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RELATIONSHIP BETWEEN PARENTS' AND DAUGHTERS' BODY ESTEEM AT
DIFFERENT TIME POINTS IN ADOLESCENCE.

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Abstract

This research explored the relationship between parents' body esteem and daughters' body esteem at different time points in adolescent development. Mothers' body esteem and daughters' body esteem were measured at ages 11 and 15 while fathers' body esteem was only measured at girls' age 11. When girls were age 11, there were 177 families participating in the study. At the final assessment, when girls were 15, there were 167 families participating. Body esteem was measured using the Appearance-Related Body Esteem score from The Body Esteem Scale (Mendelson and White, 2001). This measure was used for both adolescents and parents. Girls' weight status was measured at ages 11 and 15; measured heights and weights were used to calculate body mass index (BMI). Descriptive statistics and ordinary least squares regressions were conducted. Mothers' body esteem was predictive of daughters' body esteem at age 11, even when adjusting for BMI. Fathers who had higher body esteem when their daughters were age 11 had daughters with higher body esteem at age 11. After adjusting for BMI, fathers' body esteem was only a marginally significant predictor of daughters' body esteem at age 11. When the daughters were age 15, mothers' body esteem did not predict daughters' body esteem at age 15. This result was consistent when adjusting for BMI at age 15. Although mothers' body esteem predicted daughters' body esteem early in adolescence, it was not predictive of daughters' body esteem in later adolescence. It is important for future research to examine development from early to late adolescence and what other factors may contribute to a girl's body esteem. The relationship between fathers' and daughters' body esteem at age 11 suggests that fathers may play a role in their daughters' body esteem in early adolescence.

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Introduction

Body Esteem has been defined as how an individual evaluates his or her own body or appearance (Mendelson, Mendelson, & White, 2001). The way in which an individual perceives their body is particularly important, as it seems to be related to the way that they perceive their self concept (McCabe & Ricciardelli, 2003). There are factors outside of the individual that contribute to how body esteem develops (Gillen & Lefkowitz, 2009). These include family, peers, schools, and the media. For example, stereotypes such as “fat is bad” and “thin is synonymous with beauty and success” are ideas that are constantly reinforced by the media (Monteath & McCabe, 1997). The strong emphasis western culture places on weight, shape, and overall appearance can drive an individual to place a higher emphasis on their own body (Stice & Shaw, 1994).

Dissatisfaction with one's body tends to increase for females in early adolescence (Littleton & Ollendick, 2003). In recent years, low body esteem has become a widespread problem, which has led to the development of many problematic behaviors. A study investigating 84 children in first, third, and fifth grade found that children as young as six reported eating and weight concerns (Flannery-Schroeder & Christler, 1996). A significant portion of these participants had low body esteem, as measured by The Body Esteem Scale. These children's reports of low body esteem could explain their weight concerns. Having weight concerns at a young age could have serious negative implications for overall development. Low body esteem is associated with low self-esteem, which is predictive of negative consequences during adulthood including criminal behavior, worse economic prospects, and poorer mental and physical health (Trzesniewski, Donnellan, Moffitt, Robins, Poulton, & Caspi, 2005).

In addition, low body esteem has been associated with different outcomes regarding eating behaviors (i.e. binge eating, emotional eating, abnormal attitudes to eating and weight) and general psychological outcomes (i.e. depression, low self esteem, stress) in adolescent girls (Johnson & Wardle, 2005). For this study, 1,117 girls between the ages of 13 and 15 were studied both cross-sectionally and longitudinally to see how body esteem related to the eating and psychological outcomes mentioned above. Johnson & Wardle (2005) found that low levels of body esteem were highly correlated with negative outcomes in both domains. For example, girls in both age groups (13 and 15) with low body esteem were more likely to demonstrate higher levels of dietary restraint as measured by the Dutch Eating Behavior Questionnaire (DEBQ; Strien, Frijters, Bergers, & Defares, 1986). Low levels of body esteem have also been found to be related to higher weight status in girls as young as 5-years-old (Davison & Birch, 2001). In another study of 7th to 10th grade girls, girls with lower body esteem were more likely to develop an eating disorder as compared to their peers with higher body satisfaction levels (Leon, Fulkerson, Perry, & Cudeck, 1993). It has been made clear by the literature that lower levels of body esteem can have serious negative implications for child and adolescent development. The current study sought to understand the role that parents play in their adolescent daughters' body esteem.

Body esteem can be studied using different self-report measures, all of which can help researchers understand relationships between low body esteem and other variables at different points of individual development. One way of measuring body esteem is with the Eating Disorder Inventory (EDI; Garner, Olmstead, & Polivy, 1983). The EDI is a 91-item self-report scale that assesses eating disorder tendencies. There are 10 specific items that identify body esteem on a 6-point Likert scale. An example of an item from this measure is "I feel satisfied

with the shape of my body.” This measure is primarily used to diagnose women with eating disorders and women already in treatment for these disorders. The Body Shape Questionnaire (BSQ; Cooper, Taylor, Cooper, & Fairburn, 1986) is another measure of body esteem. The BSQ assesses shape and weight concerns through 16 self-reported items such as “How do you feel at this very moment?” ranging on a scale from 0 to 100, with 0 being extremely dissatisfied to 100 being extremely satisfied. The BSQ was designed for adult women but also is applicable for adult men.

There are multiple ways of measuring body esteem in adults and adolescents, but the larger study of which this thesis is a part required a measure appropriate for both young children and adolescents. The body esteem scales by Mendelson and White (1985; 2001) provide such a measure. The Body Esteem Scale for Children (Mendelson & White, 1985) assesses children’s body esteem using 24 self-report items, including “I like what I look like in pictures” and “I’m proud of my body.” In the current study, the body esteem data were from the revised version of this measure, The Body Esteem Scale, which is appropriate for adolescents and adults (Mendelson, Mendelson, & White, 2001). Items load onto 3 subscales: BE-appearance (general feelings about appearance), BE-weight (weight satisfaction), and BE-attribution (evaluations attributed to others about one’s body and appearance), which have demonstrated adequate reliability and validity in a sample of 1,334 participants (763 females and 571 males) between the ages of 12 and 25 years drawn from elementary schools, high schools, and a junior college in Montreal, Quebec. A subsample of 97 junior college students (61 women and 36 men) was retested 3 months after the initial assessment. Internal consistency was demonstrated during tests of split-half reliability and test- retest reliability. Construct validity was demonstrated via significant correlations between the Body Esteem-Appearance Scale and the Global Self-Worth

subscale (Neeman & Harter, 1986) and appearance from a different measure, Rosenberg Self-Esteem Scale (RSE; Rosenberg, 1979) $r=.89$, $p<.001$. In the current study, the Appearance-Related Body Esteem scale from the Body Esteem Scale was investigated in adolescent girls and their parents.

This scale is applicable for adolescents and adults, allowing data to be collected across family members and/or over time all using the same measure. This scale was used for all participants of the Girls' NEEDS Project, the dataset used in the current study. Because this was a longitudinal study, it was valuable for researchers to have the ability to apply the same measures to the girls at all ages as well as their parents, enabling a characterization of relationships between parents' body esteem and girls' body esteem at different points in time.

Relationships Between Mothers' and Daughters Body Esteem in Childhood and Adolescence

The relationship between mothers and daughters has been described as unique and is frequently discussed in the literature. Mothers are often the primary caregivers and first source of identification for their children; however, this strong association is only maintained throughout the lifespan for girls. Boys begin to relate to their fathers as they age, while girls remain attached to their mothers, even while establishing their own identity, which may explain why daughters often appear similar to their mothers (Chodorow, 1978).

Mothers seem to be a significant influence in various domains of their daughters' lives. In regards to work and career choices, a mother's work behavior was the best predictor for her daughter's commitment to her career (Macke & Morgan, 1978). A sample of 258 mothers and daughters reported on work behaviors and attitudes about work and researchers found that girls

who planned to work had mothers who were working. Mothers are also important in regards to their daughters' sex role attitudes (Smith & Self, 1980). Mothers' attitudes about sex roles were the only significant predictor of their daughters' sex role attitudes in a study examining 74 mother-daughter pairs when girls were freshmen in college.

