

EXPOSURE TO MEDIA-PORTRAYED THIN-IDEAL IMAGES ADVERSELY AFFECTS VULNERABLE GIRLS: A LONGITUDINAL EXPERIMENT

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Although laboratory experiments indicate that brief exposure to thin models leads to acute body dissatisfaction and negative affect in women, research has not tested whether longer term exposure results in lasting effects. Accordingly, we randomly assigned 219 adolescent girls to a 15-month fashion magazine subscription or a no-subscription condition and followed them over time. Despite evidence that the experimental manipulation successfully increased exposure to the fashion magazine and the ample statistical power, there were no main effects of long-term exposure to thin images on thin-ideal internalization, body dissatisfaction, dieting, negative affect, or bulimic symptoms. However, there was evidence that vulnerable adolescents, characterized by initial elevations in perceived pressure to be thin and body dissatisfaction and deficits in social support, were adversely affected by exposure to these images. Results suggest that exposure to thin-ideal images has lasting negative effects for vulnerable youth.

Researchers have suggested that media-portrayed images of the current beauty ideal, the hallmark of which is an ultra slender body, contribute

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to body dissatisfaction and eating pathology among young women (Levine & Smolak, 1996; Striegel-Moore, Silberstein, & Rodin, 1986; Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999). According to the dual pathway model (Stice, Ziemba, Margolis, & Flick, 1996), repeated exposure to ultra-slender models promotes an internalization of the thin-ideal body image for women, which in turn fosters body dissatisfaction. Internalization of the thin-ideal putatively contributes to body dissatisfaction because of a social comparison process where women compare themselves to idealized images and judge themselves as not meeting social expectations. Frequent exposure to media-portrayed, thin-ideal images may also contribute to body dissatisfaction because it alters normative perceptions regarding the average body dimensions of women. This resulting body dissatisfaction is thought to lead to elevated dieting and negative affect, which in turn increase the risk for the onset of bulimic symptoms. Thus, thin-ideal internalization and body dissatisfaction theoretically mediate the relation of media exposure to dieting, negative affect, and bulimic symptoms.

In addition, certain individual difference factors are thought to moderate the adverse effects of exposure to thin-ideal images. Exposure to thin-ideal images is hypothesized to produce greater thin-ideal internalization, body dissatisfaction, dieting, negative affect, and bulimic symptoms in adolescents who also receive elevated pressure to be thin from their family and friends because this should facilitate the internalization of media messages (Austin & Meili, 1994). Similarly, media exposure should produce more body dissatisfaction, dieting, negative affect, and bulimic symptoms for individuals showing greater initial internalization of the thin-ideal (Heinberg & Thompson, 1995). Initially elevated body dissatisfaction is also thought to potentiate these adverse effects because individuals with body image disturbances may be more affected by the social comparison process because their perceptions of their bodies are more discrepant from the thin-ideal (Posavac, Posavac, & Posavac, 1998). Alternatively, elevated social support may buffer individuals against the adverse effects of exposure to thin-ideal images. Elevated pressure to be thin, thin-ideal internalization, and body dissatisfaction may potentiate, and social support may mitigate, the negative effects of exposure to thin-ideal images.

A small group of studies has found that use of media with ideal body content was correlated with thin-ideal internalization, body dissatisfaction, and eating pathology (Abramson & Valene, 1991; Harrison & Cantor, 1997; Stice, Schupak-Neuberg, Shaw, & Stein, 1994; for an exception see Cusumano & Thompson, 1997). For example, Harrison and Cantor (1997) found that use of media with high ideal-body content was correlated with thin-ideal internalization, body dissatisfaction, and eating

disorder symptoms among young women. Although findings from these studies are consistent with the assertion that exposure to thin-ideal media results in eating problems, there are two alternative interpretations for these correlational data. First, it is possible that eating-disordered individuals seek thin-ideal media, perhaps to learn more effective weight control techniques. Second, it may be that some third variable (elevated thin-ideal internalization) causes both media use and eating disturbances.

