Global Self-Esteem, Appearance Satisfaction, and Self-Reported Dieting in Early Adolescence

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Abstract

Global self-esteem, appearance satisfaction, and self-reported dieting are interrelated. In the current study, we examine the temporal ordering of global self-esteem and appearance satisfaction across the early adolescence transition, from age 10 to age 14, as well as the independent associations of self-esteem and appearance satisfaction on self-reported dieting at age 14. Participants were 130 firstborn European American adolescents (40% girls). Adolescents who were less satisfied with their appearance at age 10 reported declines in self-esteem from age 10 to age 14. Adolescents with lower global self-esteem at age 10 did not decline in appearance satisfaction. Girls, adolescents with higher BMI scores at age 10, and adolescents who were less satisfied with their appearance at age 14 all reported more frequent dieting at age 14. Implications for etiological and intervention models of eating problems in adolescence are considered.

Self-esteem, satisfaction with one's appearance, and dieting are three constructs that are bound together closely in the life and mind of the young adolescent today. Global self-esteem is the evaluative component of self-knowledge. Generally, high self-esteem refers to favorable global evaluations of the self, and low self-esteem refers to unfavorable evaluations of the self (Baumeister, Campbell, Krueger, & Vohs, 2003). Measures of appearance satisfaction tap general aspects of body satisfaction, the affective component of body image (Smolak, 2004). Body dissatisfaction generally refers to negative subjective evaluations of one's body (Stice & Shaw, 2002). Self-report measures of dieting often include questions about the desire to lose weight, specific weight-loss behaviors, or attempts to maintain current weight or prevent weight gain (Hill, 2002). In the current study, we examine three important issues surrounding these central constructs (1) the temporal ordering of global self-esteem and appearance satisfaction across the early adolescence transition, from age 10 to age 14; (2) the independent associations of self-esteem and appearance satisfaction on self-reported dieting at age 14; and (3) gender differences in these processes.

Relations between Global Self-Esteem and Appearance Satisfaction

Measures of global self-esteem and appearance satisfaction show strong concurrent correlations, ranging from the .40s to the .80s, and similar patterns of change in adolescence (Harter, 2006). Intraindividual patterns of change in global self-esteem show declines across early adolescence that begin around 12 years of age for girls and 14 years of age for boys (Baldwin & Hoffmann, 2002). On average, girls' body satisfaction decreases across adolescence, whereas boys' body satisfaction appears more consistent, on average (Bearman, Presnell, Martinez, & Stice, 2006; Rosenblum & Lewis, 1999). It has been suggested that declines in appearance satisfaction reflect issues related to general low self-

esteem (Ricciardelli & McCabe, 2001a). However, the directionality of relations between self-esteem and appearance satisfaction is unclear (Grogan, 2008; Wertheim, Paxton, & Blaney, 2004). Is high self-esteem antecedent to positive evaluations of appearance? Or, is self-esteem an index of good adjustment to changes in appearance?

The answer to these questions is not evident in the current literature. Indeterminacy exists, in part, because self-esteem has been conceptualized as the predictor of appearance satisfaction in some studies (e.g., Johnson & Wardle, 2005; Muris, Meesters, van de Bloom, & Mayer, 2005; Ricciardelli & McCabe, 2001b; Usmiani & Daniluk, 1997), whereas in other studies appearance satisfaction has been conceptualized as a predictor of self-esteem (e.g., DuBois, Tevendale, Burk-Braxton, Swenson, & Hardesty, 2000; Frost & McKelvie, 2004; Shroff & Thompson, 2006; Williams & Currie, 2000). The former perspective derives from findings that individuals with eating disorders have low self-esteem (Button, Sonuga-Barke, Davies, & Thompson, 1996), and the latter perspective from multidimensional models of self-esteem that hold that domain specific self-evaluations, including appearance evaluations, underlie global self-esteem (Dubois et al., 2000; Harter, 2006).

The lack of clarity with regard to the temporal ordering of self-esteem and appearance satisfaction also arises, in part, because most of the research in this area has been conducted with cross-sectional samples. Multiple regression analyses show that, when self-esteem is the outcome, body dissatisfaction is significantly associated with self-esteem; the reverse relation is also true, when body dissatisfaction is the outcome, self-esteem is associated with body dissatisfaction. The shortcoming of cross-sectional designs, and thus the advantage of longitudinal designs, in this arena is exemplified in a study by Mendelson, White, and Mendelson (1996) who conducted both cross-sectional and longitudinal analyses of associations among self-esteem, appearance esteem, and weight esteem. First, they conducted regression analyses on cross-sectional data where the effects of appearance esteem and weight esteem on global self-esteem were tested. Then, they conducted cross-sectional analyses where the effects of global self-esteem on appearance esteem and weight esteem were tested. Both sets of analyses were conducted with data from two separate samples, one a pre- to early adolescent sample (mean age 10), and the other a sample of early to middle adolescents (mean age 14). In the younger sample, appearance esteem was associated with concurrent global self-esteem and global self-esteem was associated with appearance and weight esteem. In the older group, appearance esteem was associated with concurrent global self-esteem and global self-esteem was associated with appearance esteem. These results illustrate clearly the difficulty of exploring relations between self-esteem and appearance satisfaction concurrently. In an effort to clarify relations of self-esteem with appearance and weight esteem, Mendelson et al. (1996) surveyed their participants two years later on the basis of which they conducted longitudinal analyses. Controlling for stability in the predictor variables, they found that, for the younger group only, Time 1 weight status (i.e., body mass index; BMI) predicted Time 2 appearance esteem. For the older group, Time 1 BMI, appearance esteem, and weight esteem predicted Time 2 global self-esteem. Time 1 global self-esteem did not predict Time 2 appearance or weight esteem for either group. Thus, their longitudinal analyses indicate that earlier levels of appearance esteem, as well as BMI, contribute to future levels of self-esteem, but that earlier levels of self-esteem do not contribute to future levels of appearance esteem.

