

Body Image and Self-Esteem Among Adolescent Girls: Testing the Influence of Sociocultural Factors

Daniel Clay, Vivian L. Vignoles, and Helga Dittmar

*Policy Research Bureau, London
University of Sussex*

In Western cultures, girls' self-esteem declines substantially during middle adolescence, with changes in body image proposed as a possible explanation. Body image develops in the context of sociocultural factors, such as unrealistic media images of female beauty. In a study of 136 U.K. girls aged 11–16, experimental exposure to either ultra-thin or average-size magazine models lowered body satisfaction and, consequently, self-esteem. Self-esteem was also lower among older than among younger girls. Structural equation modeling showed that this age trend was partially accounted for by a corresponding downward trend in body satisfaction; this, in turn, was fully accounted for by upward age trends in awareness and internalization of sociocultural attitudes toward appearance, and in social comparison with media models. Results support calls for early educational interventions to help girls to deconstruct advertising and media images.

Self-esteem is defined as a “positive or negative attitude toward . . . the self” (Rosenberg, 1965, p. 30), and can be viewed as a key indicator of psychological well-being, at least among people in Western cultures (Baumeister, Campbell, Krueger, & Vohs, 2003; Oishi, Diener, Lucas, & Suh, 1999). In Western cultures, self-esteem typically differs by gender. A recent meta-analysis of self-esteem studies, most conducted in Western industrialized nations, has confirmed that women's self-esteem is moderately, but significantly, lower than men's ($d = .21$); moreover the average

Requests for reprints should be sent to Vivian L. Vignoles, Department of Psychology, University of Sussex, Falmer, Brighton, BN1 9QH, U.K. E-mail: v.l.vignoles@sussex.ac.uk
Daniel Clay now works at the Policy, Research and Influencing Unit, Barnardos, U.K.

gender difference is greatest during middle adolescence ($d = .33$), peaking at around 16 years of age (Kling, Hyde, Showers, & Buswell, 1999). This is reinforced by a recent self-esteem growth-curve analysis, which modeled developmental patterns over 7 years both between and within adolescents in a metropolitan area of the Midwestern US (Baldwin & Hoffmann, 2002). Controlling for family cohesion and stressful life events, this analysis showed a pronounced and progressive drop in girls' self-esteem from 12 to 17 years of age. In contrast, boys' self-esteem was much more stable, showing only a slight and short-lived decline from 14 to 16 years. Thus, comparatively, Western teenage girls appear to suffer from falling self-esteem.

How can we explain this decline in self-esteem among adolescent girls? Of course, factors abound that may affect girls' self-esteem, but there are good reasons to propose that changes in body image may be crucial for understanding this trend. Body image is central to adolescent girls' self-definition, because they have been socialized to believe that appearance is an important basis for self-evaluation and for evaluation by others (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999). Indeed, perceptions of appearance and self-worth are inextricably linked, such that perceived appearance consistently emerges as the strongest single predictor of self-esteem among both male and female adolescents. The link is remarkably strong and robust, with an average correlation of .65 in the US and .62 in other countries (Harter, 1999).

However, this close association between body image and self-esteem is especially problematic for girls growing up in the context of developed mass consumer societies (Becker, Burwell, Herzog, Hamburg, & Gilman, 2002). The media—magazines, TV, films, advertising, music videos—not only emphasize that female self-worth should be based on appearance, but present a powerful cultural ideal of female beauty that is becoming increasingly unattainable (Richins, 1991; Silverstein, Perdue, Peterson, & Kelly, 1986). For example, a recent content analysis of TV sit-coms found that 76% of female characters were below average weight (Fouts & Burggraf, 2000). The body size of women in the media is often more than 20% underweight (Spitzer, Henderson, & Zivian, 1999)—exceeding a diagnostic criterion for anorexia nervosa of 15% underweight (DSM-IV-TR: American Psychiatric Association, 2000). Airbrushing, digital alteration, and cosmetic surgery further increase the unrealistic nature of media images of women as standards for self-evaluation (Thompson et al., 1999).

These issues are of particular concern during adolescence, not only because adolescence is an important period for forming views about oneself and sociocultural ideals, but also because the onset of puberty entails bodily changes (such as greater adipose deposits, and acne) that, on

average, move girls further away from societal standards of female beauty. A longitudinal study of 12–15-year-old girls has confirmed that such bodily changes are associated with increased concerns about weight and eating (Attie & Brooks-Gunn, 1989). In another study, adolescent girls described their ideal as 5 ft 7 in., 100 lb, and size 5—an ultra-thin, if not anorexic, body size (body mass index (BMI) = 15.61: Nichter & Nichter, 1991). Thus, it comes as no great surprise that adolescent girls—unlike boys, who are not subjected to such unrealistic ideals—show a marked decline in perceptions of their physical attractiveness from about 11 years onward (Harter, 1999). Notably, self-esteem shows a very similar pattern, declining substantially among girls between the ages of 12 and 17 (Baldwin & Hoffmann, 2002).

However, to understand better the causes of these age trends, it is important to study their underlying social psychological mechanisms. The present study extends previous research on these issues, combining experimental and correlational designs to address two interlinked questions. Using an experimental method, we tested the impact of viewing ultra-thin and average-size female magazine models on body image and self-esteem among adolescent girls aged 11–16. Using a correlational method, we evaluated the extent to which age trends in awareness and internalization of societal standards of female beauty, and in social comparison with media models, could account for age trends in body satisfaction and self-esteem among our participants. Below we introduce each of these objectives in turn.

EFFECTS OF VIEWING MEDIA IMAGES

There is now growing empirical support for the proposition that idealized portrayals of women in the Western media have a negative impact upon how adolescent girls and adult women see themselves. In one major American survey of over 500 adolescent girls aged 9–16, nearly 70% believed magazine pictures influenced their idea of the ideal body shape, and 47% of the same sample wished to lose weight as a result (Field, Cheung, Wolf, Herzog, Gortmaker, & Colditz, 1999).

Evidence from Experimental Research

A particularly useful form of empirical research on media effects is controlled experimentation where participants are exposed to ultra-thin models (compared with other types of images) to assess their immediate psychological impact. Many such studies have found that exposing

women to the thin ideal has a negative impact on body satisfaction (Heinberg & Thompson, 1995; Irving, 1990; Posavac, Posavac, & Posavac, 1998), although this is not invariably so (e.g., Richins, 1991). A recent meta-analysis of 25 studies involving 43 comparisons between image conditions found an effect size of $d = -.31$ across studies showing that, on average, women felt worse about their bodies after exposure to the thin ideal, as opposed to other types of images (Groesz, Levine, & Murnen, 2002).

