thin women make me wish I were thin," and respondents were asked to indicate how much they (dis)agreed with each statement on a five-point Likert-type scale (1 = completely disagree to 5 = completely agree). Cronbach's alpha for this scale was .88; identical to the original reliability found when the questionnaire was developed (.88, Heinberg et al., 1995).

PROCEDURE AND EXPOSURE CONDITIONS

The experiment was administered individually, and presented in two parts. The images and cover story were presented on computer screen (using the experiment-generator Superlab), whereas all other measures were completed afterwards, embedded in a paper-and-pencil questionnaire ostensibly concerned with student health and material well-being.

For the first part of the experiment, participants were told that the computer-run study was investigating the advertising effectiveness of subliminal and normal advertisements, so as to keep the women naive about the true purpose of the experiment in order to avoid demand characteristics. They were informed that they would see a number of advertisements held still on the screen for a prolonged period, 10 seconds, and a corresponding number of quick flashes, which were also advertisements, but for a different product. All women were given the same set of double instructions. They were asked to concentrate on the advertisements that were held on the screen for a substantial time and to pay as little attention as possible to the quick flashes. In order to strengthen the advertising effectiveness cover story, they were also told that they would be asked to evaluate each of the long advertisements and, finally, to state their overall preference for the best long ad.

The next part of the program involved the exposure to the images, where participants were randomly assigned to one of three exposure conditions: control (no models), high attention to thin models, or low attention to thin models. Each participant saw five advertisements that were flashed quickly (150 milliseconds), and five advertisements with a long exposure time (10 seconds). In the high attention condition, respondents saw the advertisements with ultra-thin models each for 10 seconds, and neutral advertisements as short flashes. In the low attention condition, they saw advertisements with ultra-thin models as quick, 150 ms, flashes, and neutral advertisements were shown for 10 seconds each. In the control condition, both long and short advertisements con-

TABLE 1. Image Exposure Conditions and Types of Advertisements

Condition	Long Exposure: 10 s (Five Advertisements)	Short Exposure: 150 ms (Five Advertisements)
No Models (Control)	Drink adverts (neutral)	Car adverts (neutral)
Low Attention to Thin Models	Drink adverts (neutral)	Fashion adverts (thin models)
High Attention to Thin Models	Fashion adverts (thin models)	Car adverts (neutral)

tained neutral images. The exposure conditions and types of images are outlined in Table 1.

With respect to the flashed ads, participants were simply warned about them and asked to pay little attention to them. The length of exposure chosen was 150 milliseconds because, although clearly supraliminal, this time was sufficiently short to prevent elaborate processing (Blair & Banaji, 1996). Thus, respondents were able to perceive these images, but could only process them at a low level of attention. For the long ads, participants were instructed to concentrate on the images and they also completed a number of evaluation questions for each, thus ensuring concentrated and thorough processing with high attention. The sequence of presentation, repeated five times, was: short exposure image, long exposure image, and then rating questions about the long advertisement.

The word-stem completion task, weight-related anxiety, and thin-ideal internalization measures were then presented to participants embedded within a paper-and-pencil questionnaire. It also contained a question concerning the low attention images, asking respondents to indicate how clearly they had been able to perceive the flashed images. The word-stem completion task was introduced as a "free association task" used to elicit a "specific type of thinking" before respondents would be asked about their current mood. Respondents then completed ten three-letter word-stems with whatever word came to mind first. It was then suggested that current mood could affect the effectiveness of advertisements, and respondents completed the weight-focused anxiety items embedded within filler questions about present anxiety (or "mood") concerning two aspects of student life: health and material success. Example filler items are "The extent to which I am unhealthy" and "My financial situation." Thin-ideal internalization items were also embedded within filler questions, this time under the pretence that personal beliefs and goals can alter advertising

effectiveness. The filler items concerned, again, general beliefs about health and material success (e.g., "In our society, people do not consider their health as very important" and "I place too much importance on material possessions").

All respondents were then asked what they believed the "specific" purpose of the study was, in order to determine whether the cover story had been effective. Three respondents had become aware of the focus on body image, and were therefore excluded from data analysis. Finally, the questionnaire ended with a short demographic section that included age, ethnicity, weight, and height (in order to calculate BMI).

