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Processes Linking Weight Status and Self-Concept Among Girls From Ages 5 to 7 Years

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Abstract

This study assessed the relationship between girls' weight status and self-concept and examined peer teasing and parent criticism as potential mediators of this relationship. Data were collected for 182 girls and their parents when the girls were 5 and 7 years old. At each age, girls' body mass index, self-concept, peer weight-related teasing (child report), and parents' criticism of girls' weight status (spouse report) were assessed. At ages 5 and 7, girls who were more overweight reported lower self-concept. Peer teasing and parent criticism mediated the relationship between weight status and self-concept at age 7, but not at age 5. In addition, the duration and timing of parent criticism across ages 5 and 7 mediated the association between girls' weight status at age 5 and perceived peer acceptance at age 7.

In the past two decades, a twofold increase has been reported in rates of overweight and obesity among U.S. children (Troiano & Flegal, 1998). Today, 25% of U.S. children aged 6 to 17 years are obese or at risk of obesity (i.e., overweight). Overweight children and adolescents report negative self-evaluations in comparison to their nonoverweight peers (e.g., Banis et al., 1988; Braet, Mervielde, & Vandereycken, 1997; Kaplan & Wadden, 1986; Mendelson & White, 1985), potentially reflecting negative stereotypes held by both adults and children toward obesity (Brylinsky & Moore, 1994; Lerner & Korn, 1972; Maddox, Back, & Liederman, 1968; Richardson, Goodman, Hastorf, & Dornbusch, 1961; Wardle, Volz, & Golding, 1995). Although numerous studies have assessed the simple relationship between weight status and self-concept among children, research has seldom assessed processes linking weight status and self-concept; likewise, no research has assessed how such processes change with age. In this study we assessed (a) the relationship between weight status and self-concept in a longitudinal sample of girls when they were 5 and 7 years old and (b) whether parental criticism and peer teasing mediate the relationship between weight status and self-concept.

Children's Weight Status and Self-Concept

Self-concept is multidimensional in nature, incorporating components such as the global self (or self-esteem), the physical-appearance self (or body esteem/satisfaction), the athletic self, the social self, and the academic self (Marsh, 1990). Among school-aged children and adolescents, concurrent associations have been found between childhood overweight and low global self-concept (Banis et al., 1988; Braet et al., 1997; Kaplan & Wadden, 1986; Kimm, Sweeney, Janosky, & MacMillan, 1991; Pierce & Wardle, 1993; Sallade, 1973; C. C. Strauss, Smith, Frame, & Forehand, 1985), low athletic self-concept (Braet et al., 1997; Phillips & Hill, 1998), and low physical-appearance self-concept, or low body esteem (Hill, Draper, & Stack,

1994; Mendelson & White, 1982, 1985; Mendelson, White, & Mendelson, 1996; Phillips & Hill, 1998; Pierce & Wardle, 1993). In addition, obesity preceding adolescence has been associated with lower global self-concept during adolescence (R. S. Strauss, 2000), and increases in degree of overweight have been associated with decreases in athletic self-concept and global self-concept among children (Kolody & Sallis, 1995).

A notable body of research, however, has failed to identify an association between childhood overweight and self-concept (Klesges et al., 1992; Mendelson et al., 1996; Rumpel & Harris, 1994; Wadden, Foster, Brownell, & Finley, 1984). In a comprehensive review of the literature, Friedman and Brownell (1995) concluded that inconsistencies in the literature are a byproduct of the simplistic approach adopted by research to date, including the search for main effects and the failure to assess factors that moderate (i.e., risk and protective factors) or mediate (i.e., reactions by peers and significant others) the relationship between weight status and self-concept. Recently, we have shown that among 5-year-old girls, parents' restriction of girls' access to food moderates the relationship between girls' weight status and self-concept such that girls who are overweight and whose mothers exert high levels of control over what, when, and how much they eat are particularly at risk for low self-concept (Davison & Birch, 2001). Using the same sample, in this study we assessed factors that mediate the relationship between girls' weight status and self-concept at ages 5 and 7 years.

The Development of Self-Concept and the Theory of the Looking Glass Self

Research assessing the association between overweight and self-concept has rarely taken into consideration the process by which self-concept develops. The self is a social product and develops as a result of ongoing interactions between the child and the social environment (Case, 1991; Cooley, 1902; Harter, 1998; Rosenberg, 1979). According to Cooley (1902), a child learns through the process of social interaction to distinguish the self from the other and, as a result, becomes cognizant of the opinions of others. Such opinions are then internalized and used as a basis of social comparison. Hence, according to Cooley (1902), the attributions you make of yourself are a function of your perception of the attributions others make of you, which was defined as the *looking glass self*. A substantial body of research supports the validity of the theory of the looking glass self (see Harter, 1998, for a review). On the basis of this theory, girls with high weight status are predicted to experience low self-concept as a result of negative reactions from significant others.

Parents and peers are two important sources of social influence for children and may, therefore, play an important role in the development of children's self-concept. A growing body of research supports the role of parental support and acceptance in the development of positive self-esteem among children and adolescents (Eskilson & Wiley, 1987; see Feiring & Taska, 1996, for a review; Measelle, 1998). During the preschool years, parental support is likely to be particularly influential in the development of self-concept because of the primacy of parents as social referents. As children enter school, they are provided with increasing opportunities for social comparison with same-age peers. In addition, school entry coincides with the emerging ability to make self-other comparisons (Masters, 1971; Ruble, Boggiano, Feldman, & Loebel, 1980; Suls & Sanders, 1982). Consequently, school entry signals the emergence of peers as important social referents (Harter, 1998). Research provides consistent evidence of the beneficial effects of peer acceptance and friendship (Bishop & Inderbitzen, 1995; Boivin & Bégin, 1989; Eskilson & Wiley, 1987), and the damaging effects of peer teasing and victimization (Boulton & Smith, 1994; Graham & Juvonen, 1998; Tracey, 1998), on self-concept among school-aged children and adolescents. Developmental researchers suggest that although the importance of peers in the construction of self-concept changes with age, the importance of parents does not change. That is, parental approval is more predictive of self-

esteem than is peer approval in younger children, and parental and peer approval are both important predictors of self-esteem in older children (Harter, 1990a; Rosenberg, 1979).

Parent Reaction to Children's Weight Status and Children's Self-Concept

There is a paucity of research assessing parental reactions to children's weight status (i.e., parental acceptance, concern, or criticism) and the impact that such reactions have on children's self-concept. What research is available, however, suggests that parent reaction may play an important mediational role in the relationship between weight status and self-concept. Smolak, Levine, and Schermer (1999) found that mothers' concern about children's weight status was associated with lower body esteem among school-aged children. Also using a sample of school-aged children, Pierce and Wardle (1993) found that parental dissatisfaction with children's body size, as well as children's beliefs about parental dissatisfaction, were associated with lower global self-concept. Unfortunately, the results of Smolak et al. (1999) and Pierce and Wardle (1993) were not independent of children's weight status, thus making it difficult to determine whether parental reaction mediates the relationship between weight status and self-concept or whether parental reaction simply shares variance with both variables.

Peer Reaction to Children's Weight Status and Children's Self-Concept

In contrast to parental reactions, a larger body of research has assessed associations between weight status and peer weight-related teasing, and the impact of teasing on children's self-concept. Overweight school-aged children and adolescents report higher levels of peer weight-related teasing (Cattarin & Thompson, 1994; Pierce & Wardle, 1997), and rejection by peers (C. C. Strauss et al., 1985), than do nonoverweight children. In a study by Pierce and Wardle (1997), overweight children complained of being repeatedly bullied and subjected to verbal abuse by peers, and a large majority (90%) of the overweight children were convinced that the teasing would stop if they lost weight. Correspondingly, research shows that peer weight-related teasing during childhood is concurrently associated with lower body satisfaction, or physical-appearance self-concept (Cattarin & Thompson, 1994; Gardner, Sorter, & Friedman, 1997; C. C. Strauss et al., 1985), and lower global self-concept (C. C. Strauss et al., 1985). In addition, research suggests that a history of teasing about size and weight is associated with greater body image problems during late adolescence and adulthood (Cattarin & Thompson, 1994; Grilo, Wilfley, Brownell, & Rodin, 1994; J. K. Thompson & Psaltis, 1988).