Although Mendelson et al. (1996) controlled for stability of the predictor variables in their longitudinal analyses, they did not control initial levels of the outcome variables, and therefore did not assess change over time in global self-esteem and measures of appearance satisfaction. Predicting change in body dissatisfaction from earlier levels of self-esteem, Hargreaves and Tiggemann (2002) found that, from age 15 to age 17, body dissatisfaction increased among girls and increases were associated with greater importance placed on

appearance at age 15, but not self-esteem at age 15. Predicting change in self-esteem from earlier levels of body dissatisfaction, Johnson and Wardle (2005) found that, in a large sample of 14- to 15-year-old girls, after controlling for initial levels of body dissatisfaction increases in body dissatisfaction over a 10-month period predicted low self-esteem. Likewise, Paxton, Neumark-Sztainer, Hannan, and Eisenberg (2006) predicted change in self-esteem from earlier levels of body dissatisfaction in two cohorts of adolescent boys and girls. The younger cohort was followed from age 13 to age 18, and the older cohort was followed from age 15 to age 20. Among girls, Time 1 body dissatisfaction predicted decreases in self-esteem, controlling for Time 1 self-esteem, for the younger cohort only. Among boys, Time 1 body dissatisfaction predicted decreases in self-esteem, controlling for Time 1 self-esteem, only for the older cohort only. Exploring the temporal ordering of self-esteem and body dissatisfaction Tiggemann (2005) conducted longitudinal cross-lagged analyses first predicting change in self-esteem from earlier levels of weight dissatisfaction and then predicting change in weight dissatisfaction from earlier levels of self-esteem. She found that, from middle to late adolescence, girls' dissatisfaction with weight predicted declines in self-esteem, controlling for earlier levels of self-esteem. The reverse relation did not hold – self-esteem did not predict change in weight dissatisfaction, controlling for earlier levels of weight dissatisfaction. The results of these studies suggest that body dissatisfaction contributes to change in self-esteem, but that self-esteem does not contribute to change in body dissatisfaction from middle to late adolescence. The first goal the current study was to examine the temporal ordering of self-esteem and appearance satisfaction across the early adolescence transition, from age 10 to age 14, when normative declines in self-esteem occur (Robins & Trzesniewski, 2005), and appearance, weight, and body dissatisfaction increase (Smolak, 2004).

Relations of Self-Esteem and Appearance Satisfaction with Dieting

Low self-esteem and appearance dissatisfaction are correlated with self-reported dieting, and dieting likewise increases in early adolescence (Hill, 2002). The average age adolescents start to diet is about 12 to 13 years (Hill, 2002), and results from studies with large samples show that many adolescents report having dieted (e.g., Raifiroiu, Sargen, Parra-Medina, Drane, & Valois, 2003). The McCreary Centre Society (2004) surveyed over 30,000 7th to 12th grade adolescents in Canada and found that 22% of boys were trying to lose weight, 26% were trying to gain weight, and 17% were trying to stay the same weight. Among girls, 72% reported trying to lose weight or maintain their current weight. If appearance satisfaction predicts changes in self-esteem rather than vice versa, as the literature suggests, the question arises, are both equally predictive of potentially problematic eating behaviors, such as self-reported dieting?

Few studies have tested the independent effects of self-esteem and appearance satisfaction on dieting. Looking only at self-esteem, Saling, Ricciardelli, and McCabe (2005) found that self-esteem among 8- to 11-year-olds was not associated with concurrent dieting in cross-sectional analyses or change in dieting over a 10-month period in longitudinal analyses. Looking only at body dissatisfaction in concurrent analyses, Ricciardelli and McCabe (2001b) found that body dissatisfaction was associated with self-reported dieting among adolescent girls and boys who desired to be thinner, and for boys who desired to be more muscular based on comparisons of real and ideal body perceptions. Similarly, Stice (2001) found that body dissatisfaction among adolescent girls predicted increases in self-reported dieting over time. Looking at self-esteem and body image together in concurrent analyses, Friestad and Rise (2004) reported that body image, self-esteem, and the body image by self-esteem interaction were associated with dieting for boys at ages 15 and 18. For girls, body image and the body image by self-esteem interaction was associated with dieting at age 15; only body image was associated with dieting at age 18. These findings lend only limited

support for the association of self-esteem and dieting, and stronger support for the association between body dissatisfaction and dieting, but only one investigation tested the effects together. The second goal of the current study was to assess the independent associations of self-esteem and appearance satisfaction with self-reported dieting in a sample of early adolescent girls and boys.