The experiment was conducted in accordance with BPS/APA guidelines for ethical conduct. At the start, participants were made aware of their right to withdraw at any time, and reassured of confidentiality. Although the women were exposed to images that they regularly encounter in everyday life (all the images were actual advertisements, taken from fashion magazines), exposure may still have had a negative effect on their body-esteem. Therefore, the printed debrief that all participants received at the end of the study did not only outline the true purpose of the experiment, but also contained information aimed to counteract any detrimental effects of the images (such as emphasizing that the models were unrealistically thin because they were approximately four (UK) dress sizes smaller than the average dress size for women in the UK).

RESULTS

PRELIMINARY ANALYSES

All respondents were asked how clearly they perceived the "flashed images" on a 5-point scale (1 = very clearly to 5 = not at all) in order to examine how effective the low attention manipulation had been. The mean score was 3.0 ($sd = .76$, ranging from 2–4), indicating that the processing of the flashed images was neither wholly implicit nor wholly explicit.

The relationship between the study variables (thin-ideal internalization and appearance schema activation) and weight-focused anxiety was examined, separately for each exposure condition and overall. The resulting correlations (see Table 2) revealed that relationships between the study variables and body-focused anxiety were only present if the participants had seen a model. Whereas the correlations were non-significant in the control condition, both internalization and appearance schema activation were significantly and strongly correlated with weight-focused anxiety after exposure to thin models, laying the grounds for testing their moderating and mediating influence on the re-

TABLE 2. Correlations and Means of Thin-Ideal Internalization, Appearance Schema Activation, and Women’s Weight-Related Anxiety (Controlling for BMI)

Variable	Exposure Condition			Overall
	No Models (Control)	Low Attention to Thin Models	High Attention to Thin Models	
Correlations with Weight-Related Anxiety				
Thin-Ideal Internalization	.334, <i>ns</i>	.668***	.747***	.613***
App. Schema Activation	.001, <i>ns</i>	.416*	.460*	.345**
Means (and Standard Deviations)				
Thin-Ideal Internalization	2.60 (.80)	2.89 (.88)	2.99 (.98)	2.82 (.89)
App. Schema Activation	1.67 (.96)	2.52 (1.38)	2.60 (1.38)	2.24 (1.30)
Weight-Related Anxiety	1.19 (.85)	1.28 (1.18)	1.86 (1.04)	1.44 (1.05)

p* < .05; *p* < .01; ****p* < .001.

relationship between exposure and women’s anxiety. These associations were marginally stronger for the high attention compared to the low attention condition, suggesting that attention may function as a further moderator. Table 2 also gives means (and standard deviations) for the three key variables by exposure condition.

WEIGHT-FOCUSED ANXIETY

A stepwise hierarchical multiple regression analysis was carried out, predicting women’s experience of weight-focused anxiety from image exposure and thin-ideal internalization, following the principles for testing moderator effects by Baron & Kenny (1986). Thus, thin-ideal internalization was examined as a variable that changes the causal relationship between image exposure and weight-focused anxiety, and moderation is supported if internalization interacts with exposure condition. In order to test the hypotheses concerning the experimental presentation of media images directly, the three exposure conditions were effect-coded, so that they represented the two comparison contrasts of central interest: The first contrast (Exposure Contrast 1) compared exposure to thin models (both at low and high attention) with exposure to neutral stimuli, and the second (Exposure Contrast 2) contrasted the response to thin models processed at either a high or low level of attention. The no-models control can be viewed as a baseline condition for

women's weight-focused anxiety, because they report how they feel about weight-related body sites in the absence of any appearance-related stimuli. The mean across the internalization items was close to the mid-point of the scale ($M = 2.82$; $sd = .89$), with a range across almost all five scale points (1.13 to 4.82).

