



# HHS Public Access

Author manuscript

*J Youth Adolesc.* Author manuscript; available in PMC 2016 April 18.

Published in final edited form as:

*J Youth Adolesc.* 2014 January ; 43(1): 15–29. doi:10.1007/s10964-012-9899-8.

## Parental and Peer Factors Associated with Body Image Discrepancy among Fifth-Grade Boys and Girls

**Shannon L. Michael,**

Centers for Disease Control and Prevention, 4770 Buford Highway NE, MS K-12, Atlanta, GA 30341, USA, sot2@cdc.gov

University of Maryland, 3304 Benjamin Building, College Park, MD 20742, USA

**Kathryn Wentzel,**

University of Maryland, 3304 Benjamin Building, College Park, MD 20742, USA, wentzel@umd.edu

**Marc N. Elliott,**

RAND Corporation, 1776 Main Street, P.O. Box 2138, Santa Monica, CA 90407-2138, USA, Marc\_Elliott@rand.org

**Patricia J. Dittus,**

Centers for Disease Control and Prevention, 1600 Clifton Rd, MS E-44, Atlanta, GA 30333, USA, pdittus@cdc.gov

**David E. Kanouse,**

RAND Corporation, 1776 Main Street, P.O. Box 2138, Santa Monica, CA 90407-2138, USA, kanouse@rand.org

**Jan L. Wallander,**

Psychological Sciences, University of California, Merced, 5200 North Lake Rd., Merced, CA 95343, USA, jwallander@ucmerced.edu

**Keryn E. Pasch,**

University of Texas at Austin, 1 University Station, D3700, Austin, TX 78712-0360, USA, kpasch@austin.utexas.edu

**Luisa Franzini,**

---

Correspondence to: Shannon L. Michael.

*Disclaimer:* The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

**Author Contributions** SLM conceived of the study, participated in its design and coordination, performed the statistical analysis, participated in the interpretation of the data, and drafted the manuscript; KW conceived of the study, participated in the design of the study and interpretation of the data, and helped to draft the manuscript; MNE participated in the design of the study and interpretation of the data and informed the statistical analysis; PJD participated in the design of the study and interpretation of the data; DEK participated in the design of the study and interpretation of the data and helped to draft the manuscript; JLW participated in the design of the study and interpretation of the data; KEP participated in the design of the study and interpretation of the data; LF participated in the design of the study and interpretation of the data; WCT participated in the design of the study and interpretation of the data; TQ participated in the design of the study and helped perform the statistical analysis; FAF participated in the design of the study, identified measurement issues, and participated in the interpretation of the data; MAS participated in the design and interpretation of the data and helped to draft the manuscript. All authors read and approved the final manuscript.

University of Texas Health Science Center at Houston, 1200 Herman Pressler Street, Houston, TX 77030, USA, luisa.franzini@uth.tmc.edu

**Wendell C. Taylor,**

University of Texas Health Science Center at Houston, 7000 Fannin Street, Suite 2670, Houston, TX 77030, USA, Wendell.C.Taylor@uth.tmc.edu

**Tariq Qureshi,**

Centers for Disease Control and Prevention, 4770 Buford Highway NE, mailstop K-33, Atlanta, GA 30341, USA, tq@tariqq.com

**Frank A. Franklin,** and

University of Alabama at Birmingham, 1600 7th Avenue South, Birmingham, AL 35294, USA, FFranklin@ms.soph.uab.edu

**Mark A. Schuster**

Department of Pediatrics, Harvard Medical School, Boston, MA, USA, mark.schuster@childrens.harvard.edu

Division of General Pediatrics, Department of Medicine, Children's Hospital Boston, 300 Longwood Avenue, Boston, MA 02115, USA

## Abstract

Many young adolescents are dissatisfied with their body due to a discrepancy between their ideal and actual body size, which can lead to weight cycling, eating disorders, depression, and obesity. The current study examined the associations of parental and peer factors with fifth-graders' body image discrepancy, physical self-worth as a mediator between parental and peer factors and body image discrepancy, and how these associations vary by child's sex. Body image discrepancy was defined as the difference between young adolescents' self-perceived body size and the size they believe a person their age should be. Data for this study came from Healthy Passages, which surveyed 5,147 fifth graders (51 % females; 34 % African American, 35 % Latino, 24 % White, and 6 % other) and their primary caregivers from the United States. Path analyses were conducted separately for boys and girls. The findings for boys suggest father nurturance and getting along with peers are related negatively to body image discrepancy; however, for girls, fear of negative evaluation by peers is related positively to body image discrepancy. For both boys and girls, getting along with peers and fear of negative evaluation by peers are related directly to physical self-worth. In addition, mother nurturance is related positively to physical self-worth for girls, and father nurturance is related positively to physical self-worth for boys. In turn, physical self-worth, for both boys and girls, is related negatively to body image discrepancy. The findings highlight the potential of parental and peer factors to reduce fifth graders' body image discrepancy.

## Keywords

Body image discrepancy; Peer factors; Parental factors; Self-worth; Fifth graders

---

## Introduction

Many young adolescents are dissatisfied with their body weight and shape, with about 40 % of girls and 23 % of boys dissatisfied with their bodies (Bearman et al. 2006). One reason for their dissatisfaction with their bodies might be a discrepancy between their ideal and actual body size. Young adolescents with a discrepancy are at a higher risk for low self-esteem and poor self-concept (Ata et al. 2007; Marsh et al. 2007). Furthermore, such adolescents are at higher risk for chronic body image problems, which can contribute to weight cycling, eating disorders, depression, and obesity (Barker and Bornstein 2010; Mirza et al. 2011; Paxton et al. 2006).

Researchers often use the terms body image, body dissatisfaction and body image discrepancy interchangeably, regardless of how they are measured. In general, body image is the subjective concept of one's physical appearance based on self-perceptions and self-attitudes, including thoughts, beliefs, and feelings (Cash and Pruzinsky 2002). Body image is composed of two components: perceptions of the appearance of one's body (cognitive/rational) and emotional responses to those perceptions (affective/emotional) (Cash 1994; Tiggemann 1996). Some researchers examine these components as one index called body dissatisfaction (Altabe and Thompson 1992; Tiggemann 1996). However, other researchers examine these components separately as body image discrepancy, which is defined as the difference between individuals' self-perceived body size and the size they believe a person their age and sex should be (cognitive/rational) (Gilliland et al. 2007; Tiggemann 1996). Although research of body dissatisfaction and body image discrepancy might yield similar findings, it is important to be able to articulate which parental, peer, and psychological factors contribute uniquely to these two outcomes, so that researchers can develop targeted prevention and intervention programs.

Research suggests that children and adolescents learn from their families and friends that they should be thin and that being overweight is unappealing (Dohnt and Tiggemann 2006; Phares et al. 2004). Much of the research examines the role of family and peer relationships and psychological well-being as they relate to body dissatisfaction. For example, studies have shown that a lack of social support from parents and peers has been associated with body dissatisfaction in young adolescents (Bearman et al. 2006; Helfert and Warschburger 2011). Researchers also have examined the association between adolescent self-beliefs (e.g., global self-esteem and self-worth) and body dissatisfaction (e.g., van de Berg et al. 2010), demonstrating that higher levels of self-esteem are associated with lower levels of body dissatisfaction.

Despite a growing body of literature for body dissatisfaction, several important questions remain for body image discrepancy. First, more general levels of social-emotional support afforded by parent-adolescent and peer relationships rarely have been examined in association to body image discrepancy. Moreover, few studies have addressed the possibility that mothers, fathers, and peers might have differential effects on body image discrepancy. Third, while some studies have identified direct associations between social influences and body image discrepancy during adolescence, psychological processes that might explain

these associations rarely have been examined. Finally, few studies have taken into account the possibility that these associations might differ as a function of sex.

The current study addresses these gaps by exploring associations between social influences from mothers, fathers, and peers and fifth graders' body image discrepancy. In addition, associations between fifth graders' physical self-beliefs, which include physical self-worth (belief about their physical appearance), and their body image discrepancy are examined. Lastly, this study was designed to illuminate how these associations might be moderated by child's sex.