In an effort to eliminate these alternative explanations, researchers have used randomized laboratory experiments that are not subject to these potential confounds to examine the effects of exposure to thin-ideal images. These investigations found that exposure to thin-ideal images resulted in moderate decreases in self-esteem and increases in depression, stress, guilt, shame, insecurity, and body dissatisfaction among women (Irving, 1990; Ogden & Munday, 1998; Richins, 1991; Stice & Shaw, 1994). For instance, Irving (1990) randomly assigned women to view slides of thin, average, or overweight models from fashion magazines in a standardized laboratory environment and found that participants exposed to thin models exhibited lower self-esteem and body satisfaction immediately after viewing these images than participants exposed to average or overweight models. Although these experiments have not examined mediational processes that may account for these relations, some have investigated factors that moderate these effects. In particular, studies suggest that these adverse effects are stronger for participants with initial elevations in thin-ideal internalization and body dissatisfaction (Heinberg & Thompson, 1995; Posavac et al., 1998; Waller, Hamilton, & Shaw, 1993). As an illustration, Posavac et al. (1998) found that exposure to ultra slender images from magazines only resulted in weight concerns for participants who had initially elevated body dissatisfaction. The evidence that exposure to these images results in greater body dissatisfaction and negative affect is noteworthy because these are documented risk factors for future eating pathology (Attie & Brooks-Gunn, 1989; Stice & Agras, 1998; Stice, Killen, Hayward, & Taylor, 1998; Striegel-Moore, Silberstein, Frensch, & Rodin, 1989).

Whereas the above experiments indicate that exposure to thin-ideal images results in body dissatisfaction and negative affect, it has been suggested that these effects may be short lived (Levine & Smolak, 1996; Thompson et al., 1998). Moreover, the above findings might have questionable external validity because of the artificial nature of the laboratory environment. Accordingly, we sought to eliminate these two possibilities by testing whether long-term exposure to media-portrayed, thin-ideal images in the natural environment results in lasting increases in body dissatisfaction and negative affect. We also investigated

whether exposure to these images resulted in greater thin-ideal internalization, dieting, and bulimic symptoms, as would be predicted from the dual pathway model (Stice et al., 1996). The first aim of this experiment was to test whether exposure to thin-ideal images in the natural environment produced main effects on thin-ideal internalization, body dissatisfaction, dieting, negative affect, and bulimic symptoms. Because past experiments have not investigated the processes that may mediate the adverse effects of exposure to thin-ideal images, the second aim of this experiment was to test the assertion that thin-ideal internalization and body dissatisfaction mediate the relation of media exposure to growth in dieting, negative affect, and bulimic symptoms. The third aim was to investigate individual difference factors that may moderate the adverse effects of media exposure. Specifically, we tested whether elevated pressure to be thin, thin-ideal internalization, and body dissatisfaction potentiates, and social support mitigates, the negative effects of exposure to thin-ideal images.

To accomplish these aims, we randomly assigned adolescent females to a fashion magazine subscription or a no-subscription control condition and followed them over time. We decided to manipulate exposure to a fashion magazine to facilitate comparability with past laboratory experiments on the effects of magazine-portrayed, thin-ideal images. The external validity of this decision was supported by the finding that 41% of adolescent females report that magazines are their most important source of information on dieting and health (Paxton et al., 1991) and that 61% of adolescent females read at least one fashion magazine regularly (Levine, Smolak, & Hayden, 1994). We selected *Seventeen* magazine in particular because it is the most widely read magazine among adolescent females, with a total readership of 11 million (Levine & Smolak, 1996). Content analyses have also clearly documented that the models portrayed in this magazine are ultra slender (Cusumano & Thompson, 1997).

METHOD

PARTICIPANTS

Participants were 219 adolescent females recruited from two private high schools in the San Francisco Bay area, one of which was coeducational and the other of which was all female. At baseline, these students were in 9th or 10th grade and ranged in age from 13 to 17 years ($M = 14.1$). The sample was composed of 19% Asians/Pacific Islanders, 4% African Americans, 2% Hispanics, 1% Native Americans, 66% Caucasians, and 8% who specified "other." Average parental education (a

proxy for socioeconomic status) ranged from some grade school (1%) to advanced degree (37%), which was also the mode.

PROCEDURES

A passive consent procedure was used where a letter describing the study was sent home to parents and they were asked to return a signed letter if they did not want their children to participate. This procedure resulted in a 93% participation rate. The study was described as an investigation of the development of adolescent physical and mental health. Participants completed a seven-page survey in groups of approximately 30 to 50 students at baseline (T1), 10 months after baseline (T2), and 20 months after baseline (T3). Participants were identified by a number to ensure confidentiality.

