DOES THE GENDER-ADDITIVE MODEL OF DEPRESSION APPLY? AN EXAMINATION OF BODY-IMAGE RELATED RISK FACTORS IN EARLY ADOLESCENT BOYS AND GIRLS

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by

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 DOES THE GENDER-ADDITIVE MODEL OF DEPRESSION APPLY? AN
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 Abstract

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The present study examined body-image components of the gender-additive model of depression and tested whether these mediational processes were significant for boys as well as girls. Early adolescents (73 boys, 91 girls) completed well-developed self-report measures of depressive symptoms, body dissatisfaction, thin-ideal internalization, self-esteem, and pubertal development. Their height and weight were also measured. The structural equation modeling approach to path analysis was used to test the mediation models. The results indicated that for girls, self-esteem mediated the relation between thin ideal and depressive symptoms, and for boys, both self-esteem and body dissatisfaction mediated the relation between thin-ideal internalization and depressive symptoms. Body dissatisfaction did not completely mediate the relation between body mass and depressive symptoms for boys or girls. These models were also examined with
self-esteem as a proxy-dependent variable for depressive symptoms. Our findings indicated that there were gender similarities in the mediational processes proposed by the gender-additive model.
DEDICATION

This is for my wonderful husband, Ryan.

I am so lucky to have you in my life.
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INTRODUCTION

Epidemiological studies show that depression is twice as common in women as in men. This increased differential risk emerges during adolescence and is thought to begin at puberty (American Psychiatric Association, Diagnostic and statistical manual of mental disorders, Text revision, 2000). Researchers have deemed the increase in prevalence rates at puberty the most significant developmental trend in the phenomenon of depression (Wenar & Kerig, 2000). Currently, neither established risk factors for depression, nor theories of gender role intensification have been able to fully explain the occurrence and timing of the gender difference in depression (Nolen-Hoeksema, 2001; Stice & Bearman, 2001).

Some of the major established risk factors for depression in include stressful life events (Chang, 2001; Compas, 1987) internalizing or ruminative coping styles (Cramer, 1979; Nolen-Hoeksema, 1987), and low self-esteem (Hirsch & Dubois, 1991; Reinherz, Giaconia, Hauf, Wasserman, & Sliverman, 1999). While researchers have proposed that the aforementioned stressful experiences and stress reactivity may interact to create an increased vulnerability to depression for women (i.e., Nolen-Hoeksema, 2001), some studies have failed to find gender differences in these variables among children and adolescents (i.e., Chang, 2001; Tram & Cole, 2000) while others have found main effects for gender (i.e., Cole, Martin, Peeke, Seroczynski, & Hoffman, 1998).
The gender role intensification theory (Hill & Lynch, 1983) has also received mixed empirical support. The theory states that pubertal changes in early adolescence cause both boys and girls to become more focused on their prescribed, stereotypical gender roles. For girls, according to this theory, being feminine is linked to developing depression. For boys, masculinity is theorized to be a protective factor. Although Petersen and colleagues (1991) found that early pubertal timing (prior to 8th grade) predicted depressed affect (in 12th grade), they did not find that early adolescent sex role identity played a role in later depressed affect. In contrast, Wichstrom (1999) found that femininity (but not masculinity) was modestly correlated with depressed mood during early adolescence. Pubertal timing was shown to increase girls’ BMI scores but was not predictive of femininity, nor could pubertal timing account for gender differences in depression. By age 14, when the gender difference in depressed mood was the strongest, femininity mediated the effect of gender on depressed mood for girls. Interestingly, “the most potent factor in the final model” (p. 243) was body dissatisfaction. Wichstrom found that increases in girls’ body dissatisfaction coincided with increases in depressed mood. Although the body dissatisfaction finding was not necessarily inconsistent with the gender role intensification theory, body image was certainly not a major aspect of the theory.

