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Jane Ellen Smith  
*University of New Mexico*

Sarah J. Erickson  
*VA Medical Center*

Julia L. Austin  
*Primary Children's Medical Center*

Jaime L. Winn  
*VA Medical Center*

Denise N. Lash  
*Primary Children's Medical Center*

*See next page for additional authors*

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**Authors**

Jane Ellen Smith, Sarah J. Erickson, Julia L. Austin, Jaime L. Winn, Denise N. Lash, and Paul Amrhein

# Mother–Daughter Relationship Quality and Body Image in Preadolescent Girls

Jane Ellen Smith<sup>1</sup> · Sarah J. Erickson<sup>1</sup> · Julia L. Austin<sup>1</sup> · Jaime L. Winn<sup>2</sup> · Denise N. Lash<sup>3</sup> · Paul C. Amrhein<sup>4</sup>

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**Abstract** Research suggests that mothers may play a role in girls' body image development. The “interactive” hypothesis specifies that qualities of the mother–daughter relationship, as opposed to maternal modeling alone, predict daughter's body image. We sought to understand how maternal relationship quality, from the perception of both daughters and mothers, was associated with preadolescent girls' body image. The relationship between mother–daughter relationship quality and daughters' body image was examined in 152 girls (ages 8–12) and their mothers. Mothers and daughters primarily identified as non-Hispanic white or Hispanic. Hierarchical linear regression analyses indicated that daughters' perception of mother–daughter relationship quality was associated with daughters' body esteem and body dissatisfaction, adding a small, but significant, amount of variance above the larger effect of child z-BMI and age. In contrast, maternal perception of mother–daughter relationship quality was *not* associated with any child body image measures. Young girls who perceived their relationships with their mothers more positively had healthier body images. Although effect sizes were relatively small and the cross-sectional design precludes conclusions regarding causality, these results support the “interactive” model of body image development whereby the characteristics of the mother–daughter relationship (as

perceived by the daughter) are related to body image. Our findings support the notion that daughters' perceptions of strong mother–daughter relationships are associated with healthy child body image, and fall in line with family-based prevention efforts that attempt to enhance parent–child relationships.

**Keywords** Body image · Body dissatisfaction · Preadolescent · Mother–daughter relationship · Hispanic

## Introduction

Internalization of the ultra-thin ideal and subsequent body dissatisfaction often begin during childhood (Dohnt and Tiggemann 2006; Harriger et al. 2010; see reviews, Ricciardelli and McCabe 2001; Smolak and Levine 2001; Wood et al. 1996). Indeed, American girls as young as three demonstrate awareness of the thin ideal (Harriger et al. 2010) and a large number of preadolescent girls report a desire to be thinner (e.g., see Clark and Tiggemann 2006). Such early body dissatisfaction is postulated to serve as a risk factor for the development of eating disorder symptoms (see review, Thompson and Smolak 2001). In addition, beyond the risk of eating disturbances, poor body image in girls also has been linked to worse self-esteem (Phares et al. 2004), negative affect (Gilliand et al. 2007) and depressive symptoms (Phares et al. 2004; Stice and Bearman 2001).

Body image disturbance in youth has received a great deal of attention, with much research focusing on the role of socio-cultural level variables in body image development, especially media exposure and peer-level influences (e.g., see Anschutz et al. 2011; Dohnt and Tiggemann 2006; Nelson et al. 2011). Although media and peer-level

✉ Jane Ellen Smith  
janellen@unm.edu

<sup>1</sup> Department of Psychology, University of New Mexico, MSC 03 2220, Albuquerque, NM 87131, USA

<sup>2</sup> James A. Haley Veterans Hospital, Tampa, FL, USA

<sup>3</sup> Intermountain Health Care, Ogden, UT, USA

<sup>4</sup> Department of Psychology, Montclair State University, Montclair, NJ, USA

influences appear to be of primary importance in predicting body image in female adolescent samples, family influences, and maternal influences in particular, have long been presupposed to be a key determinant of *preadolescent* girls' body image development (Field et al. 2005; see review, Smolak and Levine 2001). This notion has even been the subject of recent media attention, with two widely promoted mass audience texts describing how mothers transmit beliefs regarding beauty standards and influence their daughters' weight-related behaviors (e.g., Chadwick 2009; Fuerstein 2009).

A body of recent research supported the notion that mothers may play a role in girls' body image development. Influenced by social-learning theory, a majority of this research focused on how maternal modeling of weight-related behaviors influenced daughters (Haines et al. 2008). Several studies indicated that mothers' direct comments to their daughters about weight or actual attempts to control their child's food intake were linked to poor body image and dieting behavior (Francis and Birch 2005; Smolak et al. 1999; Vander Wal and Thelen 2000).

Some researchers have argued that mothers might influence their daughters' body image in ways beyond that hypothesized by social learning theory (Kearney-Cooke 2002; Ogden and Steward 2000). Indeed, styles of interaction within families have long been hypothesized to influence body image development and eating disorder symptoms (see review Steinberg and Phares 2001). Recent studies have noted characteristics such as hostility, low expressiveness, and lack of cohesion in many families of children and adults with poorer body satisfaction (Crespo et al. 2010).