Gender Differences

Although boys show higher mean-levels of, and different patterns of change in, self-esteem and appearance satisfaction across the early adolescence transition to girls (e.g., Barker & Galambos, 2003; Rosenblum & Lewis, 1999; Shaw, Stice, & Springer, 2004), many boys experience appearance dissatisfaction and report dieting often specifically related to desires to be bigger or more muscular (Furnham & Calnan, 1998; Ricciardelli & McCabe, 2007). Results from the McCreary Centre Society (2004) survey showed that 43% of boys were not satisfied with their appearance; 19% of healthy weight boys thought they were underweight, and 6% thought they were overweight. In a recent review of the literature on risk factors for eating-related health-risk behaviors used by males to gain a muscular physique (e.g., dieting and steroid use), Cafri et al. (2005) identified body dissatisfaction as a potential risk. Research suggests that boys and girls share risk factors for elevated body dissatisfaction, including internalizing societal messages about body ideals (i.e., accept and apply the standards to themselves), talking with friends a lot about body and weight issues, and being teased about appearance (Barker & Galambos, 2003; Jones, 2004; Jones, Vigfusdottir, & Lee, 2004). Given that boys' self-esteem declines in adolescence, albeit later than girls, on average (Baldwin & Hoffman, 2002), that body dissatisfaction predicts declines in self-esteem in late adolescence for boys (Paxton et al., 2006), and that many boys report trying to change their body (McCreary, 2004), the third goal of the present study was to assess whether the processes linking self-esteem, appearance satisfaction, and dieting are the same for boys and girls in early adolescence.

The Current Study

In the present study we examine the temporal ordering of self-esteem and appearance satisfaction in a sample of early adolescent girls and boys from age 10 to age 14, and the independent effects self-esteem and appearance satisfaction on self-reported dieting at age 14. Considering that few longitudinal studies have been conducted to clarify the temporal ordering of self-esteem and appearance satisfaction, and that most that controlled Time 1 levels of the variables included only girls in middle to late adolescence, more research is warranted that examines the temporal ordering of self-esteem and appearance satisfaction, especially across the early adolescence transition when normative declines in self-esteem occur (Robins & Trzesniewski, 2005), and appearance, weight, and body dissatisfaction increase (Smolak, 2004). Furthermore, additional research examining the independent effects of self-esteem and appearance satisfaction on dieting behavior in early adolescence is also warranted. Indeed, unraveling the temporal ordering of self-esteem and appearance satisfaction, and their independent relations with dieting behavior, has implications for etiological models of eating problems in adolescence. Body dissatisfaction is the most robust and consistent risk and maintenance factor for eating pathology (Jacobi, Hayward, de Zwaan, Kraemer, & Agras, 2004; Stice, 2002), and dieting is linked to increases in eating pathology among adolescent girls (Stice, 2002).

Based on previous findings with older adolescents (e.g., Tiggemann, 2005), we expected that appearance satisfaction would predict change in self-esteem, but that self-esteem would not predict change in appearance satisfaction from age 10 to age 14. We expected that appearance satisfaction would also predict self-reported dieting at age 14 and that self-

esteem would not predict self-reported dieting at age 14. Additionally, we assessed the moderating effects of gender on these patterns of association. We expected that, although mean-level differences in self-esteem, appearance satisfaction, and dieting favor boys, the patterns of association among the variables would be the same for boys and girls. Due to consistent findings that BMI is negatively related to global self-esteem and appearance satisfaction, and positively related to self-reported dieting, BMI was controlled for in all analyses (e.g., Barker & Galambos, 2003; Medelson et al., 1996; Puhl & Latner, 2007).

Method

Participants

All participants were firstborn European American adolescents. Data were collected when adolescents were, on average, 10.25 years of age ($SD = .16$) and again when adolescents were, on average, 13.84 ($SD = .24$) years of age. Seventy-eight were boys (60%), and 52 were girls (40%). Families were of middle to upper socioeconomic status (SES; Hollingshead, 1975, *Four-Factor Index of Social Status*; see Bornstein, Hahn, Suwalsky & Haynes, 2003) with a mean of 56 (*range* = 25 – 66, $SD = 8.50$). Thirty-seven percent of mothers and 30% of fathers completed a standard four-year college degree. Forty-five percent of mothers and 50% of fathers started or completed a graduate or professional degree. At age 10, 93% of adolescents' mothers and fathers lived together.

Procedure

Families were recruited through mass mailings and newspaper advertisements in the greater Washington, DC, metropolitan area for an on-going longitudinal study beginning in infancy. Data were collected during home visits when adolescents were 10 years of age and at laboratory visits at age 14 (some members of the interview team were the same and some differed from wave to wave). All questionnaires were self-administered. At both waves of measurement active informed consent and assent procedures were used.

Of 202 adolescents who participated when they were 10 years of age, 159 also participated when they were 14 years of age, resulting in a retention rate of 78.7%. T-tests comparing the 43 adolescents who dropped out of the study to the 159 who continued to participate showed that group means did not differ on age-10 measures of global self-esteem, $t(197) = .63$, appearance satisfaction, $t(196) = .07$, or BMI, $t(173) = .59$, *ns*. The final sample for the current study consisted of 130 adolescents who provided complete data at both 10 years and 14 years on the three main variables of interest, global self-esteem, appearance satisfaction, and self-reported dieting. However, 12 cases (9%) were missing values for age-10 BMI, and 8 cases were missing values for age-14 BMI (6%). No cases were missing both age-10 and age-14 BMI. Little's MCAR test, $\chi^2(12, N = 130) = 10.58$, $p = .57$, showed that these data were missing completely at random. Therefore, the missing values for these 20 cases were imputed using the Expectation-Maximization algorithm (Dempster, Laird, & Rubin, 1997).