Mothers also seem to be important in the areas of body esteem and weight concerns. Mothers' roles in this domain have been explored using earlier data from the larger longitudinal project of which the current study is a part (the Girls' NEEDS Project). Mothers who reported dieting behaviors were twice as likely to have daughters who had ideas about dieting as compared to girls whose mothers did not diet (Abramovitz & Birch, 2000). For this study, 197 5-year-old girls were asked to define dieting behaviors. The mother-daughter relationship was further examined when girls were 9 years old. It was found that mothers' fruit and vegetable intake predicted their daughters' fruit and vegetable intake, and mothers who were picky eaters tended to have daughters who were picky eaters (Galloway, Fiorito, Lee, & Birch, 2005). The authors concluded that the girls modeled their own behaviors after what they observed from their mothers. This link has been studied in younger girls but not in adolescents in the current sample. The broader developmental literature suggests that the mother-daughter relationship is still important but undergoes changes during adolescence.

A longitudinal study examining adolescent girls at ages 11, 15, and 17 sought to investigate how adolescents viewed their relationships with their parents over time (Clark-Lempers, Lempers, & Ho, 1991). It was discovered that the mother-child relationship, defined by the adolescents' reports of admiration, affection, companionship, intimacy, alliance, aid and satisfaction, was greatest in early adolescence for females. At ages 15 and 17, girls rated their relationship with their mothers lower on all measures. These findings suggest that mothers'

significance may decrease as girls grow and mature. This may also be true in the area of daughters' body esteem, which is examined within this study. It is imperative to understand what predicts low body esteem as it is correlated with outcomes such as higher levels of dieting, unhealthy weight control techniques, and binge eating (Neuemark-Sztainer, Paxtion, Hannan, Haines, & Story, 2006). Higher levels of dissatisfaction are also associated with lower self esteem and a depressive mood (Paxton, Neuemark-Sztanier, Hannan, & Eisenberg, 2006). The existing research suggests that mothers' body esteem may be one factor that predicts daughters' body esteem. Although there is less research on the topic, it is also possible that fathers' body esteem may be related to their daughters' body esteem levels.

Relationships Between Fathers' and Daughters' Body Esteem

Fathers, as compared to mothers, are not as often the focus of studies in regards to their daughters' development. There is limited literature about fathers and body esteem, and some research indicates that fathers do not play a significant role as it was found that a fathers presence is not critical for a child's well being (Amato & Gilbreth, 1999). However, others argue that fathers are important; fathers who were very involved in parenting had daughters who practiced safer sex behaviors as compared to their peers who did not have involved fathers (Bowling & Werner-Wilson, 2000). In terms of sexual development, mothers were more central to daughters' sexual decisions than fathers. In a study examining how likely adolescents aged 13 to 15 were to discuss sexual topics with their parents, it was found that both males and females were more likely to choose their mother over their father when seeking guidance (Diiorio, Kelley, & Hockenberry-Eaton, 1999). Adolescent girls were less likely to discuss these topics with their peers as compared to their mothers but would choose to speak with their peers over their fathers. Previous research has found that regardless of paternal involvement, adolescents

would choose to confide in their mothers and peers over their fathers. Thus, mothers may be more significant than fathers on their adolescent daughters' development in this domain.

With regard to body esteem, one study reported that fathers attitudes about gender roles had no relationship to their adolescent daughters' weight concerns while a mothers' more traditional gender role attitudes predicted higher weight concerns in their daughters (McHale, Corneal, Crouter, & Birch, 2001). Questions such as "Do you ever feel fat?" were asked to measure adolescent weight concerns to examine if attitudes about gender roles predicted weight concerns. It was discovered that within a traditional family, fathers were less likely to take part in their daughters' socialization and in turn were less likely than mothers to have an influence on their daughters' weight concerns (McHale et al, .2001). However, the potential importance of fathers has been demonstrated in non-traditional families: for example, girls who had absentee father figures and were living in unstable environments were more prone to anorexia (Elliott, 2009). In this study, narrative analysis was collected from participants, and it was found that girls who developed anorexia described their relationships with their fathers as uncertain, inconsistent and unstable.

While most of the previously mentioned studies suggest that fathers do not play a direct role in their adolescent daughters' body esteem or even development more broadly, other research suggests that fathers may play a role. There seems to be a lack of research on how fathers contribute to their daughters' eating behaviors and body esteem in a more direct way, but there is direct evidence that fathers have an influence in some other areas of development. Girls who have involved fathers are significantly less likely to engage in risky sexual behaviors as compared to their peers without paternal involvement (Ellis, Tilley, & Butler, 2012). Within the sample of 101 girls, those with involved fathers were less likely to engage in early sexual activity

and less likely to become pregnant as a teen. Paternal involvement is also associated with decreased risk of psychological maladjustment or psychological distress in girls (Williams & Kelly, 2005).

The perception that fathers may play a role in their daughters' development is further supported by an investigation of parent-child relationships over time, which found that adolescents at age 11 rated their relationship with their fathers as very important (Clark-Lempers et al., 1991). Fathers were more important and rated higher on all of the attributes (admiration, affection, companionship, intimacy, alliance, aid and satisfaction) in early adolescence, but as with mothers, the ratings declined as children became adolescents. Adolescents at ages 15 and 17 rated their fathers less important as compared to their ratings of their fathers at age 11. Taken together, the literature suggests that fathers may play a role in daughters' development, but it may decline over time. This relationship in the specific domain of body esteem is not clear however; in other words, there is little research on the specific relationship between fathers' body esteem and daughters' body esteem in early adolescence.

Thus, one goal of the current study is to characterize relationships between fathers' and daughters' body esteem levels in early adolescence. The literature suggests that fathers may play a role in their daughters' development in early adolescence; however, this would not be as great as the mother's role. While the literature leads to this broad hypothesis, it is difficult to hypothesize about this relationship in the realm of body esteem as father-daughter relationships are not as studied as often as mother-daughter relationships, particularly in this domain.

Developmental Changes From Early to Later Adolescence

Adolescence is a developmental time period of rapid change; it is when an individual transitions from childhood to adulthood. These changes occur in biological, cognitive, and social

areas of development (Graber & Brooks-Gunn, 1996). Although adolescence is a widely accepted term, it is not clearly defined by the literature. The Journal of Adolescence defines adolescence as any development between puberty and when an individual reaches adult status within their society (Journal of Adolescence, 2012). However, as the definition of adulthood has changed, exactly when adolescence ends is unclear (Arnett, 2000). For the purposes of this study, individuals' aged 11 are considered to be in early adolescence and 15 year olds will be considered in later adolescence.

From early to late adolescence, there are significant biological changes that individuals undergo, which are linked to shifts in other developmental domains. For example, puberty and menarche are two major life events that occur during this development period. With the onset of menarche, it has been found that daughters' perception of their mothers is most negative, and they are less accepting of their parents (Paikoff & Brooks-Gunn, 1991). Girls who were premenarheal did not have negative perceptions of their mothers, displaying a clear change in relationship patterns from early to later adolescence. Paikoff & Brooks-Gunn (1991) found that while girls did discuss the symptoms of puberty with their mothers, adolescent girls confided in their same-sex friends to discuss their feelings behind these changes. This shift in self-disclosure from mothers to peers displays a change in adolescent girls, further alluding to the idea that as girls' develop and grow, they shift away from the family unit.

The significant changes in brain development that occur during adolescence is reflected in higher cognitive functioning. Emotional and cognitive changes were explored by examining adolescent brain scans from Functional Magnetic Resonance Imaging (fMRI). From early to later adolescence, significant brain changes occur allowing for abstract thought, organization, better decision making, and planning and response inhibition. As a result, as an individual matures

through adolescence they are better able to read social and emotional cues (Yurgelun-Todd, 2007).

An individual's ability to think more abstractly in later adolescence may influence the way they view themselves. A longitudinal study investigating changes in self-esteem throughout adolescence found that females' self-esteem decreased from age 14 to 18 (Block & Robins, 1993). Taken together, there are numerous physiological and psychological changes during adolescence, and for these reasons, the relationship between mothers' and daughters' body esteem levels during both early and later adolescence is explored in the current study. It is hypothesized that mothers' body esteem will be more strongly related to daughters' during early adolescence as compared to later adolescence. Again, it is important to characterize different potential predictors of low body esteem because low body esteem is predictive of a range of negative outcomes, including low self esteem and depression (Paxton et al., 2006).

When studying body esteem, it is important to keep in mind that weight status may be predictive of how individuals feel about themselves. In one study, 80 girls with an average age of 12.8 years were examined for three years to understand how weight status affects how girls felt about themselves (O'Dea, 2006). Self-concept, depression, and anxiety measures were used; in addition, height and weight were measured. Girls with a higher BMI scored lower in nine self-concept domains (scholastic competence, social acceptance, athletic competence, physical appearance, job competence, romantic appeal, behavioral conduct, close friendship and global self-worth). Similarly, a group of 213 nine-year-old girls were studied in an effort to understand self-perception and satisfaction across different weight categories (Hill, Draper, & Stack, 1994). The girls in the heaviest group showed the lowest body esteem, strongest drive for thinness, and highest levels of dietary restraint. Obesity is a rapidly growing problem in America with 16.9%

of children and adolescents, from ages 2 to 19, being obese (Ogden, Carroll, Kit, & Flegal, 2012). The growing amount of overweight adolescent girls puts more girls at risk for the negative outcomes that are associated with low body esteem. It has been made clear by the literature that weight status is important in understanding body esteem and this study sought to examine this relationship further.