Ogden and Steward (2000) posited an "interactive" hypothesis whereby specific qualities of the mother–daughter relationship, as opposed to modeling alone, predict daughter's body image. That is, there is something about the two-way relationship between mother and daughter than can be either protective or facilitative of weight concerns in the daughter. In support of this notion, increased weight concern was noted among adolescents whose mother–daughter relationships were marked by lower autonomy (Ogden and Steward 2000) and more limited maternal acceptance (Bun Lam and McHale 2012). In addition, other research noted that weight concerns were higher among preadolescent and early adolescent girls reporting insecure, as opposed to secure, attachment styles (Sharpe et al. 1998). Moreover, girls who reported less identification with their mother's personality characteristics, namely, less interest in being like their mothers, demonstrated increased body dissatisfaction (Hahn-Smith and Smith 2001). Although the precise mechanisms of change at work in these complex interactions are as yet

unknown, the existing evidence points to the need for a more nuanced understanding of the mother–daughter relationship, beyond that provided by the modeling hypothesis alone, particularly as the relationship develops over time.

A small body of research has examined how more general aspects of the mother–daughter relationship, such as perceived closeness, support, or warmth, are associated with body image development. Findings from studies focused on such general relationship aspects have largely not supported the interactive hypothesis. For example, 7th to 8th grade adolescent girls who experienced school-related stressors were *not* protected from eating disorder symptoms by perceived maternal support (McVey et al. 2002). Additionally, a more recent study with an older, college-age sample failed to find a relationship between mother–daughter closeness and body dissatisfaction (Cooley et al. 2008). However, such findings may partially reflect the gradual loss of maternal influence over body image as children mature. Indeed, Byely et al. (2000) found that while warmth of family relationships predicted concurrent body image among largely 6th and 7th grade early adolescent girls, it did not predict prospective body image one year later. These researchers concluded that family relationships may hold their strongest influence over body image *prior* to adolescence. However, to our knowledge, no studies to date have examined how the quality of family relationships, and specifically mother–daughter relationships, are associated with body image prior to adolescence.

The current study sought to better understand how maternal relationship quality, from the perception of both daughters and mothers, is associated with preadolescent (3rd to 6th grade) girls' body image (which was conceptualized as encompassing both body dissatisfaction and body esteem). Study mothers and daughters each separately rated the quality of the mother–daughter relationship. Based on the idea that family relationship characteristics are likely a salient predictor of body image for preadolescent girls (Byely et al. 2000), we expected that higher quality mother–daughter relationships, as rated by daughters, would be associated with healthier child body image (lower body dissatisfaction, higher body esteem). Generally following findings which suggest that daughters', but not mothers', perceptions of the mother–daughter relationship predict daughter body image (Field et al. 2005), we expected that maternal rating of relationship quality would be unrelated to child body image. Although we did not expect the maternal perception of the quality of the relationship to be related to child body image, we believed that the measurement of maternal perception was necessary in order to rule out that association and thereby replicate an important previous finding.

## Method

### Participants

The current study sampled 152 8–12-year old preadolescent girls and their mothers who lived in the Southwestern United States (see recruitment process in Procedure section). Girls with learning disorders/developmental disabilities that precluded completion of the current study were excluded ( $n = 1$ ). In order to have independent observations, for those cases in which two siblings participated we randomly selected data from only one sibling. The sample was drawn from grades 3–6 at both urban and rural public schools. The participating schools were located in primarily lower and lower-middle class districts, with a majority of students in the catchment area (56.2 %) qualifying for subsidies under the National School Lunch Program.

Although the study was also open to girls whose primary caretaker was another female relative, all enrolled dyads but one included a mother and daughter. In addition to living with their mothers a majority of the time, a small portion of study girls (13.8 %,  $n = 21$ ) lived with a caregiver besides the mother on a part-time basis. A slight majority of study mothers indicated that their daughter's father lived in the same home as their daughter (59.9 %;  $n = 91$ ).<sup>1</sup> Additional demographic characteristics for study mothers and daughters are available in Table 1.

### Procedure

All study procedures were approved by the University of New Mexico Institutional Review Board. All study mothers gave informed consent. Study daughters had active parental/guardian consent and gave assent to participate themselves.

Participants were recruited from a convenience sample of 14 public schools in urban and rural areas of New Mexico. All principals who were contacted were interested in having their schools participate, and teachers in eligible classrooms (third through sixth grades) asked their female students to bring information about the study home to their mothers. These forms had a space for mothers to sign and return, which then allowed researchers to contact them by phone. Following the phone call, mothers and daughters who were still interested were scheduled to meet with researchers at the daughter's school after classes had ceased for the day. A majority (83.0 %) of those who expressed interest in the study participated. For every 10

participating girls, a girl's name was randomly selected to receive a \$25 gift certificate to the local mall. Furthermore, every girl received either a \$5 prize or \$5 in cash, and mothers each received \$20 for the 2-hour study.

After giving informed consent and child assent, mothers and daughters completed their measures separately. Multiple mother–daughter dyads were scheduled concurrently and measures were completed in two groups (study mothers, study daughters). Measures were taken to ensure privacy (e.g., space between participants) and all measures were read aloud to girls to improve comprehension. The height and weight of study daughters were measured privately.

### Measures

In addition to the measures below, mothers and daughters also each completed a demographic measure constructed by the study authors.

