

For Your Health? The Relationship Between Magazine Reading and Adolescents' Body Image and Eating Disturbances¹

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Research has indicated female adolescents are more vulnerable to body image disturbance than male adolescents. However, scholars have begun to examine the increased emphasis on muscularity for men. The current supposition is that a drive to be muscular may be as dangerous for adolescent boys as a drive to be thin is for adolescent girls. Sports, health, and fitness magazines may be a meaningful training ground for adolescents to learn the importance of muscularity and the methods to obtain these perfect sports bodies. Magazines also reinforce the rewards that accompany the attainment of "perfect" bodies. Nearly 400 high school and college students from an urban area in the Midwest were surveyed to test the extent to which reading fashion, sports, and health/fitness magazines is related to body image and eating disturbances, including the added dimension of muscularity. Results indicate that magazine reading, social comparisons, and critical body image processing are important predictors of body image and eating disturbances for adolescent boys and girls.

KEY WORDS: body image; eating disorders; social comparisons; adolescents; magazines.

Research has indicated that female adolescents are more vulnerable to body image disturbance and eating disorders than male adolescents. However, scholars have begun to examine the increased emphasis on muscularity for men. Cohane and Pope (2001) recently argued there has been a "striking" increase in body image concerns among men (p. 373). Their supposition is that a drive to be muscular may be as dangerous for adolescent boys as a drive to be thin is for adolescent girls. Indeed, adolescent boys take steroids and other pills, powders, and supplements in order to gain muscle, thereby doing irreparable damage to their bodies in much the same way adolescent girls vomit, abuse laxatives, and stop eating. The reported rate of anabolic steroid use among high school boys ranges from 4 to 12% (Bahrke, Yesalis, &

Brower, 1998; Johnston, O'Malley, & Bachman, 1998), which is similar to the rate of anorexic and bulimic symptomatology among adolescent high school girls (Botta, 1999). Moreover, steroid use is increasing among adolescent boys (Goldberg et al., 2000; Wroblewska, 1997).

Body image is a multidimensional concept that includes the thoughts, feelings, and attitudes related to one's own body (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999). Body Image and Eating Disturbances (BIED) occur when those perceptions and attitudes become distorted or agitated and include eating-disordered behaviors. For example, disturbed body image feelings include being dissatisfied with one's body, disturbed body image perceptions include overestimating one's body size, disturbed body image thoughts include chronic thoughts about weight loss and weight gain, and disturbed body image and eating actions include exercising excessively, bingeing and purging, and fasting to lose weight.

Problems with body image arise for women in part because they are judged for thinness, whereas

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men are judged for muscularity (Franzoi, 1995; Parks & Read, 1997). Davis, Shapiro, Elliot, and Dionne (1993) noted the changing trend toward a cultural ideal body type as v-shaped and muscular for men's bodies. They also emphasized the increased pressure for men to live up to that ideal. In a review of the literature on body image in men, Cohane and Pope (2001) concluded that body image disturbance does exist in men; however it is linked to trying to be more muscular rather than to trying to be thinner. Furnham and Calnan (1998) found that men were equally divided in whether they wanted to gain or lose weight and that both were tied to body dissatisfaction. Their findings exemplify the confusion of looking at "weight gain" in men because weight gain may be thought of as gaining fat or as gaining muscle. To address the problem, Lynch and Zellner (1999) used figure drawings that varied in muscle mass rather than body fat. They found that college men were dissatisfied with their bodies and had a desire to be more muscular. Therefore, in order to make studies of body image disturbance in men and women more comparable, a measure of muscularity must be added to the dimensions. Smolak, Levine, and Thompson (2001) found that internalizing a muscular ideal was related to increased muscle-building techniques and increased weight control techniques for boys and girls. It appears that measuring BIED in terms of attitudes and behaviors related to thinness may apply more to women and girls, whereas attitudes and behaviors related to muscularity may apply more to men and boys.

Through the framework of social comparison theory and a cognitive processing approach to media effects, I investigated the extent to which reading sports, health/fitness, and fashion magazines are related to adolescents' BIED (body dissatisfaction, drive to be thin, anorexic and bulimic behaviors, and muscularity).

Magazine reading has been a consistent predictor of body image and eating disturbances for women. Harrison and Cantor (1997) found that magazine reading was related to college students' BIED. Harrison (2000) found that increased exposure to thin ideal bodies in magazines was related to increased eating disorder symptoms for adolescent girls. Levine, Smolak, and Hayden (1994) also found that increased reading of magazines with fitness, beauty, and weight information was strongly related to increased body dissatisfaction and eating patterns symptomatic of eating disorders. This relationship is not surprising when considered along

with content analyses that have shown these magazines to be filled with weight-loss-promoting advertisements and articles (Andersen & DiDomenico, 1992; Nemeroff, Stein, Diehl, & Smilack, 1994). More important, though, may be the unrealistically thin models—many whose body mass meets the requirements for anorexia nervosa—who adorn the pages (Cusumano & Thompson, 1997; Wiles, Wiles, & Tjernkud, 1996).