Predictors were entered in six steps in the following order: BMI (mean-centered¹, model 1), the two exposure contrasts (model 2), thin-ideal internalization and the interaction between internalization and BMI (both mean-centered, model 3), the two-way interaction between internalization and the first exposure contrast between no models and thin models (model 4), the two-way interaction between internalization and the second exposure contrast between high and low attention to thin models (model 5), and, finally, three-way interactions with BMI (model 6). In model 2, the two exposure contrasts test the hypotheses directly that, first, women's weight-related anxiety is higher after exposure to thin media ideals than control images and, second, that women's weight-related anxiety after thin ideals is higher when they process images with high attention compared to low attention. The interaction between the first exposure contrast and thin-ideal internalization in model 4 tests the hypothesis that only high internalizers show heightened weight-related anxiety after thin images. Given the absence of previous research, we have no hypothesis concerning the second image contrast, but it is possible that low-level versus high-level attention to images may also have a different effect depending on women's degree of internalization (model 5).

BMI was systematically related to women's weight-focused anxiety ($\Delta F_{1,73} = 8.42$; $p = .005$). As predicted, exposure to images added significantly to the prediction of women's weight-focused anxiety ($\Delta F_{2,71} = 3.54$; $p < .05$), as did internalization ($\Delta F_{2,69} = 20.57$; $p < .001$). With respect to internalization as a moderator, the addition of the two-way interaction term with the no models versus thin models contrast was significant ($\Delta F_{1,68} = 3.95$; $p = .05$), thus providing support for our hypothesis that the extent to which women have internalized the thin ideal alters the impact of thin media images on their anxiety levels. In contrast, there was no evidence that internalization interacts with attention level ($\Delta F_{1,67} = .11$; *ns*). This is interesting because it suggests that thin-ideal internalization has an impact on women's weight-focused anxiety after exposure to thin models, *independent* of the attention level at which they are processing these thin ideals. The addition of the three-way interaction terms be-

1. Mean-centering is a recommended routine procedure for continuous variables in a regression that are also used in interaction terms (Aiken & West, 1991).

TABLE 3. Predictors of Women's Weight-Related Anxiety After Exposure to Media Images

Variable	<i>B</i>	Standard Error	β	<i>t</i>	<i>Sig</i>
Body Mass Index	.13	.04	.28	3.25	<.005
Exposure Contrast 1: Control vs. Thin Image	.24	.19	.11	1.26	ns
Exposure Contrast 2: High vs. Low Attention	.50	.22	.19	2.26	<.05
Internalization	.64	.10	.55	6.33	<.001
Internalization \times BMI	.00	.05	-.09	-1.03	ns
Exposure Contrast 1 \times Internalization	.45	.23	.17	1.99	.05

tween internalization, image exposure contrasts, and BMI proved non-significant ($\Delta F_{2,65} = .01$; *ns*). Thus, model 4 provides the best fit, producing a significant regression model ($F_{6,68} = 12.14$; $p < .001$), which predicts a considerable 48% of the variance in women's anxiety.

This model contains six predictors, and Table 3 gives a summary of the regression coefficients. The significant association between BMI and weight-focused anxiety ($\beta = .28$; $p < .005$) shows that heavier women report more anxiety about weight-related body sites than lighter women, which is unsurprising. This effect is independent of the central study variables, given that BMI does not interact with internalization, nor with the image contrasts in conjunction with internalization (as we saw in the models analysis). The contrast between exposure to no models and thin models did not reach significance by itself, but—as predicted—it does significantly affect women's weight-related anxiety once its relation to thin-ideal internalization is taken into account ($p = .05$). The nature of this significant interaction is explored further in the next section. In contrast to the presence or absence of thin models, the attention level at which thin models were processed had a direct, significant impact on women's anxiety ($\beta = .19$; $p < .05$). As shown in Table 2, women who paid full attention to ultra-thin media ideals scored more than half a scale point higher on the measure of weight-focused anxiety than women who saw the images only fleetingly (1.86 vs. 1.28 respectively). Thus, our hypothesis that the level of attention at which ideal images are processed has an impact on women's experience of anxiety about their body size was supported. We know from the models analysis that this negative impact of attention level is unaffected by thin-ideal internalization.