Parents and students at each school were informed that a raffle would be held for (a) subscriptions to “a popular adolescent magazine” or (b) gift certificates to a book and music store to compensate participants for completing the surveys.¹ In this way we were able to randomly assign roughly half (45%) of the participants to the magazine condition (wherein they received a subscription to *Seventeen*) without divulging the hypotheses of this experiment. Gift certificates were awarded to a subset of the raffle winners (5%) to further obscure the purpose of the study. Adolescents and parents were not told which magazine would be distributed to raffle winners and only became aware that they had won the raffle when they received the first magazine at their home (or the gift certificate to the book and music store). Magazines were mailed directly from *Seventeen* to students’ homes on a monthly basis for the last 15 months of the 20-month study period. Similar raffles were held for the T2 and T3 data collections to compensate participants for completing surveys, but only gift certificates to a book and music store were awarded at these subsequent time points. This project was approved by the Stanford University Committee for the Protection of Human Subjects in Research.

1. It should be noted that this experiment was somewhat incidental in conception. The raffle for magazine subscriptions (and gift certificates to the book and music store) was initially intended to simply serve as a participant incentive. However, it occurred to us after starting the study that a raffle was equivalent to random assignment and we therefore recorded who received the subscription so that we could detect any long-term adverse effects over the study period.

MEASURES

Magazine Exposure Manipulation Check. Two measures were included as a manipulation check. First, to assess whether the experimental manipulation successfully resulted in increased exposure to *Seventeen* magazine for participants in the experimental condition relative to those in the control condition, adolescents were asked at each of the three assessments how many hours per month, on average, during the last six months they had spent reading *Seventeen* magazine. Second, to assess whether there were differences in exposure to other fashion magazines that might compromise the experimental manipulation, adolescents were asked at the three assessments how many hours per month on average during the last six months they spent reading *Cosmopolitan*, *Mademoiselle*, and *Glamour* using three separate items. These items were summed to form a fashion magazine exposure composite. The 10-month test-retest coefficient was .52 for the *Seventeen* magazine exposure item and .45 for the other fashion magazine exposure composite in the control group.

Body Mass. Body mass was measured with the body mass index: BMI = weight (kg)/height² (m²), based on self-report data. Self-reported weight has been found to be highly correlated with actual weight measurements for both adolescents and adults, with the correlation typically ranging from .96 to .99 (Attie & Brooks-Gunn, 1989; United States Public Health Service, 1988). The temporal reliability, convergent validity, and criterion validity of the BMI has been established (Garrow & Webster, 1985; Kraemer, Berkowitz, & Hammer, 1990; Stice, Cameron, Killen, Hayward & Taylor, 1999). The 10-month test-retest coefficient was .91 for the BMI in the control group.

Perceived Pressure to be Thin. Participants reported the amount of pressure to be thin they perceived from family, friends, and dating partners using six items from the Perceived Sociocultural Pressure Scale (Stice et al., 1996; sample item: "I've perceived a strong message from my family to have a slender figure"). Items used a 7-point response format ranging from 1 (*none*) to 7 (*a lot*), and items were averaged for analyses. The internal consistency, temporal reliability, and predictive validity of this measure has been documented (Stice & Agras, 1998; Stice et al., 1996). This scale had a Cronbach's α of .80 at T1 in the current sample and a 10-month test-retest coefficient of .59 in the control group.²

2. It might be noted that the 2-week test-retest coefficient for the perceived pressure to be thin scale was .81 in an unpublished pilot study involving adolescent females ($N = 50$).

Social Support. Perceived social support was measured with 12 items adapted from the Network of Relationships Inventory (Furman & Buhrmester, 1985) assessing companionship, guidance, intimacy, affection, admiration, and reliable alliance from parents and peers. These items asked participants to respond using a 5-point format ranging from "strongly disagree" to "strongly agree" and all items were averaged. The internal consistency, temporal reliability, and predictive validity of this measure have been documented (Furman & Buhrmester, 1985; Stice & Barrera, 1995). This scale had a Cronbach's α of .86 at T1 in the current sample (because this measure was only administered at T1, no test-retest coefficient could be calculated).

Thin-Ideal Internalization. Internalization of the thin-ideal was assessed with the Ideal-Body Stereotype Scale-Revised (Stice et al., 1996). This scale asks participants to indicate their level of agreement with statements concerning what attractive women look like (sample item: "Slender women are more attractive") on 5-point scales ranging from "strongly disagree" to "strongly agree." Items were averaged for analyses. This scale possesses acceptable internal consistency, in addition to convergent, discriminant, concurrent, and predictive validity (Stice & Agras, 1998; Stice et al., 1996). This scale had a Cronbach's α of .83 at T1 in the current sample and a 10-month test-retest coefficient of .67 in the control group.