Specific Aims and Hypotheses

Given the negative outcomes associated with low body esteem, the goal of the current study was to characterize potential familial predictors of girls' body esteem over a period of development using data from The Girls' NEEDS Project. The Girls' NEEDS Project was a longitudinal study completed at The Pennsylvania State University examining the developmental patterns of girls in central Pennsylvania. Families with a five-year old girl and a married mother and father were recruited from counties in central Pennsylvania. Girls visited the laboratory every other year from age 5 to age 15 for a total of 6 assessments; the study lasted a total of 10 years. The majority of the published data on body esteem from this project has focused on 5 to 9 year olds. This research will expand on past studies by focusing on data from girls' visits at ages 11 and 15, and by studying links between both parents' body esteem and their daughters' body esteem. The specific aims of the current study are:

- 1) Aim 1: The relationship between mothers' and daughters' body esteem in early adolescence
 - a. Do mothers' levels of body esteem when their daughters are 11 years old predict daughters' body esteem at 11?
 - i. It is hypothesized that mothers with higher levels of body esteem will have daughters with higher levels of body esteem.

- b. Do mothers' levels of body esteem when their daughters are 11 years old predict daughters' body esteem at 11, adjusting for daughters' weight status?
 - i. Even when controlling for the relationship between daughters' weight status and her body esteem, there will still be a significant, positive relationship between mothers' body esteem and daughters' body esteem.
- 2) Aim 2: The relationship between fathers' and daughters' body esteem in early adolescence
- a. Do fathers' levels of body esteem when their daughters are 11 years old predict daughters' body esteem at 11?
 - i. Fathers' body esteem will have a small relationship to daughters' body esteem at age 11.
 - b. Do fathers' levels of body esteem when their daughters are 11 predict daughters' body esteem at 11, adjusting for daughters' weight status?
 - i. When controlling for weight status, there will still be small relationship between fathers' body esteem and their daughters' body esteem at age 11.
- 3) Aim 3: Relationship between mothers' and daughters' body esteem in later adolescence
- a. Do mothers' levels of body esteem when their daughters are 15 years old predict daughters' body esteem at 15?
 - i. Mothers' levels of body esteem when daughters are 15 will be significant when relating to their daughters' body esteem at age 15.
 - b. Do mothers' levels of body esteem when their daughters are 15 predict daughters' body esteem at 15, adjusting for daughters' weight status?

- i. When controlling for the relationship between daughters' weight status and her body esteem, there will still be a small positive relationship between mothers' body esteem and daughters' body esteem at age 15.

Methods

Participants

Girls and their mothers and fathers participated the Girls NEEDS project a a ten-year longitudinal study of the health and development of young girls. Girls and their families were eligible to participate if they were living with both biological parents and had no food allergies or dietary restrictions. Families were recruited from flyers and newspapers about a study on the health and development of young girls. Moreover, families with eligible females within a 5-county radius in central Pennsylvania received mailings and follow-up phone calls. The study began with 197 5-year-old girls (mean age 5.4 ± 0.4) and their parents. Parents, on average, were in their mid-thirties at time of recruitment, and two thirds of parents reported an education level above a high school diploma. The majority of participants was non-Hispanic White and was of middle-to-upper income. These characteristics reflect the demographics of the central Pennsylvania area from which participants were recruited.

The current study focuses on data from when the girls were ages 11 and 15. When girls were 11 (mean age 11.3 ± 0.3), 177 families were still participating in the study. A final assessment occurred 4 years later with 167 families participating when the girls were 15 (mean age 15.3 ± 0.3). All available data were used in the current analyses.

Procedures

Families visited the laboratory for “camp sessions” for two days every second summer for ten years. At age 11, a trained researcher interviewed each girl to assess multiple constructs including body esteem. At age 15, the girls completed the questionnaires on their own during the visit. At both of these visits, the girls’ height and weight were also measured. Parents completed the adult versions of questionnaires assessing body esteem in advance of the visit.

Measures

Girls’ and mothers’ body esteem were assessed when daughters were ages 11 and 15. Girls’ weight status were assessed at ages 11 and 15. Fathers’ body esteem were measured when daughters age 11.

Body esteem.

To assess girls’ body esteem, The Body Esteem Scale (Mendelson & White, 2001) was used. The Body Esteem Scale (2001) is a 23-item scale used to assess children and adults’ overall non-specific body esteem (e.g., “I am proud of my body”, “I like what I look like in pictures.”). This is a revised version of the original Body- Esteem Scale (Mendelson & White, 1982). Response scales were changed from the original format (yes, no, sometimes) to a 5 point Likert scale ranging from (1) never to (5) always, in an effort to increase variability in responses. This updated version of the Body Esteem Scale took items from the original scale and also added new items that were more applicable to adolescents and adults. Within the Body Esteem Scale, there are a number of subscales tapping different aspects of body esteem. In the current study, the Appearance-Related Body Esteem score (BE-Appearance) was used to examine general feelings about one’s physical appearance. Thus, in the context of these analyses, references to body esteem refer to this appearance-related subscale. Scores from this subscale range from 0-4 with higher score indicating higher levels of Appearance- Related Body Esteem.

This measure showed good reliability and validity in this sample of girls and parents over time. For girls, the coefficient alpha of our index of body esteem (the Appearance-Related Body Esteem score) at age 11 was $\alpha = .93$, and at age 15, it was $\alpha = .91$, demonstrating excellent internal consistency, an indicator of reliability. Construct validity was demonstrated by significant correlations between the Appearance-Related Body Esteem score and overlapping constructs at ages 11 and 15. For example, when girls were age 11, validity was demonstrated by a significant positive correlation between overall scores on the chEAT, and lower Appearance-Related Body Esteem ($0.30, p < .001$). The chEAT is a measure designed to understand children's attitudes about their own eating and dieting behaviors and higher scores on this measure indicate greater dieting behaviors, food preoccupation, and social pressure (chEAT; Garner & Garfinkel, 1979). Furthermore, when girls were aged 15, validity was demonstrated by a significant inverse correlation between their Body Mass Index (BMI) and a higher Appearance-Related Body Esteem ($r = -.32, p < .001$).

Coefficient alphas for the Appearance-Related Body Esteem subscale also demonstrated reliability in mothers ($\alpha = .91$ when girls were age 11, $\alpha = .92$ when girls were age 15) and fathers ($\alpha = .92$ when girls were age 11). Correlations between mothers' and fathers' Appearance-Related Body Esteem and other variables demonstrate the validity of this measure in parents. For example, mothers' BMI was significantly and inversely related to their Appearance-Related Body Esteem appearance scores ($r = -.45, p < .001$) when daughters were 11. Mothers' BMI was significantly and inversely related to the appearance-related body esteem score again when girls were 15 years of age ($r = -.50, p < .001$). Fathers' BMI was significantly and inversely related to their Appearance-Related Body Esteem appearance scores ($r = .45, p < .001$) when daughters were 11. Taken together, our measure of body esteem, the Appearance-Related Body

Esteem score from The Body Esteem Scale, has demonstrated excellent reliability and validity in adolescent girls and their parents.

Weight status.

Girls' body mass index (BMI) was used as a measure of weight status; BMI values were calculated from measured heights and weights. Trained research staff measured each girl's height and weight at ages 11 and 15. Girls' heights were measured in triplicate to the nearest tenth of a centimeter. Girls' weights were measured in triplicate to the nearest tenth of a kilogram. BMI was calculated using the equation: $BMI = \frac{kg}{m^2}$, using the average height and weight values for each participant.

Data Analysis

First, descriptive statistics were generated for all variables, to investigate means and standard deviations and whether variables were normally distributed. Then, correlations between all variables of interest were tested. Then, regression analyses were conducted to test the three specific aims.

The first aim was to investigate whether mothers' levels of body esteem when their daughters were 11 years old predicted daughters' body esteem at 11. To test this, ordinary least squares regressions were performed to test whether mothers' body esteem when daughters were age 11 predicted daughters' body esteem at the same time point. First, this analysis was performed with only the mother body esteem and daughter body esteem variables. Then, a second regression was conducted to test whether mothers' body esteem still predicted daughters' body esteem when adjusting for daughters' BMI at age 11 as an additional predictor of daughters' body esteem.