Measures

Global self-esteem and appearance satisfaction at age 10 and age 14—At age 10, separate scales from the *Self-Perception Profile for Children* were used to assess global self-esteem and physical appearance satisfaction (SPPC; Harter, 1985). At age 14, the *Self-Perception Profile for Adolescents* (SPPA; Harter, 1988) was used. These questionnaires were designed to assess multiple dimensions of self-esteem in addition to global self-esteem. Cole et al. (2001) demonstrated that the two scales are comparable across time. Items are presented as two contrasting statements (e.g., "Some teenagers usually do the right thing, BUT, Other teenagers often don't do what they know is right."). The adolescent chooses the statement that is more like him/her and then chooses either *sort of true for me* or *really true*

for me. Responses are scored from 1 to 4, with high scores indicating positive self-perceptions. Means were computed for all scales. The internal consistency (α) estimates in the current sample of adolescents were .82 for global self-esteem and .87 for appearance satisfaction at age 10, and .88 for global self-esteem and .86 for appearance satisfaction at age 14.

Weight status at age 10 and age 14—Height and weight data were measured by trained research assistants. Body mass index (BMI) was calculated by dividing weight in kilograms by height in meters squared.

Dieting at age 14—The mean of three items drawn from a larger Center**s** for Disease Control and Prevention youth risk survey (Centers for Disease Control and Prevention, 2005) measured dieting. Adolescents indicated how often in the past 6 months they worried about their weight, dieted to lose weight, and exercised to lose weight. Items were scored on a 5-point Likert scale ranging from 1 = *never* to 5 = *5 or more times* (α = .74). Self-report measures of dieting often include questions about desire to lose weight, specific weight-loss behaviors, or attempts to maintain current weight or prevent weight gain (Hill, 2002). Barker and Galambos (2003) found significant associations between body dissatisfaction and a similar measure that asked adolescents how hard they were trying to control their appearance (e.g., weight, muscularity) in a sample of early-to-middle adolescent girls.

Results

Descriptive Statistics

Table 1 presents means and standard deviations for age-10 and age-14 global self-esteem, appearance satisfaction, and BMI, and the mean and standard deviation for age-14 self-reported dieting, by gender. On average, at both age 10 and age 14, adolescents reported moderate to high levels of global self-esteem and appearance satisfaction. At both age 10 and age 14, BMI was in the normal range (Kuczmarski et al., 2000). At age 14, low levels of dieting were reported.

A series of 2 (gender) X 2 (age) repeated-measures analyses of variance tested gender differences, age differences, and Gender by Age interactions for global self-esteem, appearance satisfaction, and BMI. For global self-esteem, none of the effects was significant. For appearance satisfaction, there was a significant within-persons main effect of age such that appearance satisfaction declined from age 10 to age 14, $F(1, 128) = 18.85$, $p < .05$, partial $\eta^2 = .13$. The main effect of gender and the Gender by Age interaction were not significant. For BMI, the Gender by Age interaction was significant, $F(1, 128) = 4.49$, $p < .05$, partial $\eta^2 = .03$. However, independent t-tests showed that BMI did not differ significantly between girls and boys at either age 10 or age 14, ts $(128) = -.56$ and .95, *ns*, respectively, and, although BMI increased significantly from age 10 to age 14 for both girls and boys, $t(51) = -12.29$, $p < .05$, and $t(77) = -7.50$, $p < .05$, respectively, the gain in BMI was slightly larger for girls compared to boys. This is expected given that most boys would be in earlier stages of pubertal development at age 14 compared to most girls (Archibald, Graber, & Brooks-Gunn, 2003). Finally, girls reported more dieting at age 14 compared to boys, $t(128) = 2.49$, $p < .05$.

Correlations among age-10 and age-14 global self-esteem, appearance satisfaction, BMI, and age-14 self-reported dieting are presented separately by gender in Table 2. Among girls, there was moderate stability between age-10 and age-14 global self-esteem. Furthermore, higher age-10 global self-esteem was associated with higher age-10 and age-14 appearance satisfaction, and lower age-10 BMI. Appearance satisfaction scores were also moderately stable for girls. Higher age-10 appearance satisfaction was associated with lower age -10

BMI and higher age-14 appearance satisfaction. BMI was highly stable for girls, and greater BMI at age 10 was associated with lower appearance satisfaction at age 14 and more self-reported dieting at age 14. Age-14 global self-esteem and appearance satisfaction were positively related to elevated self-reported dieting at age 14, but only age-14 appearance satisfaction was associated with age-14 BMI. Finally, age-14 BMI was positively correlated with age-14 self-reported dieting; at age 14, girls who had higher BMI scores also reported dieting more.

Among boys, global self-esteem was not stable from age 10 to age 14. Appearance satisfaction was somewhat stable, and BMI was highly stable. The only variable associated with age-10 global self-esteem for boys was age-10 appearance satisfaction. Boys who had higher global self-esteem scores also had higher appearance satisfaction scores at age 10. Higher age-10 appearance satisfaction was associated with lower age-10 BMI and higher age-14 global self-esteem. Higher age-10 BMI was associated with elevated self-reported dieting at age 14. Higher age-14 global self-esteem was also associated with higher age-14 appearance satisfaction and lower age-14 BMI. Higher age-14 appearance satisfaction was associated with lower age-14 BMI and less self-reported dieting at age 14. Age-14 BMI and self-reported dieting were also positively correlated.

Predicting 14-Year Self-Esteem and Appearance Satisfaction

Cross-lagged regressions assessed the temporal ordering of global self-esteem and appearance satisfaction across the early adolescence transition, controlling for gender and BMI. Initially, tests of gender interactions were included in the analyses, but the steps including the interaction terms were not significant and therefore gender interactions are not presented in the final cross-lagged regressions[1].