Men's magazines, on the other hand, tend to emphasize muscle gain and a change in body shape (Anderson & Di Domenico, 1992). Sports magazines may be an important training ground for adolescents to learn the importance of muscularity. Sports, health, and fitness magazines in particular offer muscular models and advice on how to obtain a perfect sports body. They also reinforce the rewards that accompany the attainment of those bodies. In a content analysis of 12 years of women's and men's magazines, Nemeroff and colleagues (1994) found that although women's magazines had far more body-oriented articles than men's magazines, the frequency of weight loss articles decreased over time in women's magazines but increased in men's magazines. In a content analysis and comparison of population versus media body sizes over four decades, Spitzer, Henderson, and Zivian (1999) found that male models gained muscle, whereas female models lost weight. Smolak et al. (2001) found that internalizing media images was related to muscle-building techniques for middle school boys and to weight control techniques for middle school girls. Therefore, it is expected that in addition to fashion magazine reading being related to BIED for girls, health/fitness magazine reading and sports magazine reading will also be related to BIED for both boys and girls.

H1: Reading fashion, sports, and health/fitness magazines will predict increased BIED (increased drive to be thin, increased anorexic and bulimic eating-disordered behaviors, increased muscularity, and decreased body satisfaction).

Adolescents who spend similar amounts of time with magazines may not all process or think about what they see and read in magazines in the same way. Indeed, research has shown that how adolescents process magazines may be as important, or even more important, in predicting BIED as how much time they spend with magazines. Cusumano and Thompson (1997) found that time spent reading

magazines particularly laden with thin images was not related to college women's BIED; rather a combined measure of social comparisons and perceived media influence increased BIED along with awareness of social pressures to be thin.

Social comparison theory asserts that adolescents examine media images to learn what is beautiful, decide how they should look, compare their appearance to what the media set forth as beautiful, and motivate themselves to change how they look to match the models and actors they see in media. It is through this process that adolescents become dissatisfied with their bodies and resort to unhealthy eating behaviors. Several studies have shown a social comparison link between media exposure and BIED (Botta, 1999, 2000a, 2000b; Martin & Kennedy, 1993; for a review of other studies, see Levine and Smolak, 1996). However, most of the social comparison studies have concerned women and girls. Heinberg and Thompson (1992) surveyed 297 male and female college students about how often they compared themselves to peers, celebrities, and family members on appearance and nonappearance traits. They also assessed how important those comparisons were to the students. Heinberg and Thompson found that although men were more likely than women to compare themselves to celebrities on the basis of appearance, and that men rated those comparisons as more important than did women, the comparison ratings for men were not linked to body dissatisfaction, drive for thinness, or bulimic behaviors. For women, the celebrity comparisons were significantly linked to increased body dissatisfaction, increased drive for thinness, and increased bulimic behaviors. They speculated that the men were making downward comparisons in which they rated themselves better than the target, and therefore felt better about themselves. On the basis of the previously discussed review of literature, it is expected that male models and athletes who represent the v-shaped ideal will elicit upward comparisons for adolescent boys and therefore increase BIED. Furthermore, it may be necessary to measure muscularity as a dimension of body image and eating disturbance in order to reveal the relationship between social comparisons and boys' BIED. Thus, social comparisons with magazine models and athletes are expected to increase boys' and girls' BIED.

H2: Social comparisons with magazine images will predict increased BIED. Social comparisons may

also moderate the relationship between magazine consumption and BIED. In other words, for those who make social comparisons while reading magazines, increased reading of the magazines should increase the effect of the magazines. Whereas, for those who don't make social comparisons with magazine images, increased magazine reading may not increase BIED.

H3: Social comparisons will moderate the relationship between magazine reading and BIED.

Adolescents may think about more than just social comparisons while reading magazines. They may process the central, or essential, content of the magazines, which includes articles, letters, and columns. And, they may process the peripheral, or incidental, content, which includes the photographs and advertisements. One way in which they can process incidental content is to be critical of the models and athletes pictured in the magazines, a concept called critical body image processing. Previous researchers have examined the relationship between BIED and processing of different kinds of content on television (Botta, 2000b; Nathanson & Botta, in press). Botta found that thinking about central content was related to decreased BIED, whereas thinking about actors' and models' bodies was related to increased BIED, even if those thoughts were critical of the ideal bodies. Adolescents are less distracted by images of ideal bodies when they focus on central program content and therefore less affected by the images. Further, the finding that being critical of images of ideal bodies was related to increased BIED is consistent with other studies (Botta, 1999, 2000a; Milkie, 1999; Nathanson & Botta, in press). Focusing on images of ideal bodies (regardless of whether they are critical when doing so) triggers negative affect and motivates adolescents to try to achieve an ideal body even if they don't really want to try. Therefore, it is expected that being critical of images of ideal bodies (critical body image processing) in magazines will predict increased BIED in the same way that critical body image processing of television images predicts increased BIED.