The second aim was to understand if fathers' levels of body esteem when their daughters were 11 predicted their daughters' body esteem at age 11. Similar to the first aim, an ordinary least squares regression was performed to test if fathers' body esteem at age 11 predicted their daughters' body esteem at the same point in time. This first regression was performed with fathers' body esteem and daughters' body esteem variables. Then, a second regression was performed to investigate if fathers' body esteem predicted daughters' body esteem when adjusting for daughters' BMI at age 11.

The final aim was to see if the relationship between mothers' and daughters' body esteem levels changed over time. Building off the first aim, which investigated this relationship at age 11, the third aim examined if mothers' body esteem when daughters were age 15 was predictive of daughters' body esteem at age 15. First, an ordinary least squares regression was conducted with the mother body esteem and daughter body esteem variables. Then a second regression was conducted to test whether mothers' body esteem predicted daughters' body esteem variables at age 15 when daughters' BMI at age 15 was included as an additional predictor in the analysis.

Results

Descriptive statistics were generated for the six variables of interest: girls' body esteem (BE) at age 11, mothers' BE at girls' age 11, fathers' BE at girls' age 11, girls' BMI at age 11, girls' BMI at age 15, and mothers' BE at girls' age 15 (Table 1). Descriptively, it can be noted that mothers' BE when girls are age 11 ($m=2.20$) and when girls are age 15 ($m=2.16$) remains fairly constant while girls' BE declines (girls' BE at 11, $m=3.15$; girls' BE at 15 $m=2.40$). Descriptively, it can be observed that, girls BMI at age 11 ($m=20.02$) and girls BMI at age 15 ($m=22.31$) remains constant. Figure 1 examines the relationship between this variable at two time points.

Additionally, correlations between the variables of interest can be seen in Table 2. Girls' BMI at age 11 has a strong negative correlation with girls' BE at age 11 (-0.44^{****}), as shown in Figure 2. At age 15, girls' BMI is still highly negatively correlated with girls' BE at age 15 (-0.32^{****}), as shown in Figure 3.

With respect to the first aim of the study, mothers with higher body esteem when girls were 11 had daughters with higher body esteem at age 11 ($\beta=.26, p<.001$). This relationship can be observed in Figure 4. Mothers' body esteem was still a significant predictor of daughters' body esteem when adjusting for daughters' BMI at age 11 ($\beta =.15, p<.05$), as shown in Table 3.

With respect to the second aim, fathers with higher body esteem when girls were 11 had daughters with higher body esteem at age 11 ($\beta =.16, p<.01$). This relationship can be observed in Figure 5. Fathers' body esteem was only a marginally significant predictor of daughters' body esteem when adjusting for daughters' BMI at age 11 ($\beta =.13, p<.10$), as shown in Table 4.

Regarding the final aim, mothers' body esteem when girls were 15 did not predict daughters' body esteem at age 15 ($\beta =.07, p>.05$). This relationship can be observed in table 5. Mothers' body esteem when girls were 15 remained a non-significant predictor of girls' body esteem at 15 when adjusting for girls' BMI at age 15 ($\beta =.01, p>.05$), as shown in Table 5.

Discussion

This study sought to explore if mothers' and fathers' attitudes about their own bodies related to their daughters' body esteem. Mothers with higher body esteem when their daughters were age 11 had daughters with higher body esteem at age 11. To explore this relationship further, the model was adjusted for girls' BMI; in other words, mothers' body esteem was examined to see if this measure was still predictive of girls' body esteem when girls' BMI was held constant statistically. It was found that mothers' body esteem was still significantly related

to their daughters' body esteem at age 11, over and above the strong relationship between girls' body esteem and their BMI. For the second aim, it was found that fathers who had higher body esteem when their daughters were age 11 had daughters with higher body esteem at age 11. After adjusting for girls' BMI, it was discovered that fathers' body esteem was only marginally significant when predicting daughters' body esteem at age 11. Finally, the relationship between mothers and their daughters over time was examined, by comparing the results from aim 1 with the relationship between mothers' and daughters' body esteem when girls were 15 years old. When the daughters were age 15, it was found that mothers' body esteem did not predict daughters' body esteem at age 15. This result was consistent when adjusting for BMI at age 15. Similar to what was found when girls were age 11, girls' BMI at age 15 was predictive of girls' body esteem at age 15. By this age, however, mothers' body esteem no longer seems to play an important role.

Relationships Between Mothers' and Daughters' Body Esteem Levels In Early Adolescence

As explained above, girls had higher body esteem at age 11 when their mothers had higher body esteem at the same time point. This relationship was still significant when adjusting for girls' BMI at age 11. It was expected that this relationship would be significant with or without controlling for BMI as mothers are often the most significant person in their daughters' lives at this age, and mothers' body esteem was expected to predict girls' body esteem, regardless of whether the girl had a high or low weight status. Mothers and daughters often have a close relationship during early adolescence, which can be seen across multiple domains. For instance, the strongest predictor for girls' sexual status (virgin or non-virgin) in early adolescence is her relationship to her mother (Fox & Inazu, 2010). It was found that a positive

relationship and open communication between mother and daughter early on led to a delay in sexual activity. This strong relationship between mothers and daughters is also demonstrated by a mothers' importance during middle school years in preventing substance abuse (Hops, 1996). It has been made evident by the literature that the relationship between mothers and daughters is important across domains, and that this may be particularly true prior to the adolescent years.

It was expected that after adjusting for BMI, mothers' body esteem would be the most significant predictor of their daughters' Appearance-Related Body Esteem at age 11; this, however, was not the case. In other words, while both predictors were significant, girls' BMI was more strongly related to their body esteem than mothers' body esteem was. The fact that the relationship between mothers' body esteem and their daughters' body esteem remained significant suggests that mothers were influential, but still it was found that BMI plays a larger role than anticipated. Thus, mothers' body esteem when daughters were 11 was related to their 11-year-old daughters' body esteem, but girls' BMI may be a more important predictor of their body esteem, an important finding in the context of the current obesity epidemic.

Relationships Between Fathers' and Daughters' Body Esteem In Early Adolescence

In addition to mothers' body esteem, it was found that fathers' body esteem at age 11 predicted daughters' body esteem at age 11. It was expected that fathers' body esteem would show a small association with daughters' body esteem, given the limited amount of literature focused on fathers' and daughters' body esteem. In the current study, contrary to the results for mothers, fathers' body esteem was only marginally significant in predicting daughters' body esteem after adjusting for girls' BMI. Both mothers' and fathers' body esteem plays a role in predicting daughters' body esteem at age 11, but as predicted, mothers seem to play a larger role.

Similar results were found in other studies examining the relationship between high school aged girls' dieting behaviors and their parents' dieting behaviors (Wertheim, Mee, & Paxton, 1999). In this study, the relationship between mothers' and daughters' dieting behaviors (e.g., crash dieting, exercising) was stronger than the relationship between fathers' and daughters' dieting behaviors. The relationship between fathers' and daughters' eating behaviors was significant; however, it was not as strong as the relationship between the mother and daughter's dieting behaviors. These findings are consistent with what was found within this study, furthering the idea that fathers may have some influence, but mothers may be more important when it comes to daughters' body esteem in early adolescence. This may be because daughters are able to relate their physical attributes to their mothers', unlike their fathers' bodies. Fathers are often not the main focus of studies about body esteem; however, as previously discussed, the current results show that fathers do predict their daughters' body esteem. Because there is a relationship between fathers' and daughters' body esteem at age 11, fathers may be significant in other domains of their daughters' development.

Relationships Between Mothers' and Daughters' Body Esteem In Later Adolescence

Finally, the relationship between mothers' body esteem and daughters' body esteem was studied over time, by comparing the results from aim one, when daughters were 11, to the relationship between mothers' and daughters' body esteem when daughters were age 15. It was expected that mothers' body esteem would still have a significant relationship with daughters' body esteem at age 15. Contrary to the hypothesis, mothers' body esteem when daughters were age 15 did not predict daughters' body esteem at age 15. In comparing Figure 4 with Figure 6, it

is evident that the relationship mothers' have with their daughters in regards to body esteem declines over time.