Body Dissatisfaction. Body dissatisfaction was assessed with an adapted form of the Satisfaction and Dissatisfaction with Body Parts Scale (Berscheid, Walster, & Bohrnstedt, 1973). This scale asks participants to indicate their level of satisfaction with eight body parts on 6-point scales ranging from "extremely satisfied" to "extremely dissatisfied." Items were averaged for analyses. This scale has acceptable internal consistency, temporal reliability, and predictive validity (Stice & Shaw, 1994; Stice & Agras, 1998). In the present sample, this scale had a Cronbach's α of .91 at T1 and a 10-month test-retest coefficient of .72 in the control group.

Dieting. The Dutch Restrained Eating Scale (DRES; van Strien, Frijters, van Staveren, Defares, & Deurenberg, 1986) was used to assess dieting. Participants indicate the frequency of dieting behaviors using 5-point scales ranging from "never" to "always." Items were averaged for analyses. This scale has been found to possess adequate internal consistency, convergent validity, and criterion validity (Laessle et al., 1989; van Strien et al., 1986; Wardle & Beales, 1987). The DRES had a Cronbach's α of .93 at T1 and a 10-month test-retest coefficient of .75 in the control group.

Negative Affect. A composite of the Burns Depression Checklist (BDC; Burns, 1997) and the Burns Anxiety Inventory (BAI; Burns &

Eidelson, 1998) was used to assess negative affect. The BDC is a 25-item scale that assesses depressive symptoms over the past month using a 5-point response format ranging from 1 = "not at all" to 5 = "extremely." The BAI is a 25-item measure assessing anxiety symptoms over the past month using the same response format as the BDC. Items from these two scales were averaged to form an overall negative affect composite. The internal consistency and convergent validity of these scales have been documented (Burns, 1997; Burns & Eidelson, 1998). The negative affect composite had a Cronbach's α of .96 at T1 and a 10-month test-retest coefficient of .76 in the control group.

Bulimic Symptoms. The diagnostic items from the Eating Disorder Examination-Questionnaire (EDE-Q; Fairburn & Beglin, 1994) were used to assess bulimic symptoms. The EDE-Q was derived directly from the Eating Disorder Examination interview (EDE; Fairburn & Cooper, 1993), a validated measure of eating pathology. The EDE-Q focuses on the past 28 days to assess the main features of bulimia, including binge eating, compensatory behaviors, and overvaluation of weight and shape. The 17 diagnostic items for bulimia were standardized (to accommodate the different response formats) and summed to create an overall bulimic symptomatology index. The internal consistency and convergent validity of the EDE-Q has been documented (Black & Wilson, 1996; Fairburn & Beglin, 1994). The EDE-Q had a Cronbach's α of .84 at T1 and a 10-month test-retest coefficient of .77 in the control group.

RESULTS

PRELIMINARY ANALYSES

Seven of the T1 participants did not provide data at T2 (3%) and another seven did not provide data at T3 (3%), although only three participants did not provide data at both T2 and T3 (1%). Participants who provided complete data did not differ significantly from those who did not on any of the variables at T1. Because the random regression growth curve models used here can accommodate cases with only two of three waves of data, the effective attrition rate was 1%.

Preliminary analyses also verified that there were no significant differences (all $ps > .10$) between experimental and control conditions on age, ethnicity, average parental education, BMI, thin-ideal internalization, body dissatisfaction, dieting, negative affect, or bulimic symptoms at T1. In addition, the two groups did not differ significantly (all $ps > .10$) in terms of exposure to *Seventeen* or other fashion magazines at T1. These

preliminary analyses collectively suggest that random assignment was successful in creating initially equivalent groups.