Moreover, the meta-analysis showed that this negative impact is strongest for women younger than 19 ($d = -.36$), based on findings in five separate studies. Thus, adolescent girls may be particularly vulnerable to media exposure. Although few in number and using small samples, findings are consistent: exposure to ultra-thin models depressed adolescent girls' self-evaluations of their physical attractiveness (Crouch & Degelman, 1998; Martin & Gentry, 1997), their body satisfaction (Shaw, 1995) and their sense of "personal desirability" (Tan, 1979). All but one of these studies used either no models or overweight models as controls. The only exception was a single study which found no reliable difference between participants exposed to ultra-thin and "average" models (Martin & Gentry, cited by Groesz et al., 2002).¹

Current Objectives

Thus, exposure to ultra-thin media models has a negative effect on adolescent girls' body image. Yet none of these studies has assessed effects on global self-esteem.² Our first objective was therefore to extend the research paradigm described above by assessing effects on both body image and self-esteem, and testing the role of the former as a mediator of effects on the latter. Would the effects on body satisfaction generalize to global self-esteem? If so, this would demonstrate a causal role of sociocultural influences on body satisfaction in undermining self-esteem, at least temporarily, among adolescent girls.

Previous studies of this kind have typically confounded model size with model attractiveness, making it hard to disentangle whether the impact of the images is because of the models' ultra-thin size or their attractiveness, or both (Halliwell & Dittmar, 2004). We addressed this by

¹ This study was not reported in Martin and Gentry (1997), but is attributed to these authors by Groesz et al. (2002). We have been unable to locate a full published report.

² Martin and Gentry (1997) reported effects on what they described as state self-esteem. However, their measure was an appearance-focused subscale of a state self-esteem measure, not a measure of *global* self-evaluation.

presenting participants with images of the same models, varying their size so that they were either ultra-thin (as in the magazines adolescent girls read) or presenting a slim, but more average, body size. This was achieved using the digital imaging procedure outlined by Halliwell and Dittmar, where pictures of ultra-thin models can be stretched realistically to represent a somewhat larger body size. This is the first study among adolescent girls to compare the effects of exposure to ultra-thin and average-size models using a controlled manipulation of model size. We compared both size conditions with a control condition in which the participants did not see models. Thus we would be able to distinguish effects of exposure to models from effects of the models' size.

Some studies have measured body satisfaction both before and after exposure to images (e.g., Heinberg & Thompson, 1995), but this produces demand characteristics. Hence, we opted for a between-subjects design, with body satisfaction and self-esteem measured just once, after exposure. We compared three exposure conditions: (i) ultra-thin models, (ii) average-size models, (iii) no models (control). We expected that exposure to magazine models would have a negative effect on girls' body image, which might possibly spread to global self-esteem. The average-size models, although larger than the ultra-thin models, were nevertheless idealized, digitally-enhanced depictions of attractive young women. It was unclear whether or not exposure to these models would have a less negative impact on adolescent girls than exposure to the ultra-thin models; hence, this was considered a matter for empirical investigation.

In summary, the experimental part of the study was designed to test the following hypotheses:

- H1: Participants viewing magazine models would show significantly lower levels of body satisfaction than participants in the control condition.
- H2: Participants viewing ultra-thin models would show significantly lower levels of body satisfaction than participants viewing average-size models.
- H3: Participants viewing magazine models would show significantly lower levels of self-esteem than participants in the control condition.
- H4: Participants viewing ultra-thin models would show significantly lower levels of self-esteem than participants viewing average-size models.
- H5: Any effects on self-esteem would be fully mediated by effects on body satisfaction.

SOCIOCULTURAL PREDICTORS OF BODY IMAGE DISTURBANCE

Exposure to unrealistic media images is one contextual factor that can negatively affect body image, but there are also more chronic individual variables, reflecting social psychological processes, which predict body satisfaction. Several studies have used a correlational approach to study sociocultural predictors of body-related affect and behavior.

Awareness and Internalization of Sociocultural Attitudes Toward Appearance

Harrison (2001) found that exposure to thin-ideal TV was associated with a rise in eating disorder symptoms in adolescent girls; this effect was partially mediated through increasing perceived discrepancies between actual and ideal body shape. Stice, Schupak-Neuberg, Shaw, and Stein (1994) found that, among young college women, greater media exposure was linked directly with more eating disorder symptoms and indirectly—through stronger internalization of the ideal-body stereotype—with greater body dissatisfaction. These findings suggest that women's internalization of sociocultural standards of female beauty is an important factor mediating the association between media exposure and body dissatisfaction.

It is important to draw a distinction between simply being aware of cultural standards of female beauty, and internalizing them as a personal belief system. Awareness of these ideals may be particularly important to study in younger girls, as it is likely to be a precursor to internalization. Heinberg, Thompson, and Stormer (1995) developed the sociocultural attitudes toward appearance questionnaire (SATAQ), a measure of the degree to which individuals (i) are aware of, and (ii) internalize, societal norms regarding beauty and body size. Awareness and internalization of these norms appear to be good predictors of subsequent body satisfaction. Although most individuals express awareness of these societal norms, not all internalize them; internalization predicts body dissatisfaction better than does awareness (Cusumano & Thompson, 1997; Halliwell & Dittmar, 2004).

Social Comparison with Media Models

Additionally, experimental and correlational research suggests that social comparison may be an important mechanism for adverse effects of the media on women's body image. Studies suggest that comparison processes may be triggered automatically for women as soon as attractive

media models are presented (Cattarin, Thompson, Thomas, & Williams, 2000; Dittmar & Howard, 2004b). Martin and Kennedy (1993) report that social comparison with advertising models increases markedly between ages 8 and 12, and continues to increase thereafter with age. They argue that the observed decline with age in adolescent girls' perceptions of their attractiveness may be attributable to increasing social comparison with media models.

Current Objectives

Based on the evidence above, it seems reasonable to theorize that increasing awareness and internalization of sociocultural attitudes toward appearance, and increasing social comparison with media models, may help to explain the decline in body satisfaction and self-esteem typically observed during early to middle adolescence among girls in Western cultures. No previous study has examined the contribution of these three factors together to the explanation of age trends in body satisfaction and self-esteem. Hence, our second objective was to test a conceptual model of these trends, over the age range 11–16, among participants in the two experimental conditions.

Specifically, we reasoned that girls growing up in Western cultures would become increasingly aware of sociocultural attitudes toward appearance, as a result of repeated media exposure during adolescence. On the assumption that awareness of a social value is a prerequisite for endorsing it personally, we reasoned that growing awareness must precede greater internalization of these attitudes (after Heinberg et al., 1995). Greater internalization would increase both the salience of media standards of female attractiveness as a comparison dimension and the extent to which models presented in the media were subjectively appropriate comparison targets—leading to an increase in social comparison with media models. Comparisons with these unrealistic ideals would be inherently frustrating for the majority of girls, resulting in a decline with age in body satisfaction. This, in turn, would contribute to the decline in global self-esteem among girls over this age range in Western cultures.