Parent and Peer Reaction as Mediators of the Relationship Between Weight Status and Self-Concept

Research to date has not effectively assessed parent and peer reaction to childhood overweight as mediators of the relationship between weight status and self-concept (Baron & Kenny, 1986). A number of studies have assessed the relationship between weight status and parent reaction or peer teasing; additional studies have assessed the relationship between parent and peer acceptance and children's self-concept. Only one of the studies reviewed in the previous two sections assessed relations among weight status, parent or peer reaction, *and* children's self-concept in the same model (i.e., Cattarin & Thompson, 1994). That study, however, did not directly assess mediation and did not include data on young children. The data from Cattarin and Thompson (1994) were later combined with data from additional samples of adolescent girls, and mediation was assessed. Results indicated that peer teasing fully mediated the association between weight status and body image, or physical-appearance self-concept (J. K. Thompson, Coovert, Richards, Johnson, & Cattarin, 1995). In addition, weight status and teasing measured at one point in time predicted body image 3 years later, although this longitudinal model did not show full mediation. Also using an adolescent sample, Rosenbaum and Lewis (1999) found that the association between average weight status across ages 13 to

18 years and body dissatisfaction at age 18 for girls was mediated by ratings of attractiveness at age 13. In this instance, ratings of physical attractiveness were considered a proxy for appearance-related social feedback from peers.

Although the work of J. K. Thompson et al. (1995) and Rosenbaum and Lewis (1999) provides initial evidence that feedback from peers is an important mechanism that links weight status and self-evaluations among adolescents, many questions still remain to be addressed. No research to date has assessed (a) whether peer teasing or parent criticism mediates the association between weight status and self-concept among children, (b) whether mediation is found across multiple domains of self or is limited to evaluations of the physical self, or (c) whether such processes change as children move from kindergarten to grade school. These questions are important to address in young children because over 25% of U.S. children are overweight and negative attitudes to overweight are still widespread. Identifying mechanisms by which weight status is linked to negative self-evaluations among children would provide a basis by which to address the psychological health of a large number of children.

The Present Study

With this consideration in mind, we addressed these questions using a sample of young White girls from relatively well-educated families. This particular sample is of interest because research suggests that White girls from middle- and upper class families are more likely to identify with the “thin ideal” and are at greater risk of body dissatisfaction, weight concerns, and dieting compared with boys and girls from other ethnic and socioeconomic groups (Collins, 1991; Dornbusch et al., 1984; Parker et al., 1995; S. H. Thompson, Corwin, & Sargent, 1997; Wardle & Marsland, 1990). In addition, research indicates that in comparison to boys, girls are more likely to derive their sense of self from their physical appearance (Harter, 1998), parents are more critical of girls’ weight status (Pierce & Wardle, 1993), and girls are more influenced by parental approval or criticism of their physical appearance (Baker, Whisman, & Brownell, 2000; Eskilson & Wiley, 1987). Research has shown that socioeconomic status (SES) is associated with weight status (see Sobal & Stunkard, 1989, for a review) and self-concept (Bullock & Pennington, 1988; O’Brien, Smith, Bush, & Peleg, 1990; Reddy & Gibbons, 1999). Likewise, parental control, in both the feeding domain and in general, is associated with child weight status (Beck & Terry, 1985; Fisher & Birch, 1999; Mendelson, White, & Schliecker, 1995) and self-concept (Baumrind, 1991; Buri, Louiselle, Misukanis, & Mueller, 1988; Conger, Conger, & Scaramella, 1997). Therefore, we addressed family income, parent educational status, and parental control as potential confounding variables in the association between girls’ weight status and self-concept.

Multiple domains of self-concept, including perceived physical appearance (body esteem), peer acceptance, physical ability, and cognitive ability, were assessed in order to examine whether relationships were specific to perceived physical appearance or extended across the domains of self-concept. In addition to perceived physical appearance, there is reason to believe that being overweight will negatively impact on domains of self-concept including perceived peer acceptance, physical ability, and cognitive ability as a result of the nature of the negative feedback directed at overweight children (i.e., that they are clumsy, unpopular, and less intelligent). Maternal acceptance, however, was not included in this study because of the conceptual overlap between parent criticism and maternal acceptance.

On the basis of results from previous research, we predicted that girls with higher weight status would report lower self-concept than would girls with lower weight status. Because of the importance of feedback from significant others in defining the self, we predicted that girls who were criticized by their parents or teased by peers about their weight would report more negative self-evaluations at each age, that peer teasing and parent criticism would mediate the

relationship between girls' weight status and self-concept, and that the importance of parent criticism and peer teasing as mediators would vary by age. On the basis of developmental changes in the "importance" of peers between ages 5 and 7 years (reflecting both developmental change and school entrance), we predicted that peer weight-related teasing would have more explanatory power at age 7 than at age 5 whereas parent criticism would be an important explanatory mechanism at ages 5 and 7. Finally, with respect to the longitudinal effects of teasing and criticism on self-concept, we predicted that girls who were criticized by their parents or teased by peers about their weight at both ages would report more negative self-evaluations than would girls with less persistent experiences of teasing or criticism and that the duration and timing of teasing or criticism would mediate links over time between girls' weight status and self-concept. Predictions for the longitudinal analyses were based on research reporting associations between the frequency of teasing and future body image problems (as outlined above) and on research showing links between the duration of exposure to peer victimization and children's future social adjustment (Kochenderfer-Ladd & Wardrop, 2001).

Method

Participants

Participants were part of a larger 5-year longitudinal project designed to assess the health and development of young girls from ages 5 to 9 years. Eligibility criteria for girls' (and parents') enrollment in the longitudinal project included living with both biological parents, an absence of severe food allergies or chronic medical problems affecting food intake, and an absence of dietary restrictions involving animal products. All families participating were non-Hispanic Whites. As part of the larger project, girls and their parents visited the laboratory when the girls were 5 and 7 years of age. Participants at Time 1 included 197 five-year-old girls (mean age = 5.4 ± 0.3 years) and their parents. Participants at Time 2 included 192 seven-year-old girls (mean age = 7.3 ± 0.3 years) and their parents. Only families with complete data across both times of measurement for girls' weight status, girls' self-concept, parent criticism, and peer teasing were included in analyses, which resulted in a final sample size of 182 girls, mothers, and fathers. Families with complete data did not differ significantly in terms of family income, parents' education, or parents' general control at entry into the study from families with incomplete data.

Procedure

Girls and their parents visited the laboratory when the girls were 5 and 7 years old. At each assessment, girls were interviewed individually by a trained interviewer, parents completed a series of questionnaires, and trained staff collected three measures of girls' height and weight. The longitudinal project has been reviewed and approved by the institutional review board of the associated university. Mothers and fathers provided written consent of participation; mothers also provided consent for their daughters.

Measures

Weight status, self-concept, peer weight-related teasing, maternal and paternal weight-related criticism, and background variables were assessed when the girls were 5 and 7 years of age. Methods used to assess each construct were generally identical at each age; hence, the method of assessment is outlined without reference to the time of measurement. It can be assumed, unless stated otherwise, that the construct was assessed at both ages and that the method of assessment was identical across time.