## **A Conceptual Model of Young Adolescent Body Image Discrepancy**

Figure 1 presents the conceptual model that served as the basis for this study. The figure depicts pathways whereby parental and peer factors are related to young adolescents' body image discrepancy. Direct links between multiple aspects of parental and peer factors and body image discrepancy were posited, based on previous research showing positive and negative associations between social influences and health-related outcomes (e.g., Helfert and Warschburger 2011; Heitzler et al. 2006). Parents and peers have been shown to affect children's beliefs about themselves (Harter et al. 1996). Therefore, the model specifies a pathway whereby parental and peer factors are related to body image discrepancy by way of young adolescents' beliefs about physical appearance self-worth (belief about one's physical appearance); in turn, these perceptions are posited to be the most proximal predictors of body image discrepancy.

### **Young Adolescent Body Image Discrepancy and Physical Self-Beliefs**

Few studies have examined the associations between young adolescents' self-perceptions and body image discrepancy. However, low self-worth, low self-esteem, and negative affect have been associated with young adolescents' body image discrepancy in particular and dissatisfaction with their lives in general (Gilliland et al. 2007; Mirza et al. 2011; Stice 2001). Even less research has examined specific self-perceptions that reflect physical appearance in association with body image discrepancy. Perceived self-worth partly reflects one's self-esteem in the domain of physical appearance (Harter 1983). Physical self-worth is a contributor to overall levels of self-worth during childhood and early adolescence, and has been related positively to peer acceptance during adolescence (Harter 1990). In general, research has shown that boys have higher level of self-worth than girls (Robins and Trzesniewski 2005), and boys also have been shown to have a more positive body image than girls (Holsen et al. 2012). In the current study, therefore, we focused on physical self-worth, which is the value that young adolescents place on their physical appearance, as a predictor of body image discrepancy for boys and girls.

### **Parental Factors**

Research has shown that when parents are emotionally warm, affectionate, and available, and balance these qualities with high expectations and a firm but fair disciplinary style, they create an emotional context in which children and adolescents tend to be more secure, well-adjusted, healthier, and safer than peers raised in other settings (Baumrind 1991).

Specifically, parental nurturance is important throughout the developmental process and appears to be an especially significant factor in the positive development of young adolescents (Maccoby 2007; Windle et al. 2010). Researchers have found positive associations between young adolescents who are satisfied with their bodies and parents who are nurturing and supportive (Crespo et al. 2010), whereas young adolescents dissatisfied with their bodies are associated with parents who are less nurturing and warm (Bearman et al. 2006). These findings are consistent for boys and girls.

Nurturing parents also have a lasting effect on their children's body image. In a recent study, researchers showed that boys and girls with positive and supportive parents have more consistent body image satisfaction over time (Holsen et al. 2012). These associations rarely have been examined for body image discrepancy; however, the few studies that have examined these associations have shown that low social and emotional support received from parents was associated with higher levels of body image discrepancy (Ata et al. 2007).

Another gap in this literature is the fact that little is known concerning the independent contributions of nurturance from mothers and fathers to young adolescents' health-related outcomes. There is some evidence that fathers play distinctive roles in families and have different effects from mothers on their children's behaviors (Marsiglio et al. 2000). With regard to health outcomes, some studies have found that teasing by fathers is associated with daughters' body dissatisfaction and internalization of sociocultural norms of thinness (e.g., Keery et al. 2005), but studies have not examined how positive father practices are associated with body image discrepancy. Other studies have tried to understand if mothers mainly affect their daughters' body image and fathers mainly affect their sons'; however, the findings showed that both parents have an impact on their sons' and daughters' body image (e.g., Field et al. 2001). However, to our knowledge, no study has looked at how father and mother nurturance may contribute differently to body image discrepancy among young adolescent boys and girls. In the current study, we will examine mother and father nurturance separately.

Parents also might indirectly affect how young adolescents view their bodies by affecting their perceptions of self-worth. For example, research suggests that parents who are critical and unsupportive (e.g., who express dissatisfaction with their own, or their children's weight, or tease them about it) can have a negative impact on their children's beliefs about themselves (Helfert and Warschburger 2011; Paxton et al. 2006). These findings are consistent for boys and girls. However, little research has investigated the mediating role of young adolescents' physical appearance self-worth in the association between mother and father nurturance and body image discrepancy, especially how this might differ for boys and girls.

### **Peer Factors**

Young adolescents who feel that they are accepted and well-connected to their peer group have more positive perceptions of themselves and their bodies (Holsen et al. 2012; Stice and Whitenton 2002). Researchers also have found that children's perception that being thin is related to popularity among peers predicted children's body dissatisfaction and eating-related concerns, especially for girls (Clark and Tiggemann 2007; Oliver and Thelen 1996).

However, much of the research examining associations between peers and body image has focused on peer criticism about weight and shape, peer conversations about appearance, and peer weight-loss habits (e.g., Helfert and Warschburger 2011; Gondoli et al. 2011). Few studies, if any, have examined how general levels of influence from peers are associated with young adolescents' body image discrepancy.

Peers also might influence body image discrepancy by affecting young adolescents' beliefs about themselves. For example, young adolescents who worry about what others think of them or how they may be treated at school tend to have negative perceptions of themselves (Ata et al. 2007; Clark and Tiggemann 2006). In addition, peer criticism and teasing contribute negatively to young adolescents' beliefs about their physical appearance and are correlated with lower levels of self-worth (Ata et al. 2007; Ricciardelli and McCabe 2001).

In the current study, we examined four general aspects of peer relationships that might be associated with body image discrepancy and self-beliefs: one positive aspect (getting along with peers) and three negative aspects (loneliness [lack of friends], peer victimization, and fear of negative evaluation by peers). Little is known about how these constructs are associated with body image discrepancy for boys and girls.

### Demographic Variables

Additional factors that have been associated with body image discrepancy and dissatisfaction include sex, race/ethnicity, socioeconomic status (SES), and body mass index (BMI). Sex differences in body image emerge sometime between ages eight and ten (Ricciardelli et al. 2003). Girls tend to desire a thinner body type and have more body image concerns than boys (van de Berg et al. 2010). Moreover, similar to girls, boys' physical self-beliefs are likely to be affected by parental and peer factors (Ricciardelli et al. 2006). Because of these findings, this current study will examine the proposed model (Fig. 1) separately for boys and girls. With regard to race/ethnicity, researchers found, in general, that African American children were less dissatisfied with their weight, even if they were heavier, than White students (van de Berg et al. 2010). Paxton et al. (2006) found that SES predicted body dissatisfaction for boys and girls, with low levels of SES associated with greater body dissatisfaction. Finally, BMI is also associated with body image concerns among young adolescents (Gardner et al. 1997; Paxton et al. 2006). Studies have shown that young adolescents with higher BMIs, especially girls, desire to be thinner and are more dissatisfied with their bodies (e.g., Holsen et al. 2012; Rolland et al. 1996; Wallander et al. 2009). In light of this literature, even though it mostly focused on body dissatisfaction and satisfaction, we controlled for the potentially confounding effects of fifth graders' race/ethnicity, SES (parent's highest education level and family income), and BMI on body image discrepancy.

### Hypotheses

Despite growing research in this area, there is limited understanding of the associations between parental and peer factors, young adolescent psychological processes, and body image discrepancy, and, in particular, how these associations vary for boys and girls. Therefore, the current study was designed to address these gaps.

Based on previous research (Harter 1990; Bearman et al. 2006; Holsen et al. 2012; Stice and Whiteman 2002), a major focus for the study was to examine how parental nurturance (mother and father nurturance), peer factors (getting along with peers, peer loneliness, peer victimization, and fear of negative evaluation by peers), and fifth graders' physical self-worth are related to body image discrepancy. We hypothesized a negative association between parental nurturance and body image discrepancy. While examining the differences among mothers and fathers is an exploratory analysis, we predicted that father and mother nurturance would be associated negatively with body image discrepancy for both boys and girls (e.g., Helfert and Warschburger 2011; Holsen et al. 2012), with father nurturance having a stronger effect for girls than boys. Further, we predicted that both mother and father nurturance would be associated positively with physical self-worth, with mother nurturance having a stronger effect for girls than boys (Phares et al. 2004).

While very few studies have examined how positive peer relationships influence body image discrepancy by gender, we hypothesized a negative association between getting along with peers and body image discrepancy for both girls and boys. In addition, we predicted positive associations between negative aspects of peer relationships (loneliness, peer victimization, fear of negative evaluation by peers) and body image discrepancy for both girls and boys (e.g., Helfert and Warschburger 2011; Phares et al. 2004). However, we expected that the effect for peers would be stronger for girls than boys.