H4: Increased critical body image processing will predict increased BIED.

Although focusing on central content may be less heuristic than being distracted by images, the central content in magazines is quite different from

central content on television in that much of the essential information in magazines is about obtaining an ideal body. Thus, focusing on central content may not provide the same protection for BIED when reading magazines that it does when watching television.

RQ1: What is the relationship between processing of central magazine content and adolescents' BIED?

Botta's findings (Botta, 2000b) beg the question of whether ignoring or not noticing the size and shape of models' bodies is a better defense against the images than being critical of them. Therefore, the following question is posed:

RQ2: Will ignoring models' and athletes' bodies while reading magazines predict decreased BIED?

METHOD

Participants

Surveys were completed by 196 high school and college boys and 201 high school and college girls from an urban area in the Midwest. Overall, 17.7% of the sample self-reported as African American, 69.4% as European American, 3.8% as Asian American, 3.5% as Latin American, and 5.3% as other ethnic groups such as Arab American. The average age of the sample was 18.94 years.

Measures

Body Mass Index (BMI). Body mass index was computed from the adolescents' self-reported height and weight. Previous research has established that self-reported weight and height are reliable (Brooks-Gunn, Warren, Rosso, & Gargiulo, 1986).

Magazine reading. Adolescents reported how much time in hours (with half- and quarter-hour increments) they spent on an average day looking at three types of magazines: fashion, sports, and health/fitness magazines. They also reported how much attention they pay to each magazine type from 0 (*very little to no attention*) to 4 (*nearly total to total attention*). Their exposure responses were multiplied by their attention responses for an overall reading score for each magazine type.

Social comparisons. Adolescents answered three questions that assessed how often they compared their bodies to those they saw in magazines, how often they feel motivated to look like the bodies they saw in magazines, and how often they thought about what the models did to obtain such perfect bodies. Each question offered the following response options: 0 (*never*), 1 (*rarely*), 2 (*sometimes*), 3 (*most of the time*), and 4 (*always*). Cronbach's $\alpha = .90$.

Central information processing. Adolescents reported how often from 0 (*never*) to 4 (*always*) they thought about things (e.g., how the information relates to my own life, and facts and opinions expressed in articles) while looking at magazines. Research on television has found this measure to be reliable (alphas range from .78 to .80) and valid (Botta, 2000b; Nathanson & Botta, in press). Cronbach's $\alpha = .75$.

Critical body image processing. Adolescents reported how often from 0 (*never*) to 4 (*always*) they questioned the perfection of the images in magazines on the basis of items such as "I question why the models need to have such perfect bodies" and "I question why the models don't look more like how my friends and I look." Research on television has found this measure to be reliable (alphas range from .71 to .81) and valid (Botta, 2000b; Nathanson & Botta, in press). Cronbach's $\alpha = .79$.

Not noticing bodies. Adolescents reported how often from 0 (*never*) to 4 (*always*) when reading magazines, "I don't notice the size or shape of the models' bodies."

Body image and eating disturbances (BIED). Two subscales from the Eating Disorder Inventory (EDI) (Garner & Olmstead, 1991) were used for the body image feelings and body image thoughts dimensions of BIED. The EDI has been extensively tested and is commonly used to determine eating disorder symptomatology among individuals (Garner, Olmstead, & Polivy, 1984). The EDI includes several dimensions, including those used in the present study: body dissatisfaction and drive for thinness. Because the EDI subscale for behaviors only assesses bulimic behaviors, a scale was created to assess the extent of anorexic and bulimic behaviors using items from the Eating Attitudes Test (Garner & Garfinkel, 1979) to assess anorexic behaviors and items from the bulimic symptomatology subscale of the EDI to assess bulimic behaviors. When the questionnaire was put together, an adequate measure of muscularity was not available; therefore one was created for this study. Two important indicators of the validity of the muscularity index are that boys scored higher than girls (face validity)

and that the measure is related to boys' body satisfaction, $r = -.141$, $p = .054$, but not to girls' body satisfaction, $r = -.098$, $p = .160$. As a measure of discriminant validity, body mass index was not related to boys' muscularity, $r = .067$, $p = .359$, or girls' muscularity, $r = .075$, $p = .283$.

Body satisfaction. Participants reported how often from 1 (*never*) to 5 (*always*) they thought that their hips, thighs, stomach, butt, and chest are too large, too small, and just right. The sum of the negative satisfaction items was subtracted from the sum of the positive body satisfaction items. For boys, Cronbach's $\alpha = .78$ and for girls, Cronbach's $\alpha = .89$.