Weight status—Average weight and height were used to calculate girls' body mass index (BMI; $\text{weight}[\text{kg}]/\text{height}[\text{m}]^2$). Because BMI is age and sex specific, girls' BMI percentiles were calculated using recent growth charts from the Centers for Disease Control (Kuczmarski

et al, 2000). Girls were also classified as overweight (BMI > 17.2 at age 5 and BMI > 18.0 at age 7) and obese (BMI > 19.3 at age 5 and BMI > 21.0 at age 7) on the basis of recent age- and sex-specific definitions of overweight (Cole, Bellizzi, Flegal, & Dietz, 2000).

Self-concept—The Pictorial Scale of Perceived Competence and Social Acceptance for Young Children (PCSA) was used to assess girls' self-concept (Harter & Pike, 1984). At age 5, girls were administered the 4–5-year-old version; at age 7, girls were administered the 6–7-year-old version. Each version of the PCSA contains 24 items that assess four domains of self-concept (6 items per scale), or perceived competence, including physical ability, cognitive ability, peer acceptance, and maternal acceptance. The scales for perceived cognitive ability, athletic ability, and peer acceptance were used in the present study. Items were averaged for each subscale, which resulted in perceived competence scores ranging from 1 (*not competent*) to 4 (*really competent*) for each domain of self-concept. The reliability and convergent, discriminant, and predictive validity of this questionnaire have been previously illustrated in samples of kindergarten, preschool, and school-aged children (Harter & Pike, 1984). In this study, the internal consistency coefficients for the PCSA at ages 5 and 7, respectively, were .71 and .70 for perceived cognitive ability, .60 and .60 for perceived physical ability, and .71 and .73 for perceived peer acceptance.

Body esteem—Although the PCSA for young children measures physical or athletic ability, it does not assess body esteem, or physical-appearance self-concept. Therefore, in addition to the PCSA, the Body Esteem Scale (Mendelson & White, 1982) was included in the present study as a measure of physical-appearance self-concept, or how children value their appearance and body. The Body Esteem Scale is a 24-item scale that assesses overall, nonspecific body esteem (e.g., “I like what I look like in pictures”, “I’m proud of my body”) and is suitable for use with young children. The response set was changed from a two-item response set (yes/no) to a three-item response set (yes/no/sometimes) to increase variability in the responses. Responses for all items were summed to create a total body esteem score, which ranged from 24 to 72. Mendelson and White (1982), using a sample of 7–12-year-old children, reported an odd/even split-half reliability of .85 for the Body Esteem Scale, and scores on the scale correlated .67 with the Physical Attributes scale of the Piers-Harris Self Esteem Scale. In this study, the internal consistency coefficients for the Body Esteem Scale were .73 and .84 when the girls were 5 and 7 years old, respectively.

Cognitive ability—Children's verbal ability and listening comprehension for spoken words were measured at age 7 with the third edition of the Peabody Picture Vocabulary Test (PPVT-III; Dunn & Dunn, 1997). This measure was included to determine whether differences in perceived cognitive ability reflected actual differences in cognitive ability. The PPVT-III contains 204 test items, which are divided into 17 twelve-item sets of increasing difficulty. Each vocabulary word was presented with four, simple, black-and-white illustrations. The child was asked to select the picture that best represented the word. The interviewer continued this procedure until a total of eight items were missed within a set. Scores were converted to standardized percentiles using age appropriate reference data (Dunn & Dunn, 1997). The PPVT-III is well validated, and research shows that scores on the PPVT-III are highly correlated with full-scale IQ (i.e., $r = .82$ on average; Dunn & Dunn, 1997).

Peer weight-related teasing—Girls' reports of peer weight-related teasing were assessed with a teasing checklist developed for the larger longitudinal project. Girls were presented with a list of 15 body parts (e.g., arms, legs, hair, waist, bottom) and were asked (a) if they had ever been teased about the body part and (b) who teased them (i.e., Mom, Dad, brother, sister, friend, and/or other child). To ensure that girls understood the definition of teasing, we initially asked them, “Do you know what teasing is?” In the rare instances when girls did not provide an

acceptable definition of teasing, the following definition was given: “Teasing is when someone makes fun of you and calls you names.” Examples of teasing were also provided. In addition, after the interviewers completed the questionnaire with the girls, they rated the extent to which the girls appeared to understand the questionnaire on a scale from 1 to 5, with 1 indicating that the girls had difficulties understanding the questionnaire; 97% of the girls at age 5 and 99% at age 7 received a score of 3 or above, indicating that they had few difficulties in understanding the questionnaire.

A peer weight-related teasing score was created by summing all instances in which girls indicated that they were teased by a brother, sister, friend, or other child about a weight-related body part (i.e., bottom, legs, stomach, being fat, general body shape); teasing by mothers or fathers was not included in this score. For the sake of simplicity, the label *peer teasing* is used to refer to all individuals on this list (i.e., peers and siblings). Body parts such as hair, hands, and feet were not included in this score. For purposes of comparison, a non-weight-related teasing score was also created by summing across all instances of non-weight-related teasing from peers (and siblings) and was used in follow-up analyses. Both peer weight-related and non-weight-related teasing scores showed a substantial positive skew (which could not be corrected by transforming the data). Therefore, each variable was converted into a dichotomous variable (1 = *ever teased* and 0 = *never teased*), and this dichotomous variable was used in all analyses.

Parent weight-related criticism—Parent weight-related criticism was assessed using four questions. Each parent was asked to respond on a 4-point scale, from *never* to *always*, to the following items: (a) “My spouse disapproves of my daughter because she eats too much”; (b) “My spouse disapproves of my daughter because she weighs too much”; (c) “My spouse criticizes my daughter because she eats too much”; (d) “My spouse criticizes my daughter because she weighs too much.” Therefore, mothers provided reports of paternal criticism and fathers provided reports of maternal criticism. The goal of this method was to reduce socially desirable responses. A maternal criticism score was calculated using the mean of fathers’ responses across the four items, and a paternal criticism score was calculated using the mean of mothers’ responses across the four items. The internal consistency coefficients were .77 and .82 (girls age 5) and .89 and .84 (girls age 7) for paternal and maternal criticism, respectively. A total parental criticism score was created by summing maternal and paternal criticism scores, with higher scores indicating higher levels of criticism.

As with peer teasing, parent criticism scores showed a substantial positive skew at both times of measurement. Consequently, scores were dichotomized at each time of measurement. Scores were categorized as “criticized” if the summed parent criticism score was > 2.50. This score is equivalent to providing a response other than 1, on a scale from 1 (*never*) to 4 (*always*), for at least 3 of the 8 items across both parents. This cut-off was considered a reasonable and conservative estimate of ever being criticized. Alternative cut-off criteria were used in follow-up analyses to determine whether results differed as a function of the chosen cut-off point.

Family income and parent education—Mothers were asked to report their family income from the following choices: (a) less than \$20,000, (b) \$20,000 to \$35,000, (c) \$35,000 to \$50,000, or (d) over \$50,000. In addition, mothers were asked to report the highest level of education completed, by themselves and their husbands, from the following options: (a) high school, (b) associate’s degree, (c) technical or vocational school, (d) bachelor’s degree, (e) master’s degree, (f) doctoral degree, (g) MD, (h) JD, or (i) other. Responses were then converted into the corresponding numbers of years of education.

Parental control—When the girls were 5 years old, mothers and fathers completed the General Parental Control scale (Baumrind, 1971), which is a 13-item self-report scale designed

to tap parents' attitudes about parental authority and child obedience (e.g., "I believe that my child should be able to question authority."). Parents were asked to rate each item on a 4-point scale from *agree strongly* to *disagree strongly*. Scores for the 13 items were averaged separately for mothers and for fathers, and scores were then averaged across mothers and fathers to provide a general indication of parental control within the family. Using a sample of parents of White nursery-school-aged girls and boys, Baumrind (1971) showed that parents' reports of control are correlated with observed parenting behavior, thus supporting the validity of the questionnaire. In this study, the internal consistency coefficient was .72 for mothers and fathers.