The second focus of this study examined the extent to which fifth graders' physical self-worth mediates the associations between parental and peer factors and body image discrepancy. Research has shown that unsupportive parents and peers can have a negative impact on children's beliefs about themselves and their bodies (Helfert and Warschburger 2011; Clark and Tiggemann 2006). We hypothesized physical self-worth to have the most proximal association with body image discrepancy and that this association would be similar for both girls and boys (van de berg et al. 2010). On this basis, we hypothesized parental nurturance to be related to body image discrepancy indirectly through their associations with specific beliefs about physical self-worth, with parental nurturance positively related to physical self-worth and negatively related to body image discrepancy. Similarly, we hypothesized peer factors to be related to body image discrepancy indirectly through their associations with specific beliefs about physical self-worth, with positive peer factors positively related to physical self-worth and negatively related to body image discrepancy, and negative peer factors negatively related to physical self-worth and positively related to body image discrepancy.

Based on the differences for boys and girls described earlier, the last hypothesis explored how the associations in the proposed model varied for boys and girls. Because race/ethnicity, child's body mass index (BMI) percentile, and parent's educational level and family household income have been associated significantly with physical self-worth and different aspects of body image (Mirza et al. 2011; Paxton et al. 2006; van de Berg et al. 2010), these variables were included in the study as controls.

## Method

### Participants

This study used data from Wave I of Healthy Passages, a multi-site study of adolescent health and risk behaviors. Data were collected in 2004 in three major cities located in the West, South, and Southwest regions of the United States. A two-stage probability sampling procedure produced a representative sample of fifth-grade students. At the first stage, schools were randomly selected with probability of selection proportionate to a weighted measure of the school size for a total of 118 schools. At the second level, all fifth-grade students in regular classrooms in sampled schools were invited to participate, resulting in 11,532 eligible fifth-grade students. Of the eligible students, 6,663 (58 %) parents gave their permission for their child to be contacted, and of those, 5,147 (77 %) students and their primary caregivers completed interviews. A complete description of the design of the study, including the participant selection processes, has been reported elsewhere (Schuster et al. 2012; Windle et al. 2004).

Exploring the current model (Fig. 1) with only fifth graders allows this model to be used as a baseline for future studies. The average age of fifth graders in the sample was 10.62 (SD = .67) years and that of parents was 38.78 (SD = 7.48). The study included 2,610 girls and 2,537 boys. Thirty-four percent of students were African American, 35 % were Latino, 24 % were White, and 6 % were categorized as other race/ethnicity. Over half (55 %) of the parents had at least some college education, but almost half (43 %) had annual family incomes of less than \$30,000 per year. Based on BMI percentiles calculated from the Centers for Disease Control and Prevention (CDC) gender- and age-specific charts, of the fifth graders in the study, 1.4 % were underweight (less than the 5th percentile), 49.6 % were normal weight (5th percentile to less than the 85th percentile), 17.6 % were at risk for overweight (85th to less than the 95th percentile), and 24.6 % were overweight (Equal to or greater than the 95th percentile) (Kuczmarski et al. 2000). Parent reports were included in this study only for measures of child's sex, child's race/ethnicity, parent's highest education level, and family's total annual household income.

### Procedures

Institutional Review Boards at all participating institutions reviewed and approved the study protocol and all study materials. All three research sites used standardized data collection materials and protocols, including training manuals, field manuals, and validation procedures. Recruitment procedures across all three sites included the recruitment of school districts, schools, and students. First, permission was obtained from superintendents to approach schools within their school district. If permission was granted, school principals were approached by local investigators or other field staff, the study was explained, and the investigators asked for permission to recruit fifth-grade students within their classrooms. Once schools agreed to participate, study materials were sent home with the fifth-grade students requesting parental permission to contact parents about the study. Parents who agreed to be contacted were called, and an interview was scheduled at the home or other preferred location.



Immediately prior to data collection, the parent signed the informed consent form and the parent permission form and the child signed the assent form. Data collection consisted of measurements of child height, weight, and waist circumference; parent height and weight; child computer-assisted personal interview (CAPI) and audio computer-assisted self-interview (A-CASI); and parent CAPI and CASI. Parents and children completed their interviews in separate rooms; Spanish versions of consent materials and all instruments were available and used as needed. The consent process, anthropometrics, and interviews took approximately 3 h. Monetary incentives were provided to all participants in this study. For example, primary caregivers received \$50, and children received a \$20 gift card.

## Measures

**Body Image Discrepancy**—Body image discrepancy was assessed using the Collins Body Image measure (Collins 1991). Children were presented with a set of drawings of seven same-sex children in graduated sizes, from thin to overweight, and were asked to choose which body they thought a boy or girl of their age should look like. Next, they were asked to choose which of the seven bodies looked most like them. The absolute difference between the ordered sizes of the two bodies chosen was calculated to produce the body image discrepancy score ( $M = 0.61$  and  $SD = 0.68$ ). Estimates of children's own body size have been shown to be accurate (Gardner et al. 1997).

**Parental Nurturance**—The adapted Maternal Nurturance Scale assessed the extent of encouragement and guidance that children receive from a mother or father figure (Barnes and Windle 1987). Children provided answers to seven items for mothers and fathers (e.g., "How often does your mother/father give you praise or encouragement?"). The response format was a 4-point Likert scale ranging from "almost never" (1) to "almost always" (4). Scores for each item were summed to calculate a scale score for mothers ( $M = 21.59$  and  $SD = 4.07$ ) and fathers ( $M = 19.59$  and  $SD = 4.90$ ). Cronbach's alpha for mother nurturance was .76 and for father nurturance was .81.

**Loneliness**—Asher and Wheeler's (1985) loneliness scale assessed whether children believed they are poorly accepted by their classmates and are lonely or socially dissatisfied. Children provided answers to five items (e.g., "you have lots of friends at school," "you are lonely at school," and "you do not have anyone to play with at school"). The response format was a 5-point Likert scale ranging from "always true about you" (1) to "not true at all about you" (5). Four of the five items were reverse coded, and then the scores for each item were summed to calculate the scale score ( $M = 7.98$  and  $SD = 3.74$ ). Cronbach's alpha for the scale was .77.

**Getting Along with Peers**—Getting along with peers was measured with a five-item social subscale of the Pediatric Quality of Life Inventory (PedsQL) (Varni et al. 1999). The PedsQL was designed to measure the core dimensions of health (e.g., social, psychological, and physical) as delineated by the World Health Organization. Example items in the social subscale include: "you have trouble getting along with other kids," "other kids tease you," and "other kids do not want to be your friend." The response format was a 5-point Likert scale ranging from "never" to "almost always." Scores for each item were reversed and

transformed linearly, so that higher scores in the scale reflect higher levels of getting along with peers, with a possible range of 0 (almost always) through 100 (never). The five transformed scores were then averaged to calculate the scale score ( $M = 78.00$  and  $SD = 19.58$ ). Cronbach's alpha for the scale was .75.

**Peer Victimization**—Peer victimization was assessed with the Peer Experience Questionnaire's peer victimization scale (Prinstein et al. 2001). Children provided answers to six items (e.g., "How often do kids call you names?" and "How often did kids say they would hurt you or beat you up?") on a 5-point Likert scale ranging from "never" (1) to "a few times per week" (5). Scores for each item were summed to calculate the scale score ( $M = 10.44$  and  $SD = 3.56$ ). Cronbach's alpha for the scale was .83.

**Fear of Negative Evaluation by Peers**—Children's fear of negative evaluation by peers was measured with a six-item subscale from the Social Anxiety Scale for Children (LaGreca et al. 1988). Example items included: "you worry about being teased," "you worry about what other kids think of you," and "you are afraid that other kids will not like you." The response format was a 5-point Likert scale ranging from "not true at all" (1) to "true all the time" (5). Scores for each item were summed to calculate the scale score ( $M = 12.38$  and  $SD = 5.79$ ). Cronbach's alpha for the scale was .88.