Based on the above reasoning, the correlational part of the study was designed to test the conceptual model shown in Figure 1. Although the cross-sectional design would not allow us to draw unequivocal causal inferences, we tested the prediction that the covariance among age and indicators of self-esteem, body satisfaction, awareness and internalization of sociocultural attitudes toward appearance, and social comparison with media models would be consistent with the paths summarized in this

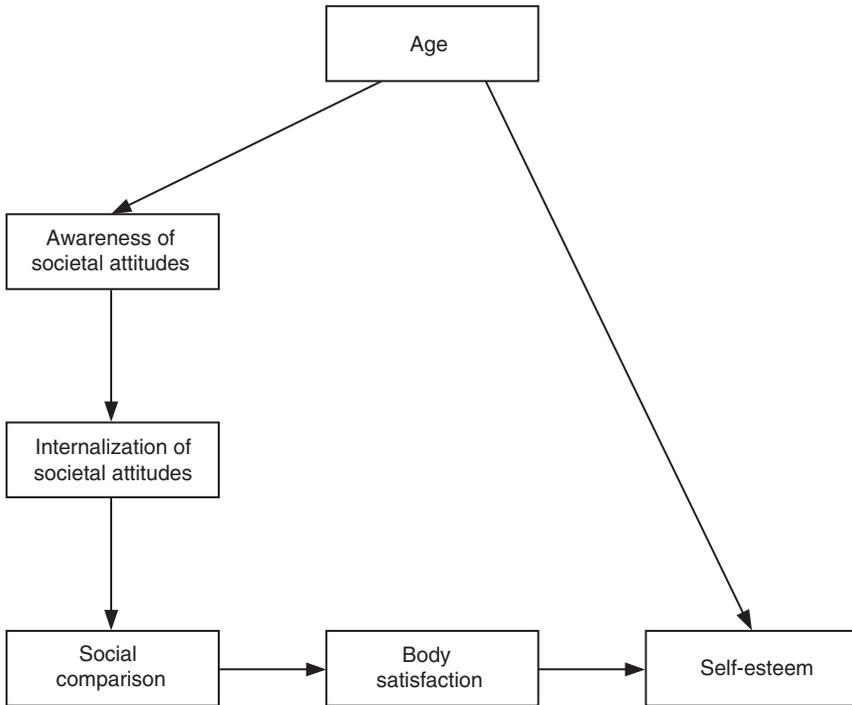


FIGURE 1 Conceptual model showing proposed mediators of age trends in body satisfaction and self-esteem among adolescent girls.

figure. In particular, we expected to see lower self-esteem among older than among younger girls in our sample. However, we predicted that this trend would be partially accounted for by a corresponding downward trend in body satisfaction. The latter would be accounted for by upward trends with age in awareness and internalization of sociocultural attitudes toward appearance, and in social comparison with media models.

METHOD

Design

The study consisted of two parts. The first used an experimental design, comparing exposure to images of ultra-thin models, average-size models, or no models (control), with body satisfaction and self-esteem as dependent variables. The second part used a correlational design, testing the proposed relationships between the variables shown in Figure 1.

Magazine Images

Each experimental condition was represented by two magazine covers created for the study, similar in general layout. The digital imaging software package Adobe Photoshop was used to create a magazine template, named "Fresh," upon which story titles and captions were placed. The template was closely modeled on prominent U.K. girls' magazines (e.g., *Sugar*, *Just 17*). To create the magazine covers for the control condition, an image of a Christmas stocking was used on both covers with two different captions relating to Christmas. Magazine covers for the ultra-thin models experimental condition featured full-length photographs of attractive female models chosen from an international modeling agency website. According to measurements provided on the website, both models had a height to waist ratio of 6.3:1, and wore a U.K. dress size 8 (Debenhams, 2001), representative of the female models typically used in advertisements and on magazine covers. Both were pictured wearing tight clothing, facing the camera, and with long, loose hair, making it easier to produce convincing stretched images for the average-size condition. To create images for the average-size condition, we used the procedure outlined by Halliwell and Dittmar (2004), where each model's body—but not her face—was stretched by 25%, so that it represented an average U.K. dress size of 12–14 (Debenhams, 2001). Thus, facial features were held constant, a key determinant of perceived attractiveness (see, e.g., Zebrowitz, 1997). In order to make these images more realistic, the models' legs and arms were also "fattened" slightly. Studies have confirmed that this procedure affects perceptions of the size, but not the attractiveness, of the models (Dittmar & Howard, 2004b; Halliwell & Dittmar, 2004).

Measures

Awareness and internalization of sociocultural attitudes toward appearance. We used a shortened version of the SATAQ (Heinberg et al., 1995), where participants rated their agreement with six statements on six-point scales, ranging from *strongly disagree* (1) to *strongly agree* (6). Awareness of sociocultural ideals was assessed through the endorsement of three statements: "In our society, fat people are regarded as unattractive," "Attractiveness is very important if you want to get ahead in our culture," and "In today's society, it is important to always look attractive." Internalization of these ideals was assessed using three statements: "Clothes look better on thin models," "Photographs of thin women in magazines make me wish that I were thin," and "I do not wish

to look like the models in magazines" (reversed). For the original scale, Heinberg et al. report reliabilities of .71 for awareness and .88 for internalization. In the present study, reliabilities were slightly lower yet still acceptable: .69 for awareness and .76 for internalization.

Social comparison with media models. As a measure of social comparison with media models in general, participants responded to a single item, also derived from the SATAQ (Heinberg et al., 1995), "I tend to compare my body to people in magazines and on TV," rated on a six-point scale, ranging from *strongly disagree* (1) to *strongly agree* (6).

As a more naturalistic indicator of social comparison, we also asked participants in the two experimental conditions to rate specifically how much they had compared themselves to the models used on the magazine covers in the study, on a six-point scale ranging from *not at all* (1) to *a lot* (6). Although only a single item, this reflected a more ecologically valid approach, as the question referred to a specific situation and specific comparison targets. Mean levels of social comparison reported on this measure did not differ between the ultra-thin and average-size model conditions. The two social comparison measures showed a correlation of .40.