Results

Descriptive Statistics

Sample characteristics are outlined in Table 1. Families had an average family income of \$35,000–\$50,000 when the girls were 5 and 7 years of age, although income levels were slightly higher at age 7. Approximately equal proportions of families reported incomes below \$35,000, between \$35,000 and \$50,000, and above \$50,000 when the girls were 5, and almost half of the families reported a family income above \$50,000 when the girls were 7. Mothers and fathers reported an average of 14–15 years of education when the girls were 5 and 7 years of age. Girls' mean BMI percentile was approximately 59 at both ages, and BMI was highly stable across ages 5 to 7 ($r = .86, p < .01$). Approximately equal proportions of girls were overweight and obese at each age, although there was a slight increase between ages 5 and 7. Parents were, on average, moderately controlling in terms of their general parenting style and beliefs, possibly reflecting the young age of the girls. The girls generally reported positive self-concept (i.e., above 3) across the various domains of self at both ages, and perceived self-concept was higher at age 7 than at age 5. Reports of peer weight-related teasing were low, with most girls indicating that they had not been teased, and such teasing decreased from age 5 to age 7 (i.e., 0.57 and 0.36 at ages 5 and 7, respectively, where 0 = *no reports of peer teasing*), $t(192) = -2.21, p < .05$ (not shown in Table 1). At ages 5 and 7, respectively, 47 and 33 girls reported peer teasing. Of the 33 girls who reported teasing at age 7, 13 reported teasing at age 5. Parents' reports of their spouses criticizing their daughters about their weight were similar at each age (i.e., 2.25 at both ages, scale range = 2–8), $t(192) = 0.28, p > .05$. At ages 5 and 7, respectively, 26 and 29 girls were exposed to parent criticism. Of the 29 girls who were criticized about their weight at age 7, 14 were also criticized at age 5. A chi-square analysis indicated that peer teasing and parent criticism were independent constructs at each age: age 5, $\chi^2(1, N = 182) = 0.12, p = .73$; age 7, $\chi^2(1, N = 182) = 2.07, p = .15$. That is, girls who were teased by their peers at a particular age were not necessarily criticized by their parents. Only 8 girls at age 5 and 8 girls at age 7 were teased by peers and criticized by their parents, and only 1 girl was teased and criticized at both ages.

Assessment of Confounding Variables

Initial analyses assessed whether family income, mothers' years of education, fathers' years of education, or parental control confounded associations between (a) girls' BMI and self-concept, (b) girls' BMI and teasing/criticism, or (c) teasing/criticism and self-concept. Background characteristics associated with both constructs for the associations listed above were considered confounding variables for that association and were used as covariates in analyses. Covariates entered into each analysis are indicated in the footnotes of the associated table. In addition, all analyses assessing associations between girls' perceived cognitive ability and girls' BMI, peer teasing, or parent criticism controlled for differences in girls' verbal ability.

Is Higher Weight Status Associated With Lower Self-Concept?

Pearson product–moment correlations were used to assess associations between girls' BMI and self-concept at each age (see Table 2). Girls with a higher BMI at age 5 reported significantly lower body esteem and perceived cognitive ability at age 5 and significantly lower body esteem and lower perceived peer acceptance, physical ability, and cognitive ability at age 7 (see Table 2). At age 7, girls with a higher BMI reported significantly lower body esteem, perceived physical ability, and perceived cognitive ability and marginally lower perceived peer acceptance. Associations between girls' BMI at age 5 and self-concept at age 7 were reassessed while controlling for BMI at age 7. Only the association between BMI and perceived cognitive ability ($r = -.20, p < .01$) was independent of girls' BMI at age 7. The extent to which these relations “dropped out,” however, reflects the substantial collinearity between girls' BMI at ages 5 and 7 (i.e., $r = .86$).

A high degree of association was noted among the various domains of self-concept at ages 5 and 7 (see Table 2). To test whether the relationships across the domains of self were independent, we used multiple regression analysis to assess the relationship between girls' BMI and each domain of self-concept while holding constant all other domains of self that were correlated with girls' BMI. Results showed that the relationship between girls' BMI and perceived cognitive ability at age 5 was independent of body esteem at age 5, but the association for girls' body esteem was not independent of perceived cognitive ability. Associations between girls' BMI at ages 5 or 7 and self-concept at age 7 were not independent across the domains of self.

Are Peer Weight-Related Teasing and Parent Criticism Associated With Lower Self-Concept?

Associations among peer teasing, parent criticism, and girls' self concept were initially assessed using correlation analysis (see Table 2). Calculating the correlation between a dichotomous variable (i.e., teasing and criticism) and a continuous variable (i.e., self-concept) simply assesses whether mean self-concept differed for the two teasing or criticism groups. Girls who reported peer teasing at age 5 had lower body esteem and higher peer acceptance at age 5; these associations were independent. In addition, peer teasing at age 5 was associated with lower body esteem at age 7, although this association was not independent of teasing at age 7. Girls' reports of teasing at age 7 were associated with significantly lower body esteem and lower perceived cognitive ability at age 7; the effect for cognitive ability was not independent of body esteem. Parent criticism at age 5 was not associated with girls' self-concept at age 5 but was associated with significantly lower perceived physical ability at age 7; this association was not independent of criticism at age 7. Finally, parent criticism at age 7 was associated with significantly lower perceived peer acceptance, physical ability, and cognitive ability and marginally lower body esteem at age 7. None of the associations at age 7 for parent criticism were independent across the domains of self.

A second series of analyses assessed the association between girls' teasing or criticism across ages 5 to 7 and self-concept at age 7. Girls were divided into four groups for both peer teasing and parent criticism, reflecting the duration and timing of teasing/criticism. These groups included girls who were (a) never teased/criticized, (b) teased/criticized at age 5 only, (c) teased/criticized at age 7 only, and (d) teased/criticized at both ages. Group classifications for teasing and criticism across ages 5 to 7 were largely independent; 2 girls were teased and criticized at age 5 only, 2 girls were criticized and teased at age 7 only, and 1 girl was teased and criticized at both ages. Differences in girls' BMI as a function of their history of teasing and parent criticism were assessed using analysis of variance (ANOVA). Differences in girls' self-concept at age 7 for each of the teasing/criticism groups were assessed using a multivariate analysis of variance (MANOVA). In instances where the MANOVA identified a multivariate effect, a Roy-Barmann stepdown analysis (as outlined by Tabachnick & Fidell, 1996) was

performed to determine which domains of self-concept differed as a function of teasing/criticism across ages 5 to 7. For the stepdown analysis, the domains of self-concept were assessed in a stepwise fashion reflecting a logical ordering of how important (from most to least important) each domain was likely to be with respect to weight-related teasing and criticism. The following order was chosen: body esteem, perceived peer acceptance, perceived physical ability, and perceived cognitive ability. The association between teasing/criticism and body esteem was assessed first using a one-way ANOVA. The association between teasing/criticism and each of the remaining domains of self-concept was assessed in a series of analyses of covariance (ANCOVAs), each controlling for the domains of self-concept higher up in the importance hierarchy.

For peer teasing, results from the MANOVA revealed significant differences in girls' self-concept, Wilks's lambda $F(12, 177) = 4.03, p < .0001$, as a function of teasing history (see Table 3). Results from the stepdown analysis indicated that differences in self-concept were specific to body esteem and perceived cognitive ability. Further, post hoc analyses showed that girls who were teased at age 7 reported significantly lower body esteem than girls who were never teased or teased at age 5 only, and girls who were teased at both ages reported lower body esteem than all other teasing groups. For perceived cognitive ability, girls who were teased at age 7 reported significantly lower cognitive ability than the three remaining teasing groups. For parent criticism, marginal differences in girls' self-concept were identified across the criticism groups, Wilks's lambda $F(12, 177) = 1.61, p < .10$ (see Table 4). This difference was due to differences in perceived peer acceptance. Specifically, girls who were criticized at age 7 reported lower peer acceptance than girls who were criticized at age 5 or were never criticized but not lower peer acceptance than girls who were criticized at both ages.