**Physical Self-Worth**—Children's physical self-worth was measured with a six-item physical appearance self-worth subscale of the Self-Perception Profile (Harter 1983). For each of the six items, children responded to two items; for example, they were asked first to identify which contrasting description best fits them (e.g., "some kids are happy with the way they look" and "some kids wish their body was different") and then, whether this description was "sort of true" or "really true." Each of the six pairs of items was recoded to create an ordered 4-point Likert scale. Scores for these six derived items were summed to calculate the scale score with a possible range of 6 through 24 ( $M = 17.77$  and  $SD = 4.00$ ). Cronbach's alpha for the scale was .68. The alpha for physical self-worth is consistent with other studies (e.g., Mirza et al. 2011). The lower alpha in this study might be due to the age of these students.

**Control Variables**—Information on child's sex, child's race/ethnicity, parent's highest education level in the household, and family's annual household income was obtained during the parent interview. Parent's highest education level in the household referred to one of the following options: 8th grade or less, some high school but did not graduate, high school graduate, GED, some college, 2-year degree, 4-year college graduate, and more than a 4-year college degree. For family's total annual household income, respondents selected from 20 response options, beginning with less than \$5,000 per year to over \$250,000 per year. Child's BMI percentile ( $M = 72.32$  and  $SD = 27.20$ ) was based on the child's weight and standing height as measured by standard anthropometric protocols (Ogden et al. 2008; Kuczmarski et al. 2000). Trained field researchers collected the child's height and weight data. BMI percentiles were calculated for children using the CDC gender- and age-specific charts (Kuczmarski et al. 2000).

## Missing Data

Missing values were imputed using the Markov Chain Monte Carlo method (Schafer 1997). Proc MI from SAS version 9.1 was used to perform the imputation to replace “Don’t know,” “Refused,” and “Blocked” responses with valid responses. Legitimately skipped items were not imputed. Demographic variables and height and weight also were not imputed. In addition, the weighted mean plus indicator of missingness approach (Cohen and Cohen 1985) was used as a means of imputation for the following variables: parent’s highest education level, family’s annual household income, and child’s BMI percentile.

## Analysis Plan

To account for the two-stage probability sampling strategy, all analyses were conducted with Mplus version 6.1, using a robust maximum likelihood algorithm for complex data (Muthén and Muthén 2010). Analyses for each statistical model took the stratification, clustering, and weights of the sample into account. The stratification identified the three sites, and the clusters identified the schools that were randomly selected within the stratifications. Finally, design weights were included to reflect school selection probabilities based on racial/ethnic composition and student non-response as a function of school, sex, and race/ethnicity (for more detail see Windle et al. 2004). Using this weight allows researchers to generalize the results of analyses of the Healthy Passages data to the population of fifth-grade students in public schools in the three geographic areas.

The primary outcome variable was body image discrepancy. The primary predictors were mother and father nurturance, four peer measures, and physical self-worth. Mean differences in body image discrepancy and physical self-worth by sex and race/ethnicity were examined with one-way analyses of variance. Direct and indirect associations were tested and evaluated by means of path analytic procedures. Direct pathways between parental and peer factors and body image discrepancy as well as between fifth graders’ physical self-beliefs and body image discrepancy were examined, along with indirect paths from parental and peer factors to body image discrepancy by way of fifth graders’ physical self-worth. Race/ethnicity, parent’s highest education level, family household income, and child BMI percentile were included in the model as control variables. This model was used as the foundation to apply multi-group analysis to test for differences between boys and girls. To do this, invariant and variant models were established, and then the model-data fit for these two models were directly compared to determine which model to use. In addition, to examine whether coefficients for specific pathways differed between the two groups (boys vs. girls), the model test command was used in Mplus to perform a Wald test.

The model selected was fully identified, which means that all the variances and covariances for measures included in the model were accounted for, and therefore, model-data fit indices could not be generated. Because of this, a second model was created that excluded non-significant primary independent measures from the first model that were consistent for both boys and girls. Models with comparative fit index (*CFI*) values close to .95, standardized root mean squared residual (*SRMR*) values of less than .09, and root mean square error of approximation (*RMSEA*) values of less than .06 were considered an acceptable fit (Hu and Bentler 1999).

## Results

The results are presented in two sections. In the first section, group mean differences in body image discrepancy and fifth graders' self-beliefs by sex and race/ethnicity and correlations that provide initial support for the study predictions are provided. The second section presents the results of the path analysis, including both the direct and indirect effects for boys and girls. We assessed the associations separately by direction of body image discrepancy (larger than ideal, equal to ideal, and smaller than ideal); however, the findings did not indicate a need to stratify. Therefore, absolute body image discrepancy was used in the analyses.

### Descriptive Statistics

**Mean Group Differences**—Table 1 presents the mean differences of body image discrepancy and physical self-worth as a function of sex and race/ethnicity. Body image discrepancy differed significantly as a function of sex, with boys having a higher discrepancy than girls. Body image discrepancy also differed significantly as a function of race/ethnicity, with White fifth graders reporting the lowest discrepancy and Latino fifth graders reporting the highest discrepancy. There also were sex and racial/ethnic differences for physical self-worth. Specifically, boys reported higher levels of physical self-worth than did girls. White fifth graders reported higher levels of physical self-worth compared with African American, Latino, and “Other” fifth graders. Further, Latino fifth graders reported the lowest levels of physical self-worth.

**Correlations**—Intercorrelations among parental factors, peer factors, and physical self-beliefs are presented in Table 2. Of note were significant correlations among the two parental nurturance measures, the four peer measures, and physical self-worth. In addition, all of the parental and peer measures and physical self-worth were related significantly to body image discrepancy.

### Path Analysis

The statistically significant paths are shown in Fig. 2 for boys and Fig. 3 for girls. Multi-group analysis was conducted comparing the fit of the group-variant model and the group-invariant model and assessed differences between boys and girls in the strength of paths between mother and father nurturance, four peer influence measures, physical self-worth, and body image discrepancy. As described in the analysis plan, the results are based on the second model in order to report model-data fit indices. Specifically in the second model, mother nurturance, peer loneliness, and peer victimization were not included as direct predictors of body image discrepancy, and peer loneliness and peer victimization were not included as direct predictors of physical self-worth. Again, these measures were non-significant for boys and girls in the first model. Parameter estimates and significance levels for measures were the same in both models, so deleting the non-significant measures did not impact the findings.

Both the group-variant and the group-invariant models yielded the following satisfactory fit indices:  $CFI = 1.00$ ;  $SRMR = .001$ ; and  $RMSEA = .00$  and  $CFI = .98$ ;  $SRMR = .01$ ; and

*RMSEA* = .02, respectively. The Satorra-Bentler test was used to get the correct Chi square difference test statistic for models estimated with MLR ( $\chi^2 = 51.54$ ,  $df = 26$ ,  $p = .002$ ), indicating that the models were statistically different. In addition, the models were compared using the AIC measure, which takes into account both the model parsimony and model fit. The score for the group-variant model (38410) was lower than the group-invariant model (38424), indicating the group-variant model was both more parsimonious and better fitting than the group-invariant model. Therefore, for this study the group-variant model was used, indicating boys and girls have one or more path coefficients that were significantly different.

**Boys Only Model**—The model for boys is presented in Fig. 2. Father nurturance, getting along with peers, and physical self-worth had direct negative associations with body image discrepancy. In addition, father nurturance and getting along with peers were direct positive predictors of physical self-worth, whereas fear of negative evaluation by peers was a direct negative predictor of physical self-worth. Together, the independent measures were associated with 8 % of the variance in body image discrepancy and 12 % of the variance in physical self-worth.

In addition, significant pathways were found such that body image discrepancy was related indirectly to father nurturance, getting along with peers, and fear of negative evaluation by peers by way of physical self-worth. Because of the complex sampling design, joint significance tests were used to identify mediators (MacKinnon et al. 2002). As shown in Fig. 2, physical self-worth was a significant mediator between body image discrepancy and each of the following predictors: father nurturance ( $\beta = -.01$ ,  $z = -2.38$ ,  $p = .02$ ), getting along with peers ( $\beta = -.02$ ,  $z = -3.88$ ,  $p < .001$ ), and fear of negative evaluation by peers ( $\beta = .02$ ,  $z = 3.35$ ,  $p = .001$ ).