Predicting age-14 global self-esteem—First, age-14 self-esteem was the outcome (see Table 3). Step 1a results show that as a set, gender, BMI, and global self-esteem at age 10 was related to age-14 global self-esteem, accounting for 7% of the variability in age-14 global self-esteem. Individually, only age-10 global self-esteem predicted age-14 global self-esteem, reflecting stability in the construct. Step 2a results show that the addition of age-10 appearance satisfaction accounted for an additional 3% of the variance in age-14 global self-esteem, controlling for age 10 self-esteem. Adolescents who were less satisfied with their appearance at age 10 decreased in self-esteem from age 10 to age 14. Furthermore, with the addition of age-10 appearance satisfaction, age-10 global self-esteem was no longer a significant predictor of age-14 global self-esteem.

Predicting age-14 appearance satisfaction—Next, age-14 appearance satisfaction was the outcome. As a set, gender, age-10 BMI, and age-10 appearance satisfaction accounted for 15% of the variance in age-14 appearance satisfaction, but only age-10 appearance satisfaction was significantly related to age-14 appearance satisfaction. Step 2b results show that the addition of age-10 self-esteem did not account for additional variance in age-14 appearance satisfaction. That is, adolescents with lower global self-esteem at age 10 did not decrease in appearance satisfaction from age 10 to age 14.

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[1]A post-hoc power analysis was conducted to determine whether the sample size of 130 provided sufficient power to detect a medium-sized effect in the regression analyses. With a medium effect size of .15, $\alpha = .05$, and $N = 130$, the power estimates ranged from .90 - .95, indicating adequate power to detect a medium effect (Faul, Erdfelder, Lang, & Buchner, 2007). If the gender interaction effects were of medium size, the sample size would have been sufficient to detect these effects.

Predicting 14-year Self-Reported Dieting

Finally, the independent effects of global self-esteem and appearance satisfaction at age 14 on age-14 self-reported dieting were tested, controlling for stability in global self-esteem, appearance satisfaction, BMI, and gender (Table 4). Again, in initial tests, the step including gender interaction terms was not significant and therefore gender interactions were not included in the final analyses. As a set, the variables accounted for 30% of the variance in age-14 dieting. Girls, adolescents with greater BMI, and adolescents who were less satisfied with their appearance at age 14 reported more self-reported dieting at age 14. Self-esteem did not predict age-14 dieting.

Discussion

The goals of the current study were, first, to clarify temporal relations between global self-esteem and appearance satisfaction across the early adolescence transition from age 10 to age 14; second, to evaluate their independent effects on self-reported dieting; and, third, to examine gender differences in these patterns of association. Few previous studies have assessed the directionality of relations between global self-esteem and appearance satisfaction or their independent effects on self-reported dieting in early adolescence.

Addressing the first goal, cross-lagged analyses showed that, when age-14 self-esteem was the outcome, adolescents who were less satisfied with their appearance at age 10 reported declines in self-esteem from age 10 to age 14. However, predicting age-14 appearance satisfaction from self-esteem showed that adolescents with lower global self-esteem at age 10 did not decrease in appearance satisfaction from age 10 to age 14. These results accord with those of Tiggemann (2005) who found that body satisfaction predicted declines in self-esteem, but self-esteem did not predict change in body satisfaction in a sample of girls in late adolescence.

Furthermore, these results correspond with the inclusion in the Diagnostic and Statistical Manual of Mental Disorders (APA, 1994) of the defining feature for both bulimia nervosa and anorexia nervosa that one's general self-esteem is overly determined by perceptions of and feelings about weight and shape. This implies that dissatisfaction with appearance underlies low self-esteem, as in multidimensional models of self-esteem (DuBois et al., 2000; Harter, 2006), rather than vise versa. DuBois et al. (2000) found that body image was the strongest unique predictor of overall feelings of self-esteem in two cross-sectional samples of young adolescents, and for girls appearance perceptions were the primary source of less favorable self-evaluations. Indeed, adolescents themselves explicitly identify appearance issues as important determinants of how they feel about themselves more generally. Polce-Lynch, Myers, Kilmartin, Forssmann-Flack, and Kliewer (1998) asked 5th, 8th, and 12th grade adolescents to name things that made them feel good about themselves and things that made them feel badly about themselves. Appearance issues such as looks, weight, and clothes were common themes. Geller, Zaitsoff, and Srikameswaran (2002) found that 84% of 16-year-old girls endorsed "body" as an important dimension of their self-esteem and 21% ranked it as the most important dimension.

Addressing the second goal, examination of the independent associations of global self-esteem and appearance satisfaction with self-reported dieting revealed that gender, age-14 BMI, and age-14 appearance satisfaction were related to age-14 dieting (controlling for stability in global self-esteem, appearance satisfaction, and BMI). Girls, adolescents with higher BMI, and adolescents with lower appearance satisfaction at age 14 reported more frequent dieting at age 14. Global self-esteem was not significantly related to self-reported dieting at age 14. Our findings support those of previous studies that, when taken together, suggest that appearance or body dissatisfaction may be a more robust risk factor for dieting

and eating pathology compared to low global self-esteem (Ricciardelli & McCabe, 2001b; Saling et al., 2005; Shaw et al., 2004; Stice, 2001).