Drive to be thin. Adolescents reported how often from 0 (*never*) to 4 (*always*) they felt that their value as a person was related to their weight and how often they felt other things such as being terrified of gaining weight, preoccupied with a desire to be thinner, terrified of being fat, committed to being thin, and committed to losing weight, boys' Cronbach's $\alpha = .85$, and for girls' Cronbach's $\alpha = .90$.

Anorexic behaviors. Adolescents reported how often from 0 (*never*) to 4 (*always*) they thought about or did things such as avoided eating when they were hungry, liked their stomachs to be empty, took pills to lose weight, smoked when they were hungry to avoid eating, and didn't eat for one or more days to lose weight. Boys' Cronbach's $\alpha = .85$, and girls' Cronbach's $\alpha = .82$.

Bulimic behaviors. Adolescents reported how often from 0 (*never*) to 4 (*always*) they thought about or did things such as eat when they were upset, stuffed themselves with food, vomited to lose weight, and took laxatives to lose weight. Boys' Cronbach's $\alpha = .90$ and girls' Cronbach's $\alpha = .87$.

Muscularity. Adolescents reported how often from 0 (*never*) to 4 (*always*) they thought about or did take pills to gain muscle, take supplements to gain muscle, and were committed to being muscular. Boys' Cronbach's $\alpha = .85$ and girls' Cronbach's $\alpha = .83$.

RESULTS

Boys' and girls' scores were significantly different on all but one of the variables. Boys and girls were similar in how much they report not noticing models' bodies in magazines. Boys had higher scores than girls for sports magazine reading, body satisfaction, and muscularity. Girls had higher scores than boys for health/fitness magazine reading, fashion magazine reading, social comparisons, critical body image processing, central information processing, drive for

Table I. Means, Standard Deviations, and t Tests for Boys and Girls on Independent and Dependent Variables

	Girls ($n = 201$)	Boys ($n = 196$)	t test	p
Fashion magazine reading	1.66 (1.85)	0.35 (1.01)	8.92	.0001
Health/fitness magazine reading	0.97 (1.49)	0.56 (1.18)	3.06	.002
Sports magazine reading	0.44 (1.03)	1.87 (1.94)	-9.16	.000
Social comparisons	1.55 (1.15)	0.90 (0.88)	6.41	.0001
Critical body image processing	0.98 (0.78)	0.63 (0.63)	4.98	.0001
Central information processing	2.17 (0.95)	1.85 (0.95)	3.39	.001
Not noticing body size in images	1.34 (1.19)	1.35 (1.14)	-0.20	.984
Body satisfaction	4.01 (9.73)	12.17 (7.44)	-9.41	.0001
Anorexic behaviors	1.08 (0.60)	0.81 (0.56)	4.51	.0001
Bulimic behaviors	0.93 (0.68)	0.67 (0.70)	3.75	.0001
Muscle-building techniques	0.38 (0.62)	1.22 (1.03)	-9.75	.0001
Drive to be thin	1.65 (0.91)	1.05 (0.75)	7.01	.0001

thinness, anorexic behaviors, and bulimic behaviors (see Table I.)

A separate regression was calculated for each of the five criterion BIED variables with demographic controls (age, ethnicity, and body mass index) entered as the first step, reading for each of the magazine types entered second, processing (comparisons, critical body image processing, central information processing, and not noticing bodies) entered third, and the interactions entered stepwise as a fourth step. The interactions were entered stepwise so that only the significant interactions became part of the model.

For the control variables, BMI was a more consistent predictor of boys' BIED than girls' BIED. For boys, increased BMI was a significant predictor of increased anorexic behaviors, $\beta = .232$, $p = .004$, increased drive to be thin, $\beta = .372$, $p < .001$, decreased body satisfaction, $\beta = -.346$, $p < .001$, and a marginal predictor of increased bulimic behaviors, $\beta = .155$, $p = .056$. For girls, BMI was a significant predictor of decreased body satisfaction, $\beta = -.242$, $p = .001$, but was not a significant predictor of the other BIED variables. This is consistent with the notion that girls' BIED is not driven by an actual need to lose weight.

Ethnicity was a significant predictor of girls' body satisfaction, $\beta = -.152$, $p = .030$. African American girls ($M = 6.13$, $SD = 10.06$) were significantly more satisfied with their bodies than were European American girls ($M = 3.18$, $SD = 9.65$) and girls from other ethnic groups ($M = 4.14$, $SD = 9.46$). Ethnicity was not a significant predictor of the other girls' BIED

variables. The finding that ethnic groups differed in body satisfaction but not other BIED variables is consistent with previous research (e.g. Botta, 2000). Ethnicity was not a significant predictor of boys' BIED.

Age was a marginal predictor of boys' body satisfaction, $\beta = -.137$, $p = .06$; older boys were less satisfied with their bodies than were younger boys. Age was not a significant predictor of other boys' BIED variables or any of the girls' BIED variables.

Hypothesis 1

Hypothesis 1 predicted increased magazine reading would predict increased body image and eating disturbances (BIED).