**Girls Only Model**—In the model for girls (Fig. 3), physical self-worth had a direct negative association with body image discrepancy, and fear of negative evaluation by peers had a direct positive association with body image discrepancy. In addition, mother nurturance and getting along with peers were direct positive predictors of physical self-worth, whereas fear of negative evaluation by peers was a direct negative predictor of physical self-worth. The independent measures were associated with 10 % of the variance in body image discrepancy and 18 % of the variance in physical self-worth.

Similar to boys, significant pathways were found such that body image discrepancy was related indirectly to mother nurturance, getting along with peers, and fear of negative evaluation by peers by way of physical self-worth. Physical self-worth was a significant mediator between body image discrepancy and each of the following predictors: mother nurturance ( $\beta = -.02$ ,  $z = -3.49$ ,  $p < .001$ ), getting along with peers ( $\beta = -.03$ ,  $z = -4.95$ ,  $p < .001$ ), and fear of negative evaluation by peers ( $\beta = .03$ ,  $z = 4.71$ ,  $p < .001$ ).

**Boys Versus Girls**—For boys and girls, physical self-worth had a negative association with body image discrepancy. For boys only, father nurturance and getting along with peers was negatively associated with body image discrepancy. For girls only, fear of negative evaluation by peers was positively associated with body image discrepancy. There were also different indirect paths for boys and girls. For boys, physical self-worth fully mediated the

association between fear of negative evaluation by peers and body image discrepancy; for girls, partial mediation was found. On the other hand, physical self-worth fully mediated the association between getting along with peers and body image discrepancy for girls; for boys, partial mediation was found. For boys, father nurturance also was associated indirectly with body image discrepancy; for girls, mother nurturance was associated indirectly with body image discrepancy.

In order to determine the differences between path coefficients for boys and girls, the Wald test was used in Mplus. The path coefficients for four pathways were significantly different. These include getting along with peers and body image discrepancy ( $\chi^2 = 4.58, p = .03$ ); father nurturance and physical self-worth ( $\chi^2 = 3.65, p = .05$ ); mother nurturance and physical self-worth ( $\chi^2 = 6.76, p = .01$ ); and physical self-worth and body image discrepancy ( $\chi^2 = 23.90, p < .001$ ). For boys, the negative association between getting along with peers and body image discrepancy was significant, but not for girls. In addition, while the negative association for father nurturance and body image discrepancy was significant for boys, but not for girls, the Chi square test was non-significant. Boys also had a significant positive association between father nurturance and physical self-worth that was not found for girls. On the other hand, the positive association between mother nurturance and physical self-worth was significant for girls, but not for boys. In addition, girls had a significant positive association between fear of negative evaluation by peers and body image discrepancy, but the Chi square test was non-significant. Finally, the strength of the association between physical self-worth and body image discrepancy was significantly stronger for girls than for boys.

## Discussion

As body image discrepancy is a salient and problematic issue from childhood through adulthood, understanding the socialization of body image discrepancy is necessary to inform efforts to prevent it. The current study examined mechanisms by which mother and father nurturance and peer factors are associated with body image discrepancy among fifth graders, both directly and indirectly through the role held by physical self-worth. This study also explored the ways in which the proposed model (Fig. 1) differed for boys and girls. In general, we found that mother and father nurturance and peer factors are related to body image discrepancy indirectly through their associations with fifth graders' physical self-beliefs, and that these pathways differed for boys and girls.

Our findings confirmed those of previous researchers and extended past work in important ways. This was the first study, to our knowledge, to include general levels of social-emotional support afforded by mother- and father-adolescent and peer relationships as predictors of body image discrepancy. For boys, father nurturance was associated negatively with body image discrepancy, suggesting that positive support from fathers might serve as a buffer for boys in developing a discrepancy between their ideal and perceived actual body sizes. Interestingly, no association was found for mother nurturance, demonstrating that nurturing fathers might uniquely affect their son's body image discrepancy above and beyond nurturing mothers.

In contrast to our predictions, neither father nor mother nurturance was associated significantly with body image discrepancy for girls. One possible explanation could be that we used general support versus body-specific measures. Keery et al. (2005) found that only appearance-related criticism and teasing from fathers were associated with daughters' body dissatisfaction. In addition, previous researchers found that encouraging messages to control weight and shape rather than teasing and negative commentary by parents tend to be more hurtful and affect their sons' and daughters' body dissatisfaction (Helfert and Warschburger 2011).

A closer look at the literature reveals that most researchers did not use separate measures for mothers and fathers (e.g., Bearman et al. 2006; Crespo et al. 2010; Holsen et al. 2012); when an aggregate measure is used, general support by mothers and fathers seems to contribute differently to their daughters' and sons' perceptions of their body size. In addition, the outcome measure for previous studies was body dissatisfaction or body satisfaction (e.g., Bearman et al. 2006; Crespo et al. 2010; Helfert and Warschburger 2011; Holsen et al. 2012; Presnell et al. 2004) rather than body image discrepancy, which suggests that body dissatisfaction and body image discrepancy may be affected differently by parents.

As predicted for peers, getting along with peers was associated negatively with body image discrepancy for boys, whereas fear of negative evaluation by peers was associated positively with body image discrepancy for girls. Although the items for the construct of child's fear of negative evaluation by peers are not specific to appearance or body image, the results are consistent with previous research that showed young adolescents' body dissatisfaction is affected by their perception of pressure to be thin from their peers, especially for girls (Gondoli et al. 2011; Presnell et al. 2004). Most of the research on peers uses body dissatisfaction and satisfaction as the outcome measure, so these findings extend the literature for body image discrepancy, showing general support (both positive and negative) from peers is associated with body image discrepancy.

In addition, indirect paths linked parental nurturance and peer factors to body image discrepancy through physical self-worth. With respect to parental nurturance, our results indicated that father nurturance has a significant effect on boys' self-beliefs, and mother nurturance has a significant effect on girls' self-beliefs, which could be important in terms of targeted messaging for mothers and fathers. Similar to previous research, mothers and fathers who are nurturing and warm can affect their children's level of self-confidence and self-esteem (Harter et al. 1996). These findings also reflect previous observations that mothers tend to have a stronger association with their daughters' self-beliefs than fathers do, because they are generally the original attachment figure in a child's life and tend to be more involved in everyday relationships of support (see, for example, Bowlby 1969; Wentzel and Feldman 1996). It is, however, surprising that there was not a significant association between mother nurturance and physical self-worth found for boys. One explanation might be due to our use of a specific measure of self-worth (i.e., physical self-worth) rather than a global measure as most previous studies have done.

The extent to which fifth graders are influenced by their peers also was indirectly predictive of body image discrepancy by way of young adolescents' physical self-worth. These

findings are the same for both boys and girls, with positive aspects of influence (getting along with peers) being associated positively with physical self-worth, and fear of negative evaluation by peers being related negatively with physical self-worth. In turn, fifth graders' physical self-worth was associated negatively with body image discrepancy, with this association being significantly stronger for girls than for boys. Our findings for body image discrepancy are consistent with studies that examined self-worth and body dissatisfaction and satisfaction by gender, which show that young adolescents' beliefs about themselves are closely tied to their satisfaction with their body size, with this association being stronger for girls (e.g., Phares et al. 2004; van de Berg et al. 2010).

While we controlled for BMI, it is important to note the significant associations between BMI and physical self-worth and body image discrepancy. The results indicate that fifth-grade boys and girls with a higher BMI tend to have decreased physical self-worth and increased body image discrepancy. These findings are consistent with other studies (Holsen et al. 2012; Wallander et al. 2009), demonstrating that BMI affects the perception of physical appearance and body size for boys and girls. On the basis of these findings, other researchers should consider examining whether this model varies for underweight and overweight young adolescents.

Certain limitations of the study also merit consideration. Most notably, our cross-sectional data do not allow for conclusions regarding the direction of the causal relationships that were modeled. Indeed, our model represents only one of several possible ways in which the measures of interest could be related. For instance, it is likely that how young adolescents view their bodies has an effect on their physical self-worth or even on the extent to which they seek out or receive supports from parents or peers.

In addition, most of the statistically significant effects were small in magnitude. However, we found medium-sized effects for four of the associations (Cohen 1992). The following three effects were found for both boys and girls: physical self-worth with body image discrepancy; getting along with peers with physical self-worth, and fear of negative evaluation with physical self-worth. The other medium-sized effect was found only in the girls' model and was between mother nurturance and physical self-worth. One explanation for these small effects might be the use of the body image items by Collins (1991), which use drawings intended for younger children and might not be relevant to fifth graders, particularly females whose bodies have started to undergo the physical changes of puberty.