#### *Anthropometric Measures*

Study research assistants measured daughter height and weight. A scale was provided for study mothers to weigh themselves privately if they were unsure of their current weight. Body Mass Index (BMI) was calculated using the standard formula (weight in kg/height in m<sup>2</sup>). Girls' BMIs were age-standardized using sex-specific means and standard deviations from the Centers for Disease Control and Prevention Growth Charts (z-BMI; Kuczmarski et al. 2000).

#### *Girls' Self-Report Measures*

*Child Figure Drawings* (CFD; Childress et al. 1993). This measure, which was adapted from Stunkard et al. (1983) adult Figure Rating Scale (FRS; see below), consists of eight child female figures ranging from very thin to very heavy. Participants choose the figures that best represent their current/perceived figure and their ideal figure. The difference in ratings between their current/perceived figure and their ideal figure represents their level of dissatisfaction with their bodies (Thompson and Altabe 1991). Positive scores indicate the desire for a smaller body size. The CFD measure has demonstrated at least adequate test–retest reliability in previous samples (Candy and Fee 1998).

The *Revised Eating Disorder Inventory—Body Dissatisfaction subscale* (Revised EDI-BD; Wood et al. 1996) is a 9-item scale intended to assess the level of children's dissatisfaction with specific parts of the body (e.g., stomach, thighs). A sample item is, "I think that my stomach is too big". The Revised EDI-BD has good test–retest reliability ( $\alpha = .79$ ) and good internal consistency, ranging from .73

<sup>1</sup> Presence of father was neither a reliable factor nor did it function as a moderator of the other factors in the regressions. Also, presence of father did not correlate reliably with the other study variables.

**Table 1** Participant demographic characteristics

<i>Daughter demographic characteristics</i>			
	M	SD	Range
Age	9.76	1.30	8–12
	N	%	
Reached Menarche	15	9.9	
<i>Ethnic Status</i>			
White (non-Hispanic)	57	37.5	
Hispanic (of any race)	51	33.6	
African-American	4	2.6	
Other	8	5.3	
Bi-racial/Bi-ethnic	32	21.1	
White/Hispanic	25	78.1	
Native American/Hispanic	4	12.5	
White/Native American	3	9.4	
<i>Mother demographic characteristics</i>			
	M	SD	Range
Age	37.14	6.09	24–64
	N	%	
<i>Ethnic Status</i>			
White (non-Hispanic)	74	48.7	
Hispanic (of any race)	58	38.2	
African-American	2	1.3	
Native American/American Indian	3	2.0	
Other	3	2.0	
Bi-racial/Bi-ethnic	12	7.9	
White/Hispanic	9	75.0	
White/Native American	2	16.7	
Native American/Hispanic	1	8.3	
<i>Education Level</i>			
High school or less	49	32.9	
Some college	53	35.6	
College graduate	22	14.8	
Post-graduate work	25	16.8	
<i>Marital Status</i>			
Married (living with spouse)	102	67.1	
Divorced	33	21.7	
Never married	11	7.2	
Separated (not living with spouse)	6	3.9	

Percentages may not sum to 100 % due to rounding. Women included in the post-graduate work category were college graduates who completed at least some post-graduate work, whether or not it led to a degree. Three women described their educational status as “other” and did not specify their level of education and are not included above. White = non-Hispanic. Hispanic individuals could be of any race. Mother and daughter ethnic status is displayed separately given that mothers and daughters did not always share ethnic status (e.g., the biological father was of different ethnic status than study mother)

to .95 (Wood et al. 1996). With our sample the Revised EDI-BD demonstrated good internal reliability (Cronbach’s  $\alpha = .84$ ).

*Body Esteem Scale* (BES; Mendelson and White 1982). This 24-item forced choice (yes/no) scale measures the degree to which children value their physical appearance and how they believe others evaluate it. One sample item is, “I wish I looked better”. Items are summed so that higher scores denote greater body satisfaction, and total scores range from 0 to 24. The original validation study supported the construct validity and split-half reliability of the BES (Mendelson and White 1982). Internal consistency was high with the current sample (Kruider-Richardson-20 = .90).

*Clinical Assessment of Interpersonal Relations* (CAIR; Bracken 1993). This instrument, previously known as the Assessment of Interpersonal Relations (AIR), measures children’s perceptions of the quality of several important relationships with separate 35-item scales. Each individual relationship scale can be completed independently from the other scales (Bracken 1993) and the present study only utilized the CAIR maternal scale. The 4-item response scale ranges from “strongly agree” to “strongly disagree” and several items are reverse scored. Higher scores denote greater relationship strength. Sample items include, “I like to spend time with my mother”, and “I am really understood by my mother”. Based on standardized scores, relationships are dichotomized into five relationship quality categories, ranging from “very positive relationship” to “very negative relationship.” The CAIR is designed for use with children as young as 9 years old. Given that the current study included participants as young as 8 years old, normative data presented below were based on the youngest available norms. The current study used raw, as opposed to standardized, scores in all analyses (see Lemma et al. 2006). The CAIR has demonstrated known-groups validity, discriminant validity, and test–retest reliability (Bracken 1993). Internal consistency with the current sample was high (Cronbach’s  $\alpha = .91$ ).