Fashion magazines. For adolescent girls (see Table II), increased fashion magazine reading was marginally related to increased bulimic behaviors. There were no other significant relationships between fashion magazine reading and BIED. For adolescent boys (see Table III), increased fashion magazine reading was related to decreased body satisfaction and decreased muscularity.

Health/Fitness magazines. For adolescent girls (see Table II), increased health/fitness magazine reading was related to increased bulimic behaviors, increased anorexic behaviors, and an increased drive

to be thin. For adolescent boys (see Table III), increased health/fitness magazine reading was related to increased muscularity.

Sports magazines. For adolescent girls (see Table II), increased sports magazine reading was related to increased muscularity. For adolescent boys (see Table III), sports magazine reading was not significantly related to BIED.

Therefore, hypothesis 1 received partial support. Reading *all* types of magazines was not related to increased BIED. Rather it was predominantly reading health/fitness magazines that was related to overall increased BIED for girls and to increased muscularity for boys. And, for adolescent boys, fashion magazine reading was related to decreased muscularity and decreased body satisfaction.

Hypothesis 2

Hypothesis 2 predicted that an increase in comparisons with magazine images would predict increased BIED.

For adolescent girls (see Table II), increased social comparisons was related to increased anorexic behaviors, increased bulimic behaviors, increased drive to be thin, and decreased body satisfaction. For adolescent boys (see Table III), increased social comparisons was a significant predictor for increased

Table II. Summary of Hierarchical Regressions Predicting Girls' BIED

	Body satisfaction		Drive to be thin		Anorexic Behaviors		Bulimic behaviors		Muscularity	
	Beta In	Final model	Beta In	Final model	Beta In	Final model	Beta In	Final model	Beta In	Final model
Step 1: Demographics										
Age	−.05	−.08	−.02	−.01	−.02	−.01	−.12	−.12*	.07	.14*
Ethnicity	−.13*	−.07	.10	.04	.01	−.03	−.04	−.07	.05	.04
Body mass	−.24***	−.21***	.09	.08	.05	.01	.09	.07	−.03	−.05
Step 2: Reading										
Fashion magazines	−.01	.08	.07	−.03	.09	−.03	.13*	.01	−.08	.20
Health/fitness mags	−.09	.02	.23***	.04	.19***	.09	.25***	.13*	.12	.06
Sports magazines	−.03	−.03	.08	.04	.02	−.02	.02	−.04	.18**	.16**
Step 3: Processing										
Social comparisons	−.50****	−.44****	.61****	.66****	.46****	.40****	.46****	.45****	.14*	.28**
Critical body image	−.33****	−.06	.32****	−.06	.37****	.16*	.31****	.07	.15*	.12
Central information	.13*	.01	.06	−.11*	.002	−.14**	−.03	−.17**	−.06	−.09
Not noticing bodies	.22***	.09	−.24***	−.06	−.14**	−.02	−.16**	−.03	−.10	−.11
Step 4: Interactions										
Compare × Fashion	.09	—	.04	—	.17	—	.18	—	−.50***	−.50***
Compare × Sports	−.07	—	−.06	—	−.04	—	−.06	—	.14	—
Compare × Health	−.08	—	−.06	—	.10	—	.09	—	.17	—
	$R^2 = .31$;		$R^2 = .43$;		$R^2 = .27$;		$R^2 = .30$;		$R^2 = .15$;	
	Adj. $R^2 = .28$;		Adj. $R^2 = .40$;		Adj. $R^2 = .23$;		Adj. $R^2 = .27$;		Adj. $R^2 = .08$;	
	$F(10, 181) = 8.24^{***}$		$F(10, 181) = 13.48^{***}$		$F(10, 181) = 6.63^{***}$		$F(10, 181) = 8.24^{***}$		$F(11, 180) = 2.55^{***}$	

* $p < .10$. ** $p < .05$. *** $p < .01$. **** $p < .001$.