When adjusting for girls' BMI at 15, mothers' body esteem remained a non-significant predictor of girls' body esteem at age 15. It was expected that mothers' body esteem would still be a significant predictor at this time, given previous findings in the literature that mothers' eating behaviors are related to daughters' eating behaviors in adolescence (Benedikt, Wertheim, & Love, 1998). In a group of 10th and 11th grade girls and their mothers, it was found that the mothers who used extreme weight loss techniques and had low body esteem themselves had daughters with similar attributes. This relationship was explained by the mother's desire for her daughter to lose weight. It was expected that this study would find similar findings. While it is understood that during adolescence girls receive influences outside of the family, it was not anticipated that mothers' body esteem would have no relationship with their daughters' body esteem at age 15. It is valuable to note that the relationship between mothers' and daughters' body esteem changes over time, but BMI remains a constant and strong predictor of girls' body esteem. This static relationship is shown in Figure 1. The fact that adjusting for BMI did not change patterns of relationships between mothers' and daughters' body esteem levels demonstrates that transmission of body esteem from mother to daughter is more than just overweight mothers encouraging low body esteem in their overweight daughters. With every study, to fully comprehend the findings, it is important to examine the accompanying strengths and limitations that have contributed to the results.

Strengths and Limitations

The Girls NEEDS' Project provides data over a 10-year period. This dataset allows for inferences to be made about change over time, while providing a better understanding about how

girls grow and develop from childhood to adolescence. This dataset also showcases information from three different vantage points: mothers, fathers, and daughters. Researchers are able to investigate relationships between all three family members. In the current study, it is a methodological strength that different informants reported on the same variables; this method prevents the problem of finding significant correlations as an artifact of taking self-reported information from the same individual. This study also has some limitations. First, the dataset does not include information on fathers' body esteem after daughters were age 11, so it is not possible to examine the relationship between fathers' body esteem and daughters' body esteem at age 15. Based on the pattern of results, it is assumed that fathers' body esteem at age 15 would not have predicted girls' body esteem, but it cannot be known for sure.

Another limitation is the inability to conclude that parents' body esteem *causes* daughters' body esteem. The study was observational, which only allows for inferences to be made about how parents' body esteem related to daughters' body esteem. Another limitation is the issue of social desirability bias. This form of bias is a systematic error found in self-report measures causing the respondents to respond to avoid embarrassment and project a favorable image of themselves to others (Fisher, 1993). Social desirability bias may reduce validity because participants may report what they expect the researchers want to hear, instead of their true opinions. Finally, researchers cannot generalize these results to a larger, general population of adolescents. The majority of the participants were from White, middle class backgrounds and these data cannot be generalized to populations outside of this particular sample. Thus, before drawing conclusions about adolescents differing in race, ethnicity, or socioeconomic status, similar research needs to be conducted among these groups to test whether these relationships between family members' body esteem levels would be similar.

Current research suggests that body esteem may operate differently in different demographic groups making it especially important to study its predictors and associated outcomes across different populations. In a meta-analysis examining ethnicity and its impact on eating disturbances and body esteem, it was found that there were significant differences within black and white samples. Black women reported fewer symptoms of eating-related psychopathology compared to their white counterparts. White women reported greater levels of eating disturbances, ranging from drive for thinness to bulimia. Differences in culture may translate into risk or protective factors. It was found that African-American families tend not to emphasize thinness as much as their white peers which could explain the lower rates of eating-related psychopathology in this population (Wildes & Emery, 2001). It is important to study the various influences that affect people from different races, cultures, or ethnicities, especially in terms of body esteem and weight related disorders, as these influences seem to vary across different populations.

Future Research and Implications

In the current study, the relationship between parents' and daughters' body esteem was observed as well as how mothers' body esteem may influence daughters' body esteem over time. As shown in the results, the relationship between mothers' and daughters' body esteem levels is non-significant by age 15. In general, girls' BMI remained the same from age 11 to 15, so it is important to consider what changed in the relationship between mothers' body esteem and daughters' body esteem, if BMI remained constant. However, it is interesting to note that there is a significant decrease in girls' body esteem from age 11 to 15. It has been shown in the results that mothers' body esteem was significantly related to girls' body esteem at age 11 but not at age 15, when this decline in girls' body esteem occurs. Future research should examine what is

occurring in development during this time as well factors that may influence girls that this study did not consider.

This study focuses on ages 11 and 15 but only observes relationships between parents and girls. It is important to examine other factors that may influence adolescent girls to fully comprehend why mothers' body esteem is no longer significant at age 15. In adolescence, peers seem to be very important. For example, adolescent smoking has been more highly correlated with peer smoking than parental smoking (Baurman, Carver, & Gleiter, 2001). Future research should focus on how peers may influence each other's body esteem levels, and if so, when this begins to occur. It would also be interesting to see future research examine the relationship between media influences and girls' body esteem. During adolescence, the media begins to become a significant factor in girls' development. A study examining high school aged girls discovered the majority of the participants found that pictures of models from magazines made the strongest impression on how they viewed their own bodies (Field, Cheung, Wolf, Herzog, Fortmaker, & Colditz, 1999). It is critical to be able to predict the emergence of low body esteem, so effective intervention and prevention programs can be put in place to decrease negative influences from peers or the media.

During this study, some of the results changed when adjusting for BMI and it is imperative for future researchers to be aware of the possible impact that weight status may have on body esteem. As shown through this study, parents' body esteem levels positively relate to their daughters' body esteem levels at age 11, but BMI seems to have a substantial role in how girls feel about their bodies at all time points. Furthermore, for this study, body esteem is defined by using the "Appearance- Related Body Esteem" subscale from the Body Esteem Scale (Mendelson, Mendelson, & White, 2001), examining how individuals felt about their body and

not how they felt about their weight specifically (even though results suggest that these constructs are linked). If the “Weight- Related Body Esteem” subscale had been used instead, one would expect the relationship between BMI and body esteem to be even greater. Given the current obesity epidemic with 16.9% of children and adolescents from the ages of 2 to 19 classified as obese (Ogden, Carroll, Kit, & Flegal, 2012) many young girls are at risk for obesity, and in addition to the negative physical effects of obesity, the current study suggests that it may also have implications for girls’ body esteem levels.

It is essential to remember that daughters with a higher BMI are more likely to have parents with a similar BMI. This relationship between parents’ and their childrens’ weight status is in part due to genetics, which could explain some of the inter-relationships between all of these variables. Aside from genetics, parents may impact their children through the environments they create and the examples that they set. It is valuable for parents, mothers especially, to set healthy examples for their children (e.g., mothers can be aware of their food choices in order to model healthy eating and ensure a healthy diet for their children). Interventions that target mothers’ health behaviors and cognitions around appearance and weight can also help to promote healthy development for their children. The current results suggest that by increasing mothers’ self-esteem and body image when daughters are age 11 or younger, daughters’ body esteem may improve as well. This study only examined ages 11 and 15; however, mothers’ body esteem and related variables are factors in daughters’ development at earlier time points as seen through other studies using the Girls’ NEEDS dataset.

In summary, this study set out to explore the relationship between parents’ body esteem and girls’ body esteem and if the relationship between mothers’ and daughters’ body esteem remained significant over time. As described in the results, this study found that there is a strong

relationship between mothers' body esteem and their 11-year-old daughters' body esteem; however this relationship is no longer significant when girls are age 15. With regards to fathers, there is a significant relationship between fathers' body esteem when daughters were age 11 and daughters' body esteem at age 11. While fathers are often considered the head of the family, in this case, mothers' body esteem seems to be more central to how an adolescent girl feels about her own appearance. It is important for mothers to understand the potential influence they may have on their developing daughters and for researchers to explore other potential influences on girls' body esteem, particularly after age 11. BMI was a significant predictor of body esteem at both time points, and the role that weight status plays in how a girls' body esteem develops needs to be examined further as obesity is a serious health concern in America today. Intervention and prevention programs should be put in place to help mothers improve how they feel about their own bodies and to encourage healthy lifestyles and possibly protect their daughters from low body esteem.