The low variance explained in body image discrepancy for both the direct and indirect pathways also suggests that there are additional measures that need to be incorporated into future models. The role of exposure to specific media is one important factor to consider in this regard. Other types of social influences such as accessibility to information about maintaining ideal body weight, exercise programs, or other help with body image also should be considered.

Although specific peer practices have been shown to directly affect children's body dissatisfaction (see, for example, Clark and Tiggemann 2006), more exploration of the possible moderating effects of the emotional climate of the peer group is warranted. The



inclusion of additional specific aspects of influence, such as teasing or criticism about physical appearance, or others' communication concerning weight would help determine the relative contribution of global social-emotional supports and health-specific supports to self-beliefs and body image discrepancy. The current model might explain more of the variance if the study sample was of older adolescents. Research shows that both self-esteem/self-worth and body image satisfaction decrease from childhood to adolescence, especially for girls (Crespo et al. 2010; Robins and Trzesniewski 2005). Finally, future studies are needed to explore other mechanisms (e.g., parental and peer beliefs, self-efficacy beliefs) through which social and cultural influences affect the body image discrepancy of young adolescents. A greater understanding of the development of body image discrepancy will lead to more appropriate and effective educational programs targeting young adolescents at risk for developing body discrepancies, as well as the negative health outcomes that are associated with body dissatisfaction, such as depression or eating disorders.

The current findings have important prevention and intervention implications. Prevention efforts to consider include developing targeted resources that educate mothers and fathers about how they influence their children's self-worth and perception of their body size, including their beliefs, thoughts, feelings, and behaviors. Resources also can be developed that could be integrated into the school curriculum. School programs can be based on a collaborative approach with school counselors, teachers, and parents to help reinforce key messages. These resources can include information on how to have a high self-worth, resist social pressures to be thin, deal with peer norms about body image, prevent body image problems, and get help if they have a body image issue. The results from this study support the ongoing prevention work in this field of research, especially prevention strategies that are developed to increase adolescent's self-worth and bolster positive support from parents and peers (Cousineau et al. 2010; O'Dea and Yager 2011; Steinberg and Phares 2001).

Our findings lend support to a model of young adolescents' body image discrepancy that recognizes the joint effects of global social-emotional influences from mothers, fathers, and peers for both boys and girls; results also highlight the importance of including young adolescents' physical self-worth in explanations of their body image discrepancy. In addition, this study provides modest supporting evidence in favor of the notion that the physical self-worth of fifth graders serves as a mediator between mother and father and peer factors and fifth graders' body image discrepancy. A further strength of this study is a large demographically diverse sample of fifth graders and their primary caregivers, and the ability to control for a wide range of demographic and physiological factors that could affect our proposed pathways. It is noteworthy that demographic variables were not associated with our independent and dependent measures to any great extent.

## Acknowledgments

Emily O'Malley Olsen, MSPH, Centers for Disease Control and Prevention, provided technical assistance and reviewed the manuscript.

## Biographies

**Shannon L. Michael** is a Health Scientist in the Division of Adolescent and School Health at the Centers for Disease Control and Prevention. She received her doctorate in Human Development from the University of Maryland, College Park. Her research focuses on adolescent health and development, adolescent risk behaviors, and protective factors including parent and school connectedness, parent engagement, and parental monitoring.

**Kathryn Wentzel** is Professor of Human Development at the University of Maryland, College Park. She received her Ph.D. in education from Stanford University. Her research focuses on the role of adolescents' relationships with teachers, peers, and parents in facilitating healthy adjustment to school.

**Marc N. Elliott** is a Senior Statistician in RAND Health. He received his doctorate in Statistics from Rice University. His areas of interest and experience include health disparities, Medicare, vulnerable populations, experiences with health care, survey sampling, experimental design, casual inference, and case-mix adjustment.

**Patricia J. Dittus** is a Behavioral Scientist in the Division of STD Prevention at the Centers for Disease Control and Prevention. She received her doctorate in Psychology from the University at Albany, State University of New York. Her research focuses on adolescent sexual risk behavior, parental influences on adolescent behaviors including parental monitoring and communication, and the development and evaluation of parent-based and structural interventions to prevent adolescent HIV, STD, and unintended pregnancy.

**David E. Kanouse** is a Senior Behavioral Scientist at The RAND Corporation in Santa Monica, California. He received his doctorate in social psychology from Yale University. His major research interests include health promotion and disease prevention in adolescent and adult populations, sexual risk behavior, and public reporting on health care quality.

**Jan L. Wallander** is Professor of Psychological Sciences at University of California, Merced. He received his Ph.D. in clinical psychology from Purdue University. His major research interests are in disparities in interactions between health and behavior across child and adolescent development.

**Keryn E. Pasch** is an Assistant Professor in the Department of Kinesiology and Health Education in the College of Education at the University of Texas, Austin. She received her M.P.H. in Health Behavior and Health Education from the University of North Carolina at Chapel Hill's Gillings School of Global Public Health and her Ph.D. in Behavioral Epidemiology from the University of Minnesota School of Public Health. Her research interests include the cooccurrence of risk behaviors in adolescence and early adulthood and the influence of environmental factors on adolescent health behavior.

**Luisa Franzini** is Professor and Director of the Division of Management, Policy, and Community Health at the University of Texas School of Public Health in Houston, Texas. She trained as an econometrician and received her Ph.D. in Economics and Econometrics

form the London School of Economics (England). Her research focuses on health economics, health inequalities, and obesity.

**Wendell C. Taylor** is Associate Professor at the University of Texas Health Science Center at Houston. He received his doctorate in Social Psychology from Arizona State University, and his M.P.H. from the University of Texas Health Science Center at Houston, School of Public Health. His research focuses on health promotion in children and adolescents.

**Tariq Qureshi** is the director of clinical operations at the Emory healthcare, department of neurology. He received his medical degree from Karachi University, Pakistan and an MPH from Rollins School of Public Health, at Emory University Atlanta, Ga. His research interests include Healthcare quality, Role of technology in healthcare delivery, opportunities for real-time analytics and data mining of EMR data.

**Frank Franklin** is Professor Emeritus of Public Health at UAB. He received his MD at the University of Maryland and his Ph.D. at MIT in Nutritional Biochemistry and Metabolism. His major research interests are nutrition and child development.

**Mark A. Schuster** is the William Berenberg Professor of Pediatrics at Harvard Medical School and Chief of the Division of General Pediatrics and Vice Chair for Health Policy in the Department of Medicine at Boston Children's Hospital. He received his MD from Harvard Medical School and his Ph.D. in Public Policy Analysis from the Pardee RAND Graduate School. He conducts research primarily on child, adolescent, and family issues. His work spans a wide range of topics, including quality of health care, health disparities, adolescent sexual health, and family leave.

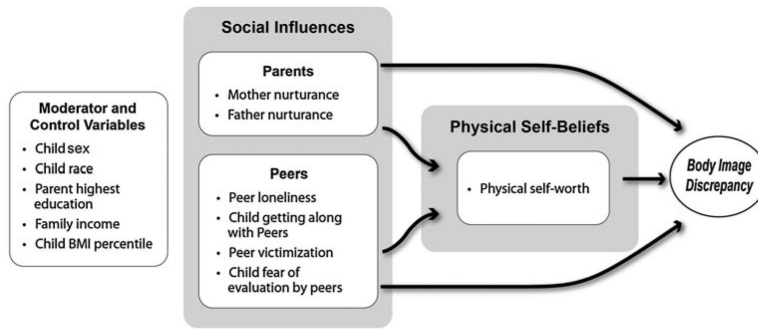
## References

- Altabe M, Thompson JK. Size estimation versus figural ratings of body image disturbance: Relation to body dissatisfaction and eating dysfunction. *International Journal of Eating Disorders*. 1992; 11:397–402.
- Asher SR, Wheeler VA. Children's loneliness: A comparison of rejected and neglected peer status. *Journal of Consulting and Clinical Psychology*. 1985; 53:500–505. [PubMed: 4031205]
- Ata RN, Ludden AB, Lally MM. The effects of gender and family, friend, and media influences on eating behaviors and body image during adolescence. *Journal of Youth and Adolescence*. 2007; 36:1024–1037.
- Barker ET, Bornstein MH. Global self-esteem, appearance satisfaction, and self-reported dieting in early adolescence. *Journal of Early Adolescence*. 2010; 30:205–224. [PubMed: 23155302]
- Barnes GM, Windle M. Family factors in adolescent alcohol and drug abuse. *Pediatrician*. 1987; 14:13–18. [PubMed: 3615298]
- Baumrind D. The influence of parenting style on adolescent competence and substance use. *Journal of Early Adolescence*. 1991; 11:56–95.
- Bearman S, Presnell K, Martinez E, Stice E. The skinny on body dissatisfaction: A longitudinal study of adolescent girls and boys. *Journal of Youth and Adolescence*. 2006; 35:217–229. [PubMed: 16912810]
- Bowlby, J. *Attachment*. Basic Books, Inc; New York, NY: 1969.
- Cash TF. Body image attitudes: Evaluation, investment, and affect. *Perceptual and Motor Skills*. 1994; 78:1168–1170. [PubMed: 7936939]