Addressing the third goal, initial investigations of gender interactions to test whether these processes differed for girls compared to boys were not significant (and thus not presented in the final analyses). These null findings could be due, in part, to the relatively small sample size. At the bivariate level, differences and similarities in the patterns of associations among the variables were evident comparing girls and boys. Stability correlations for all three longitudinal variables, global self-esteem, appearance satisfaction, and BMI, were higher for girls compared to boys. Another difference was that for girls (compared to boys), global self-esteem at age 10 was associated with more variables. For boys, age 10 self-esteem was only associated with age-10 appearance satisfaction. However, girls and boys showed similar patterns of association between age-10 appearance satisfaction and the other variables. These results correspond with findings in the growing literature that explores risk processes that promote body/appearance/weight dissatisfaction for girls and boys (e.g., Barker & Galambos, 2003; Jones, 2004; Jones et al., 2004). Although boys may, on average, show higher levels and less decline in self-esteem and appearance satisfaction across the early adolescence transition (e.g., Barker & Galambos, 2003; Rosenblum & Lewis, 1999; Shaw et al., 2004), the processes linking global self-esteem, appearance satisfaction, and self-reported dieting may be the same for girls and boys . To date, the vast majority of research into these processes has been conducted only on girls, so more research with large samples with the power to test interaction effects is needed. Additionally, in future research, measures that capture body image concerns particularly pertinent to males, such as the desire to gain a muscular physique, should be used (Grogan, 2008; Ricciardelli & McCabe, 2007). This was not done in the current study.

This study is not without limitations. Replication of these and previous findings (e.g., Tiggemann, 2005) is warranted with larger, more diverse samples, and more waves of measurement. Do the patterns hold for African American adolescent girls, who on average have greater body satisfaction compared to European American girls and women (Wildes & Emery, 2001), or other ethnic groups? With larger samples, path analysis or latent variable models could be used to test simultaneously associations among all of the variables in a single model, assess model fit, and multi-sample methods used to test group differences. Furthermore, with additional waves of measurement trajectories of change in global self-esteem and appearance satisfaction could be modeled.

The results of the current study contribute to the literature by demonstrating converging results with previous studies that examined the temporal ordering, and independent associations, of global self-esteem and appearance satisfaction with self-reported dieting using different measures and focusing on the early adolescence transition. This is the risk period during which self-esteem and satisfaction with appearance decline and dieting behavior increases. Judging the temporal relations between global self-esteem and appearance satisfaction, and assessing their independent effects on dieting behavior during a period when risk for developing eating disorders increases, have implications for etiological as well as intervention models of eating problems. Interventions aimed at raising global self-esteem in an effort to protect against the development of eating problems may not be effective if self-esteem is an outcome of success or an indicator of well-being (Baumeister et al., 2003). Our findings suggest that targeting appearance satisfaction may be a more effective strategy in preventing eating problems, and may help to lift adolescents' global self-esteem at the same time.

Acknowledgments

Biography

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References

Archibald, AB.; Graber, JA.; Brooks-Gunn, J. Pubertal processes and physiological growth in adolescence. In: Adams, GR.; Berzonsky, MD., editors. Blackwell handbook of adolescence. Oxford, UK; Blackwell: 2003. p. 24-47.

American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 4th ed. Author; Washington, DC: 1994.

Baldwin SA, Hoffmann JP. The dynamics of self-esteem: A growth-curve analysis. Journal of Youth and Adolescence. 2002; 31:101–113.

Barker ET, Galambos NL. Body dissatisfaction of adolescent girls and boys: Risk and resource factors. Journal of Early Adolescence. 2003; 23:141–165.

Baumeister RF, Campbell JD, Krueger JI, Vohs KK. Does high self-esteem cause better performance, interpersonal success, happiness, or healthier lifestyles? Psychological Science in the Public Interest. 2003; 4:1–44.

Bearman SK, Presnell K, Martinez E, Stice E. The skinny on body dissatisfaction: A longitudinal study of adolescent girls and boys. Journal of Youth and Adolescence. 2006; 35:229–241.

Bornstein, MH.; Hahn, C-S.; Suwalsky, JTD.; Haynes, OM. Socioeconomic status, parenting, and child development: The *Hollingshead Four-Factor Index of Social Status* and the *Socioeconomic Index of Occupations*. In: Bornstein, MH.; Bradley, RH., editors. Socioeconomic status, parenting, and child development. Erlbaum; Mahwah, NJ: 2003. p. 29-82.

Button EJ, Sonuga-Barke EJS, Davies J, Thompson M. A prospective study of self-esteem in the prediction of eating problems in adolescent schoolgirls: Questionnaire findings. British Journal of Clinical Psychology. 1996; 35:193–203. [PubMed: 8773797]

Centers for Disease Control and Prevention. Youth Risk Behavior Survey. 2005. Retrieved from http://www.cdc.gov/HealthyYouth/yrbs/index.htm

Cole DA, Maxwell SE, Martin JM, Peeke LG, Seroczynski AD, Tram JA, et al. The development of multiple domains of child and adolescent self-concept: A cohort sequential longitudinal design. Child Development. 2001; 72:1723–1746. [PubMed: 11768142]

Dempster AP, Laird NM, Rubin DB. Maximum likelihood from incomplete data via the EM algorithm. Journal of the Royal Statistical Society. 1997; 39:1–38.

DuBois DL, Tevendale HD, Burk-Braxton C, Swenson LP, Hardesty JL. Self-system influences during early adolescence: Investigation of an integrative model. Journal of Early Adolescence. 2000; 20:12–43.

Faul F, Erdfelder E, Lang A-G, Buchner A. G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. Behavior Research Methods. 2007; 39:175–191. [PubMed: 17695343]

Friestad C, Rise J. A longitudinal study of the relationship between body image, self-esteem and dieting among 15-21 year olds in Norway. European Eating Disorders Review. 2004; 12:247–255.