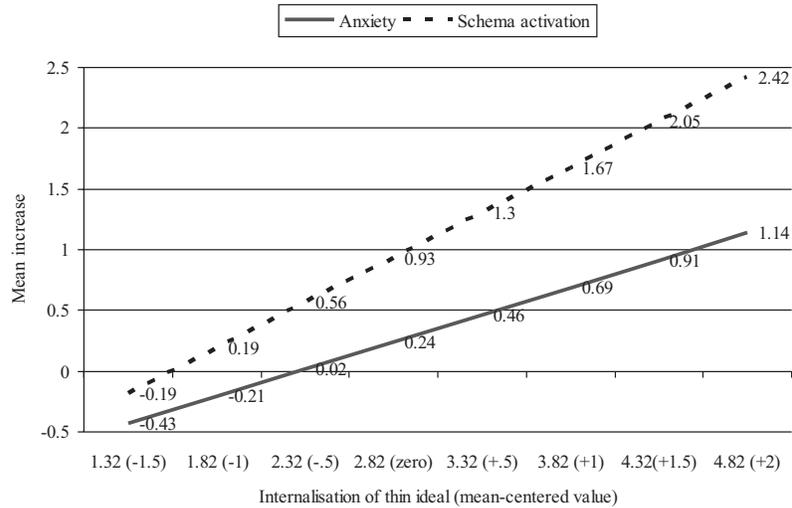


FIGURE 1. Mean increase in weight-related anxiety and appearance schema activation after exposure to thin models (compared to control) as a function of thin-ideal internalization.

The exact nature of the moderator effect of internalization for the contrast between exposure to no models and thin models was examined in a subsequent analysis, which is a regression analogue to a simple effects analysis for interpreting interactions in an analysis of variance, as outlined by Jaccard, Turrissi, & Wan (1990). The average difference in anxiety after thin models compared to no models images was predicted and evaluated at various levels of internalization. Given that hypotheses about the impact of thin images were directional, predicting higher anxiety after thin models, differences are evaluated with one-tailed tests. Figure 1 shows the mean increase in anxiety between the no models and the thin models exposure conditions at seven levels of thin-ideal internalization.

The internalization mean for the whole sample was 2.82 (corresponding to 0 after mean-centering), which lies just below the scale mid-point at 3. At this level of thin-ideal internalization, anxiety—on average—is .24 scale points higher after seeing thin models compared to the control, which fails to reach significance ($t_{68} = 1.25$; *ns*). Similarly, for all those

women whose internalization score is even lower, there is no negative impact after exposure to thin images. Thus, women who are low internalizers, scoring below the mid-point of the scale, were not affected by thin images.

In contrast, above the mean level of internalization, women reported heightened weight-focused anxiety after exposure to thin media ideals. At half a scale point above the mean level (corresponding to an internalization score of 3.32), the mean difference in anxiety, .46, is significant ($t_{68} = 1.97$; $p < .05$). In terms of effect size (Cohen, 1988), this difference equates to just over half a standard deviation, thus constituting a moderate effect ($d = .52$). Consistent with our expectation, the negative effect of thin images on anxiety increases the more strongly women internalize the thin ideal. At one scale point above the mean level (3.82), the mean difference in anxiety rises to .69 ($t_{68} = 2.17$; $p < .05$), which constitutes a moderate to large effect ($d = .77$). At 1.5 scale points above (4.32), the mean difference reaches almost a full anxiety scale point at .91 ($t_{68} = 2.22$; $p < .05$), a large effect ($d = 1.03$). Finally, at two scale points above the mean (4.82), the difference exceeds one full scale point with 1.14 ($t_{68} = 2.21$; $p < .05$). This means that the anxiety increase women experience is larger than a standard deviation ($d = 1.28$), which is a very powerful effect.

Thus, when women's thin-ideal internalization is at or below average, exposure to thin images does not have a negative effect on their body-focused anxiety, meaning that this negative effect is limited to women who have internalized the thin ideal as a personal standard to a certain extent. The negative effect of thin images on women's anxiety becomes appreciable (and statistically significant) only for women who score above the mid-point of the thin-ideal internalization scale, consistent with the findings of Dittmar & Howard (2004). The impact becomes increasingly more powerful with stronger thin-ideal internalization. In the present sample, almost 50% of women showed moderate or strong negative effects after ultra-thin images.