Table 1
Means and Standard Deviations of Variables of Interest

Variable	<i>M</i>	SD
Girls' BE at age 11	3.15	.72
Mothers' BE at girls age 11	2.20	.73
Fathers' BE at girls age11	2.63	.55
Girls' BMI at age 11	20.02	4.00
Girls' BMI at age 15	22.31	4.43
Girls' BE at age 15	2.40	.75
Mothers' BE at girls age 15	2.16	.76

* $p < .05$; ** $p < .01$; *** $p < .001$; **** $p < .0001$
BE=Body Esteem

Table 2
Correlations Between Variables of Interest

Variable	1.	2.	3.	4.	5.	6.	7.
1.Girls' BE at age 11	1.0						
2.Mothers' BE at girls age 11	.26***						
3.Fathers' BE at girls age 11	0.16*	0.04					
4.Girls' BMI at age 11	-0.44****	-0.27***	-0.059				
5.Girls' BMI at age 15	-0.39****	-0.34****	-0.02	0.82****			
6.Girls' BE at age 15	0.33****	0.18*	0.12	-0.29***	-0.32****		
7.Mothers' BE at girls age 15	0.22**	0.80****	-0.003	-0.19*	-0.22**	0.08	1.0

* $p < .05$; ** $p < .01$; *** $p < .001$; **** $p < .0001$
BE=Body Esteem

Table 3
Regression Models with Mothers' Body Esteem Predicting Girls Body Esteem at age 11

Variable	<i>B</i>	SE <i>B</i>	β
Model 1: Initial Analysis			
Mothers' BE when daughters are 11	.25	.07	.26***
Model 2: Controlling for girls' BMI at age 11			
Step 1: Girls' age 11 BMI	-.07	0.01	-.39*****
Step 2: Mothers' BE at girls age 11	.15	.07	.15*

* $p < .05$; ** $p < .01$; *** $p < .001$; ***** $p < .0001$
BE=Body Esteem

Table 4
Regression Models with Fathers' Body Esteem Predicting Girls Body Esteem at age 11

Variable	<i>B</i>	SE <i>B</i>	β
Model 1: Initial Analysis			
Fathers BE when daughters are 11	.21	.10	.16*
Model 2: Controlling for Initial BMI			
Step 1: Girls' age 11 BMI	-0.08	0.01	-0.43*****
Step 2: Fathers BE at girls age 11	0.18	0.09	0.13

* $p < .05$; ** $p < .01$; *** $p < .001$; ***** $p < .0001$
BE=Body Esteem

Table 5
Regression Models with Mothers' Body Esteem Predicting Girls Body Esteem at age 15

Variable	<i>B</i>	SE <i>B</i>	β
Model 1: Initial Analysis			
Mothers BS when daughters are 15	.08	.08	.078
Model 2: Controlling for Initial BMI			
Step 1: Girls age 15 BMI	-.053	.013	0.31****
Step 2: Mothers BE at girls age 15	.008	.074	.009

* $p < .05$; ** $p < .01$; *** $p < .00$; **** $p < .0001$
BE=Body Esteem

FIGURE 1. Scatterplot of the relation between Girls' BMI at age 11 and Girls' BMI at age 15

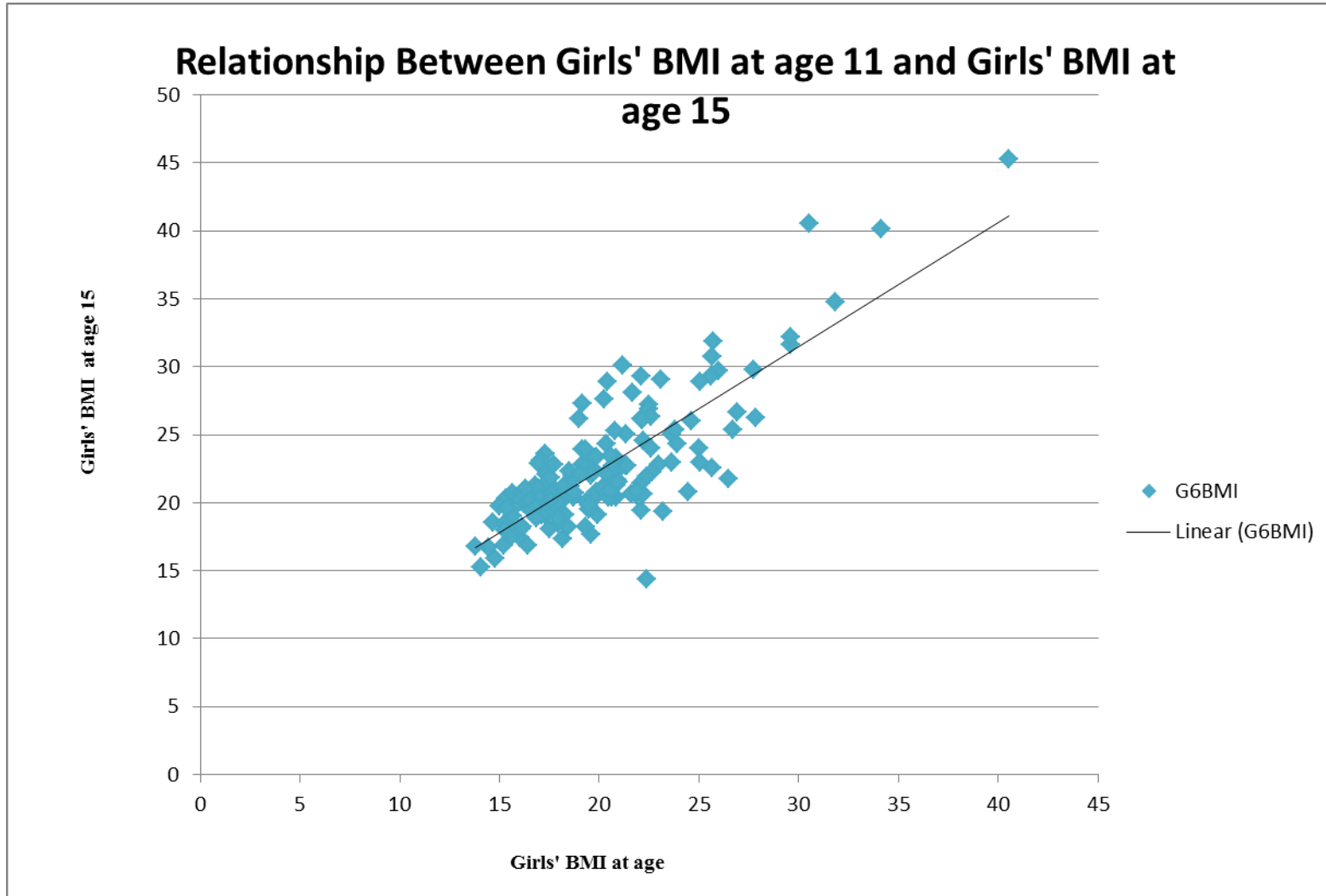


FIGURE 2. Scatter plot of the relation between Girls' Body Esteem at age 11 and Girl BMI at age 11