Frost J, McKelvie S. Self-esteem and body satisfaction in male and female elementary school, high school, and university students. Sex Roles. 2004; 51:45–54.

Furnham A, Calnan A. Eating disturbance, self-esteem, reasons for exercising and body weight dissatisfaction in adolescent males. European Eating Disorders Review. 1998; 6:58–72.

Geller J, Zaitsoff SL, Srikameswaran S. Beyond shape and weight: Exploring the relationship between nonbody determinants of self-esteem and eating disorder symptoms in adolescent females. International Journal of Eating Disorders. 2002; 32:344–351. [PubMed: 12210649]

Grogan, S. Body image: Understanding body dissatisfaction in men, women, and children. 2nd ed. Routledge; New York: 2008.

Hargreaves D, Tiggemann M. The role of appearance schematicity in the development of adolescent body dissatisfaction. Cognitive Therapy and Research. 2002; 26:691–700.

Harter, S. Manual for the Self-Perception Profile for Children. University of Denver; Denver, CO: 1985.

Harter, S. Manual for the Self-Perception Profile for Adolescents. University of Denver; Denver, CO: 1988.

Harter, S. The self. In: Damon, W.; Lerner, RM.; Eisenberg, N., editors. Handbook of child psychology. 6th ed. Vol. Vol. 3. Social, emotional, and personality development. Wiley; Hoboken, NJ: 2006. p. 505-570.

Hill, AJ. Prevalence and demographics of dieting. In: Fairburn, CG.; Brownell, KD., editors. Eating disorders and obesity: A comprehensive handbook. Guilford; New York: 2002. p. 80-83.

Jacobi C, Hayward C, de Zwaan M, Kraemer HC, Agras S. Coming to terms with risk factors for eating disorders: Application of risk terminology and suggestions for a general taxonomy. Psychological Bulletin. 2004; 130:19–65. [PubMed: 14717649]

Johnson F, Wardle J. Dietary restraint, body dissatisfaction, and psychological distress: A prospective analysis. Journal of Abnormal Psychology. 2005; 114:119–125. [PubMed: 15709818]

Jones DC. Body image among adolescent girls and boys: A longitudinal study. Developmental Psychology. 2004; 40:823–835. [PubMed: 15355169]

Jones DC, Vigfusdottir TH, Lee Y. Body image and the appearance culture among adolescent girls and boys: An examination of friend conversations, peer criticism, appearance magazines, and the internalization of appearance ideals. Journal of Adolescent Research. 2004; 19:323–339.

Kuczmarski RJ, Ogden CL, Grummer-Strawn LM, Flegal KM, Guo SS, Wei R, et al. CDC growth charts: United States. Advance Data. 2000; 314:7–20.

Mendelson BK, White DR, Mendelson MJ. Self-esteem and body esteem: Effects of gender, age, and weight. Journal of Applied Developmental Psychology. 1996; 17:321–346.

McCreary Centre Society. Healthy Youth Development: Highlights from the 2003 Adolescent Health Survey. Author; Vancouver, BC: 2004.

Muris P, Meesters C, van de Blom W, Mayer B. Biological, psychological, and sociocultural correlates of body change strategies and eating problems in adolescent boys and girls. Eating Behaviors. 2005; 6:11–22. [PubMed: 15567107]

Paxton SJ, Neumark-Sztainer D, Hannan PJ, Eisenberg ME. Body dissatisfaction prospectively predicts depressive mood and low self-esteem in adolescent girls and boys. Journal of Clinical Child and Adolescent Psychology. 2006; 35:539–549. [PubMed: 17007599]

Polce-Lynch M, Myers BJ, Kilmartin CT, Forssmann-Falk R, Kliwer W. Gender and age patterns in emotional expression, body image, and self-esteem: A qualitative analysis. Sex Roles. 1998; 38:1025–1048.

Puhl RM, Latner JD. Stigma, obesity, and the health of the nation's children. Psychological Bulletin. 2007; 133:557–580. [PubMed: 17592956]

Ricciardelli, LA.; McCabe, MP. The muscular ideal: Psychological, social, and medical perspectives. In: Thompson, JK.; Cafri, G., editors. Pursuit of muscularity among adolescents. American Psychological Association; Washington, DC: 2007. p. 199-216.

Ricciardelli LA, McCabe MP. Children's body image concerns and eating disturbance: A review of the literature. Clinical Psychology Review. 2001a; 21:325–344. [PubMed: 11288604]

Ricciardelli LA, McCabe MP. Self-esteem and negative affect as moderators of sociocultural influences on body dissatisfaction, strategies to decrease weight, and strategies to increase muscles among adolescent boys and girls. Sex Roles. 2001b; 44:189–207.

Robins RW, Trzesniewski KH. Self-esteem development across the lifespan. Current Directions in Psychological Science. 2005; 14:158–162.

Rosenblum GD, Lewis M. The relations among body image, physical attractiveness, and body mass in adolescence. Child Development. 1999; 70:50–64. [PubMed: 10191514]

Saling M, Ricciardelli LA, McCabe MP. A prospective study of individual factors in the development of weight and muscle concerns among preadolescent children. Journal of Youth and Adolescence. 2005; 34:651–661.