Thus, exposure to thin images has negative effects on women's weight-focused anxiety if they internalize the thin ideal. This negative effect occurs regardless of whether women are paying a lot or little attention to thin media images. Thus, as long as a woman has internalized the thin ideal, she is likely to feel anxious about her body size as soon as she encounters thin images, even if she only pays fleeting attention to them. In addition, when thin images are given full and thorough attention, rather than only glanced at with little attention, anxiety is heightened further. This effect is independent of internalization.

APPEARANCE SCHEMA ACTIVATION

Internalization and exposure contrasts were also examined as predictors of appearance schema activation, where the outcome variable is the number of thinness-related words in the word-stem completion task. A hierarchical multiple regression analysis of the same format as used for weight-related anxiety showed that, for schema activation, BMI was not a systematic predictor ($\Delta F_{1,73} = 0.16$; *ns*). As we found for weight-related anxiety and as expected, exposure to images significantly added to the prediction of schema activation ($\Delta F_{2,71} = 4.39$; $p < .05$), as did internalization ($\Delta F_{2,69} = 5.79$; $p = .005$). With respect to internalization as a moderator, the addition of the two-way interaction term with the no models versus thin models contrast was again significant ($\Delta F_{1,68} = 4.81$; $p < .05$), suggesting that the extent to which women activate schemata related to thinness—think “thin” after image exposure—depends on their level of thin-ideal internalization. There was no evidence that internalization interacts with attention level ($\Delta F_{1,67} = .01$; *ns*), nor was there any support for three-way interactions ($\Delta F_{2,65} = 1.24$; *ns*). Model 4 thus, again, provides the best fit as well as a significant regression model ($F_{6,68} = 4.62$; $p < .001$), predicting 23% of the variance in appearance schema activation.

This model contains six predictors (see Table 4). BMI does not affect schema activation ($\beta = -.10$; *ns*), but does interact with thin-ideal internalization ($p < .05$). The more women internalize the thin ideal, the higher their schema activation ($\beta = .28$; $p < .01$). The interaction between BMI and internalization is explained by this positive correlation being stronger for heavier women ($r = .42$; $p < .01$, above BMI median) compared to lighter women ($r = .28$; $p < .10$, below BMI median), but it does not interact with exposure (as shown in the models analysis). For appearance schema activation, the contrast between exposure to no models and thin models is highly significant ($\beta = .35$; $p < .005$), and the positive value of the regression coefficient confirms that exposure to thin models increases schema activation (means of 1.67 and 2.55 respectively). Furthermore, the strength of this effect depends on thin-ideal internalization ($p < .05$). The nature of this significant interaction is explored further in the next section. In contrast to the analysis of women’s weight-focused anxiety, the attention level at which thin models were processed had no impact on schema activation ($\beta = .01$; *ns*). This last finding is important because it indicates—in conjunction with the finding that exposure to thin models increases appearance schema activation—that even peripheral, glancing attention at thin media models is sufficient to activate thoughts about thinness.

In order to examine the moderator effect of internalization further, the same type of further analysis was carried out as for anxiety. The average

TABLE 4. Predictors of Appearance Schema Activation After Exposure to Media Images

Variable	<i>B</i>	Standard Error	β	<i>t</i>	Sig
Body Mass Index	-.01	.06	-.10	-.92	<i>ns</i>
Exposure Contrast 1: Control vs. Thin Image	.93	.29	.35	3.24	<.005
Exposure Contrast 2: High vs. Low Attention	.00	.33	.01	.04	<i>ns</i>
Internalization	.41	.15	.28	2.71	<.01
Internalization \times BMI	-.16	.07	-.23	-2.21	<.05
Exposure Contrast 1 \times Internalization	.74	.34	.23	2.19	<.05