Body satisfaction. Body satisfaction was measured using the appearance evaluation subscale of the multidimensional body-self relations questionnaire developed by Cash (see Brown, Cash, & Mikulka, 1990). This seven-item scale assesses evaluative body image on five-point Likert scales, ranging from *definitely disagree* (1) to *definitely agree* (5). An example item is "Most people would consider me good looking." Internal consistency is reported to be .88, and test-retest reliability over 1 month is .91 (Muth & Cash, 1997). In the present study, internal consistency was highly acceptable at .87.

Self-esteem. To assess self-esteem, we used Rosenberg's (1965) self-esteem scale, a ten-item measure using four-point scales ranging from *strongly disagree* (0) to *strongly agree* (3). Self-esteem is assessed through agreement with global self-evaluative statements such as "On the whole I am satisfied with myself." Internal consistency is reported to range from .77 to .88 and, in the present study, was .84.

Participants and Procedure

The research was conducted in a single-sex state school in London, located in a primarily middle-class neighborhood. All pupils present in years 7

(age 11–12) to 11 (age 15–16) were invited to participate. Ethical approval was given by the local education authority and by the head teacher, acting *in loco parentis*, and no pupils declined to participate. The sample consisted of 136 female adolescents aged 11–16: age 11 ($n = 15$), age 12 ($n = 32$), age 13 ($n = 23$), age 14 ($n = 29$), age 15 ($n = 23$), and age 16 ($n = 14$).³ The ethnic composition of the sample reflected that of the local population with 85% white Caucasian. Remaining participants reported Asian (5%), African (8%), or Latin (2%) ethnic backgrounds.

The study was conducted in school during religious education classes. Upon arrival, girls were informed that they would take part in a study about how different magazine covers are attractive to different people. All believed this cover story and were naïve to the true purpose of the study. Participants were assured that their answers were anonymous and strictly confidential and would not be shown to their parents or teachers. Using random number tables, each participant was assigned to one of five initial conditions, which were collapsed for analysis into the three conditions reported here.⁴

Consistent with the cover story, the first section of the questionnaire related to media and extra-curricular habits. The second section included the two SATAQ scales and the first social comparison measure, interspersed with filler items designed to support the cover story, such as “People featured in magazines tend to be rich.”

Participants were then shown two magazine covers, each for 15 seconds, which differed depending on exposure condition, depicting either ultra-thin models, average-size models or no models. After viewing both covers, participants rated their reactions to them and, in the two experimental conditions, they also rated their reactions to the models. They then completed the remainder of the questionnaire, ostensibly measuring aspects of their personalities, which contained the measures of body satisfaction and self-esteem, again interspersed with filler items, such as “I enjoy the work I do at school.”

³ One girl in the ultra-thin models condition was excluded from analyses because she did not report her age.

⁴ Initially, a further manipulation was included, whereby half the participants viewing ultra-thin or average-size models saw a message emphasizing appearance, intended to enhance social comparison, and half a message that did not. The mean level of social comparison reported after images with an appearance-related message was no different from that after messages unrelated to appearance: $M_{\text{appearance}} = 2.04$, $M_{\text{nonappearance}} = 2.14$; $t(106) = -.40$; NS. Moreover, the message manipulation yielded no significant main or interaction effects on either body satisfaction or self-esteem. Hence, it is disregarded in the analyses presented here. For this reason, group sizes vary between conditions (see Table 1), with a minimum size of 28 in the control condition, sufficient to detect a small to medium effect size.

Subsequently, participants who had viewed ultra-thin or average-size models completed the second social comparison measure. To check that model sizes had been manipulated successfully, participants in these two conditions were also shown two contour-drawing rating scales, each consisting of nine female body silhouettes, ranging from *underweight* (1) to *overweight* (9) (Thompson & Gray, 1995), and were asked to indicate which figures best represented the two models they had seen. Finally, all participants provided demographic information including age (in completed years) and ethnic origin. To calculate BMI, we also asked participants to report their height and weight; however, as a majority of participants failed to provide this information, BMI could not be included in the analysis.

Finally, all participants were debriefed orally as to the true purpose of the study and were given the opportunity to withdraw their data. None chose to do so. They also received a sheet which gave details of the present study, previous research into media influences on adolescent girls, and contact details of relevant support agencies. The oral debriefing and information sheet emphasized the unrealistic nature of media images, to counteract any possible negative feelings after exposure to the models.

RESULTS

Model Size Manipulation Check

Our manipulation of model size was successful. A multivariate analysis of variance on the contour rating scales confirmed that participants rated the body size of each model as significantly smaller in the ultra-thin condition than in the average-size condition, multivariate $F(2, 105) = 45.90$, $p < .00001$: for model 1, $M_{\text{ultra-thin}} = 2.30$, $M_{\text{average-size}} = 4.12$, $F(1, 106) = 60.47$, $p < .00001$, partial $\eta^2 = .36$; for model 2, $M_{\text{ultra-thin}} = 2.36$, $M_{\text{average-size}} = 4.23$, $F(1, 106) = 68.68$, $p < .00001$, partial $\eta^2 = .39$. The average-size models' mean ratings of just above 4 indicated a perceived body size just under average, assuming that the 5th silhouette represents a meaningful midpoint.

Impact of Media Images on Body Satisfaction and Self-Esteem

Table 1 shows mean levels of body satisfaction and self-esteem in each condition. We ran a one-way analysis of covariance (ANCOVA) on body satisfaction, controlling for age, awareness, internalization and social

TABLE 1
Mean Levels of Body Satisfaction and Self-Esteem (with Standard Deviations) in each Experimental Condition

Condition	Body Satisfaction		Self-Esteem		N
	M	SD	M	SD	
Control	3.68	.70	2.15	.41	28
Ultra-thin models	3.30	.65	1.94	.47	56
Average-size models	3.13	.73	1.89	.43	52

Note. Body satisfaction scores had a theoretical range from 1 to 5; self-esteem scores had a theoretical range from 0 to 3. Values are unadjusted mean scores.

comparison with media models (general item),⁵ with planned contrasts to test whether body satisfaction was lower after seeing models (H1) and whether this effect was stronger for ultra-thin compared with average-sized models (H2). Results showed a significant main effect of condition: $F(2, 128) = 5.12, p < .01$, partial $\eta^2 = .07$. Supporting H1, participants who had viewed models reported significantly lower body satisfaction than did participants in the control condition: contrast estimate = .42, SE = .13, $p < .01$. Against H2, there was no difference in body satisfaction between participants exposed to the ultra-thin or to the average-size models: contrast estimate = -.04, SE = .13, $p = .73$.

We then ran a one-way ANCOVA on the self-esteem scores, controlling for age, awareness, internalization and social comparison, with planned contrasts to test H3 and H4. Results showed a significant main effect of condition: $F(2, 128) = 3.58, p < .05$, partial $\eta^2 = .05$. Supporting H3, participants who had viewed models reported significantly lower self-esteem than did participants in the control condition: contrast estimate = .20, SE = .08, $p < .01$. Against H4, there was no difference in self-esteem scores between participants exposed to the ultra-thin or to the average-size models: contrast estimate = .04, SE = .07, $p = .62$.