More recently, integrative, developmental models that explain the higher prevalence rates of depression in women have begun to emerge in the literature. A theory that has received empirical support is the gender-additive model (see Figure 1) (Stice & Bearman, 2001; Stice, Hayward, Cameron, Killen, & Taylor, 2000). The model emerged from studies of the etiology of bulimia (Stice & Agras, 1998), and
Figure 1. The Gender-Additive Model of Depression

builds on McCarthy’s (1990) theory that a cultural ideal of thinness for women promotes body dissatisfaction and leads to depression. Stice and Bearman (2001) proposed that during early adolescence, a range of body-image and eating-disturbance-related factors pose an additional risk for depression in girls, over and above gender non-specific risk factors shared with boys. They posited that higher body mass, perceived pressure to be thin, thin-ideal internalization, body dissatisfaction, dieting, and bulimic symptoms work together in a mediational fashion to promote mood problems in adolescent girls. For instance, they hypothesized that greater body mass results in body dissatisfaction because being overweight is undesirable. Similarly, “body dissatisfaction in turn might promote depression in our society because it is commonly accepted that one can attain an ultraslender body if one exercises and consumes a lower fat diet (i.e., that body mass is under volitional control)” (p. 598). Depression results when one feels emotionally distressed after dieting (repeatedly) fails (Stice & Bearman, 2001). In their longitudinal study, they found prospective support for each of the hypothesized mediational linkages in the gender-additive model (e.g., thin-ideal internalization predicted body
dissatisfaction, dieting predicted depressive symptoms). However, they did not find that elevated body mass predicted increases in depression. At baseline (9th grade) their sample of adolescent girls may have already experienced puberty and the accompanying weight gain associated with it.

Even though there is prospective support for links in the gender-additive model, several questions remain. First, if the gender-additive model were tested in a younger sample of adolescent girls, who may be at varying stages of pubertal development, would the relation between elevated body mass and depressive symptoms be significant? In other words, would examination of these factors in early adolescent girls clarify the relations, if any, between body mass and depressive symptoms? Second, if the gender-additive model identifies gender-specific risk factors for depression among girls, would examination of the model with early adolescent boys reveal smaller relations among these risk factors and depressive symptoms? Are these risk factors greater for girls than boys in early adolescence? And, third, given empirical support for connections between self-esteem and depression (i.e., Harter, 1999; Patterson & Capaldi, 1990), would inclusion of self-esteem into the gender-additive model show whether the variable is a gender-specific risk factor or whether self-esteem mediates other gender-specific risk factors for depression?

With these questions in mind, one of the goals of the present study was to apply Stice and Bearman’s (2001) findings to a younger sample of early adolescents. We wished to expand their findings by examining a subset of the gender-additive model in a mixed-sex sample. We examined several mediational relations to depressive symptoms: first, whether body dissatisfaction mediates the relation between internalization of the
thin ideal and depressive symptoms (see Figure 2). In addition, we proposed the inclusion of self-esteem as a risk factor in the gender-additive model of depression and therefore included it as an additional mediator in the relation between internalization of the thin-ideal and depressive symptoms (see Figure 2). Secondly, we were interested in whether body dissatisfaction mediates the relation between body mass and depressive symptoms (see Figure 3).

Figure 2. Mediational Model of Thin Ideal, Body Dissatisfaction, Self-Esteem, and Depressive Symptoms
Consistent with Stice and Bearman’s theory, we proposed that these mediational processes were gender-specific to girls. As tests of the gender-additive model, we hypothesized that in our mixed-sex sample, body dissatisfaction and self-esteem would mediate the relation between the thin ideal and depressive symptoms for girls, but not for boys. Similarly, we hypothesized that body dissatisfaction would mediate the relation between body mass and depressive symptoms for girls, but not for boys.

The relevant literature supporting examination of body-image related factors and depression is reviewed below.

*Body-Image Related Factors and Depression*

The thin ideal is a cultural standard of beauty applied almost exclusively to women (Levine & Smolak, 1996). According to the thin ideal, beauty and attractiveness are defined by a thin body-type (Cash & Hicks, 1990; Garner, Garfinkel, Schwartz, & Thompson, 1980). Researchers have documented various ways in which the thin ideal is
perpetuated, ranging from the decreasing curvaceousness of models in *Vogue* and *Ladies Home Journal* (Silverstein, Peterson, & Perdue, 1986), to increasing numbers of magazine articles on dieting and weight-loss techniques (Silverstein et al., 1986; Wiseman, Gray, Mosimann, & Ahrens, 1992), reports of young women with anorexia’s heavy use of appearance-focused magazines (Thomsen, McCoy, & Williams, 2001), and girls’ reports of pressure to be thin from their family (Pike & Rodin, 1991) and the media (Levine, Smolak, & Hayden, 1994).