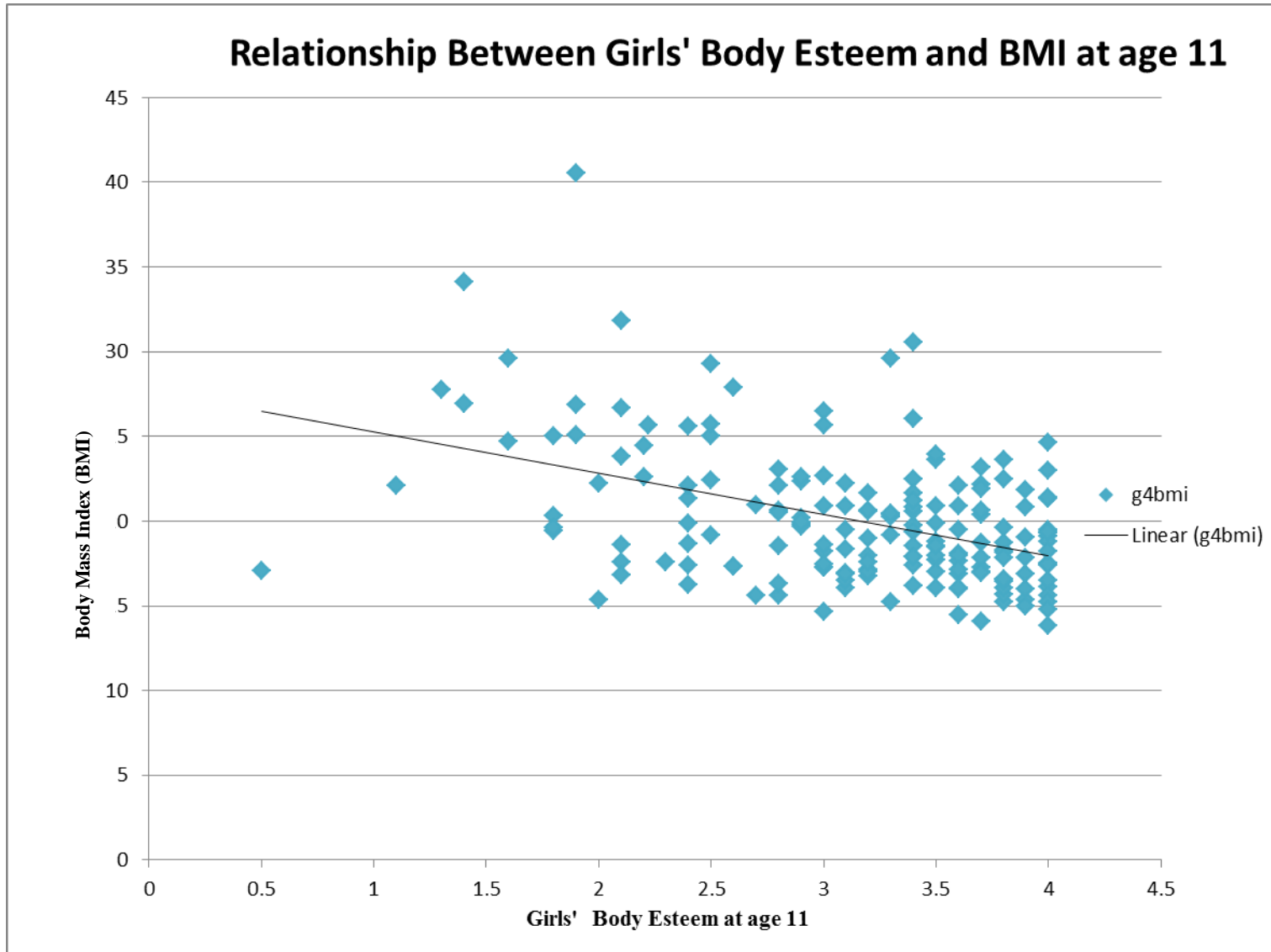


FIGURE 3. Scatter plot of the relation between Girls' Body Esteem at age 15 and Girls' BMI at age 15

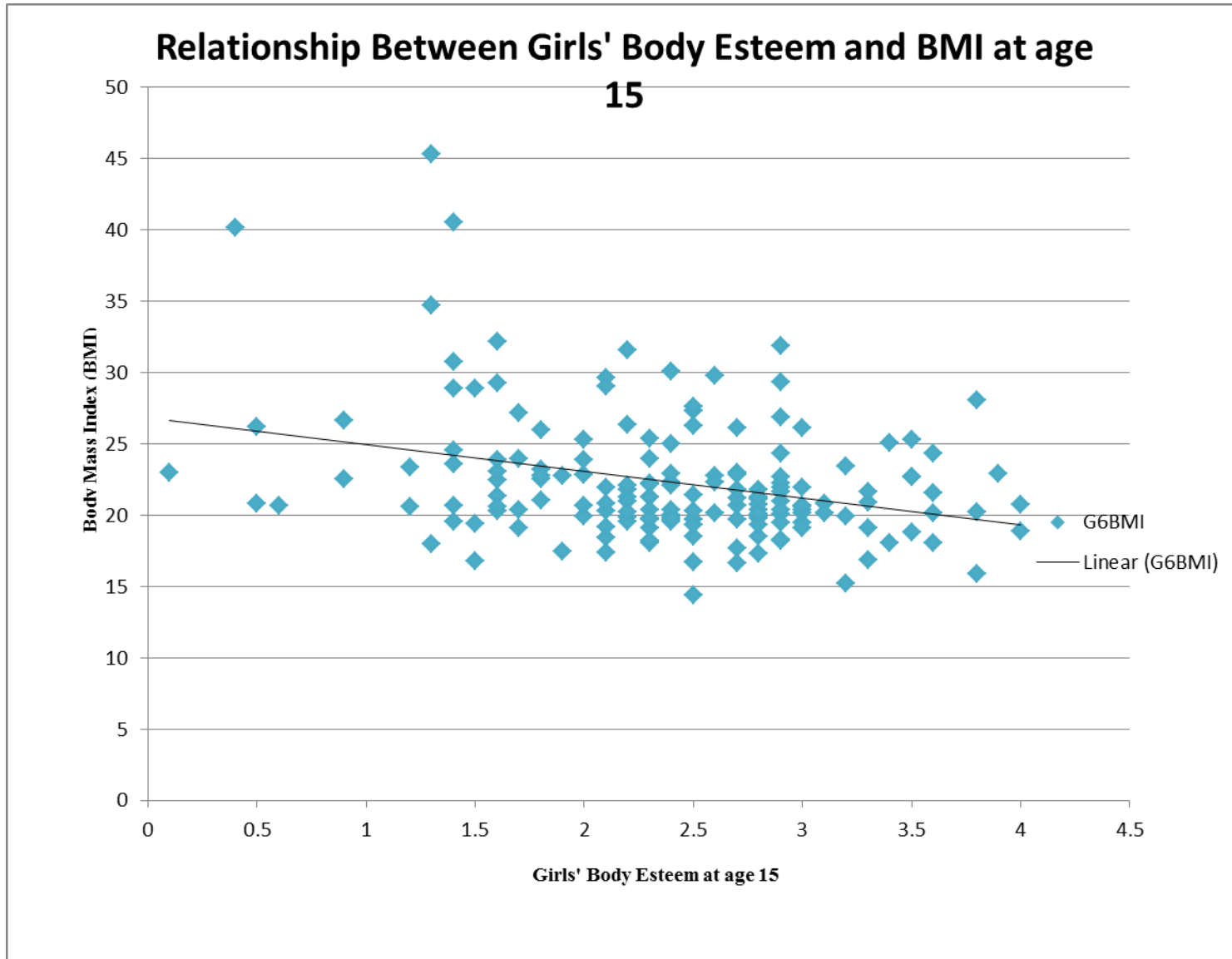


FIGURE 4. Scatter plot of the relation between Girls' Body Esteem at age 11 and Mothers' Body Esteem when daughters are age 11

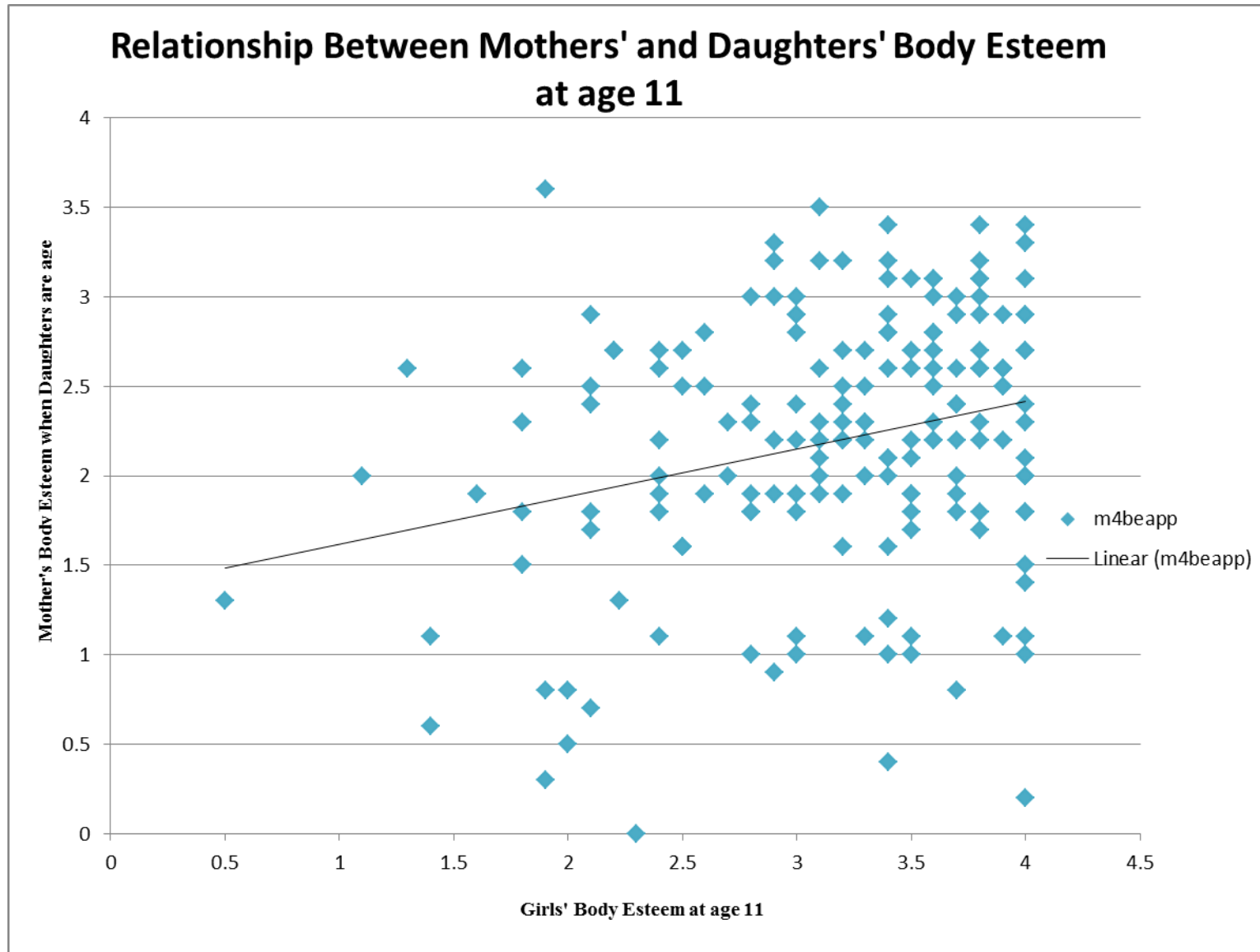


FIGURE 5. Scatter plot of the relation between Girls' Body Esteem at age 11 and Fathers' Body Esteem when daughters are age 11