To test H5, we repeated the preceding analysis with body satisfaction as a further covariate. Controlling for body satisfaction, the main effect of condition on self-esteem was eliminated: $F(2, 127) = .92, p = .40$, partial

⁵ Studies among adult women have sometimes shown moderation effects, such that the impact of ultra-thin models is greater among participants higher in internalization and/or social comparison tendencies (Dittmar & Howard, 2004a, 2004b; Halliwell & Dittmar, 2004). Hence, we conducted further GLM analyses to test whether each covariate interacted with the experimental manipulation to predict body satisfaction or self-esteem scores. These analyses had sufficient power to detect a medium effect size, but showed no significant results.

$\eta^2 = .01$. A single planned contrast showed no difference in self-esteem between participants in the experimental and control conditions after controlling for body satisfaction: contrast estimate = .07, SE = .07, $p = .29$. Thus, consistent with H5, effects of viewing models on self-esteem were fully accounted for by changes in body satisfaction. According to MacKinnon, Lockwood, Hoffman, West, and Sheets (2002), a relatively conservative criterion for evaluating the significance of indirect effects in psychological research is the Sobel test. We calculated this using the contrast estimate for H1 to define the path from IV to mediator and the parameter estimate for body satisfaction from the preceding ANCOVA to define the path from mediator to DV. Providing further support for H5, the indirect effect of condition on self-esteem through body satisfaction was significant (Sobel test: $z = 2.89$, $p < .01$).

Correlational Analysis of Age Trends in Body Satisfaction and Self-Esteem

Table 2 shows zero-order correlations between age, awareness, and internalization of sociocultural attitudes towards appearance, social comparison with media models (mean of both measures), body satisfaction and self-esteem among our participants. Only those who had viewed models are included, as our naturalistic social comparison indicator would not have been meaningful for participants in the control condition. Age trends in the three sociocultural variables and the two outcomes are shown in Figures 2 and 3, respectively. Consistent with expectations, age was positively associated with both awareness and internalization of sociocultural

TABLE 2
Zero-Order Correlations and Means (with Standard Deviations) of Study Variables Among Participants who had Viewed Models

Variable	1	2	3	4	5	6	M	SD
1. Age	—	.44	.53	.52	-.41	-.52	13.36	1.49
2. SATAQ awareness	.52	—	.52	.44	-.27	-.29	3.93	1.10
3. SATAQ internalization	.39	.43	—	.66	-.45	-.46	3.42	1.33
4. Social comparison with models	—	—	—	—	-.53	-.51	2.69	1.24
5. Body satisfaction	-.37	.04	-.29	—	—	.65	3.22	.69
6. Self-esteem	-.42	-.03	-.55	—	.71	—	1.92	.45

Note. Listwise $n = 107$. All correlations are statistically significant at $p < .01$. Correlations below the diagonal are corresponding values for the control group (listwise $n = 28$), where available.

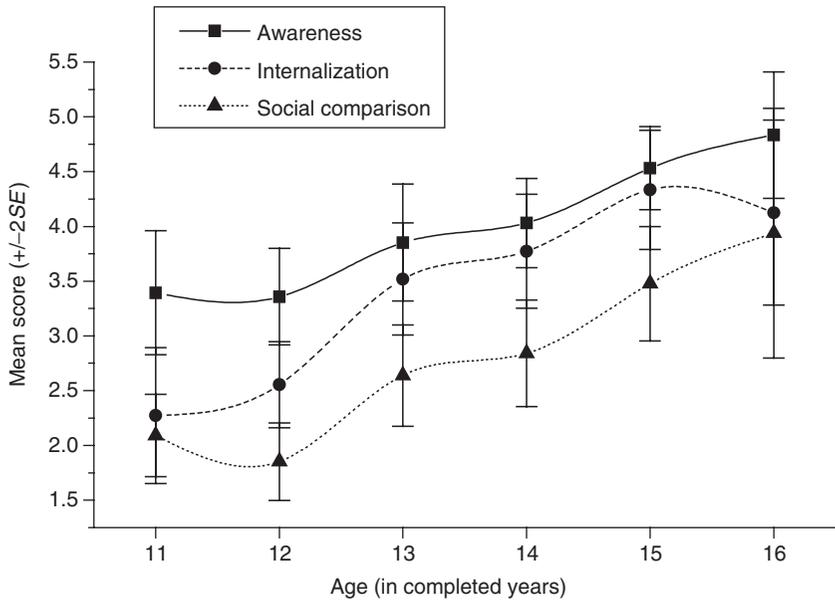


FIGURE 2 Mean (± 2 SE) awareness of sociocultural attitudes towards appearance, internalization of sociocultural attitudes toward appearance and social comparison with media models as a function of age (cross-sectional) among participants in the two experimental conditions ($n = 107$).

Note. All variables had a theoretical range from 1 to 6.

attitudes, and with social comparison (all $r \geq .44$, all $p < .001$), and was negatively associated with both body satisfaction and self-esteem (both $r \leq -.41$, both $p < .001$). The three sociocultural variables were positively associated among themselves (all $r \geq .44$, all $p < .01$) and were negatively associated with both outcomes (all $r \leq -.27$, all $p < .01$).

Subsequent analyses were designed to test the proposed path model of age trends in body satisfaction and self-esteem (Figure 1), using the EQS software package.⁶ Means, standard deviations, and zero-order correlations between all variables used are in Appendix. Two indicators each were created for awareness (AW1, AW2), internalization (IN1, IN2), social comparison (SC1, SC2), body satisfaction (BS1, BS2) and self-esteem (SE1,

⁶ We acknowledge that our sample size was small by conventional standards. However, we encountered no problems of nonconvergence or improper solutions—common difficulties with small sample sizes in structural equation modeling (Boomsma & Hoogland, 2001)—and the analysis had sufficient power to detect the effects of interest. Mardia's coefficient was acceptable at 4.15 for the measurement model (excluding age) and 4.60 for the path models.