Table III. Summary of Hierarchical Regressions Predicting Boys' BIED

	Body satisfaction		Drive to be thin		Anorexic Behaviors		Bulimic behaviors		Muscularity	
	Beta In	Final model	Beta In	Final model	Beta In	Final model	Beta In	Final model	Beta In	Final model
Step 1: Demographics										
Age	-.14*	-.18**	-.01	-.07	-.11	-.07	-.08	-.06	.01	-.05
Ethnicity	-.05	-.04	.02	-.002	-.01	-.001	.04	.03	.04	.03
Body mass	-.35****	-.36****	.37****	.39****	.23***	.28****	.16*	.20**	.08	.08
Step 2: Reading										
Fashion magazines	-.21***	-.19**	.02	-.12	.01	-.03	.05	-.04	-.02	-.24***
Health/fitness mags	-.07	.05	.09	.07	-.07	-.08	-.01	-.04	.29****	.34****
Sports magazines	-.04	.13	-.05	-.04	-.02	.02	-.05	-.01	.05	.05
Step 3: Processing										
Social comparisons	-.09	.08	.34****	.22***	.18**	.04	.31****	.17**	.27****	.23***
Critical body image	-.04	-.05	.32****	.22***	.27****	.30****	.34****	.31****	.14*	.04
Central information	.12*	.10	-.03	-.06	.21***	-.25***	-.21***	-.27***	-.04	-.03
Not noticing bodies	.15**	.11	-.17**	-.11	-.16**	-.09	-.14*	-.04	-.18**	-.13*
Step 4: Interactions										
Compare × Fashion	.11	—	-.01	—	-.02	—	-.001	—	-.10	—
Compare × Sports	-.26**	-.26**	-.04	—	.13	—	.02	—	-.04	—
Compare × Health	.15	—	.09	—	-.07	—	.22	—	-.16	—
	$R^2 = .28;$		$R^2 = .29;$		$R^2 = .19;$		$R^2 = .22;$		$R^2 = .20;$	
	Adj. $R^2 = .23;$		Adj. $R^2 = .25;$		Adj. $R^2 = .14;$		Adj. $R^2 = .17;$		Adj. $R^2 = .16;$	
	$F(11, 164) = 5.84****$		$F(10, 165) = 6.75****$		$F(10, 165) = 3.87****$		$F(10, 165) = 4.64****$		$F(10, 165) = 4.22****$	

* $p < .10$. ** $p < .05$. *** $p < .01$. **** $p < .001$.

muscularity behaviors, increased drive to be thin, increased anorexic behaviors, and increased bulimic behaviors.

Therefore, hypothesis 2 was supported for all five of the BIED variables for girls and supported for 4 of the 5 BIED variables for boys.

Hypothesis 3

Hypothesis 3 predicted that social comparisons would moderate the relationship between magazine reading and BIED. The notion tested here was that for those who made fewer social comparisons with magazine images, magazine reading would not be related to BIED, whereas for those who made more comparisons, increased magazine reading would be related to increased BIED.

For adolescent girls (see Table II), there was a significant interaction effect for fashion magazine reading and social comparisons on muscularity. For those who did not spend a lot of time comparing their bodies to the bodies they saw in magazines, there was little or no relationship between fashion magazine reading and muscle-building behaviors. Whereas for those who spent a lot of time comparing their bodies to those they saw in magazines, increased fashion magazine reading was related to decreased muscularity. The interactions between sports magazines and

social comparisons and between health/fitness magazines and social comparisons were not significant predictors of girls' BIED.

For adolescent boys (see Table III), there was a significant interaction effect for sports magazine reading and social comparisons on body satisfaction. For those who did not spend a lot of time comparing their bodies to the bodies they saw in magazines, increased sports magazine reading was related to increased body satisfaction. Whereas for those who spent a lot of time comparing their bodies to those they saw in magazines, increased sports magazine reading was related to decreased body satisfaction. The interactions between fashion magazines and social comparisons and between health/fitness magazines and social comparisons were not significant predictors of boys' BIED.

Therefore, hypothesis 3 received partial support. Social comparisons moderated the relationship between fashion magazine reading and muscularity for girls and the relationship between sports magazine reading and body satisfaction for boys.

Hypothesis 4

Hypothesis 4 predicted that increased critical body image processing would predict increased BIED.

For adolescent girls (see Table II), increased critical body image processing was related to increased anorexic behaviors, increased bulimic behaviors, increased drive to be thin, decreased body satisfaction, and was marginally related to increased muscularity. For adolescent boys (see Table III), increased critical body image processing was related to increased anorexic behaviors, increased bulimic behaviors, increased drive to be thin, and was marginally related to increased muscularity.

Therefore, hypothesis 4 received support for boys and girls.

Research Question 1

Research question 1 asked what would be the relationship between increased processing of central magazine content and BIED.

For adolescent girls (see Table II), increased processing of central magazine content was related to decreased anorexic behaviors and to decreased bulimic behaviors, and was marginally related to a decreased drive to be thin and to increased body satisfaction. For adolescent boys (see Table III), increased processing of central magazine content was related to decreased anorexic behaviors and to decreased bulimic behaviors, and was marginally related to increased body satisfaction.

Therefore, focusing on central content in magazines predominantly predicts decreased BIED behaviors.

Research Question 2

Research question 2 asked whether not noticing body sizes and shapes in magazines would predict decreased BIED.

For adolescent girls (see Table II), saying they didn't notice the size and shape of bodies in magazines was related to increased body satisfaction, decreased drive to be thin, decreased anorexic behaviors, and decreased bulimic behaviors. For adolescent boys (see Table III), it was related to increased body satisfaction, decreased drive to be thin, decreased anorexic behaviors, decreased muscularity, and was marginally related to decreased bulimic behaviors.

Therefore, saying they didn't notice or pay attention to the size and shape of bodies in magazines is a significant predictor of decreased BIED.