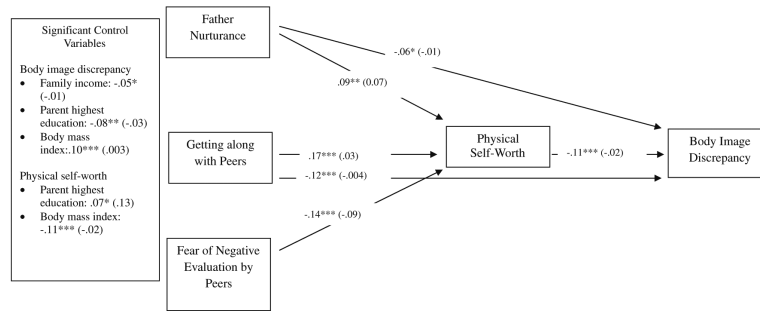
- Cash, TF.; Pruzinsky, T. Future challenges for body image theory, research, and clinical, practice. In: Cash, TF.; Pruzinsky, T., editors. *Body images: A handbook of theory, research, and clinical practice*. Guilford Press; New York: 2002. p. 509-516.
- Clark LS, Tiggemann M. Appearance culture in nine to 12-year old girls: Media and peer influences on body dissatisfaction. *Social Development*. 2006; 15:628–643.
- Clark LS, Tiggemann M. Sociocultural influences and body image in 9 to 12-year old girls: The role of appearance schemas. *Journal of Clinical Child & Adolescent Psychology*. 2007; 36(1):76–86. [PubMed: 17206883]
- Cohen J. A power primer. *Psychological Bulletin*. 1992; 112:155–159. [PubMed: 19565683]
- Cohen, J.; Cohen, P. *Applied multiple regression and correlation analysis for the behavioral sciences*. 2nd. Erlbaum; Hillsdale, NJ: 1985.
- Collins ME. Body figure perceptions and preferences among preadolescent children. *International Journal of Eating Disorders*. 1991; 10:199–208.
- Cousineau TM, Frankob DL, Trantc M, Rancourt D, Ainscoughc J, Chaudhuric A, et al. Teaching adolescents about changing bodies: Randomized controlled trial of an Internet puberty education and body dissatisfaction prevention program. *Body Image*. 2010; 7(4):296–300. [PubMed: 20638919]
- Crespo C, Kielpikowski M, Jose PE, Pryor J. Relationships between family connectedness and body satisfaction: A longitudinal study of adolescent girls and boys. *Journal of Youth and Adolescence*. 2010; 39:1392–1401. [PubMed: 20938726]
- Dohnt H, Tiggemann M. The contribution of peer and media influences to the development of body satisfaction and self-esteem in young girls: A prospective study. *Developmental Psychology*. 2006; 42:929–936. [PubMed: 16953697]
- Field AE, Camargo CA, Taylor CB, Berkey CS, Roberts SB, Colditz GA. Peer, parent, and media influences on the development of weight concerns and frequent dieting among preadolescent and adolescent boys and girls. *Pediatrics*. 2001; 107:54–60. [PubMed: 11134434]
- Gardner RM, Sorter RG, Friedman BN. Developmental changes in children's body images. *Journal of Social Behavior and Personality*. 1997; 12:1019–1036.
- Gilliland MJ, Windle M, Grunbaum JA, Yancey A, Hoelscher D, Tortolero SR, et al. Body image and children's mental health related behaviors: Results from the Healthy Passages study. *Journal of Pediatric Psychology*. 2007; 32:30–41. [PubMed: 16775084]
- Gondoli DM, Corning AF, Salafis EHB, Bucchianeri MM, Fitzsimmons EE. Heterosocial involvement, peer pressure for thinness, and body dissatisfaction among young adolescent girls. *Body Image*. 2011; 8:143–148. [PubMed: 21354882]
- Harter, S. Developmental perspectives on self-system. In: Mussen, PH., editor. *Handbook of child psychology: Socialization, personality, and social development*. Wiley; New York: 1983. p. 275-283.
- Harter, S. Causes, correlates, and the functional role of global self-worth: A life-span perspective. In: Kolligian, J.; Sternberg, R., editors. *Competence considered*. Yale University Press; New Haven, CT: 1990. p. 67-98.
- Harter S, Marold DB, Whitesell NR, Cobbs G. A model of the effects of perceived parent and peer support on adolescent false self behavior. *Child Development*. 1996; 67:360–374. [PubMed: 8625718]
- Heitzler CD, Martin SL, Duke J, Huhman M. Correlates of physical activity in a national sample of children aged 9–13 years. *Preventive Medicine*. 2006; 42:254–260. [PubMed: 16490241]
- Helfert S, Warschburger P. A prospective study on the impact of peer and parental pressure on body dissatisfaction in adolescent girls and boys. *Body Image*. 2011; 8:101–109. [PubMed: 21354379]
- Holsen I, Jones DC, Birkeland MS. Body image satisfaction among Norwegian adolescents and young adults: A longitudinal study of the influence of interpersonal relationships and BMI. *Body Image*. 2012; 9:201–208. [PubMed: 22391409]
- Hu L, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*. 1999; 6:1–55.
- Keery H, Boutelle K, van den Berg P, Thompson JK. The impact of appearance-related teasing by family members. *Journal of Adolescent Health*. 2005; 37:120–127. [PubMed: 16026721]