#### *Mothers’ Self-Report Measures*

*Figure Rating Scale* (FRS; Stunkard et al. 1983). As with the daughters, the mothers selected the figures that represented how they think they look and how they would like to look. Once again, the discrepancy between the participant’s ideal body size and their perceived size served as a measure of body dissatisfaction (Thompson and Altabe 1991). The FRS demonstrates adequate test–retest reliability and convergent validity with other measures of body dissatisfaction (Thompson and Altabe 1991). This measure and the one below were included simply to provide descriptive

information about the level of body dissatisfaction for the mothers in the current study and as a context for comparison with national norms.

*The Eating Disorder Inventory-2* (EDI-2; Garner 1991). This widely-used (Spillane et al. 2004) 90-item instrument taps various factors believed to be associated with disturbed eating attitudes. Each item is answered on a scale ranging from “never” to “always” and each response is assigned a score from 0 to 3. Scores are summed independently for each of 11 subscales, including the 9-item Body Dissatisfaction scale, which was the focus of the current design. Total scores on the Body Dissatisfaction scale range from 0 to 27. A sample item is, “I think that my hips are too big”. The test–retest reliability of the EDI-2 is high (Thiel and Paul 2006). The EDI-2 Body Dissatisfaction scale (EDI-2 BD) achieved good inter-item reliability with the current sample (Cronbach’s  $\alpha = .93$ ).

*Parent Satisfaction Scale* (PSS; Guidibaldi and Clemminshaw 1994). This 45-item questionnaire inquires about parenting practices and a parent’s relationship with his/her child. It gives a total parenting satisfaction score and assesses parenting satisfaction in three domains (satisfaction with spouse/ex-spouse parenting; satisfaction with parent–child relationship; satisfaction with parenting performance). Satisfaction with the parent–child relationship (scale 2) was the focus of the current study. Participants respond to each item on a 4-point scale ranging from “strongly agree” to “strongly disagree.” Higher scores denote greater parenting satisfaction. A sample item is, “I am delighted with the relationship that I have with my children”. As with the CAIR, we utilized raw scores (e.g., see Rodriguez 2008). The PSS has evidence of convergent validity with other measures of life satisfaction and subscale content consistency (Clemminshaw and Guidibaldi 1985). In the current study, internal consistency for the parent–child relationship scale was adequate (Cronbach’s  $\alpha = .82$ ).

## Data Analyses

Descriptive aspects of the instruments for mother and daughter participants were determined. Psychometric investigation of the measurement scales was then carried out to determine the validity of assumptions for inferential parametric statistical tests concerning normality of their raw score and residual error distributions. Next, zero-order correlational analyses between the dyadic-level variables of interest and the three measures of body image and disordered eating were completed. To test the primary study hypotheses, a series of hierarchical linear regression models examined the association between daughter’s rating of mother–daughter relationship quality and child body image, and maternal satisfaction with the mother–daughter relationship and child body image. The Child Figure Drawings

(CFD) discrepancy score (perceived figure–ideal figure) and Child BD scale served as the criterion measures of body dissatisfaction, and the Body Esteem Scale (BES) served as the criterion measure of body esteem (all three were indices of body image). Daughter’s z-BMI and daughter’s age were entered simultaneously at the first step of each model. The two dyadic-level predictors (CAIR-mother scale and PSS scale 2) were entered simultaneously at step two.

## Results

### Participant Characteristics

#### *Anthropometric Characteristics*

Daughter BMI ranged from 12.97 to 30.39 ( $M = 18.16$ ,  $SD = 3.78$ ). Compared to national normative data, a slight majority of girls (60.5 %) were in the normal weight range (BMI between 5th and 85th percentile;  $n = 92$ ), followed by obese (BMI  $\geq$ 95th percentile; 15.9 %,  $n = 24$ ), and then overweight (BMI between 85th and 95th percentile; 11.8 %,  $n = 18$ ) and underweight (BMI  $\leq$  5<sup>th</sup> percentile; 11.8 %,  $n = 18$ ). Maternal BMI ranged from 15.44 to 52.81 ( $M = 27.06$ ,  $SD = 6.27$ ) for the 151 mothers who disclosed their height and weight. Using Center for Disease Control guidelines (Center for Disease Control 2010), a majority of study mothers (56.3 %) were at least overweight (BMI  $\geq 25$ ;  $n = 85$ ). Of those, 41 (27.2 %) had BMIs in the obese range ( $\geq 30$ ). A small minority of study mothers were underweight (BMI  $> 18.5$ ; 2.7 %,  $n = 4$ ) and the remainder of mothers were normal weight (BMI 18.5–24.9; 41.1 %,  $n = 62$ ). Mother and daughter weight categories were related, such that daughters who were at risk for overweight or overweight (at-risk/overweight) were more likely to have an overweight or obese mother as compared to underweight or normal weight girls,  $\chi^2(1, N = 151) = 7.26, p < .01$ .