MANIPULATION CHECK

Manipulation checks tested whether participants in the experimental condition showed increased exposure to *Seventeen* magazine relative to participants in the control condition and whether there were any differences in exposure to other fashion magazines between groups that might have compromised the experimental manipulation. Random regression growth curve models (Rogosa, Brandt, & Zimowski, 1982; Rogosa & Willett, 1985) were used for this purpose. Available data from the three assessments were used to generate individual linear slope and intercept parameters for each participant for both exposure to *Seventeen* and exposure to other fashion magazines. The slope parameters represented the average linear growth (change) in the variable across each of the two 10-month intervals for each adolescent. The intercept parameters were coded to represent the value of the linear growth trajectory for each participant at T1. The manipulation checks were accomplished by regressing the slope parameters for exposure to *Seventeen* magazine and exposure to other fashion magazines on a dummy coded vector representing magazine condition (magazine condition = 1 and control = 0) and on the T1 intercept version of the outcome (to control for the effects of initial variation in the criteria). Results verified that participants in the experimental condition showed a significantly greater increase in exposure to *Seventeen* magazine relative to participants in the control condition over the study period ($\beta [1/212] = .15, p < .05$). Data suggested that on average participants in the experimental condition spent 30 more minutes per month reading *Seventeen* than did participants in the control condition, which represented approximately 6 hours and 15 minutes of additional exposure to *Seventeen* over the 15-month subscription. The estimated total time spend reading *Seventeen* during the study period was approximately 21 hours for participants in the experimental condition and 15 hours for participants in the control condition.³ However, participants in the two conditions did not show significantly differential exposure to other fashion magazines over the study period ($\beta [1/212] = -.04, ns$). Thus, (a) the experimental manipulation successfully increased the exposure to *Seven-*

3. Although our experimental manipulation was successful in getting participants in the magazine condition to spend more time reading *Seventeen* than participants in the control condition, there was obviously no way to force participants in the magazine condition to read the magazine or force participants in the control condition not to read the magazine.

teen magazine in the experimental condition relative to the control condition and (b) there was no differential exposure to other fashion magazines that would have compromised the experimental manipulation.

MAIN EFFECTS OF EXPOSURE TO FASHION MAGAZINES

The first aim of this experiment was to assess whether there were main effects of assignment to the 15-month fashion magazine subscription on subsequent growth in thin-ideal internalization, body dissatisfaction, dieting, negative affect, and bulimic symptoms over the 20-month study period. Random regression growth curve models (Rogosa et al., 1982) were used for this purpose where available data from the three assessments were used to generate individual linear slope and intercept parameters for each participant on all five outcome variables. Again, the slope parameters represented the average linear growth in the outcome across each of the two 10-month intervals for each adolescent and the intercept parameters were coded to represent the value of the growth trajectory for each participant at T1. The main effects of the magazine manipulation were assessed with multiple-regression analyses where each of the slope parameters for the five outcomes was regressed on a dummy coded vector representing magazine condition and on the T1 intercept version of the outcome. T1 BMI was also used as a covariate in all models to control for the effects of individual differences in adiposity. Given the present sample size, the use of directional tests, and an α of .05, we had a power of .98 to detect a medium effect size for the experimental manipulation (Cohen, 1988). In contrast to expectations, the experimental manipulation did not show any significant main effects on growth in the five outcomes over the 20-month period (Table 1).

MEDIATORS OF THE EFFECTS OF EXPOSURE TO FASHION MAGAZINES

The second aim of this experiment was to test whether growth in thin-ideal internalization and body dissatisfaction mediated the relation of media exposure to growth in dieting, negative affect, and bulimic symptoms. However, the absence of main effects of the experimental manipulation precluded the possibility of any mediated effect (a relation between the independent variable and the dependent variable is a neces-

TABLE 1. Main Effects of the 15-Month Fashion Magazine Subscription on Subsequent Growth in Thin-Ideal Internalization, Body Dissatisfaction, Dieting, Negative Affect, and Bulimic Symptoms Over the 20-Month Period

Main Effects of the Fashion Magazine Subscription			
Criteria	<i>b</i>	<i>SE of b</i>	β
Thin-Ideal Internalization	-.04	.05	-.04
Body Dissatisfaction	.05	.06	.05
Dieting Behaviors	-.03	.05	.04
Negative Affect	.05	.05	.07
Bulimic Symptoms	.28	.42	.04

Note: β = standardized regression coefficients; *b* = unstandardized regression coefficients; *SE* = standard error.

sary prerequisite for mediation; Baron & Kenny, 1986). Thus, no additional analyses were conducted to test for any mediated effects.

MODERATORS OF THE EFFECTS OF EXPOSURE TO FASHION MAGAZINES

The third aim of this experiment was to test whether elevated pressure to be thin, thin-ideal internalization, and body dissatisfaction potentiated, and heightened social support mitigated, the adverse effects of exposure to thin-ideal images. Random regression growth curve models with cross-product terms were used for this purpose.