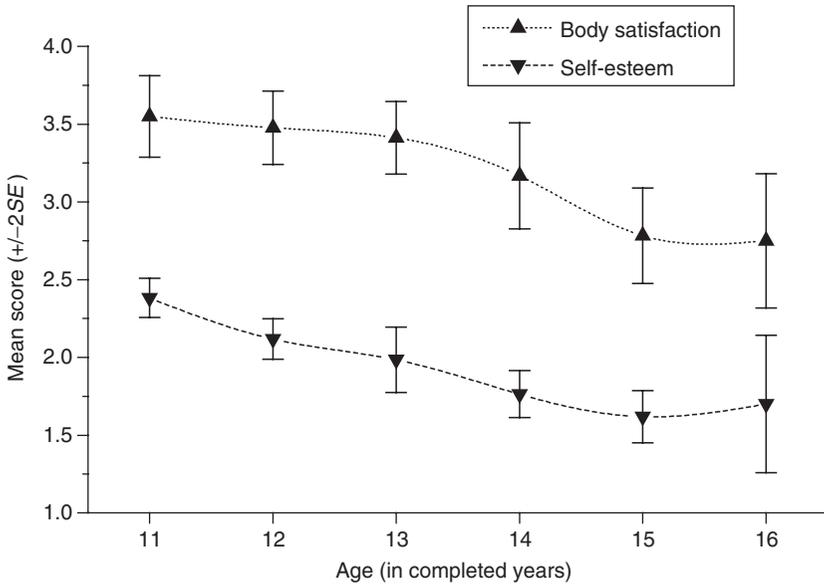


FIGURE 3 Mean (\pm 2 SE) body satisfaction and self-esteem as a function of age (cross-sectional) among participants in the two experimental conditions ($n = 107$).

Note. Body satisfaction scores had a theoretical range from 1 to 5; self-esteem scores had a theoretical range from 0 to 3.

SE2). In a preliminary analysis, we conducted a confirmatory factor analysis to test the presumed five-variable measurement model for these 10 indicators. Fit indices were highly acceptable: $\chi^2(25) = 36.52, p = .06$; comparative fit index (CFI) = .98; root mean square error of approximation (RMSEA) = .07. Hence, for our main analyses, age was treated as an observed variable, and the remaining constructs were modeled as latent variables.

We then tested our path model. All predicted paths were significant: all $|\beta| \geq .35$; all $p < .00001$. Indices of model fit were acceptable, although not perfect: $\chi^2(39) = 59.35, p = .02$; CFI = .96; RMSEA = .07. A Lagrange multiplier test indicated that the model could be improved by adding a direct path from age to internalization. As this path was considered theoretically plausible, it was included in a revised model, which showed excellent fit indices: $\chi^2(38) = 49.67, p = .10$; CFI = .98; RMSEA = .06. The revised model provided a significant improvement in fit compared with our original model: $\Delta\chi^2(1) = 9.68, p < .01$. A second Lagrange multiplier test suggested no theoretically plausible improvements to the revised model. Model parameters, shown in Figure 4, were consistent with the proposed causal

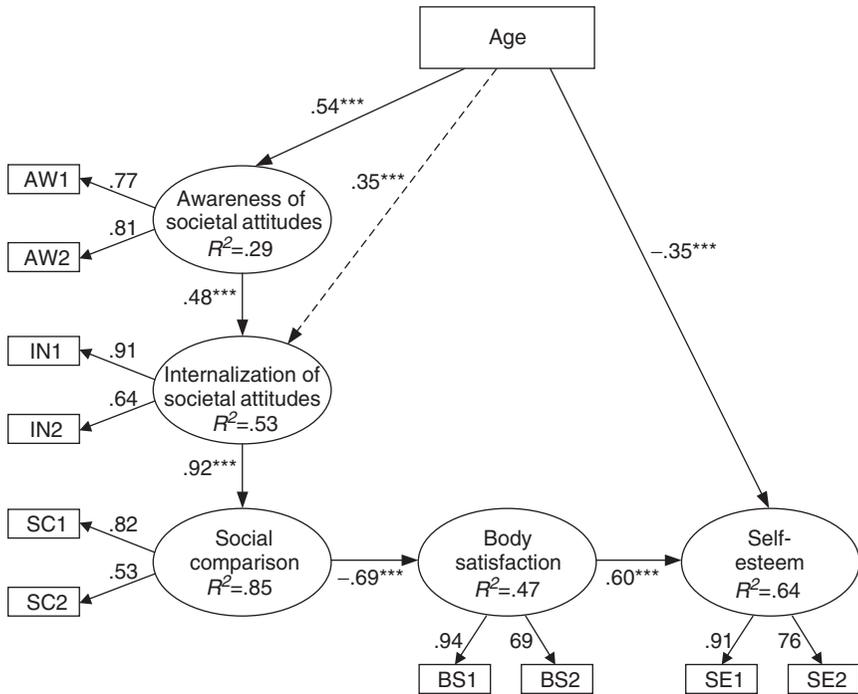


FIGURE 4 Structural equation model showing empirical mediators of age trends in body satisfaction and self-esteem among adolescent girls in the two experimental conditions ($n = 107$).

Note. Solid lines show conceptual model (from Figure 1). Dashed line shows added path. Numbers are standardized regression weights. For clarity of presentation, error terms are omitted. *** $p < .001$.

chain from age to body satisfaction and self-esteem, via awareness of sociocultural attitudes towards appearance, internalization of sociocultural attitudes toward appearance, and social comparison with media models. All paths predicted in Figure 1 remained significant: all $|\beta| \geq .35$; all $p < .001$. The model predicted an estimated 47% of variance in body satisfaction and an estimated 64% of variance in self-esteem.

We then examined the significance of indirect effect estimates, calculated by EQS based on the Sobel method, this being a relatively conservative criterion for inferring mediated effects in structural equation modeling (MacKinnon et al., 2002). In addition to the direct path from age to self-esteem ($\beta = -.35, p < .0001$), the revised model showed a significant composite indirect effect of age on self-esteem ($\beta = -.23,$

$p < .0001$) with both indirect paths passing through internalization, social comparison, and body satisfaction: this was consistent with our theoretical expectation that a downward trend in body satisfaction would partially account for the predicted downward trend in self-esteem with age.

In the revised model, age was a significant direct predictor of both awareness and internalization of sociocultural attitudes toward appearance; awareness also predicted internalization, internalization predicted social comparison, and social comparison, in turn, predicted body satisfaction. Overall, these effects amount to a highly significant indirect effect of age on body satisfaction ($\beta = -.38$, $p < .000001$). Crucially, however, there was no direct path between age and body satisfaction. To check this assumption, we computed a further model adding a direct path from age to body satisfaction. All existing paths remained significant at the .001 level. Moreover, the added path did not reach significance ($\beta = -.10$, $p = .37$), and there was no improvement in model fit compared with the revised model: $\Delta\chi^2(1) < 1$. Thus, the significant downward trend in body satisfaction with age was fully accounted for by the corresponding upward trends observed in the three sociocultural variables.