#### *Body Image and Body Dissatisfaction*

Means and standard deviations for study body image measures across all participants can be found in Table 2. Although norms are unavailable for the BES, mean scores generally reflected those found in an early study using the BES with normal and overweight 10-year old girls (Mendelson and White 1985). Daughter and mother CFD/FRS discrepancy scores generally coincided with those found in previous studies of school-age and middle-aged women, with both groups preferring slimmer physiques (Lewis and Cachelin 2001; Tiggemann and Wilson-Barrett 1998). Further examination of CFD and FRS discrepancy scores indicated that 44.6 % ( $n = 49$ ) of daughters and 65.2 % ( $n = 43$ ) of

**Table 2** Summary statistics for BMI and body image measures

	M	SD
<i>Daughter measures</i>		
BMI	18.16	3.78
z-BMI	.21	1.27
CFD discrepancy score	.88	1.40
BES	16.39	5.66
Child BD	4.39	5.75
<i>Mother measures</i>		
BMI	27.06	6.27
FRS discrepancy score	1.16	1.03
EDI-BD	11.27	8.76

*BMI* body mass index, *z-BMI* age and gender standardized child BMI. *CFD discrepancy score* Child Figure Drawings discrepancy score (perceived-ideal body size). *BES* Body Esteem Scale, *Child BD* Child Eating Disorder Inventory-Body Dissatisfaction (EDI-BD) score, *FRS* Figure Rating Scale discrepancy score (perceived-ideal body size), *EDI-BD* Eating Disorder Inventory-Body Dissatisfaction scale

mothers in the normal weight and underweight ranges still preferred thinner physiques (Daughter  $M = .48$ ,  $SD = 1.18$ ; Mother  $M = .52$ ,  $SD = .77$ ). Examination of the distribution of responses indicated that a slight majority of daughters desired a smaller physique ( $n = 85$ , 55.9 %), although the modal discrepancy between perceived and ideal figure ratings was zero ( $n = 48$ , 31.6 %). In contrast, a strong majority of mothers preferred a smaller figure ( $n = 125$ , 82.2 %) and only 20 mothers (13.2 %) indicated that they did not want to change their body size on the FRS.

Daughter's EDI-2 BD scale scores (Table 2) were slightly below normative data, although normative data are only available for girls 11 and older (Garner 1991). Given that normative data for the EDI-2 subscale appear to increase in each age group, mean EDI-2 scores for our sample appear in line with what would be expected for this younger age group. As compared to adult normative data (Garner 1991), mean maternal scores on the EDI-2 BD scale (see Table 2) indicated that study mothers reported a typical level of distress regarding their body shapes.

### Relationship Quality

As compared to the CAIR normative sample (Bracken 1993), study daughters appeared to have relatively *less* strong relationships with their mothers ( $M = 116.57$ ,  $SD = 13.39$ ). Based on the CAIR relationship strength categories, a slight majority of study participants (50.7 %) reported relationships with their mother of “average” strength ( $n = 77$ ), followed by “moderately negative relationship” ( $n = 56$ ; 36.8 %), “moderately positive relationship” ( $n = 9$ ; 5.9 %), “very negative relationship” ( $n = 9$ ; 5.9 %), and very positive relationship ( $n = 1$ ;

.7 %). Based on PASS normative data (Guidibaldi and Cleminshaw 1994) study mothers reported typical levels of satisfaction with the mother–child relationship ( $M = 52.11$ ;  $SD = 4.67$ ; percentile  $M = 58.45$ ,  $SD = 26.61$ ).

### Dyadic-Level Correlates of Daughter Body Image

Psychometric investigation of the measurement scales analyzed this study and residual errors from the multiple regression analyses indicated non-normality in their respective distributions (SPSS 23: Kolmogorov–Smirnov and Shapiro–Wilk tests, all  $ps < .05$ ). Thus, before completing the hierarchical linear regression models, zero-order Spearman Rank correlations were computed (see Table 3) between the dyadic-level variables of interest and the three measures of body image and disordered eating were completed. Second, as multiple regression analysis is generally considered robust against the violation of residual error normality (e.g., see van Bell 2002), results from conventional multiple regression are reported in Table 4. However, as Bootstrap modeling (e.g., see Hayes 2013) is transparent to the non-normality of residual errors, parameter estimates were also tested in this manner (SPSS 23, PROCESS v2.15: Bias-corrected and accelerated, 5000 samples of  $N = 152$  participants) to provide additional support for the robustness of the regression results.

Hierarchical regression analysis results for each child measure (BES, Child BD, and CFD) are displayed in Table 4. For each of the three body image variables, the first model, which included the daughter's z-BMI and daughter's age, was significant (see Table 4). Examination of the individual predictor variables in Model 1 indicated that daughters' z-BMI,  $\beta = -.42$ ,  $t(149) = -5.72$ ,  $p < .001$ , and age,  $\beta = -.25$ ,  $t(149) = -3.42$ ,  $p < .001$ , were each independently associated with BES scores, such that body esteem decreased as z-BMI and age increased. In terms of body dissatisfaction measured by the CFD, only daughters' z-BMI, but not daughters' age, was associated with CFD discrepancy scores,  $\beta = .60$ ,  $t(149) = 9.05$ ,  $p < .001$ , such that as BMI increased so did body dissatisfaction. Similarly, for body dissatisfaction measured by the BD scale of the EDI (Child BD), only daughters' z-BMI, not age, was associated with this dependent variable,  $\beta = .45$ ,  $t(149) = 6.14$ ,  $p < .001$ , such that as BMI increased so did Child BD measured body dissatisfaction.