We first tested whether initial elevations in pressure to be thin from family and friends potentiated the effects of the experimental manipulation on subsequent growth in thin-ideal internalization, body dissatisfaction, dieting, negative affect, and bulimic symptoms. Following Aiken and West (1991), we centered all main effect variables to minimize collinearity (by subtracting the mean of each scale from each participant's score so the resulting variable had a mean of zero) and created a cross-product term with the centered main effect vectors. We then regressed the slope parameters for each of the criteria on the centered main effect vectors representing experimental condition and T1 pressure to be thin and the cross-product (or interaction) term in separate multiple-regression models. All models controlled for T1 BMI and the T1 version of the criteria and all variables were entered simultaneously.

Results indicated that T1 pressure to be thin moderated the relation between the experimental manipulation and growth in negative affect but

TABLE 2. Moderators of the Effects of the 15-Month Fashion Magazine Subscription on Growth in Thin-Ideal Internalization, Body Dissatisfaction, Dieting, Negative Affect, and Bulimic Symptoms Over the 20-Month Period

Criteria	<i>b</i>	<i>SE of b</i>	β
Interaction between Fashion Magazine Subscription and Initial Pressure to Be Thin			
Thin-Ideal Internalization	-.01	.07	-.02
Body Dissatisfaction	-.02	.08	-.04
Dieting Behaviors	.08	.07	.17
Negative Affect	.17	.06	.41**
Bulimic Symptoms	.11	.56	.03
Interaction between Fashion Magazine Subscription and Initial Thin-Ideal Internalization			
Body Dissatisfaction	-.08	.10	-.30
Dieting Behaviors	.05	.08	.22
Negative Affect	-.10	.07	-.46
Bulimic Symptoms	-.22	.68	-.11
Interaction between Fashion Magazine Subscription and Initial Body Dissatisfaction			
Dieting Behaviors	.04	.06	.15
Negative Affect	.11	.05	.48*
Bulimic Symptoms	.52	.46	.26
Interaction between Fashion Magazine Subscription and Initial Social Support			
Body Dissatisfaction	-.21	.11	-.87*
Dieting Behaviors	-.15	.09	-.77*
Negative Affect	-.06	.08	-.31
Bulimic Symptoms	-1.26	.71	-.78*

Note: β = standardized regression coefficients; *b* = unstandardized regression coefficients; *SE* = standard error.

* $p < .05$; ** $p < .01$.

not growth in thin-ideal internalization, body dissatisfaction, dieting, or bulimic symptoms (Table 2). The form of this interaction was probed following the procedure outlined by Aiken and West (1991). Data indicated that the experimental manipulation resulted in subsequent growth in negative affect for adolescents who were initially one standard deviation above the mean on pressure to be thin ($\beta [1/202] = .25, p < .01$) but not for those who were initially one standard deviation below the mean ($\beta [1/202] = -.10, ns$). The effect of exposure to the fashion magazine for participants with elevations in initial pressure to be thin accounted for 3.6% of the variance in negative affect growth over time.

Second, we tested whether initial elevations in thin-ideal internalization potentiated the effects of the experimental manipulation on subsequent growth in body dissatisfaction, dieting, negative affect, and bulimic symptoms using parallel random regression models. As indicated in Table 2, none of these interactions reached statistical significance.

Analyses then tested whether initial elevations in body dissatisfaction potentiated the effects of the experimental manipulation on subsequent growth in dieting, negative affect, and bulimic symptoms. Results indicated that T1 body dissatisfaction moderated the relation between the experimental manipulation and growth in negative affect, but not growth in dieting or bulimic symptoms (Table 2). Probes indicated that the experimental manipulation resulted in subsequent growth in negative affect for adolescents who were initially one standard deviation above the mean on body dissatisfaction ($\beta [1/201] = .18, p < .05$), but not for those who were initially one standard deviation below the mean ($\beta [1/201] = -.09, ns$). The effect of exposure to the fashion magazine for participants with elevations in initial body dissatisfaction accounted for 2.3% of the variance in negative affect growth over time.