difference in schema activation scores after thin models compared to no models images was predicted and evaluated at various levels of internalization, and Figure 1 also shows these scores at seven levels of thin-ideal internalization. At the mean level of internalization (2.82, corresponding to 0 after mean-centering), the average number of thinness-related words generated was almost one word higher, .93, after seeing thin models compared to the control. This difference is not only highly significant ($t_{68} = 3.24; p < .001$), but also constitutes a strong effect ($d = 1.05$). Even at a half point below (2.32), the difference is still significant ($t_{68} = 1.79; p < .05$), though smaller at .56 and of moderate size ($d = .63$). This means that even women who score below the mean internalization level show increased schema activation after thin images. Only at a whole point below the mean internalization level (1.82), does the difference in schema activation become non-significant.

Thus, women below and at the mean level of thin-ideal internalization show increased schema activation after thin images. Whereas the effect is already strong at the mean level, it increases more powerfully still when women internalize the thin ideal more strongly. At a half point above the mean (3.32) the difference in thinness-related words generated rises to 1.30 ($t_{68} = 3.68; p < .001$), a very strong effect ($d = 1.46$). At one point above (3.82), it reaches 1.67 ($t_{68} = 3.52; p < .001$), with an even stronger effect of almost two standard deviations ($d = 1.88$), rising to 2.05 at one-and-a-half points above (4.32, $t_{68} = 3.30; p < .001; d = 2.30$). Finally, at two scale points above the mean level (4.82), the difference is 2.41 words ($t_{68} = 3.12; p < .001$). This means that the schema activation increase is well over two standard deviations ($d = 2.72$), which is an extremely powerful effect.

This analysis shows that schema activation—women thinking “thin” after exposure to thin media images—occurs at even below average levels of internalization and below the mid-point of the scale. In fact, it does *not* occur only for women whose internalization scores are 1.82 or below (on a five point scale) which, in the present sample, is the case for only 13.3% of women, that is, a small minority. Thus, a thinness-related appearance schema is easily activated for the great majority of women when they see thin ideals in the media, even when not paying them much attention. The extent or strength of activation increases powerfully the more women endorse the thin ideal as a personal standard. Strong effects occur for 55% of women in the present sample.

SCHEMA ACTIVATION AS A MEDIATOR OF WOMEN'S WEIGHT-FOCUSED ANXIETY

Baron & Kenny (1986) stipulate that a mediation analysis consists of three separate regressions, and applied to the present research these are: anxiety regressed on exposure conditions, schema activation regressed on exposure conditions and, finally, anxiety regressed on both image exposure and schema activation. We have already shown in the first regression analysis presented that exposure condition has a significant impact on women's weight-related anxiety in conjunction with thin-ideal internalization. The second analysis presented confirmed a significant impact of exposure conditions (again with internalization) on the proposed mediator: appearance schema activation. As shown in Table 2, appearance schema activation and weight-focused anxiety are significantly correlated, at least after women are exposed to thin images, suggesting mediation. Thus, to complete the mediation analysis, we now need to examine whether the previously significant exposure effects (moderated by internalization) for weight-related anxiety become non-significant when appearance schema activation is accounted for, given that “perfect mediation holds if the independent variable has no effect when the mediator is controlled” (Baron & Kenny, 1986, p. 1177).

In order to address this, the six predictors of women's weight-related anxiety examined in the first analysis were entered into a multiple regression, as well as the schema activation score (mediator). Appearance schema activation emerged as a significant positive predictor of anxiety ($\beta = .24; p < .05$) in this final regression model, which predicted 51% of the variance in anxiety ($F_{7, 67} = 12.03; p < .001$). This means that thinking “thin” leads women to feel bad about their body size. Individual predictors are shown in Table 5. Two findings are of central interest.