DISCUSSION

This study revealed that sports magazines are less likely to encourage obsessive attitudes or behaviors around body image and eating for boys or girls. Ironically, it is the magazines that claim to be "for your health" that may induce adolescents to do the most damage to their bodies. Reading health/fitness magazines was an important predictor of body image and eating disturbances for adolescents. For boys, reading was linked to increased muscularity, which means that the more time they spent reading health/fitness magazines, the more they intended to or took pills and supplements in order to gain muscle and the more committed they were to being muscular. For girls, health/fitness magazine reading was linked to a stronger drive to be thin and to increased anorexic and bulimic intentions and behaviors such as vomiting, abusing laxatives, and fasting. However, how adolescents process the content and images in those magazines better explained the reason why these adolescents starved themselves, vomited, took laxatives, pills, and supplements in their obsessive attempts to be thin or muscular, or both.

Adolescents sometimes compare their bodies with the models and athletes pictured in magazines, notice and criticize how thin or muscular the models and athletes are, and/or concentrate on the articles and information in the magazine. My data revealed that focusing on the central content of the magazines was linked to fewer eating-disordered behaviors for boys and girls, whereas focusing on the models' body size and shape was linked to increased BIED for both boys and girls. Even though the adolescents reported being critical of models' bodies, their body image and eating were more disturbed than those of adolescents who were less critical of the images. These findings make sense in light of previous research that has shown similar (albeit stronger) results for incidental body image processing and the processing of central program content on television (Botta, 2000b; Nathanson & Botta, in press). It appears that adolescents are less likely to be distracted by the models in the magazines when they focus on central magazine content, and they are less likely to be motivated to engage in disordered behaviors in an attempt to look like the models they see. The test of whether self-reports of not noticing body images in magazines might serve as a protective factor received some support. Shared variance with central content processing may be why the protective relationship for ignoring body sizes disappeared in the final model (when

all other variables were entered). Thus, although not noticing body sizes may "protect" adolescents from BIED, it may not do so to any extent greater than concentrating on central content. In other words, it appears that not being distracted by body sizes is a way for adolescents to avoid the negative impact of magazine reading, and that they can avoid such distraction by ignoring the body size of the models or by focusing on central content. A single item may also not be adequate to measure the notion of disregarding body size and shape. Further research is necessary to examine whether a reliable index is a stronger predictor of decreased BIED, and therefore a potentially important protective factor in the relationship between media images and BIED.

Heinberg and Thompson (1992) found that although men engaged in more social comparisons, those comparisons were not linked to body image and eating disturbances. My findings indicate that although social comparisons were more important for girls' body image and eating disturbances than for boys' BIED, a consistent relationship was revealed for boys. The important difference here is that the comparisons were linked to muscularity, which, as argued earlier, is an important measure of unhealthy body behaviors for boys that in extreme cases is comparable to anorexia nervosa in girls. However, the results of the present study also revealed a relationship between social comparisons and adolescent boys' bulimic behaviors and drive for thinness, both of which were measured by Heinberg and Thompson and found to be unrelated. Thus, my findings may indicate a shift over the 10 years since Heinberg and Thompson's study in the relationship between social comparisons and BIED for adolescent boys. As posited here, the increased emphasis on body image for boys should indicate a shift to adolescent boys rating themselves lower than the models and athletes in magazines and therefore feeling compelled to attain a similar body. This claim is supported by the significant relationships revealed between social comparisons with magazine images and not just muscularity but also bulimic behaviors and a drive for thinness.

The results also reveal that the type of comparison is important in predicting specific types of BIED. Comparing themselves to thin fashion models makes adolescent girls less likely to engage in muscularity behaviors, whereas sports magazine reading is linked to increased muscularity, and health/fitness magazines were not related to muscularity. When adolescent boys compare themselves to the muscular athletes and models in sports magazines, they are less satisfied with

their bodies. However, if they do not compare themselves to the models and athletes in sports magazines, then spending more time reading sports magazines is related to feeling better about their bodies. Thus, simply seeing v-shaped athletes bodies is not enough to disturb body image feelings; it is when adolescent boys engage in social comparisons with the images that they feel worse about their bodies. Moreover, young men who compare their bodies with magazine images are more likely to contemplate or take pills and supplements to gain muscle and are more committed to being muscular. Fashion magazines appear to play a different role for boys because reading was related to decreased muscularity.

It is important to note that social comparisons were not a main effect of body satisfaction for boys. As already discussed, it is only those boys who made social comparisons and spent more time reading sports magazines who were less satisfied with their bodies. Thus, it could be that only particular kinds of comparisons coupled with increased sports magazine reading is related to boys' body satisfaction. However, it is also possible that the measure of body satisfaction used in the present study does not adequately tap into boys' body satisfaction. A measure that includes more items related to the muscular ideal, such as biceps, would strengthen the relationship. Indeed, Jones (2001) also used the EDI body satisfaction subscale but removed the thigh and hip items for the boys. She found that although weight-based social comparisons were related to boys' body dissatisfaction, body-build comparisons were not. Jones speculated that build may be more important later in life for boys (she studied adolescents in 7th and 10th grades, whereas the present study included boys in 9th grade and in college). However, the lack of significance in her results could also be due to not including more items in the body satisfaction scale that are closely related to build for boys (e.g., biceps). Consequently, future researchers need to continue examining revisions to the body satisfaction scale for men and boys.