Finally, we tested whether initial elevations in social support mitigated the effects of the experimental manipulation on subsequent growth in body dissatisfaction, dieting, negative affect, and bulimic symptoms. Results indicated that T1 social support moderated the relation of the experimental manipulation to growth in body dissatisfaction, dieting, and bulimic symptoms, but not growth in negative affect (Table 2). Probes of the first interaction revealed that the experimental manipulation resulted in subsequent growth in body dissatisfaction for adolescents who were initially one standard deviation below the mean on social support ($\beta [1/203] = .20, p < .05$) but not for those who were initially one standard deviation above the mean ($\beta [1/203] = -.05, ns$). The effect of exposure to the fashion magazine for participants with deficits in social support accounted for 2.3% of the variance in body dissatisfaction growth over time. Probes of the second interaction revealed that the experimental manipulation showed a significant relation to subsequent growth in dieting for adolescents who were initially one standard deviation below the mean on social support ($\beta [1/202] = .15, p < .05$), but not for those who were initially one standard deviation above the mean ($\beta [1/202] = -.07, ns$). The effect of exposure to the fashion magazine for participants with deficits in social support accounted for 1.3% of the variance in dieting growth over time.

Probes of the final interaction revealed that the experimental manipulation showed a significant relation to subsequent growth in bulimic symptoms for adolescents who were initially one standard deviation below the mean on social support ($\beta [1/202] = .16, p < .05$), but not for those

who were initially one standard deviation above the mean ($\beta [1/202] = -.07, ns$). The effect of exposure to the fashion magazine for participants with deficits in social support accounted for 1.4% of the variance in growth in bulimic symptoms over time.

DISCUSSION

Past laboratory experiments indicated that brief exposure to media-portrayed thin-ideal images resulted in acute body dissatisfaction and negative affect among young women. This experiment sought to assess whether longer-term exposure to thin-ideal media would result in lasting effects. We attempted to provide a test of these relations that had greater external validity because of the concern that results from previous laboratory experiments may not generalize. Despite evidence that the experimental manipulation successfully increased exposure to the fashion magazine and the ample statistical power, there were no main effects of long-term exposure to the fashion magazine on growth in thin-ideal internalization, body dissatisfaction, dieting, negative affect, or bulimic symptoms over time. The absence of main effects of the experimental manipulation precluded the possibility of any mediated effects. However, there was evidence that exposure to thin-ideal images resulted in (a) greater negative affect for vulnerable adolescents characterized by initial elevations in pressure to be thin and body dissatisfaction, and (b) in increased body dissatisfaction, dieting, and bulimic symptoms for vulnerable youth lacking adequate social support.

There are several possible interpretations for the absence of main effects of increased exposure to the fashion magazine. One possibility is that participants were too old to be adversely affected by exposure to thin-ideal images because they had already internalized the thin-ideal by mid-adolescence. Although intuitively appealing, the fact that all of the experimental studies that documented acute adverse effects of exposure to these images used young adults (Posavac et al., 1998) suggests that this cannot account for the null main effects. A second possibility was that we did not have adequate statistical power to detect experimental effects. However, power analyses indicated that we had a probability of .98 of detecting true experimental effects, making it unlikely that our null main effects were because of insufficient power. A third possibility was that we did not successfully manipulate exposure to the fashion magazine. Yet, our manipulation check verified that participants in the experimental condition showed increased exposure to the fashion magazine over time relative to controls, which renders this explanation improbable. On a related note, although 6.25 hours may seem to be a relatively small amount of exposure over the 15-month subscription period, past laboratory studies exposed

participants to these images for only a few minutes. Thus, the null main effects cannot be easily attributed to a relatively weaker manipulation of exposure to thin-ideal images in our experiment. Another possibility is that the adverse effects might only emerge in highly standardized laboratory environments that systematically isolate the effects of exposure to thin-ideal images and reduce the impact of other factors (exposure to televised images of the thin-ideal). However, this interpretation cannot account for the significant moderational effects (discussed below).

We feel a more reasonable interpretation of the finding that exposure to thin-ideal images resulted in acute negative affect and body dissatisfaction in laboratory experiments, but not in the present longitudinal experiment, is that the adverse effects of exposure to thin-ideal images are short lived, except for adolescents who are initially vulnerable. The conclusion that exposure to thin-ideal images does not have lasting main effects may suggest that the field's and the public's concerns about the negative impact of these images are somewhat overstated. Perhaps messages from the more proximal social environment, such as from family and peers, play a more important role in perpetuating the thin-ideal and consequent body dissatisfaction. Nonetheless, experiments that expose women to thin-ideal images and then assess them continuously over the next few hours and days should be conducted to clarify the duration of such adverse main effects more precisely.