Model 2, which added the dyadic-level predictor variables, was significant for each of the child body image criterion variables (BES, Child BD, and CFD). More specifically, the addition of the two dyadic-level predictors (CAIR-mother scale and PSS scale 2) significantly improved the prediction of body esteem (BES score; see Table 4). Supporting the study hypotheses, examination of individual predictors indicated that the daughter's rating of the quality of the mother–daughter relationship (CAIR-mother scale), but not maternal



**Table 3** Spearman rank correlations ( $\rho$ ) between study measures

	1	2	3	4	5	6	7	8	9
1. Daughter z-BMI	–	.34**	.56**	–.33**	.35**	.26**	.10	–.03	–.12
2. Mother BMI		–	.25**	–.14	.28**	.73**	.55**	–.02	–.06
3. CFD			–	–.49**	.47**	.30**	.19*	–.18*	–.19*
4. BES				–	–.59**	–.18*	–.10	–.01	.28**
5. Child BD					–	.25**	.18*	–.05	–.37**
6. FRS						–	.62**	–.06	–.04
7. EDI-BD							–	–.21**	–.04
8. PSS Scale 2								–	.23**
9. CAIR									–

*BMI* body mass index, *z-BMI* daughter’s age and gender adjusted BMI. *CFD* Child Figure Drawings discrepancy score (perceived-ideal body size), *BES* Body Esteem Scale, *Child BD* Child Eating Disorder Inventory-Body Dissatisfaction (EDI-BD) score, *FRS* Figure Rating Scale discrepancy score (perceived-ideal body size), *EDI-BD* Eating Disorder Inventory-Body Dissatisfaction scale, *PSS* Parenting Satisfaction Scale (PSS) scale 2, *CAIR* the Clinical Assessment of Interpersonal Relationships (mother scale)

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

relationship satisfaction (PSS scale 2), was associated with higher BES scores,  $\beta = .26, t(147) = 3.66, p < .001$ . Child z-BMI and child age also continued to be associated with body esteem in Model 2 (z-BMI:  $\beta = -.39, t(147) = -5.61, p < .001$ ; age:  $\beta = -.22, t(147) = -3.15, p < .01$ ).

The same pattern of results held for the remaining two measures: the addition of the dyadic-level predictors significantly improved the prediction of CFD discrepancy scores and the Child BD subscale of the EDI (see Table 4). As with body esteem (BES score), our measures of body dissatisfaction were independently associated with the daughter’s rating, but not the mother’s rating, of the quality of the mother–daughter relationship (CFD:  $\beta = -.17, t(147) = -2.54, p < .05$ ; Child BD subscale  $\beta = -.26, t(147) = -3.53, p < .001$ ), thereby also supporting the study hypotheses. For both the CFD and the Child BD subscale, Child z-BMI, but not child age, added independent variance in Model 2 (CFD:  $\beta = .57, t(147) = 8.97, p < .001$ ; Child BD subscale:  $\beta = .42, t(147) = 6.01, p < .001$ ). Thus, as expected, only the daughter’s rating of the quality of the mother–daughter relationship, but not maternal rating of the mother–daughter relationship, was associated with body esteem (BES) and body dissatisfaction (CFD discrepancy and Child BD). We reran analyses removing girls who had reached menarche ( $N = 15$ ), and the pattern of results remained unchanged.

**Follow-up Analyses**

Although we hypothesized that mother–daughter relationship quality would predict body image and body dissatisfaction regardless of child weight status, as a follow-up analysis, we explored whether these associations might be moderated by daughters’ weight status. As such, we

categorized girls into two weight classes: at risk for overweight/overweight ( $n = 42$ ) and normal/underweight ( $n = 110$ ). Preacher’s methodology (Preacher 2002) for comparing the strength of zero-order correlations was used to compare the relationship between the CAIR and the criterion variables across these two weight classes. This analysis indicated that the strength of the association between the CAIR and CFD discrepancy scores was negative among overweight/obese girls, Spearman’s  $\rho(40) = -.40, p = .008$ , but not present for normal/underweight girls, Spearman’s  $\rho(108) =$

$-.12, n.s.$  (using a Bonferroni critical  $p$  value of .0083 based on .05/6 tests: four regression predictors of Model 2 and the two correlation tests conducted here). The strength of the association between the CAIR and the other measures did not significantly vary by weight status.

Given the ethnic diversity of our sample, we also explored whether the strength of the correlations between the CAIR and the dependent variables varied across ethnic status groups. Daughters were separated into two groups: non-Hispanic white ( $n = 57$ ) and other ethnic status ( $n = 95$ ), which included girls of Hispanic (any race), biracial/bi-ethnic, African-American, and “other” ethnic status. Two-tailed tests using Preacher’s methodology for comparing the strength of the association between the CAIR and the dependent variables did not significantly vary by ethnic status.