Do Peer Teasing and Parent Criticism Mediate the Relationship Between Girls' Weight Status and Self-Concept?

Peer teasing and parent criticism were assessed as cross-sectional and longitudinal mediators of the relationship between girls' BMI and self-concept. The basic model that was used for all mediation analyses is outlined in Figure 1. On the basis of criteria outlined by Baron and Kenny (1986), mediation is effectively illustrated if (a) peer teasing/parent criticism is predicted by girls' BMI (Paths A and B); (b) girls' self-concept is predicted by peer teasing/parent criticism, independent of girls' BMI (Paths C and D); and (c) the simple relationship between girls' BMI and self-concept is reduced when peer teasing and parent criticism are included in the model (Path E compared with simple correlation). Perfect mediation is illustrated when the association is reduced to 0. For the analyses illustrated in Tables 4 and 5, Step 1 corresponds to Paths A and B, Step 2 corresponds to Paths C and D, and Step 3 corresponds to Path E from Figure 1.

A combination of logistic regression and multiple regression analysis was used for the cross-sectional analyses (see Table 4). Step 1 was assessed using two logistic regression analyses with peer teasing and parent criticism as the dichotomous outcomes and BMI as the predictor variable. Step 2 was assessed by regressing girls' self-concept (each domain was assessed separately) onto peer teasing, parent criticism, and girls' BMI; both peer teasing and parent criticism were entered in this model to assess their comparative contributions. Step 3 was assessed by comparing the coefficient (standardized beta weight) for BMI from Path E with the correlation coefficient for BMI and the domain of self-concept shown in Table 2.

At age 5, neither peer teasing nor parent criticism mediated the relationships previously identified between girls' BMI and perceived cognitive ability and body esteem (as shown in Table 2). That is, although girls with higher BMI had a greater likelihood of being criticized by their parents about their weight (Step 1), parent criticism was not associated with any domain of self-concept when girls' BMI and peer teasing were in the model (Step 2). With respect to peer teasing, girls with higher BMI did not report a greater likelihood of being teased by their

peers (Step 1), but girls who reported peer teasing reported significantly lower body esteem and higher perceived peer acceptance than girls who did not report teasing, independent of BMI (Step 2).

At age 7, parent criticism and peer teasing mediated relationships previously identified between girls' BMI and self-concept, although mediators varied across the domains of self. As shown in Table 4, girls with higher BMI showed a marginally greater likelihood of being teased by their peers and a significantly greater likelihood of being criticized by their parents about their weight than did girls with lower BMI (Step 1). For body esteem, peer weight-related teasing was in turn associated with lower body esteem independent of girls' BMI (Step 2), and the relationship between girls' BMI and body esteem was reduced from $r = -.15$ to $\beta = -.06$ with the mediators in the model (Step 3). For peer acceptance, parent criticism was in turn associated with lower perceived peer acceptance independent of girls' BMI (Step 2), and the relationship between girls' BMI and peer acceptance was reduced from $r = -.12$ to $\beta = .01$ (Step 3). For perceived cognitive ability, parent criticism and peer teasing were both associated with lower perceived cognitive ability independent of girls' BMI (Step 2), and the relationship between BMI and cognitive ability was reduced from $r = -.16$ to $\beta = -.04$ with parent criticism and peer teasing in the model. Neither peer teasing nor parent criticism explained the link identified between girls' BMI and perceived physical ability at age 7. That is, neither variable was associated with girls' perceived physical ability when girls' BMI was included in the model. In summary, at age 7, peer teasing mediated the relationship previously identified between girls' BMI and body esteem, parent criticism mediated the relationship between girls' BMI and perceived peer acceptance, and both parent criticism and peer teasing mediated the relationship between girls' BMI and perceived cognitive ability. When these relationships were reassessed while controlling for the other domains of self-concept (i.e., when the other domains were entered as additional predictors in Step 2), the associations outlined above did not change, with the exception of perceived cognitive ability; for perceived cognitive ability, peer teasing was again identified as a mediator, whereas parent criticism was no longer a mediator.

A combination of discriminant function analysis and dummy variable regression was used to assess the duration and timing of peer teasing and parent criticism across ages 5 to 7 as mediators of the relationship between girls' BMI at age 5 and self-concept at age 7, controlling for self-concept at age 5. This model was tested using the same series of steps that were used in the cross-sectional analyses. At Step 1, discriminant function analysis, performed separately for teasing and criticism, assessed whether girls' BMI at age 5 predicted the likelihood of being in one of the four teasing/criticism groups (Paths A and B in Figure 1). At Step 2, dummy variable regression was used to regress girls' self-concept at age 7 (each domain was assessed separately) onto peer teasing, parent criticism, and girls' BMI (Paths C and D), controlling for girls' self-concept at age 5; teasing and criticism were dummy coded such that the referent group was girls who were teased or criticized at both ages. At Step 3, the simple correlation between girls' BMI and self-concept was compared with the association when the mediators were in the model.

As shown in Table 5, mediation was shown for perceived peer acceptance only. Specifically, girls' BMI at age 5 predicted parent weight-related criticism across ages 5 to 7. As shown in Table 3, girls who were criticized at ages 5 and 7 and girls who were criticized at age 7 only had significantly higher BMI values at age 5 than did girls who were never criticized or criticized at age 5 only. Parent criticism, in turn, predicted perceived peer acceptance independent of girls' weight status, and the association between BMI and perceived peer acceptance was reduced from $r = -.16$ to $\beta = -.07$. Thus, parent criticism across ages 5 to 7 mediated the association previously identified between girls' BMI at age 5 and perceived peer acceptance at age 7. Neither parent criticism nor peer teasing mediated associations identified

between girls' BMI at age 5 and body esteem and perceived physical ability and perceived cognitive ability at age 7.

Additional Analyses

Additional analyses assessed whether results for the primary analyses of interest, the mediation analyses, would differ when alternative cut-offs were used to define parental criticism, when maternal and paternal criticism were assessed separately, or when reports of non-weight-related teasing rather than weight-related teasing were assessed. Results did not differ meaningfully using these alternative approaches. In addition, a lagged relationship between parent criticism and peer teasing at age 5 and girls' self-concept at age 7 was assessed. In this instance, girls' BMI at age 5 was used to predict teasing or criticism at age 5, which in turn was used to predict self-concept at age 7, controlling for self-concept at age 5. No evidence of a lagged relationship was identified for any domain of self-concept.

Discussion

Although research suggests that overweight children are at risk for low self-concept, no research has assessed processes that may explain this relationship among young children. The theory of the looking glass self highlights the importance of feedback from significant others in defining the self. Therefore, in this study, we assessed peer weight-related teasing and parent weight-related criticism as potential mediators of the relationship between weight status and self-concept among girls at ages 5 and 7 years. In accord with previous research, girls with higher BMI reported lower self-concept at each age. In addition, girls' concurrent exposure and long-term (i.e., across ages 5 to 7) exposure to peer weight-related teasing and parent weight-related criticism were associated with lower self-concept, although the results varied by age and domain of self-concept. Contrary to expectations, parent criticism did not mediate the relationship between girls' BMI and self-concept at age 5. At age 7, peer teasing and parent criticism mediated relationships between girls' BMI and self-concept for all domains of self-concept except perceived physical ability, thereby supporting the hypothesized relations. The duration and timing of teasing or criticism mediated the link identified between girls' BMI at age 5 and self-concept at age 7 for perceived peer acceptance. These results suggest that peer teasing and parent criticism generally served as concurrent rather than long-term mediators of the relationship between weight status and self-concept among young girls and that mediation was not apparent until age 7.