In an experimental study, college-aged women were more depressed following exposure to slides of female fashion models (Pinhas, Toner, Ali, Garfinkel, & Stuckless, 1999). But mere perpetuation of the cultural thin ideal does not explain why some women develop depression, body image problems, and even eating disorders. Research has suggested that it is internalization of the thin ideal that promotes body dissatisfaction in girls and women (Stice, Schupak-Neuberg, Shaw, & Stein, 1994; Stormer & Thompson, 1996; Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999; Thompson & Stice, 2001). The thin ideal has been theorized to foster body dissatisfaction because it is so difficult for most females to achieve this ideal (Thompson, et al., 1999).

Thin-ideal internalization, body dissatisfaction, and negative affect have been identified as risk factors in the development of eating pathology (see Stice, 1999 for a review). What has recently received empirical attention is McCarthy’s (1990) model of body dissatisfaction as a mediator of the thin ideal and depression. This is an important process to examine as researchers have found correlational links between ascribing to the thin ideal, body dissatisfaction, and depression with strong gender effects (Adams, Katz, Beauchamp, Cohen, & Zavis, 1993; Levine, et al., 1994). Body dissatisfaction has also
been shown to be a precursor of depressive symptoms in adolescent girls (Ohring, Graber, & Brooks-Gunn, 2002; Rierdan, Koff, & Stubbs, 1989).

Some theorists have argued that in recent decades, female self-worth has been defined by having a thin body-type (Bordo, 1993; Orbach, 1988; Wolf, 1991). Studies have documented early adolescent girls’ preference to be thinner than their current weight, even when obese girls were excluded from the analyses (Thelen, Powell, Lawrence, & Kuhnert, 1992). The connections between self-esteem and depression have also been shown in their relation to body image in samples of eating disordered patients (Hsu, 1990), experimental studies of female college students (Irving, 1990), adult women (Streigel-Moore, Silberstein, & Rodin, 1993), and longitudinal studies of adolescent girls (Button, Loan, Davies, & Sonuga-Barke, 1997). Correlations between social pressure for thinness, body dysphoria, self-esteem, and depression have even been documented in studies of young girls (ages 8 through 13) (Veron-Guidry, Williamson, & Netemeyer, 1997).

Other studies of gender-specific risk factors for depression have included constructs such as pubertal development, menarcheal status, and pubertal timing (i.e., Stice & Bearman, 2001, Wichstrom, 1999). Many studies of early adolescent girls have documented the associations between more advanced pubertal development and negative body image (Koff & Rierdan, 1993), as well as internalization of the thin-ideal (Hermes & Keel, 2003). In a two-year study, Ge and colleagues (2003) found support for different effects of pubertal development on depressive symptoms for early adolescent girls and boys (Ge, Kim, Brody, Conger, Simons, Gibbons, & Cutrona, 2003). They found that early maturing girls manifested the highest levels of depressive symptoms. Their results
supported the stressful change hypothesis for boys, namely that changes in pubertal development classification were significantly related to changes in depressive symptoms. Body mass, or adiposity, has usually been included in such pubertal development studies as well. Despite mixed support for pubertal development and body mass as major risk factors, we have included them in order to remain consistent with similar studies.

While the gender difference in depressive symptoms was the focus of the present study, because we planned to examine body-image related mediational linkages in boys as well, it was necessary to briefly review the studies that have examined these specific factors in males. For most of these studies, it was necessary to draw on literature from the etiology of eating disorders.