The first is that the previously significant interaction between the thin models versus no models contrast and internalization is now non-sig-

TABLE 5. Predictors of Weight-Related Anxiety After Exposure to Media Images[comma here] Controlling for Appearance Schema Activation

Variable	<i>B</i>	Standard Error	β	<i>t</i>	<i>Sig</i>
Body Mass Index	.14	.04	.30	3.62	= .001
Exposure Contrast 1: Control vs. Thin Image	.06	.20	.03	.32	<i>ns</i>
Exposure Contrast 2: High vs. Low Attention	.50	.21	.19	2.33	< .05
Internalization	.56	.05	.48	5.46	< .001
Internalization \times BMI	-.02	.05	-.04	-.41	<i>ns</i>
Exposure Contrast 1 \times Internalization	.31	.23	.12	1.36	<i>ns</i>
Appearance Schema Activation	.19	.08	.24	2.45	< .05

nificant ($t = 1.36$; *ns*). In support of our hypothesis, this shows that women's raised anxiety after thin models—compared to no models—is fully accounted for by appearance schema activation. Thus, we can conclude that schema activation *fully mediates* the relationship between this exposure contrast and weight-focused anxiety, at least in women who have internalized the thin ideal to a certain extent.

The second result concerns the attention level at which women processed the thin models they were exposed to, that is, the second exposure contrast. The heightened anxiety that results from thorough, prolonged attention rather than cursory glancing is virtually identical to that found in the original analysis ($\beta = .19$; $p < .05$); it remains unaffected by schema activation. Thus, high attention intensifies weight-related anxiety, independent of internalization, and—importantly—*independent of appearance schema activation*. This suggests that schema activation is a precondition of experiencing weight-related anxiety—it needs to be switched on before anxiety occurs. However, it does not in and of itself then determine the strength of anxiety. An additional determinant, or moderator, of that strength is level of attention, where weight-focused anxiety is further heightened if women focus explicitly on thin ideals and thoroughly engage with them cognitively.

DISCUSSION

The present study investigated the role of appearance schema activation, attention level and thin-ideal internalization for young women's experience of weight-related anxiety after viewing ultra-thin media im-

ages. In summary, there were three main findings. First, exposure to thin models increased body-focused anxiety for those women with a strong sense of thin-ideal internalization. This effect did not differ depending on whether women paid full attention to the thin images or little attention, seeing them only fleetingly. Second, level of attention was important in its own right, given that women who paid full attention to the thin images experienced more body-focused anxiety than those under low attention conditions. This effect was independent of thin-ideal internalization. Finally, weight-related anxiety after exposure to thin models occurred because women's appearance schemata were activated, producing a think "thin" and feel bad sequence. Although this effect was most pronounced for women who had internalized the thin ideal as a personal standard, schema activation did occur for the great majority of women in the current sample, over 80%, even if their thin-ideal internalization was less than average. Indeed, the think "thin" and feel bad sequence was absent only in those women who had not internalized the thin ideal. Moreover, fleeting attention to ultra-thin images was sufficient to set the think "thin" and feel bad sequence in motion. The implications of these findings are discussed below, but first we address limitations of the present study.

The experimental paradigm used aimed to simulate everyday situations of low attention to media images, such as women flicking through a magazine or having TV advertisements running in the background. One of the strengths of the present study, its control over attention level, also needs to be acknowledged as one of its limitations, because the controlled environment in which the study was run entails that it could not be entirely naturalistic. However, the exposure time of 150 milliseconds was very short, thus providing a conservative simulation of natural low attention conditions. Future research would benefit from studies that also employ naturalistic methods of manipulating attention. For instance, low attention could entail the use of an ostensible waiting room for participants, in which there could be a TV running in the background showing advertisements or where women could be invited to flick through magazines (the content of these stimuli would either contain ultra-thin models or no models).

As with the majority of studies in this field, only the immediate impact of exposure to media images was measured, limiting conclusions to short-term effects. However, if negative effects can be demonstrated after exposure to five advert stills in one single time period, and for low attention levels, the effect of a lifetime of exposure to ultra-thin images, on a daily basis, is likely to be even more damaging. It would be valuable to research the long-lasting effects of media exposure. To date, the only longitudinal study examined body dissatisfaction in 219 adolescent girls

with varied exposure to a fashion magazine over a 20-month period (Stice, Spangler, & Agras, 2001), showing negative effects of increased magazine exposure in vulnerable girls, who perceived elevated pressures to be thin. This finding is consistent with mounting evidence that thin-ideal internalization is a risk factor not only for body image disturbance, but also eating pathology (Thompson & Stice, 2001).