**Discussion**

The current study investigated the relationship between mother and daughter relationship quality and preadolescent girls’ body image. Consistent with the study hypotheses,

**Table 4** Hierarchical linear regression models

	Regression					Bootstrap <i>B</i> estimation			
	<i>B</i>	<i>SE</i>	$\beta$	<i>t</i>	<i>p</i>	<i>SE</i>	<i>p</i>	<i>LLCI</i>	<i>ULCI</i>
<i>Criterion: BES</i>									
Model 1: Predictors <sup>a</sup>									
Daughter's z-BMI	-1.85	.32	-.42	-5.72	<.001	.35	<.001	-2.52	-1.19
Daughter age	-1.08	.32	-.25	-3.42	.001	.28	<.001	-1.52	-.46
Model 2: Predictors <sup>b</sup>									
Daughter's z-BMI	-1.75	.31	-.39	-5.61	<.001	.33	<.001	-2.39	-1.15
Daughter age	-.97	.31	-.22	-3.15	.002	.28	<.001	-1.52	-.46
PSS Scale 2	-.07	.09	-.06	-.82	.41	.10	.46	-.25	.11
CAIR	.11	.03	.26	3.66	<.001	.03	<.001	.06	.16
<i>Criterion: Child BD</i>									
Model 1: Predictors <sup>c</sup>									
Daughter's z-BMI	2.03	.33	.45	6.14	<.001	.46	<.001	1.10	2.90
Daughter age	.63	.32	.14	1.95	.05	.30	.04	.071	1.24
Model 2: Predictors <sup>d</sup>									
Daughter's z-BMI	1.91	.32	.42	6.01	<.001	.44	<.001	1.05	2.71
Daughter age	.53	.31	.12	1.69	.09	.29	.07	.00	1.10
PSS Scale 2	-.03	.09	-.02	-.34	.74	.10	.77	-.26	.16
CAIR	-.11	.03	-.26	-3.53	<.001	.027	<.001	-.17	-.06
<i>Criterion: CFD</i>									
Model 1: Predictors <sup>e</sup>									
Daughter's z-BMI	.66	.07	.60	9.05	<.001	.08	<.001	.49	.82
Daughter age	.11	.07	.11	1.59	.11	.07	.08	-.01	.24
Model 2: Predictors <sup>f</sup>									
Daughter's z-BMI	.63	.07	.57	8.97	<.001	.08	<.001	.48	.78
Daughter age	.10	.07	.10	1.48	.14	.06	.11	-.02	.23
PSS Scale 2	-.04	.02	-.12	-1.78	.08	.02	.11	-.08	.00
CAIR	-.02	.01	-.17	-2.54	.01	.01	.02	-.03	.00

*BES* Body Esteem Scale, *Child BD* Child Eating Disorder Inventory-Body Dissatisfaction (EDI-BD) score, *CFD* Child Figure Drawings, Model 1 predictors = daughter's z-BMI and daughter's age. Model 2 predictors = daughter's z-BMI, daughter's age, Parenting Satisfaction Scale (PSS) scale 2, and the Clinical Assessment of Interpersonal Relationships (CAIR; mother scale). Raw PSS and CAIR scores were utilized for the above analyses; the same pattern of findings emerged when standardized PSS and CAIR scores were used. LLCI and ULCI are the Lower and Upper limits, respectively, for the 95 % Confidence Interval for *B*

<sup>a</sup>  $R^2 = .22$ ,  $F(2,149) = 20.97$ ,  $p < .001$ ,  $MSe = 25.30$

<sup>b</sup>  $R^2 = .29$ ,  $F(4,147) = 14.64$ ,  $p < .001$ ,  $MSe = 23.50$ ;  $\Delta R^2 = .07$ ,  $F(2,147) = 6.70$ ,  $p = .002$ ,  $Se = 4.85$

<sup>c</sup>  $R^2 = .21$ ,  $F(2,149) = 20.09$ ,  $p < .001$ ,  $MSe = 26.42$

<sup>d</sup>  $R^2 = .28$ ,  $F(4,147) = 14.31$ ,  $p < .001$ ,  $MSe = 24.47$ ;  $\Delta R^2 = .07$ ,  $F(2,147) = 6.92$ ,  $p = .001$ ,  $Se = 4.95$

<sup>e</sup>  $R^2 = .36$ ,  $F(2,149) = 41.41$ ,  $p < .001$ ,  $MSe = 1.28$

<sup>f</sup>  $R^2 = .41$ ,  $F(4,147) = 25.22$ ,  $p < .001$ ,  $MSe = 1.20$ ;  $\Delta R^2 = .05$ ,  $F(2,147) = 6.17$ ,  $p < .01$ ,  $Se = 1.09$

girls who reported more positive relationships with their mothers reported higher body esteem and less body dissatisfaction. Also consistent with the study hypotheses, maternal perception of the quality of the mother-child relationship was *not* associated with any of the child body image measures. Although the cross-sectional nature of the design precludes assumptions regarding causality and directionality, these results do support the “interactive” model of body image development (Ogden and Steward 2000) whereby the

characteristics of the mother-daughter relationship (as perceived by the daughter), rather than maternal modeling alone, are related to body image and eating disorder symptoms. Again, although our results do not infer directionality, they coincide with the suggestion (Byely et al. 2000) that the quality of familial interactions may be particularly important for body image development in *preadolescent* girls, given that increased autonomy from attachment figures occurs during adolescence (Allen and Land 1999).