DISCUSSION

Impact of Media Images on Body Satisfaction and Self-Esteem

Viewing ultra-thin or average-size models led to decreases in both body satisfaction and self-esteem in adolescent girls aged 11–16 (H1, H3), with changes in self-esteem fully mediated by changes in body satisfaction (H5). These findings demonstrate a causal effect of media images on body satisfaction, apparently spreading to global self-esteem, among girls in the age range over which these variables typically fall most markedly in Western cultures.

Despite evidence that we had successfully manipulated perceptions of model size, we found no difference in body satisfaction or self-esteem between participants exposed to ultra-thin or to average-size models (H2, H4). This contrasts with recent studies on adult women, who sometimes show a relief effect after seeing average-size models (Dittmar & Howard, 2004b; Halliwell & Dittmar, 2004). However, it is likely that adolescent girls are particularly sensitized to sociocultural ideals of attractiveness. Within our controlled manipulation of model size, the stretched models were nevertheless glamorized, digitally enhanced depictions of relatively slim young women, and this appears to have been sufficient for these images to have had a negative impact. Given that, for adolescent girls, only overweight models have been shown to prevent a negative impact

(cf. Crouch & Degelman, 1998; Martin & Gentry, 1997; Shaw, 1995; Tan, 1979), our findings suggest that portrayals of nonoverweight, idealized models may be sufficient to lower body satisfaction and self-esteem among girls in this age range.⁷

These effects are even more striking given two features of the methodology. First, our manipulation was comparatively minimal and naturalistic: the magazine covers—viewed for just 15 seconds each—were not dissimilar to images which many participants were likely to have been viewing anyway over much longer periods in their own time. Second, the effects were observed using *trait* measures of both body satisfaction and self-esteem, which theoretically should have been relatively insensitive to contextual fluctuations. Presumably, girls in the two experimental conditions experienced changes in *state* body satisfaction and self-esteem of sufficient magnitude to achieve the subjective impression of generality over time.

Nevertheless, we acknowledge that these findings do not demonstrate the impact of media images on body satisfaction and self-esteem over the long term. Studies such as this can only detect transient changes in these outcomes, although they provide suggestive evidence that chronic, repeated exposure to idealized media images of women—such as occurs normatively in Western cultures—would likely have longer-term negative effects. Correlational data support a link between naturally occurring thin-ideal media exposure, body-related self-discrepancies and disordered eating among both adolescent and college-age samples (Harrison, 2001). However, only one study to date has attempted to test the effects of longer-term media exposure using experimental means. Stice, Spangler, and Agras (2001) conducted a longitudinal field experiment in which they randomly assigned adolescent girls to a 15-month subscription to a fashion magazine or a no-subscription control condition. Inevitably, their study suffered from a comparatively weak “manipulation-to-noise” ratio—on average, experimental participants reported having spent only about 21 hours reading the magazine over the entire period, compared with 15 hours for control participants. Nevertheless, they did find some long-term effects, although limited to a subset of “vulnerable”

⁷ Studies by Shaw (1995) and Tan (1979) found negative effects of viewing thin-ideal images without including measures of awareness or internalization of sociocultural attitudes toward appearance, nor of social comparison. Hence, it is unlikely that the effects observed here can be attributed to a priming effect of having responded to these scales before viewing the models. This interpretation is strengthened by a recent study among adult women by Dittmar, Stirling, and Halliwell (2005), which checked for priming effects: women's responses to thin-ideal and control images were unaffected by whether they completed a set of internalization and social comparison items before exposure to models or at the end of the study.

participants: in particular, the subscription led to significant increases in body dissatisfaction, dieting and bulimic symptoms among participants who were initially lower in social support, but no effects among those higher in social support.

Accounting for Age Trends in Body Satisfaction and Self-Esteem

Consistent with the growth curves reported by Baldwin and Hoffmann (2002), we found substantially lower self-esteem scores among older than among younger participants over the 11–16 age range, with scores among 15–16-year-olds averaging close to the theoretical mid-point of 1.5 on the Rosenberg scale—indeed about 40% of participants in this age group scored at or below this level. Self-esteem scores among Western populations typically occupy the upper half of the scale, with scores below the mid-point usually restricted to clinical samples (Heine, Lehman, Markus, & Kitayama, 1999; Hoyle, Kernis, Leary, & Baldwin, 1999). Hence, even if some of the reputed benefits of high self-esteem are now thought to have been exaggerated (Baumeister et al., 2003), the levels of self-esteem observed here among 15–16-year-olds should be interpreted as indicating the presence of psychological distress among a substantial minority of this age group.⁸

Structural equation models were consistent with our conceptual model of age trends in body satisfaction and self-esteem (Figures 1 and 4). As expected, older girls showed significantly lower body satisfaction, compared with their younger counterparts, and this trend was fully accounted for by correspondingly higher levels of awareness and internalization of sociocultural attitudes toward appearance, and of social comparison with media models. Moreover, these trends partially accounted for the lower levels of global self-esteem among older participants—consistent with the spreading of negative sociocultural effects on body satisfaction to global self-esteem observed in the experimental part of the study. As expected, there remained a significant direct path from age to self-esteem in our model, presumably reflecting age differences in other determinants of self-esteem among adolescent girls, such as social relationships or academic performance (Harter, 1999). Admittedly, this model was tested only among participants who had viewed magazine models, as our naturalistic measure of social comparison would not have been meaningful for

⁸ At this age, Western girls also typically show a substantial increase in the prevalence of depressive disorders. Stice and Bearman (2001) report that perceived pressure to be thin, thin-ideal internalization, body dissatisfaction, dieting, and bulimic symptoms, prospectively predict increases in depressive symptoms among middle-class U.S. adolescent girls.

participants in the control condition. However, this does not seriously undermine the external validity of our findings: indeed the sociocultural context we created—looking at magazine covers with idealized female models on them—was one which would have been strongly represented in everyday experience for most participants.

Relationships among the three sociocultural variables were largely as expected, although differences in awareness of sociocultural attitudes toward appearance did not fully account for the observed age trend in internalization of these attitudes. The greater awareness of these attitudes observed among older girls partially accounted for their greater internalization, consistent with a view of awareness as an important precondition for internalization. However, we also found a significant direct path from age to internalization. This suggests that increasing awareness is not the only path through which adolescent girls increasingly internalize these attitudes as they get older. Other likely routes are through changing parental and peer expectations, which were not measured here (Stice & Bearman, 2001). Consistent with Martin and Kennedy (1993), social comparison with media models was also significantly greater among older girls. Extending previous findings, this study shows that this trend is accounted for by age differences in internalization of sociocultural attitudes toward appearance. This is consistent with our proposal that internalization sets the frame of reference for social comparison—defining both the subjective value of comparison dimensions (e.g., beauty standards) and the perceived relevance of comparison targets (e.g., magazine cover models) for self-evaluation processes.