Shaw HE, Stice E, Springer DW. Perfectionism, body dissatisfaction, and self- esteem in predicting bulimic symptomatology: Lack of replication. International Journal of Eating Disorders. 2004; 36:41–47. [PubMed: 15185270]

Shroff H, Thompson JK. The tripartite influence model of body image and eating disturbance: A replication with adolescent girls. Body Image. 2006; 3:17–23. [PubMed: 18089205]

Smolak L. Body image in children and adolescents: Where do we go from here? Body Image. 2004; 1:15–28. [PubMed: 18089138]

Stice E. A prospective test of the dual-pathway model of bulimic pathology: Mediating effects of dieting and negative affect. Journal of Abnormal Psychology. 2001; 110:124–135. [PubMed: 11261386]

Stice E. Risk and maintenance factors for eating pathology: A meta-analytic review. Psychological Bulletin. 2002; 128:825–848. [PubMed: 12206196]

Stice E, Shaw H. Role of body dissatisfaction in the onset and maintenance of eating pathology: A synthesis of research findings. Journal of Psychosomatic Research. 2002; 53:985–993. [PubMed: 12445588]

Tiggemann M. Body dissatisfaction and adolescent self-esteem: Prospective findings. Body Image. 2005; 2:129–135. [PubMed: 18089181]

Usmiani S, Daniluk J. Mothers and their adolescent daughters: Relationship between self-esteem, gender role identity, and body image. Journal of Youth and Adolescence. 1997; 26:45–62.

Wertheim, EH.; Paxton, SJ.; Blaney, S. Risk factors for the development of body image disturbances. In: Thompson, JK., editor. Handbook of eating disorders and obesity. Wiley; New York: 2004. p. 463-494.

Wildes JE, Emery RE. The roles of ethnicity and culture in the development of eating disturbance and body dissatisfaction: A meta-analytic review. Clinical Psychology Review. 2001; 21:521–551. [PubMed: 11413866]

Williams JM, Currie C. Self-esteem and physical development in early adolescence: Pubertal timing and body image. Journal of Early Adolescence. 2000; 20:129–149.

Table 1

Means (Standard Deviations) for Age-10 and Age-14 Global Self-Esteem, Appearance Satisfaction, and BMI, and Age-14 Self-Reported Dieting, Separately by Gender

	Girls		Boys	
	Age 10	Age 14	Age 10	Age 14
	M (*SD*)	*M* (*SD*)	*M* (*SD*)	*M* (*SD*)
Global self-esteem[a]	3.25 (.65)	3.25 (.65)	3.41 (.56)	3.21 (.65)
Appearance satisfaction[a]	2.91 (.81)	2.70 (.73)	3.19 (.65)	2.79 (.63)
BMI[b]	17.80 (3.08)	21.39 (4.01)	18.15 (3.67)	20.71 (3.96)
Self-reported dieting[c]	---	2.22 (1.15)	---	1.73 (1.07)

Note. *n* = 52 girls. *n* = 78 boys.

[a] possible range: 1 to 4.

[b] acutal range: 12.9 to 31.09 for girls and 12.48 34.24 for boys.

[c] possible range: 1 to 5. --- indicates this construct was not measured at age 10.

Table 2

Correlations among Age-10 and Age-14 Global Self-Esteem, Appearance Satisfaction, and BMI, and Age 14- Self-Reported Dieting, Separately by Gender

	1.	2.	3.	4.	5.	6.	7.
1. Age-10 Global self-esteem	--	.67**	-.12	.15	.14	.06	.06
2. Age-10 Appearance satisfaction	.66**	--	-.25*	.23*	.25*	-.07	.00
3. Age-10 BMI	-.30*	-.30*	--	-.09	-.14	.69**	.38**
4. Age-14 Global self-esteem	.40**	.41**	-.04	--	.75**	-.22*	-.11
5. Age-14 Appearance satisfaction	.33**	.50**	-.24*	.60**	--	-.25*	-.23*
6. Age-14 BMI	-.21	-.17	.86**	-.01	-.26*	--	.54**
7. Age-14 Self-reported dieting	-.09	-.09	.39**	-.28*	-.37**	.38**	--

Note. $n = 52$ girls, below the diagonal. $n = 78$ boys, above the diagonal.

*
$p < .05$.

**
$p < .01$.

Table 3

Cross-Lagged Regressions Testing the Temporal Ordering of Self-Esteem and Appearance Satisfaction from Age 10 to 14

Step and Predictor	β	ΔR^2	Total R^2
(a) Outcome = Self-Esteem Age 14			
Step 1a			
Gender	−.07		.07[**]
BMI age 10	−.02		
Self-esteem age 10	.26[**]		
Step 2a		.03[*]	.10[**]
Gender	−.09		
BMI age 10	.01		
Self-esteem age 10	.10		
Appearance satisfaction age 10	.25[*]		
(b) Outcome = Appearance Satisfaction Age 14			
Step 1b			.15[**]
Gender	−.00		
BMI age 10	−.09		
Appearance satisfaction age 10	.36[**]		
Step 2b		.00	.15[**]
Gender	−.01		
BMI Age 10	−.09		
Appearance satisfaction age 10	.38[**]		
Self-esteem age 10	−.03		

Note. $N = 130$.

[*]
$p < .05$.

[**]
$p < .01$.

Table 4

Regression Analysis Testing the Concurrent Associations of Age-14 Self-Esteem and Appearance Satisfaction with Age-14 Self-Reported Dieting

Predictor	β	Total R^2
		.30 **
Gender	−.20 *	
BMI age 10	.12	
Self-esteem age 10	.01	
Appearance satisfaction age 10	.10	
BMI age 14	.33 **	
Self-esteem age 14	−.00	
Appearance satisfaction age 14	−.22 *	

Note. N = 130.

*
p < .05.

**
p < .01.