- Kuczarski RJ, Ogden CL, Grummer-Strawn LM. CDC growth charts: United States. *Advance Data*. 2000; 314:1–27. [PubMed: 11183293]
- LaGreca AM, Dandes SK, Wick P, Shaw K, Stone WL. Development of the social anxiety scale for children: Reliability and concurrent validity. *Journal of Clinical Child Psychology*. 1988; 17:84–91.
- Maccoby, E. Historical overview of socialization research and theory. In: Grusec, JE.; Hastings, PD., editors. *Handbook of socialization: Theory and research*. Guilford Press; New York, NY: 2007. p. 13-41.
- MacKinnon DP, Lockwood CM, Hoffman JM, West SG, Sheets V. A comparison of methods to test the significance of the mediated effect. *Psychological Methods*. 2002; 7:83–104. [PubMed: 11928892]
- Marsh HW, Hau KT, Sung RYT, Yu CW. Childhood obesity, gender, actual-ideal body image discrepancies, and physical self-concept in Hong Kong children: Cultural differences in the value of moderation. *Developmental Psychology*. 2007; 43:647–662. [PubMed: 17484577]
- Marsiglio W, Amato P, Day RD, Lamb ME. Scholarship on fatherhood in the 1990's and beyond. *Journal of Marriage and Family*. 2000; 62:279–300.
- Mirza NM, Mackey ER, Armstrong B, Jaramillo A, Palmer MM. Correlates of self-worth and body dissatisfaction among obese Latino youth. *Body Image*. 2011; 8:173–178. [PubMed: 21354881]
- Muthén, LK.; Muthén, BO. *Mplus user's guide*. 6th. Muthén & Muthén; Los Angeles, CA: 2010.
- O'Dea, JA.; Yager, Z. School-based psychoeducational approaches to prevention. In: Cash, TF.; Smolak, L., editors. *Body images: A handbook of science, practice, and prevention*. 2nd. Guilford Press; New York: 2011. p. 434-441.
- Ogden CL, Carroll MD, Flegal KM. High body mass index for age among US children and adolescents, 2003–2006. *Journal of the American Medical Association*. 2008; 299:2401–2405. [PubMed: 18505949]
- Oliver KK, Thelen MH. Children's perceptions of peer influence on eating concerns. *Behavior Therapy*. 1996; 27:25–39.
- Paxton SJ, Eisenber ME, Neumark-Sztainer D. Prospective predictors of body dissatisfaction in adolescent girls and boys: A five year longitudinal study. *Developmental Psychology*. 2006; 42:888–899. [PubMed: 16953694]
- Phares V, Steinberg AR, Thompson JK. Gender differences in peer and parental influences: Body image disturbance, self-worth, and psychological functioning in preadolescent children. *Journal of Youth and Adolescence*. 2004; 33:421–429.
- Presnell K, Bearman SK, Stice E. Risk factors for body dissatisfaction in adolescent boys and girls: A prospective study. *International Journal of Eating Disorders*. 2004; 36:389–401. [PubMed: 15558645]
- Prinstein MJ, Boergers V, Vernberg EM. Overt and relational aggression in adolescents: Social-psychological adjustment of aggressors and victims. *Journal of Clinical Child Psychology*. 2001; 30:479–491. [PubMed: 11708236]
- Ricciardelli LA, McCabe MP. Children's body image concerns and eating disturbance: A review of the literature. *Clinical Psychology Review*. 2001; 21:325–344. [PubMed: 11288604]
- Ricciardelli LA, McCabe MP, Holt KE, Finemore J. A biopsychosocial model for understanding body image and body change strategies among children. *Applied Developmental Psychology*. 2003; 24:475–495.
- Ricciardelli LA, McCabe MP, Lillis J, Thomas K. A longitudinal investigation of the development of weight and muscle concerns among preadolescent boys. *Journal of Youth and Adolescence*. 2006; 35:177–187.
- Robins RW, Trzesniewski KH. Self-esteem development across the lifespan. *Current Directions in Psychological Science*. 2005; 4(3):158–162.
- Rolland K, Farnill D, Griffiths RA. Children's perceptions of their current and ideal body sizes and body mass index. *Perceptual and Motor Skills*. 1996; 82:651–656. [PubMed: 8724942]
- Schafer, JL. *Analysis of incomplete multivariate data*. Chapman & Hall; London: 1997.

- Schuster MA, Elliott MN, Kanouse DE, Wallander JL, Tortolero SL, Ratner JA, et al. Racial and ethnic health disparities among fifth-graders in three cities. *New England Journal of Medicine*. 2012; 367:735–745. [PubMed: 22913683]
- Steinberg, AB.; Phares, V. Family functioning, body image, and eating disturbances. In: Thompson, JK.; Smolak, L., editors. *Body image, eating disorders, and obesity in youth: Assessment, prevention, and treatment*. American Psychological Association; Washington, DC: 2001. p. 127-147.
- Stice E. A prospective test of the dual pathway model of bulimic pathology: Mediating effects of dieting and negative affect. *Journal of Abnormal Psychology*. 2001; 110:124–135. [PubMed: 11261386]
- Stice E, Whitenton K. Risk factors for body dissatisfaction in adolescent girls: A longitudinal investigation. *Developmental Psychology*. 2002; 38:669–678. [PubMed: 12220046]
- Tiggemann M. ‘Thinking’ versus ‘Feeling’ fat: Correlates of two indices of body image dissatisfaction. *Australian Journal of Psychology*. 1996; 48:21–25.
- van de Berg PA, Mond J, Eisenberg M, Ackard D, Neumark-Sztainer D. The link between body dissatisfaction and self-esteem in adolescents: Similarities across gender, age, weight, race/ethnicity, and socioeconomic status. *Journal of Adolescent Health*. 2010; 47:290–296. [PubMed: 20708569]
- Varni JW, Seid M, Rode CA. Pediatric quality of life inventory (PedsQL). *Medical Care*. 1999; 37:126–139. [PubMed: 10024117]
- Wallander JL, Taylor WC, Grunbaum JA, Franklin F, Harrison GG, Kelder SH, et al. Weight status, quality of life, and self-concept in African American, Hispanic, and White fifth-grade children. *Obesity*. 2009; 17:1363–1368. [PubMed: 19197260]
- Wentzel KR, Feldman SS. Relations of cohesion and power in family dyads to social and emotional adjustment. *Journal of Research on Adolescence*. 1996; 6:225–244.
- Windle M, Brener N, Cuccaro P, Dittus P, Kanouse DE, Murray N, et al. Parenting predictors of early-adolescents’ health behaviors: Simultaneous group comparisons across sex and ethnic groups. *Journal of Youth and Adolescence*. 2010; 39:594–606. [PubMed: 20422349]
- Windle M, Grunbaum JA, Elliott M, Tortolero SR, Berry S, Gilliland J, et al. Healthy passages: A multilevel, multimethod longitudinal study of adolescent health. *American Journal of Preventive Medicine*. 2004; 27:164–172. [PubMed: 15261905]

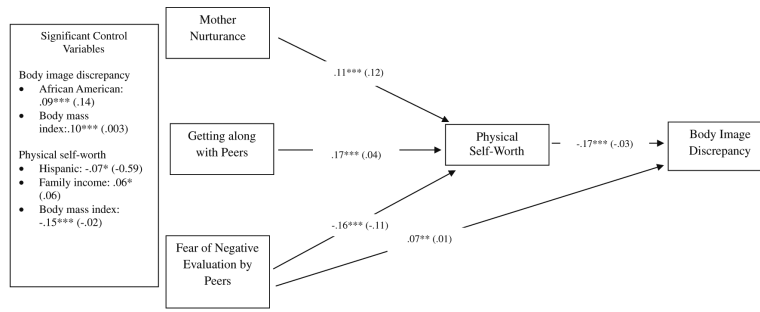


**Fig. 1.** Conceptual model of young adolescent body image discrepancy



**Fig. 2.** Parental and peer factors model for body image discrepancy for boys.  $n = 2537$ . Note that these are the results from the second model and only significant findings are presented in the table. The standardized and unstandardized (in parentheses) betas are shown. \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$





**Fig. 3.** Parental and peer factors model for body image discrepancy for girls. n = 2609. Note that these are the results from the second model and only significant findings are presented in the table. The standardized and unstandardized (in parentheses) betas are shown. \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

**Table 1**

Mean level of body image discrepancy and physical self-worth for sex and race/ethnicity

Variables	Body image discrepancy			Physical self-worth		
	<i>M</i>	<i>SE/SD</i> <sup>a</sup>	<i>Z-test</i>	<i>M</i>	<i>SE/SD</i>	<i>Z-test</i>
Sex			1.95 <sup>*</sup>			3.52 <sup>***</sup>
Girls	.59	.02/.70		17.51	.15/4.15	
Boys	.64	.02/.68		18.02	.15/3.74	
Race/ethnicity			-5.72 <sup>***</sup>			7.24 <sup>***</sup>
Latino	.67	.03/.71		17.07	.25/4.00	
African American	.62	.03/.71		18.14	.22/3.93	
White	.48	.02/.60		18.61	.20/3.72	
Other	.56	.05/.70		18.07	.32/3.78	

*N* = 5147. The range for body image discrepancy is 0–6 and physical self-worth is 6–24

\*\* *p* < .01;

<sup>a</sup>Standard error/standard deviation

\* *p* < .05;

\*\*\* *p* < .001

**Table 2**

Pearson correlation among parental factors, peer factors, physical self-beliefs, and body image discrepancy

Variables	1	2	3	4	5	6	7
Parental factors							
Mother nurturance	–						
Father nurturance	.55	–					
Peer factors							
Peer loneliness	–.17	–.16	–				
Child getting along with peers	.14	.15	–.49	–			
Peer victimization	–.06	–.08	.42	–.61	–		
Child fear of evaluation	–.06	–.10	.33	–.41	.33	–	
Physical self-beliefs							
Physical self-worth	.14	.15	–.20	.27	–.18	–.26	–
Outcome							
Body image discrepancy	–.07	–.09	.10	–.17	.11	.13	–.21

*N* = 5147. All correlations were significant at the  $p < .01$  level