Previous studies have reported that eating concerns and body dissatisfaction increase with age among adolescents, and this has been attributed to the increasing discrepancy between how they look (which changes with puberty) and how they would like to look (Harter, 1999). The present study clarifies the nature of these age trends: here, the lower body satisfaction among older girls was fully accounted for by higher levels of internalization of the thin ideal (Stice et al., 1994) and social comparison with media images (Martin & Kennedy, 1993). Seemingly, as adolescent girls get older, they become more aware of societal ideals regarding appearance, yet pubertal development draws many away from these ideals. With no educational intervention, adolescents will internalize these values and hence engage in social comparisons, which result in an actual-ideal body discrepancy, entailing reduced body satisfaction and self-esteem.

However, we were unable to identify a key age, in the present study, at which girls become vulnerable to these sociocultural influences. Body satisfaction and self-esteem appeared to decline consistently from age 11 to age 16 (see Figure 3). Approximately 35% of 11-year-old girls scored

above the theoretical midpoint of the awareness scale, indicating that they were aware of societal attitudes concerning female attractiveness, while both internalization of these attitudes and social comparison with media models were markedly higher among girls of 13 and over (see Figure 2). Among 16-year-olds, approximately 65% of girls scored above the theoretical midpoint of the internalization scale, indicating overall acceptance of sociocultural attitudes toward appearance, and approximately 50% also scored above the theoretical midpoint of our social comparison measure. Taken together, these results suggest the need for early intervention strategies and for studies into these processes among even younger girls.

Some Limitations of the Study

Although the response rate for this study was near perfect, an acknowledged limit to generalizability is the fact that participants were predominantly middle-class, and all were attending a single-sex school. Existing research suggests that thinness norms and disordered eating may be especially prevalent among women of higher socioeconomic status (Drewnowski, Kurth, & Krahn, 1994). The possible effects of single-sex versus coeducational schooling on these processes remain unknown at present, and should be investigated empirically.

A second limitation is that we were unable to calculate an objective measure of adiposity for our participants. Previous research has shown that adiposity levels can prospectively predict the development of body dissatisfaction among middle-class U.S. adolescent girls, an effect apparently separate from the sociocultural pathway of "pressure to be thin" (Stice & Whitenton, 2002). Nevertheless, we should reiterate that an estimated 47% of variance in body satisfaction in the current study was directly attributable to individual differences in the use of media models as social comparison targets—without considering participants' adiposity levels.

A third limitation is that our data were collected at a single time point. Although the consistency of age trends with those identified longitudinally by Baldwin and Hoffmann (2002) provides some confidence that our results represent genuine developmental changes in self-esteem, rather than cohort differences, our structural equation models do not provide a conclusive test of the direction of effects proposed in Figures 1 and 4. Based on the theoretical reasoning outlined earlier, we propose that our results reflect important pathways between the variables measured. Nevertheless, there are probably also some recursive relationships between these variables. Bi-directional relationships have often been proposed between global self-esteem and domain specific self-evaluations, such as

body satisfaction (Hoyle et al., 1999). Moreover, in some cases, feelings of body dissatisfaction and low self-esteem may lead adolescents seeking self-improvement to increase their media consumption—resulting in a “vicious circle” of media exposure, internalization of sociocultural ideals, social comparison with unrealistic images, and further erosion of body satisfaction and self-esteem. Indeed one 13-year-old girl in the current study commented that “magazines are going to exploit the fact that teenagers are often unhappy with themselves.” Hence, longitudinal research is needed to confirm the causal paths we have proposed, and to unravel the full complexity of these processes.

Implications of These Findings

Implications of this study, as with many in this area, are far reaching. In an ideal world, the media should vary the size and the attractiveness of the models they employ, to represent the diversity of shapes and sizes among girls and women. However, this is unlikely to happen, especially considering the widespread belief among advertisers that “thinness sells” (Halliwell & Dittmar, 2004). In June 2000, the U.K. government held a body image summit to discuss the need for policies preventing the use of ultra-thin models as media images, but there remains little sign of any policy changes forthcoming in the near future.

Instead, it may be more fruitful to focus on giving adolescents tools to deconstruct the sociocultural influences they encounter. Psycho-educational interventions in school could focus on presenting and reinforcing a critical stance toward female beauty standards, in order to prevent—or at least reduce—high levels of internalization and social comparison. Suggestive evidence comes from a small-scale media literacy program administered to American high school sophomores (17–18 years old), which successfully reduced both internalization of the thin ideal and perceptions of the realism of media images (Irving, DuPen, & Berel, 1998). Another intervention, the “Everybody’s Different” program, led to both short- and long-term self-esteem benefits, through focusing on positive self-appraisal around weight and body image (O’Dea, 2001). Future research should examine primary school children, to determine at what age children become aware of sociocultural beauty ideals and to examine the mechanisms that moderate their impact. By extending or adapting the model presented here to even younger samples, it may be possible to provide a basis for theoretically informed educational programs that target girls before puberty and help prevent the decline in body image and self-esteem that currently is so typical of their middle adolescence.

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Appendix

TABLE A1
Zero-Order Correlations and Means (with Standard Deviations) of Variables Used for
Structural Equation Modeling Among Participants Who had Viewed Models

		1	2	3	4	5	6	7	8	9	10	11	M	SD
1.	Age	—	.37	.47	.53	.39	.48	.39	-.41	-.33	-.58	-.38	13.36	1.49
2.	AW1		—	.62	.48	.35	.43	.26	-.37	-.12	-.26	-.23	3.93	1.22
3.	AW2			—	.50	.30	.39	.23	-.25	-.05	-.31	-.17	3.89	1.22
4.	IN1				—	.60	.70	.42	-.54	-.31	-.50	-.39	3.23	1.45
5.	IN2					—	.48	.27	-.35	-.13	-.30	-.21	3.75	1.52
6.	SC1						—	.40	-.52	-.29	-.51	-.41	3.29	1.57
7.	SC2							—	-.47	-.28	-.45	-.22	2.08	1.41
8.	BS1								—	.66	.61	.58	3.21	.80
9.	BS2									—	.52	.50	3.25	.73
10.	SE1										—	.70	2.40	.52
11.	SE2											—	2.44	.46

Note. Listwise $n = 107$. AW1 and IN1 were means of two items each, measuring awareness and internalization, respectively. AW2 and IN2 were single items measuring these constructs. SC1 was the generalized social comparison item, and SC2 was the naturalistic social comparison item. BS1 and BS2 were means of four and three items, respectively, measuring body satisfaction. SE1 and SE2 were means of five items each, measuring self-esteem.

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