**Body-Image Related Factors Examined in Males**

Studies of both adults and adolescents have suggested that males’ presentation of eating disorders, including body dissatisfaction, is similar to females’ (French, Story, Downes, Resnick, & Blum, 1995; Keel, Klump, Leon, & Fulkerson, 1998; Olivardia, Pope, Mangweth, & Hudson, 1995). Even though the majority of studies on body-image related factors have focused on girls, there is an emerging body of research showing that boys also experience body image problems (see Cohane and Pope, 2001 for a review). In general, girls tend to exhibit higher levels of body dissatisfaction than boys. But for boys, body dissatisfaction has been identified as common and associated with lower levels of self-esteem, and a preference for either a thinner or heavier ideal image (Raudenbush & Zellner, 1997). Recent studies have also shown differences between the average body sizes of men in the population and men in the media (Spitzer, Henderson, & Zivian, 1999), suggesting that such discrepancies may account for body dissatisfaction reported
by men. Studies have also documented that both average-weight and obese children exhibit body dissatisfaction, with obese children indicating more dissatisfaction than average-weight, and generally with girls indicating more dissatisfaction than boys (Vander Wal & Thelen, 2000). Similarly, a study of 8- to 13-year-old boys and girls found that a large percentage of the sample was preoccupied with body image concerns (Maloney, McGuire, Daniels, & Specker, 1989).

Finally, although the thin ideal is a construct that has received little empirical attention in male samples, the process itself does not have to be exclusive to females. Internalization of the thin ideal refers to the extent to which an individual takes on socially defined ideals of attractiveness and engages in behaviors designed to produce an approximation of these ideals (Thompson & Stice, 2001; Thompson et al., 1999). While it has been well-documented that women desire a thinner shape, men, however, desire a more muscular one unless they are overweight (Cohane & Pope, 2001).

In summary, the present study sought to extend and clarify Stice and Bearman’s (2001) gender-additive model of depression. We planned to test a subset of the gender-additive model, the body-image related risk factors, within a sample of early adolescent boys and girls. We hypothesized that examination of their model within a younger sample would yield support for the mediational processes by which the thin ideal affects depressive symptoms and body mass affects depressive symptoms. We hypothesized that body dissatisfaction and self-esteem mediate the relation between the thin ideal and depressive symptoms; and, that body dissatisfaction mediates the relation between body mass and depressive symptoms. We posited that early adolescents were at varying stages of pubertal development, a time and event that may be particularly relevant for these
processes. According to the gender-additive model, we hypothesized that the mediational linkages between body-image related factors and depressive symptoms would be supported for girls but not boys.
METHOD

Participants

The present study was part of an on-going five-year longitudinal study focused on mother and child well-being and adjustment during the transition to adolescence. A subset of the measures collected during the third year of the study was used for the current analyses. Participants were sixth-grade students ($N = 164$) from several school districts in a midsize, Midwestern city. The participants, 73 boys and 91 girls, ranged in age from 11 to 13 ($M = 11.7$, $SD = .51$). Approximately three percent were African-American, 93% were Caucasian, 2% were Latino, 1% were Native American, and 1% reported “other.” The annual household incomes of the study participants ranged from $9,000 to $450,000, with an average income of $87,000 ($SD = 65,000$). Maternal education ranged from no high school diploma (1%) to graduate professional degree (2%), with a mode of bachelor’s degree (37%).

Procedure

The mother and child participants were recruited from several public and private schools via letters sent home from school or by direct mailings. Potential participants were instructed to call the project phone number if they were interested in the study. Research assistants then screened them for eligibility. The criteria for inclusion in the first year of the longitudinal study were that the oldest child was in fourth grade and that
the mother was either married to the child’s father or divorced and not remarried or living with a partner. Of the 537 who contacted the research office, 198 met the criteria. Thirteen (7%) of the eligible dyads refused after hearing more about the study and four (2%) dropped out of the study after repeatedly canceling their appointments.

All eligible dyads were invited to come to the research laboratory. During the visits, mothers and children completed self-report questionnaires independently in separate rooms. Research assistants read a copy of the survey to the child participants to ensure that they understood the questions. By the third year of the study, the participants could choose whether they wanted the survey read to them. We paid dyads $30 for their participation in the first year of the study, increasing $10 for each successive visit.

Visits were scheduled approximately twelve months apart. Participants were contacted via phone to schedule each visit. At the first year of the study, 181 (91%) of the eligible dyads participated. For the second year, 172 dyads returned (5% attrition). We were unable to locate four dyads, two refused, and three mothers agreed to complete only the mothers’ surveys via mail. For the third year of the study, there are complete data for 164 dyads (4% attrition). We were unable to locate one dyad, one refused, and four more mothers agreed to complete the mom-only survey packets. In addition, data from two early adolescents (one boy and one girl) were dropped because they were unable to report their weight.