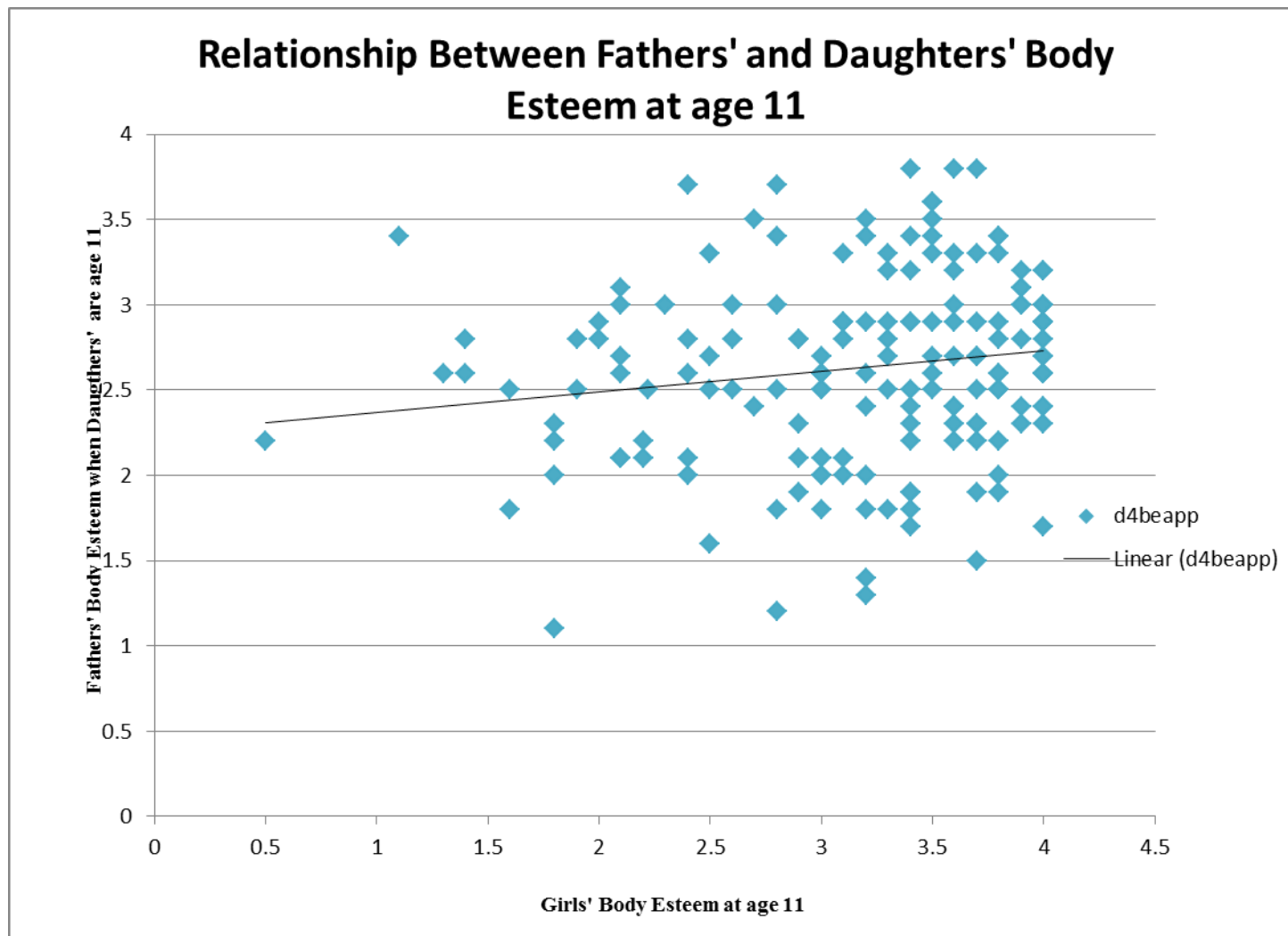
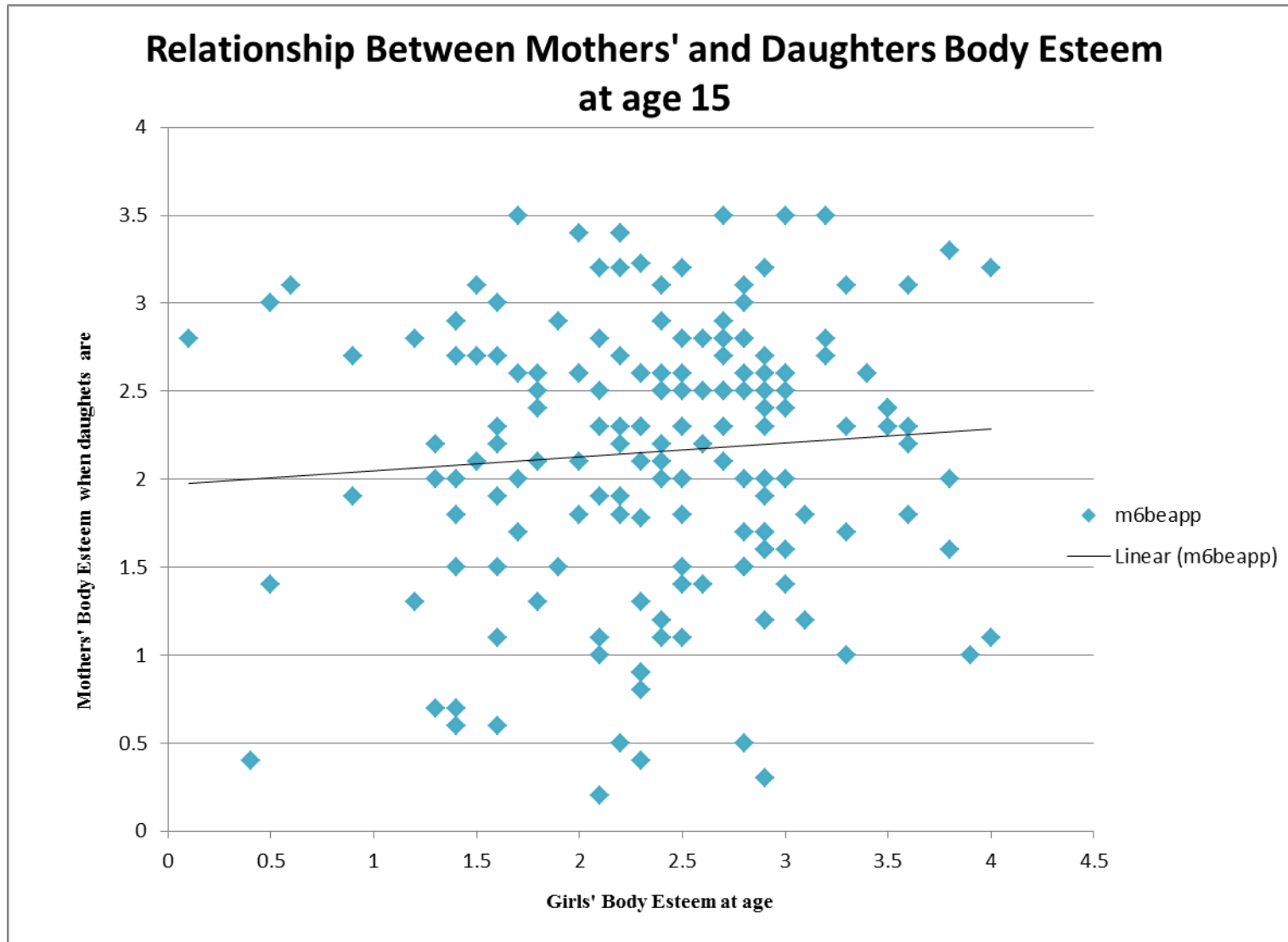


FIGURE 6. Scatter plot of the relation between Girls' Body Esteem at age 15 and Mothers' Body Esteem when daughters are age 15.



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