Exploratory analyses revealed that child weight status moderated the relationship between CAIR scores and body dissatisfaction such that a daughter's perception of the mother–daughter relationship quality was highly correlated with body dissatisfaction for overweight/obese girls, but no relationship emerged for underweight/normal weight girls. This finding is congruent with a previous study of early adolescent Mexican girls, which found that girls' adherence to familism, or the belief that one should put the needs of the family above the needs of the self (Steidel and Contreras 2003), was associated with decreased internalization of the ultra-thin ideal in at risk/overweight girls, but not in normal weight girls (Austin and Smith 2008). Echoing the speculation of Austin and Smith (2008), it is possible that the perception of a positive maternal relationship could protect at-risk/overweight girls from negative peer feedback about their weight or media messages about weight loss, such that overweight/obese girls with positive relationships with their mother place less importance on these messages. Additionally, it is possible that a close maternal relationship may strengthen overweight girls' acceptance of overweight family members' efforts towards self-acceptance and rejection of negative messages about excess weight. Future work should attempt to identify the mechanisms that explain why a daughter's perception of the mother–daughter relationship is more highly correlated with body dissatisfaction for overweight/obese girls than for underweight/normal weight girls.

Although a daughter's perception of the mother–daughter relationship was significantly associated with our body image variables, it should be noted that these effects were each in the small-to-medium range (Cohen 1988). Child z-BMI held the strongest relationship with our body image criterion variables. Indeed, Model 1, which contained only child z-BMI and child age, possessed effect sizes in the medium-to-large (body esteem) and large (body dissatisfaction) ranges (Cohen 1988). In fact, age was only a unique predictor of body esteem, with body esteem decreasing as age increased. This finding provides partial support for the notion that body image follows a developmental course, with girls becoming less satisfied with their physiques as they grow older (Bearman et al. 2006). In contrast, child z-BMI was a unique predictor of all three outcome measures. Taken together, these findings support the myriad studies suggesting that preadolescent girls who struggle with their weight have already internalized negative beliefs about their body shape and are at risk for disordered eating (Kostanski et al. 2004; Tanofsky-Kraff et al. 2004; Vander Wal and Thelen 2000). It is important to continue the exploration of factors, such as aspects of family relationships, which may protect overweight girls from the negative consequences of poor body image (Neumark-Sztainer et al. 2006; Stice et al. 2000).

As previously noted, the cross-sectional nature of the current study's design precludes assumptions of causality. Lack of prospective data disallows series analyses and evidence of directionality (Bun Lam and McHale 2012). Indeed, although our hypotheses were formulated to be consistent with the “interactive” model's emphasis on the role of mother–daughter relationships in body image (Ogden and Steward 2000), it is plausible that our findings reflect a bi-directional or even opposite-directional relationship such that daughters' poor body image might weaken their bonds with their mothers. Future work will need to address the developmental progression of these associations.

Although the current study focused on girls in a younger, less studied age group (8–12 years) and included an ethnically diverse sample, the generalizability of the findings are somewhat constrained given the use of a relatively small, convenience sample. In addition, the study only included girls, despite evidence that boys also struggle with body dissatisfaction (Cohane and Pope 2001). Measuring the quality of girls' relationships with other family members and peers would have helped determine whether the current findings were specific to mother–daughter relationships. Moreover, selecting girls across a wider range of ages and stages of pubertal development would have allowed for an exploration of developmental influences (e.g., see Usmani and Daniluk 1997).

In addition, although mother and daughter perceptions of relationship strength were positively correlated, the current study may have benefited from using instruments with more recent norms, or gathering an objective measure of mother–daughter interactions (e.g., observational data). The latter would have allowed the authors to examine which specific maternal or daughter behaviors were associated with a daughter's positive perception of the mother–daughter relationship, and whether objective behavior plays the same role as relationship perceptions in association with body image and disordered eating. Furthermore, obtaining ongoing measures of relationship quality perceptions would be useful to determine if these perceptions remain stable over time, given that such perceptions may be dynamic and were only captured at one time point in the current study. Subsequent research should also include measures of family-level factors previously linked to child body image or disordered eating, such as maternal acceptance (Bun Lam and McHale 2012), limited boundaries (Ogden and Steward 2000), and lack of family connectedness (Crespo et al. 2010), in order to examine to what extent such factors are predictive of or distinct from a daughter's perception of the quality of her relationship with her mother. It is possible that mother–daughter relationship quality could at least partially account for the observed relationships between these family-level factors and child

body image (Hahn-Smith and Smith 2001). Additionally, future work should examine whether third variables, such as direct modeling (e.g., negative weight and appearance-related comments girls receive from their mothers), which was not measured in the current study, could mediate the relationship between perceived mother–daughter relationship quality and child body image.

Finally, it should be noted that there has been recent criticism of the use of figure rating scales (FRS and CFD in current design), with concerns regarding order of presentation effects and the possibility of inflated test–retest reliabilities given recall bias (Gardner and Brown 2010). However, we chose to maintain their inclusion given their widespread and recent use with diverse populations (e.g., see Adami et al. 2012; Mirza et al. 2011), and our finding of a similar pattern of results across all three daughter body image measures in the current study. However, future research should strongly consider including additional measures of body image distortion.

The current study supports the notion that strong mother–daughter relationships are associated with healthy child body image and generally falls in line with family-based prevention efforts that attempt to enhance parent–child relationships (Loth et al. 2009). Importantly, given that prior studies which relied on samples that were older than the current study’s found limited support for the role of the mother–daughter relationship in body image (Byely et al. 2000; Cooley et al. 2008; McVey et al. 2002), family-based prevention efforts might consider including younger children in their programs and outcomes studies.

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#### Compliance with Ethical Standards

**Conflicts of interest** The authors declare that they have no conflicts of interest.

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