Weight Status and Self-Concept

Girls who were more overweight reported lower self-concept at ages 5 and 7. Specifically, girls with higher BMI at age 5 reported lower body esteem and lower perceived cognitive ability at age 5 and lower perceived cognitive ability at age 7, after BMI at age 7 was taken into consideration. In addition, at age 7, girls with higher BMI reported lower self-concept for all domains of self, although the association for perceived peer acceptance was only marginally significant. These relationships generally were not independent. That is, many of the relationships were no longer apparent after we controlled for the other domains of self-concept. This pattern of findings suggests that the domains of self-concept may be linked by some underlying characteristic, such as global self-concept. Although Harter (1983, 1986, 1990b) argued strongly that global self-worth does not evolve before approximately age 8, Marsh, Craven, and Debus (1991) showed that children as young as 5 years of age can accurately distinguish between multiple domains of self and give reliable accounts of their global self-concepts. Thus, it is possible that children's weight status influences their general opinions of themselves, which are in turn reflected in lower reported self-concept in multiple areas of perceived competence. Unfortunately, the relationship between girls' BMI and global self-

concept could not be assessed in this study, because the PCSA, developed by Harter and Pike (1984), does not include a measure of global self-concept.

Peer Weight-Related Teasing and Self-Concept

Peer weight-related teasing was consistently associated with lower body esteem among girls. That is, peer teasing was concurrently associated with lower body esteem at ages 5 and 7, teasing at age 5 was associated with lower body esteem at age 7, and teasing across ages 5 and 7 was associated with lower body esteem at age 7. The consistent associations between peer teasing and self-concept may be explained by shared method variance; that is, both peer teasing and self-concept were assessed with self-report measures. Although shared method variance is likely to have some contribution to the current findings, it does not explain why the associations were generally only found for one domain of self-concept. With one exception, teasing was not associated with any other domain of self-concept, independent of girls' body esteem. Thus, it appears that the negative impact of peer weight-related teasing tends to focus on the domain of self that is criticized, namely, weight and body shape. This hypothesis is purely speculative, however, and warrants further investigation.

While girls who were teased consistently reported lower body esteem, teasing at age 5 was also concurrently associated with higher perceived peer acceptance, which suggests that preschool children may interpret teasing as a sign of acceptance by peers (i.e., any attention is good attention). This finding, in conjunction with the fact that reports of "ever being teased" decreased between ages 5 and 7, suggests that girls' reports of teasing at age 5 may lack validity. Previous research, however, shows that kindergarten-aged children are able to provide reliable and valid reports of victimization (Kochenderfer & Ladd, 1997), and reports from interviewers in this study indicated that few girls had problems understanding the questionnaire. In addition, a decrease in reported teasing across ages 5 to 7 is consistent with patterns that we have found using other well-validated questionnaires in the larger longitudinal study. For example, we have found that girls' reported weight concerns decreased between ages 5 and 7 (Davison, Markey, & Birch, 2001). We also found that despite potential overreporting in weight concerns at younger ages, the internal consistency of girls' reports did not differ with age, and weight concerns at age 5 showed predictive validity with other measures at age 5 and weight concerns at age 7. Similarly, in this study, girls showed stability in their reports of teasing across ages 5 and 7, and teasing at age 5 was associated with lower body esteem, thus illustrating its predictive validity. Consequently, we are reluctant to dismiss these results as being invalid.

Parent Weight-Related Criticism and Self-Concept

In contrast to peer teasing, no association was found between parent weight-related criticism and girls' self-concept at age 5. The presence of a relationship at age 5 between peer teasing and girls' body esteem and the absence of a relationship between parent criticism and self-concept may be due to differences in exposure to negative feedback from peers and parents, with parents providing less negative feedback, and to differences in the measurement of teasing and criticism. Peer teasing was assessed on the basis of girls' self-reports; of course, the girls needed to be cognizant of teasing in order to provide such reports. Parent criticism, in contrast, was assessed using parents' reports; in this instance it is not clear whether girls are able to discern such criticism, particularly at age 5. In addition, as discussed above, the presence of associations for peer teasing and the absence of associations for parent criticism at age 5 may be explained by differences in shared method variance for self-concept and peer teasing (both self-report) compared with self-concept and parent criticism (self-report and parent report). The identification of associations between parent criticism and self-concept at age 7, however, argues against this possibility.

At age 7, parent weight-related criticism was associated with lower perceived peer acceptance, physical ability, and cognitive ability and with marginally lower body esteem. In addition, parent criticism at age 5 was associated with lower perceived physical ability at age 7, and criticism across ages 5 to 7 was weakly associated with lower peer acceptance at age 7. Therefore, unlike peer teasing, the impact of parent criticism was evident across all domains of self. These results suggest that parental disapproval may have a broader effect on children's self worth than peer teasing may, although this possibility requires additional research.

Peer Teasing and Parent Criticism as Processes Linking Weight Status and Self-Concept

The primary goal of this study was to assess whether peer teasing and parent criticism mediated the relationship between girls' weight status and self-concept. On the basis of the theory of the looking glass self and the centrality of parents as social referents in the lives of preschool-aged children, we predicted that at age 5 parent criticism would mediate links between girls' weight status and self-concept. The results did not support this prediction; neither parent criticism nor peer teasing was identified as a mediator. This lack of mediation is a result of the fact that girls with higher BMI did not report higher levels of weight-related teasing, although teasing was associated with lower body esteem. Consequently, reports at age 5 of lower body esteem and lower perceived cognitive ability among girls with higher weight status are difficult to explain. It seems unlikely that girls internalize physical ideals by age 5 and evaluate themselves on such ideals independent of feedback from significant others because this process requires certain cognitive prerequisites that generally are not apparent among preschool children (Harter, 1990b). It is worth noting that peer teasing incorporated teasing from siblings and schoolmates. It is possible that schoolmates and siblings differentially tease children on the basis of their weight status and that teasing from each source has a different impact on children's self-concept at ages 5 and 7. Consequently, additional work using more rigorous measures of teasing is needed to examine processes linking weight status and self-concept during the kindergarten period.

On the basis of the increased importance of peers as social referents after school entry and the continued importance of parents, we predicted that feedback from both peers and parents about girls' weight status would mediate the relationship between girls' weight status and self-concept at age 7. Support was gained for this hypothesis, although the results differed across domains of self-concept. Specifically, peer teasing mediated the relationship between girls' weight status and body esteem, parent criticism mediated the relationship between girls' weight status and perceived peer acceptance, and peer teasing and parent criticism mediated the relationship between girls' weight status and perceived cognitive ability. Links between girls' weight status and their body esteem, perceived cognitive ability, and perceived peer acceptance may be explained by peers and parents directly communicating to girls stereotypes associated with overweight, that is, that overweight individuals are unattractive, unpopular, and unintelligent (Staffieri, 1972; Wardle et al., 1995). Perceived physical ability is the only domain of self at age 7 for which mediation was not identified. This result is not surprising, however, because it is possible that there is a direct relationship between weight status and perceived physical ability such that girls who are overweight are less athletic and are aware of this characteristic independent of feedback from others. Unfortunately, we did not have measures of girls' actual athletic competence to assess this possibility.