Overall, magazine reading and processing accounted for 14.2% of variance for boys' anorexic behaviors and 28.0% of variance for girls' anorexic behaviors, 19.4% of variance for boys' bulimic behaviors and 27.5% for girls' bulimic behaviors, 19.9% of variance for boys' muscle-building behaviors and 12.7% for girls' muscle building behaviors, 10.2% for boys' body satisfaction and 23.4% for girls' body satisfaction., 16.3% for boys' drive to be thin and 41.6% for girls' drive to be thin. Therefore, magazine reading and processing was a stronger predictor of BIED

for adolescent girls than for adolescent boys. Indeed, magazine reading and processing accounted for twice the variance in girls' anorexic behaviors and body satisfaction and nearly three times the variance in a drive for thinness. Previous research has shown that women engage in more elaborate processing of media content than men (Meyers-Levy, 1989; Meyers-Levy & Maheswaran, 1991; Meyers-Levy & Sternthal, 1991), which is consistent with the findings in this study that girls reported processing images of bodies in magazines more than boys did. Girls also may feel more compelled to process images of bodies, in particular, due to the importance of appearance attributes for women (Jones, 2001). Thus, the differences in BIED between boys and girls may in part be due to the differences in processing.

Although differences in the strength of the relationship between social comparisons and boys' and girls' BIED are consistent with previous research (e.g. Heinberg & Thompson, 1992; Jones, 2001), by introducing muscle-building attitudes and behaviors as an additional measure of BIED, an important relationship between magazine reading and boys' body image disturbance was revealed. Moreover, a shift in body image awareness and emphasis for male adolescents (Cohane & Pope, 2001) also appears to have resulted in a newly developed relationship between magazines and more traditional measures of body image and eating disturbances. Thus, although the results of the present study show that male adolescents are vulnerable to body image and eating disturbances, the data also confirm Smolak et al.'s assertion that male adolescents have not yet adopted the pressure to conform to these images to the same extent as female adolescents have (Smolak et al., 2001).

The data reported here are correlational and based on self-report; consequently caution is urged when interpreting the results. Adolescents' actual magazine reading and BIED may differ from what they report on a questionnaire. Moreover, it may be that rather than magazines causing BIED in adolescents, adolescents with increased BIED may be more likely to consume magazines that support their body image preferences, attitudes, and behaviors. However, in a meta-analysis of existing research, Groesz, Levine, and Murnen (2002) confirmed that the media can cause eating problems. Furthermore, although they established that mere exposure was linked to BIED, Groesz et al. argued that processing has a stronger influence. The findings of the present study and others (e.g., Cusumano & Thompson, 1997; Harrison, 2001; Levine et al., 1994) support the argument that processing is a better indicator of BIED

than exposure. It may be that a circular pattern exists in which the media cause BIED, which in turn causes adolescents to filter media through a disturbed body image schema, which in turn increases the influence of the media. Stice, Spangler, and Agras (2001) found a longitudinal effect of exposure to magazines for vulnerable adolescent girls (girls with low body satisfaction, high pressure to be thin, and low social support), whereas they did not find an effect for those who were not vulnerable. However, Stice et al. did not examine the extent to which the adolescent girls processed the images in the magazines that were provided to them. Differences in the way the girls thought about, stored, and retrieved the information and images from the magazines could account for part of the observed change in BIED.

An important implication of this and other work on the link between media and eating problems is that media literacy programs are necessary. Posavac, Posavac, and Weigel (2001) found that college women who received a media literacy intervention were less likely to engage in social comparison and, as a result, were less influenced by media images. They argued that the key to media literacy interventions is preventing women from engaging in social comparisons, which sounds contrary to the work of Irving and Berel (2001), who found that although a media literacy intervention increased college women's skepticism about media images, it made no difference in their BIED. However, as the results of the present study and others (Botta, 1999; Milkie, 1999) have shown, there is a clear difference between decreasing social comparisons and increasing media skepticism. Increased skepticism predicts increased BIED, whereas the opposite has been found for decreased social comparisons. Therefore, media literacy trainers need to focus on helping adolescents not to compare their bodies with those they see in media rather than training them to be skeptical of media images. More research on why some adolescents do not make social comparisons may help parents and teachers to develop more effective ways to teach adolescents better skills for responding to ideal bodies, which is imperative at a time when adolescents' abuse of steroids and eating-disordered behaviors is on the rise.

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