Conversely, the conclusion that exposure to thin-ideal images has deleterious effects on vulnerable adolescents suggests that these images may play an etiologic role in promoting body image and eating disturbances for a subset of youth. Our findings indicated that exposure to thin-ideal images resulted in (a) increased negative affect for adolescents reporting initial elevations in pressure to be thin and body dissatisfaction and (b) in increased body dissatisfaction, dieting, and bulimic symptoms for adolescents reporting deficits in social support. The evidence that media exposure resulted in increased negative affect only for those adolescents with initial elevations in pressure to be thin from family and peers was unique. The fact that media messages echo the attitudes expressed in their proximal social environment may make it more likely that these adolescents internalize media messages about the importance of thinness (Austin & Meili, 1994). The finding that media exposure resulted in greater negative affect only for those youth with initial elevations in body dissatisfaction replicates the findings from a previous laboratory experiment on the effects of exposure to television-portrayed, thin-ideal images (Heinberg & Thompson, 1995). It may be that individuals with body dissatisfaction are more affected by the social comparison process because their perceptions of their bodies are more discrepant from the thin-ideal. Alternatively, adolescents who are

satisfied with their bodies may simply not engage in the social comparison process with media images. The fact that a laboratory experiment on the short-term effects of televised thin-ideal images and the present longitudinal experiment on the long-term effects of exposure to magazine-portrayed, thin-ideal images produced similar findings suggests that this effect might be robust. The evidence that deficits in social support render adolescents more vulnerable to the adverse effects of exposure to thin-ideal images was also novel. These findings suggest that adolescents lacking a social support network may be more likely to engage in a social comparison process when confronted with thin-ideal images which fosters body dissatisfaction and consequent increases in dieting and bulimic symptoms. Perhaps exposure to thin-ideal images does not produce negative effects for adolescents who feel accepted in their immediate social environment.

Collectively, these findings imply that the adverse effects of exposure to thin-ideal images impact only vulnerable individuals. The moderational findings may help explain why so few people develop eating pathology, despite the fact that so many are exposed to these media images, by suggesting that only initially vulnerable youth are negatively effected by exposure to these images on a lasting basis. Nonetheless, it is acknowledged that these effects were relatively small in magnitude. It would be useful for future research to explore additional individual difference factors that may leave certain people more vulnerable to the negative effects of exposure to the thin-ideal, such as deficits in critical thinking or adaptive coping skills.

Although this study used a randomized experimental design, a large sample size, and was conducted in the naturalistic environment to maximize external validity, the limitations of this study should be considered. First, the manipulation of media-portrayed, thin-ideal images was relatively weak, compared with the "noise" of the ambient media exposure encountered by adolescents. For example, adolescents spend far more time watching television than they do reading fashion magazines (Levine & Smolak, 1996). Second, because this experiment was conducted outside the laboratory there was no way to ensure that participants in the magazine condition read *Seventeen* and that participants in the control condition did not read this magazine. This relative imprecision in the experimental manipulation likely made it more difficult to detect the effects of exposure to thin-ideal images. Another factor that may have resulted in a somewhat weaker manipulation of exposure to thin-ideal images is that the models portrayed in *Seventeen* are not as thin as those portrayed in some fashion magazines (Cusumano & Thompson, 1997). Perhaps future studies should use stimuli that present even more extreme images of the thin-ideal. Finally, the experimental manipulation might have been more

powerful if it had occurred at a younger age before the girls had a chance to more firmly internalize the thin-ideal.

The fact that several of the above limitations concern that fact that this randomized experiment was conducted outside the confines of the laboratory deserves note. Although this type of "ecological experiment" cannot produce the same level of strict experimental control possible in the laboratory (internal validity), we feel such experiments offer a useful compliment to their laboratory counterparts because the former affords greater external validity. We attempted to compensate for the decreased precision in the experimental manipulation and greater ambient "noise" by using a larger sample to maximize statistical power. Future studies of this nature might similarly use more frequent measurements to optimize the reliability with which change in the outcomes is measured and consequently increase statistical power. Moreover, because such experiments seek to increase the relative exposure to the independent variable, rather than ensure that the control group is not exposed to the independent variable at all, stronger manipulations might help offset the cost of the decreased precision of the experimental manipulation. We hope other investigators will consider conducting such ecological experiments in conjunction with tightly controlled laboratory experiments.

In conclusion, this study sought to assess whether the adverse effects of short-term exposure to thin-ideal images found in laboratory experiments would be present in a longitudinal experiment conducted in the natural environment. The current findings suggested that exposure to thin-ideal images does not result in lasting adverse main effects, but instead only produces deleterious effects for vulnerable youth.

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