It is also consistent with the finding in the present research, that only high internalizers were negatively affected by thin media images in terms of heightened weight-related anxiety, as well as with similar results in several recent experimental exposure studies (Dittmar & Howard, 2004; Dittmar, Stirling, & Halliwell, 2005; Halliwell & Dittmar, 2004a). This result has implication for intervention strategies at the level of individual girls and women, because it suggests that strategies which prevent or lower thin-ideal internalization could protect them from the potential negative impact of advertising (see Levine & Harrison, 2004, for a recent review). For instance, several media literacy interventions demonstrated that it is possible to increase women's skepticism about the desirability of media that depicts a thin ideal of beauty, and that making them more critical may have some effect on internalization (e.g., Irving & Berel, 2001; Posavac, Posavac, & Weigel, 2001).

However, our findings with regard to appearance schema activation suggest caution regarding the expected benefits of the increased processing of ultra-thin images that is central to media literacy interventions. Exposure to ultra-thin media images led to increased processing and elicitation of appearance-related information, reflecting increased schema activation. This was especially marked for women with high levels of thin-ideal internalization, for whom thinness is important to their sense of self. However, the think "thin" and feel bad sequence did also occur in women with relatively low levels of internalization. Appearance schemata were found to be activated after exposure to thin images in over 80% of women in the present study. Moreover, the attention level at which the thin models were processed had no impact on schema activation. This suggests that even fleeting attention to thin models is sufficient to activate thoughts about thinness. Therefore, the findings indicate that thinking "thin" after exposure to typical media models is a common phenomenon in the majority of women, even when the exposure is slight. Rehabilitative and prevention strategies that focus on increasing critical processing of media images are unlikely to have any impact on this effect of low attention exposure, and they may even have undesirable consequences through heightening appearance schema activation.

The finding that even low attention exposure to thin media ideals can be sufficient to switch on the think "thin" and feel bad sequence implies

the need for a more radical approach to intervention, shifting it from the individual to the social level. The results of the present study provide evidence for a cognitive processing model of body dissatisfaction, in which schema activation mediates fully the relationship between exposure to ultra-thin media images and weight-focused anxiety in vulnerable women. In other words, ideals of attractiveness portrayed in the media activate appearance schemata that, in turn, cause increased body-focused anxiety. These findings, in conjunction with the link between low attention and appearance schema activation, add further weight to calls for more responsible advertising strategies, which use alternative images of models with an average body size, in order to alter the cultural environment that girls and women are exposed to habitually (e.g., Kilbourne, 2004). There is emerging evidence that the use of average-sized models, as compared to ultra-thin models, has no impact on advertising effectiveness, as long as they are equally attractive (Halliwell & Dittmar; 2004a). The finding that low attention exposure can have negative effects on women's body image therefore contributes to the growth of evidence-based arguments against the continued use of ultra-thin models in advertising.

The findings regarding level of attention to thin media ideals and appearance schema activation taken together raise substantive questions that, in turn, suggest directions for further research (in addition to naturalistic methodologies discussed earlier). The level of attention paid to the thin models was found to be a determinant of the magnitude of body-focused anxiety. Anxiety was greater when attention to thin media images was prolonged and they were fully processed, than when exposure was fleeting and slight. Yet, level of attention did not significantly affect schema activation. Therefore, the cognitive processing model cannot account fully for the demonstrated impact of attention level on women's weight-related anxiety. It appears that additional psychological processes are needed to account for the significant role attention level plays in the impact of thin media images on body image. Whereas schema activation is *necessary* for weight-related anxiety to occur, it is *not sufficient* for determining the strength of that anxiety. Future research should attempt to identify exactly what these additional processes are, and particularly promising theoretical frameworks may be offered by social comparison approaches (Cattarin et al., 2000; Halliwell & Dittmar, 2004b) or by applications of self-discrepancy theory (Higgins, 1987) that focus on the arousal of self-discrepancies between actual and ideal bodily self (Dittmar, Stirling, & Halliwell, 2005; Harrison, 2001).

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