In addition to concurrent associations, we predicted that the duration and timing of negative feedback from peers or parents would explain links over time between girls' weight status and self-concept. This hypothesis was supported for perceived peer acceptance only. Thus, parent criticism mediated associations between girls' BMI and perceived peer acceptance at age 7 and across ages 5 to 7. These findings support the work of Parke and colleagues and suggest that parental socialization may provide children with important social skills that transfer to the

domain of peer relations (Isley, O'Neil, Clatfelter, & Parke, 1999; Parke & O'Neil, 1999; Parke et al., 1998). The fact that neither peer teasing nor parent criticism across ages 5 to 7 mediated the associations identified between girls' BMI at age 5 and body esteem and perceived physical and cognitive ability at age 7 suggests that these associations were simply an artifact of the strong correlation between BMI at ages 5 and 7 years. Thus it appears that the links between BMI and self-concept were in general concurrent rather than longitudinal. This conclusion is consistent with the findings from J. K. Thompson et al. (1995) in which teasing fully mediated concurrent associations between weight status and body esteem but only partially mediated longitudinal associations.

Conclusions, Limitations, and Future Research

For a sample of young White girls who were generally from middle-class backgrounds, this study indicates that parent criticism and peer teasing mediated associations between weight status and self-concept. The relationships, however, were generally small to modest, as shown by the correlations, beta weights and R^2 s (see notes to Tables 4 and 5). The small magnitude of the associations is likely to be due to measurement error in each of the questionnaires adopted as well as to the fact that weight status and parent and peer reaction to weight status are only a few of many factors involved in the development of self-concept. The results of the present study are likely to differ for boys, ethnic minorities, and children from other SES groups. For example, although girls from ethnic-minority and lower SES groups show higher rates of overweight and obesity (Bronner, 1996; Campaigne et al., 1994), they may be less exposed to negative weight-related feedback from parents and peers because there is less of an identification with the thin ideal and a greater acceptance of overweight among these groups (Allan, Mayo, & Mitchel, 1993; Collins, 1991; Powell & Kahn, 1995; Rucker & Cash, 1992). In addition, being overweight is more acceptable among boys than girls. Research shows that parents are less critical of their sons' weight status (Striegel-Moore & Kearney-Cooke, 1994) and that boys are less likely than girls to derive their sense of worth from their physical appearance (Harter, 1998). Consequently, very different relationships among weight status, peer and parent feedback, and self-concept would be expected in these samples. Exploring such gender, ethnic, and SES differences is an exciting possibility for further research.

In summary, this study indicates that the self perceptions of girls as young as 5 and 7 years of age are influenced by their weight status; girls who are more overweight perceive themselves as less competent across multiple domains of self-concept. In addition, this study illustrates the importance of feedback from significant others in explaining links between girls' weight status and self-perception. That is, results showed that peer teasing and parent criticism mediated the association between girls' weight status and self-concept at age 7; mediation was not shown at age 5, and mediation was found for only one domain of self-concept across ages 5 and 7. Results from this study suggest that intervening at the level of these mediators may protect the self-worth of overweight children and may therefore prevent outcomes related to low self-worth such as low academic achievement (Falkner et al., 2001; Mo-suwan, Lebel, Puetpaiboon & Junjana, 1999) and binge eating disorder (Fairburn et al., 1998). Schools, for example, could implement acceptance programs to teach children the dangers of teasing. More realistically, parents can be made aware of the negative implications of criticizing their children about their weight. Because childhood obesity tracks into adulthood (Serdula et al., 1993) and has serious health effects including Type II diabetes and hypertension (Dietz, 1998), parents should not ignore the fact that their child is overweight. One constructive method by which parents could address a child's weight problem is to create a healthy lifestyle for the whole family without singling out a particular child.

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Figure 1.

The process of testing mediation. Step 1 tests Paths A and B. Step 2 tests Paths C and D. Step 3 compares Path E to results from the correlation matrix. BMI = body mass index.

Table 1

Sample Characteristics

Characteristic	Scale range	Age 5		Age 7	
		M	SD	M	SD
Background					
Family income (range)	< \$20,000–\$50,000+				
Fathers' years of education	12–20	14.8 _a	2.7	\$35,000–\$50,000 _b	2.6
Mothers' years of education	12–20	14.6 _a	2.3	14.8 _a	2.3
Parental control	1–4	2.6	0.3	14.6 _a	
Girls' weight status				NA	
Body mass index (BMI)	NA	15.8 _a	1.4	16.5 _b	2.0
BMI percentile	0–100	59.8 _a	26.3	59.0 _a	27.3
% overweight	NA	15		20	
% obese	NA	2		3	
Girls' self-concept					
Body esteem	24–72	56.49 _a	6.98	61.46 _b	7.12
Peer acceptance	1–4	3.03 _a	0.62	3.66 _b	0.41
Physical ability	1–4	3.45 _a	0.45	3.63 _b	0.41
Cognitive ability	1–4	3.56 _a	0.43	3.69 _b	0.37

Note. Overweight and obese were defined on the basis of criteria outlined by Cole et al. (2000). Different subscript letters indicate that means for ages 5 and 7 were significantly different ($p < .05$) using a paired t -test analysis. Note that although the mean income was within the same range at each age, mean income was closer to \$50,000 at age 7 than at age 5.

Table 2
Correlations Between Girls' Body Mass Index (BMI), Self-Concept, Peer Teasing, and Parent Criticism at 5 and 7 Years

Variable	Age 5							Age 7						
	1	2	3	4	5	6	7	8	9	10	11	12	13	
Age 5														
1. BMI	1.0													
2. Body esteem	-.14 [*]	1.0												
3. Peer acceptance	.01 ^a	.03	1.0											
4. Physical competence	-.10	.18 ^{**}	.49 ^{**}	1.0										
5. Cognitive competence	-.18 ^{b**}	.23 ^{**}	.43 ^{**}	.57 ^{**}	1.0									
6. Peer teasing	-.01	-.17 [*]	.18 [*]	-.04	-.10 ^b	1.0								
7. Parent criticism	.30 ^{**}	.06 ^c	-.10 ^c	-.10	-.10 ^b	-.02	1.0							
Age 7														
8. BMI	.86 ^{**}	-.13 ^f	.00	-.11	-.20 ^{b**}	.04	.28 ^{**}	1.0						
9. Body esteem	-.14 ^{a*}	.24 ^{**}	-.15 [*]	.10	.14 [*]	-.14 [*]	-.08 ^c	-.15 ^{a*}	1.0					
10. Peer acceptance	-.16 [*]	.04	.10	-.14 [*]	.17 [*]	.07	-.04	-.12 ^f	.22 ^{**}	1.0				
11. Physical competence	-.23 ^{**}	.12	.14 ^f	.24 ^{**}	.28 ^{**}	.04	16 ^{d*}	-.20 ^{**}	.17 [*]	.41 ^{**}	1.0			
12. Cognitive competence	-.24 ^{b**}	.07	.00	.16 [*]	.23 ^{**}	.10	-.11	16 ^{d**}	.25 ^{**}	.51 ^{**}	.54 ^{**}	1.0		
13. Peer teasing	.10	-.11	.13 ^f	-.05	-.05	.15 [*]	.14 ^f	.13 ^f	34 ^{e**}	-.10	-.05 ^c	16 ^{f**}	1.0	
14. Parent criticism	.46 ^{**}	-.09	-.10	-.13 ^f	-.22 ^{g**}	.08	.42 ^{**}	.51 ^{**}	-.138 ^f	-.24 ^{**}	-.19 ^{**}	20 ^{g**}	-.12 ^f	1.0

^aControlling for parental control.

^bControlling for verbal ability.

^cControlling for mothers' and fathers' education.

^dControlling for mothers' education.

^eControlling for mothers' and fathers' education and family income.

^fControlling for mothers' and fathers' education and verbal ability.

^gControlling for fathers' education and verbal ability.

[†] $p < .10$.

* $p < .05$.