Measures

Depressive symptoms. The Child Depression Inventory, which was adapted for children by Kovacs (1985) from the Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961), was used to assess depressive symptoms (see
Appendix A). The original 27-item, self-report measure consists of three sentences listed in order of increasing severity from 0 to 2. The suicide item was not included in the present study because of concerns from the Human Subjects Review Committee. The early adolescent selected the statement which best described him or herself recently. The CDI has demonstrated good internal consistency, retest reliability, and convergent validity (Blumberg & Izard, 1986). Higher scores indicate greater depressive affect. The internal consistency reliabilities for our 26-item scale were .85 for boys and .77 for girls.

Body Dissatisfaction. The Body Dissatisfaction subscale of the Eating Disorder Inventory (EDI; Garner, Olmsted, & Polivy, 1983) was used to assess body image (see Appendix B). The EDI is a widely used, 64-item self-report measure of psychological, behavioral, and personality traits found in anorexia nervosa and bulimia. The EDI subscales have shown adequate reliability and validity in clinical and non-clinical samples (Wear & Pratz, 1987), and for 11- to 18-year-old boys and girls (Shore & Porter, 1990). The Body Dissatisfaction subscale is comprised of items that examine whether certain parts of the body (e.g., hips, thighs) that are associated with pubertal weight gain are too large or disliked. Participants rated each item on a six-point scale, ranging from never (0) to always (5) (Schoemaker, van Strein, & van der Staak, 1994). Higher scores indicate greater body dissatisfaction. Alphas were .95 for boys and .93 for girls in this study.

Self-Esteem. The Self-Perception Profile for Children (SPPC; Harter, 1985) was used to assess perceived competence, or self-esteem (see Appendix C). Participants completed five subscales from the self-report inventory. The subscales tap a range of competencies including scholastic competence, athletic competence, social acceptance,
physical appearance, and behavior conduct. Participants responded to the measure in a two-step process. First, they selected one of two descriptive statements. Then, they selected whether the statement was “Really true” or “Sort of True” for them. Responses were coded on a four-point scale, from low competence (1) to high competence (4). Items were summed for analyses. Higher scores indicate greater self-esteem. The internal consistency reliabilities for the scale were .90 for boys and .91 for girls in this study.

Thin-Ideal Internalization. The Drive for Thinness subscale of the Eating Disorder Inventory (EDI; Garner et al., 1983) was used to assess internalization of the thin ideal (see Appendix D). The Drive for Thinness subscale contains seven items that assess an excessive concern with dieting and the pursuit of thinness. Items reflect both the desire to lose weight as well as a fear of fatness. Participants rated each item on a six-point scale, ranging from never (0) to always (5) (Schoemaker et al., 1994). Higher scores indicate greater internalization of the thin-ideal. Alphas for this study were .76 for boys and .88 for girls.

Body Mass. Research assistants measured the height and weight of the early adolescents in a private room. Participants were asked to remove their shoes and any heavy coats. BMI was calculated for each participant (BMI = kg/m$^2$). The first eighteen participants were asked to self-report their height and weight. Self-reported height and weight have been found to be highly correlated with direct measures of BMI (i.e., Attie & Brooks-Gunn, 1989). However, after two of the participants stated that they did not know and could not estimate their weight, we decided to incorporate direct measurement by the research assistants in order to assist them. There was no significant mean difference (F(1,
162) = 1.52, \( p = .22 \) between the means of the self-reported (\( n = 16, M = 18.52, SD = 2.94 \)) versus direct measurement (\( n = 148, M = 19.88, SD = 4.32 \)) BMIs.

**Pubertal Development.** The pubertal development scale was used to measure boys’ (see Appendix E) and girls’ (see Appendix F) pubertal development (PDS; Petersen, Crockett, Richards, & Boxer, 1988). The PDS has shown adequate reliability and validity for use with early adolescents (Petersen et al., 1988). The PDS is a self-report measure that assesses the physical changes associated with pubertal development including height, body hair growth, and skin changes; voice change and facial hair growth in boys, and breast development and menarche in girls. Responses were coded on a four-point scale, from not yet growing (1) to growth seems done (4). The girls’ scale is weighted around the menarche item (Keel, Fulkerson, & Leon, 1997), which is coded from no (1) to yes (4). The PDS was scored by summing the scores of the five items and taking the mean. The internal consistency reliability for our study was .78 for both boys and girls.
RESULTS

Preliminary Analyses

Descriptive statistics were computed, including means, standard deviations, and ranges (see Table 1). One-way analyses of variance (ANOVAs) were performed on the study variables to examine mean differences by gender. For this age group, there was no significant difference between the boys’ and girls’ means on depressive symptoms. However, for pubertal development, there was a significant difference between the means $F(1, 162) = 8.69$, $p < .01$, with girls reporting greater pubertal development than boys.