** $p < .01$.

Table 3
Differences in Self-Concept at Age 7 Based on the Duration and Timing of Peer Teasing and Parent Criticism Across Ages 5 to 7

BMI and self-concept variables	Never (<i>n</i> = 115)		At age 5 only (<i>n</i> = 34)		At age 7 only (<i>n</i> = 20)		At ages 5 and 7 (<i>n</i> = 13)		<i>F</i> test from stepdown analysis
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
BMI at age 5	15.8	1.4	15.7	1.3	16.2	1.7	16.0	0.97	0.76
Body esteem	62.8 _a	6.1	62.2 _a	6.2	57.7 _b	8.0	53.2 _c	9.8	10.71 ^{**}
Peer acceptance	3.66	0.4	3.76	0.3	3.58	0.5	3.56	0.6	0.75
Physical ability	3.64	0.4	3.69	0.3	3.51	0.6	3.63	0.3	0.19
Cognitive ability	3.72 _a	0.4	3.78 _a	0.3	3.39 _b	0.6	3.74 _a	0.3	4.57 ^{d**}
Peer teasing									
BMI at age 5	15.5 _a	1.2	15.9 _a	1.2	16.9 _b	1.2	17.6 _b	1.7	17.17 ^{**}
Body esteem	62.0	6.7	61.7	8.8	60.3	8.1	57.4	8.1	1.91
Peer acceptance	3.70 ^{a,b}	0.4	3.76 _a	0.4	3.39 _c	0.6	3.49 ^{b,c}	0.5	3.19 [*]
Physical ability	3.68	0.4	3.53	0.5	3.47	0.6	3.42	0.5	1.42
Cognitive ability	3.74	0.4	3.68	0.5	3.47	0.6	3.49	0.6	0.30 ^d
Parent criticism									

Note. Different subscript letters indicate significant differences between means at $p < .05$. BMI = body mass index.

^aControlling for verbal ability.

* $p < .05$.

** $p < .01$.

Table 4
Peer Teasing and Parent Criticism as Mediators of the Relationship Between Body Mass Index (BMI) and Self-Concept at Ages 5 and 7 Years

Step 1					Step 2		Step 3	
BMI → Tease (Path A)		BMI → Criticize (Path B)		Domain of self	Tease → Self (Path C; β)	Criticize → Self (Path D; β)	BMI → Self (Path E) with mediators in model (β)	Mediation
OR	CI	OR	CI					
.98	0.7–1.1	1.8	1.4–2.5**	Body esteem	Age 5 -.16 ^a **	-.10 ^d	-.16 ^d *	No
				Peer acceptance	.16 ^b **	-.11 ^b	.03 ^b	No
				Physical ability	-.04	-.08	-.08	No
				Cognitive ability	-.09 ^b	-.05 ^c	-.18 ^c **	No
1.2	0.99–1.4 ^f	1.9	1.5–2.5**	Body esteem	Age 7 -.32 ^a **	-.06 ^d	-.06 ^d	Yes
				Peer acceptance	-.07 ^a **	-.24**	.01	Yes
				Physical ability	-.03 ^e	-.13 ^e	-.12 ^e	No
				Cognitive ability	-.15 ^f *	-.17 ^f *	-.04 ^f	Yes

Note. Paths A, B, C, and D refer to the paths in Figure 1. At Step 1, BMI was used to predict the likelihood of being teased or being criticized, using logistic regression (separate analyses were run for teasing and criticizing). OR = odds ratio. CI = confidence interval. At Step 2, self-concept was regressed onto teasing, criticism, and BMI. Note that the coefficients for teasing and criticism reported in Step 2 and the coefficient for BMI (including mediators) at Step 3 are from the same regression analysis. At Step 3, the simple relationship between BMI and self-concept (the correlation from Table 2) was compared with the resulting beta weight for BMI from Step 2 with the mediators in the model. At age 5, the R^2 and the F test for the final model including the mediators were as follows for each domain of self-concept: body esteem, $R^2 = .12$, $F(5, 169) = 4.25$, $p < .01$; peer acceptance, $R^2 = .08$, $F(5, 169) = 2.85$, $p < .05$; physical ability, $R^2 = .02$, $F(3, 182) = 1.11$, $p > .05$; cognitive ability, $R^2 = .05$, $F(4, 182) = 2.52$, $p < .05$. At age 7, the R^2 and the F test for the final model including the mediators were as follows for each domain of self-concept: body esteem, $R^2 = .20$, $F(7, 181) = 6.02$, $p < .01$; peer acceptance, $R^2 = .06$, $F(4, 182) = 2.98$, $p < .05$; physical ability, $R^2 = .13$, $F(6, 182) = 4.31$, $p < .01$.

^aControlling for mothers' and fathers' education.

^bControlling for mothers' and fathers' education and parental control.

^cControlling for verbal ability.

^dControlling for family income, mothers' and fathers' education, and parental control.

^eControlling for mothers' education and income.

^fControlling for verbal ability and mothers' and fathers' education.

[†] $p < .10$.

* $p < .05$.

¹⁰
*
 $p < .01$

Table 5

Duration and Timing of Peer Teasing and Parent Criticism as Mediators of the Relationship Between Girls' Body Mass Index (BMI) at Age 5 and Self-Concept at Age 7

Step 1				Step 2			Step 3		
BMI → Tease (Path A)		BMI → Criticize (Path B)		Tease → Self (Path C; F)		Criticize → Self (Path D; F)	BMI → Self (Path E) with mediators in the model		Mediation
<i>r</i> (canonical)	<i>F</i>	<i>r</i> (canonical)	<i>F</i>	Domain of self			<i>F</i>	β	BMI → Self (from Table 2) without mediators in model (<i>r</i>)
.11	0.76	.48	17.4 ^{***}	Body esteem	8.67 ^{a***}	0.92 ^a	0.42 ^a	-.05	-.14 [*]
				Peer acceptance	1.16 ^b	2.73 ^{b*}	.39 ^b	-.07	-.16 [*]
				Physical ability	0.38 ^c	.51 ^c	4.31 ^{c**}	-.17	-.23 ^{**}
				Cognitive ability	6.29 ^{d***}	.74 ^d	3.66 ^{d†}	-.14	-.24 ^{**}

Note. Paths A, B, C, and D refer to the paths in Figure 1. Teasing is collapsed across ages 5 and 7 to form four groups including never teased, teased at age 5 only, teased at age 7 only, and teased at ages 5 and 7. The same applies for criticism. At Step 1, BMI was used to predict the likelihood of being teased or criticized, using discriminant function analysis (separate analyses were run for teasing and criticizing). At Step 2, self-concept (at age 7) was regressed onto long-term teasing, long-term criticism, and BMI at age 5 (using dummy variable regression, in which teasing/criticism at both ages was the referent group). The resulting *F* value for the general effect for teasing and criticism for this model is reported in addition to the beta weight for the domain of self-concept. Note that the coefficients for teasing and criticism reported in Step 2 and the coefficient for BMI (including mediators) at Step 3 are from the same regression analysis. At Step 3, the simple relationship between BMI at age 5 and self-concept at age 7 (the correlation from Table 2) was compared with the resulting beta weight for average BMI from Step 2 with the mediators in the model. The R^2 and the *F* test for the final model including the mediators were as follows for each domain of self-concept: body esteem, $R^2 = .21$, $F(8, 182) = 5.79$, $p < .01$; peer acceptance, $R^2 = .09$, $F(8, 182) = 2.18$, $p < .05$; physical ability, $R^2 = .12$, $F(8, 181) = 2.92$, $p < .01$; cognitive ability, $R^2 = .25$, $F(9, 182) = 6.48$, $p < .01$.

^aControlling for parental control and body esteem at age 5.

^bControlling for perceived peer acceptance at age 5.

^cControlling for perceived physical ability at age 5.

^dControlling for verbal ability and perceived cognitive ability at age 5.

[†] $p < .10$.

^{*} $p < .05$.

^{**} $p < .01$.