This difference was consistent with findings showing that males’ pubertal development occurs later than females’ (Tanner, 1972). The girls’ means were larger than the boys’ for body dissatisfaction and thin-ideal internalization, which was consistent with other studies of early adolescents (i.e., Shore & Porter, 1990), although our differences were non-significant. The boys reported greater mean levels of self-esteem and had higher BMI scores, but these differences were non-significant.

In order to test the mediational models proposed in the hypotheses, it was necessary to establish significant bivariate relations among the independent, dependent, and mediator variables (Baron & Kenny, 1986). We computed bivariate correlations for the full sample (see Table 2), and separately by gender (see Table 3), and also included pubertal development in the correlations. These analyses revealed that the bivariate relations among
the key study variables were in the expected directions. When we ran the correlations separately, two of the relations were non-significant for boys: BMI with depressive symptoms and BMI with self-esteem.

Mediational Analyses

The structural equation modeling approach to path analysis with observed variables was used to test the indirect relations proposed in the hypotheses (Schumacker & Lomax, 1996). The LISREL 8.14 program was used to estimate relations among the variables, assess model fit, and compare models (Jöreskog & Sörbom, 1993). The fit of the models was assessed with the Root Mean Square Error of Approximation (RMSEA) and Standardized Root Mean Square Residual (SRMR). These fit indices were suggested as a good combination to assess the fit of models with small sample sizes (e.g., \( N < 250 \); Fan, Thompson, & Wang, 1999; Hu & Bentler, 1999; Yadama & Pandey, 1995). The RMSEA is an absolute fit index that is a function of the noncentrality parameter of the chi-square distribution (Schumacker & Lomax, 1996). If the RMSEA index was less than .06, then the model was considered a good fit. The SRMR is an absolute fit index based on the square root of the mean squared differences between matrix elements in the observed and reproduced correlation matrices (Schumacker & Lomax, 1996). The SRMR index indicated a good fitting model if the value was less than .05. The significance of the standardized path coefficients was determined by comparing the t ratio to a critical \( t_{(0.05)} \) of 1.96. The overall fit of the models was determined by using a combination of the results from the fit indices, the chi-square statistic, and the significance of the standardized path coefficients.

The path analysis models were tested for boys and girls in separate models, but within the same LISREL analysis.
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<td>1—3.2</td>
<td>2.15</td>
<td>0.69</td>
</tr>
</tbody>
</table>

*p < .05, **p < .01, ***p < .001.
TABLE 2. MEANS, STANDARD DEVIATIONS, AND INTERCORRELATIONS OF THE STUDY VARIABLES (FULL SAMPLE)

<table>
<thead>
<tr>
<th>Variables</th>
<th>DS</th>
<th>BD</th>
<th>SE</th>
<th>TI</th>
<th>BMI</th>
<th>PD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Depressive Symptoms</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Body Dissatisfaction</td>
<td>.56***</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Self-Esteem</td>
<td>-.63***</td>
<td>-.53***</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Thin Ideal</td>
<td>.39***</td>
<td>.68***</td>
<td>-.29***</td>
<td>---</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. BMI</td>
<td>.29***</td>
<td>.50***</td>
<td>-.26**</td>
<td>.45***</td>
<td>---</td>
<td></td>
</tr>
<tr>
<td>6. Pubertal Development</td>
<td>.14</td>
<td>.18*</td>
<td>-.06</td>
<td>.14</td>
<td>.23**</td>
<td>---</td>
</tr>
</tbody>
</table>

\[
M \quad 3.66 \quad 9.80 \quad 98.02 \quad 7.68 \quad 19.75 \quad 2.02 \\
SD \quad 4.02 \quad 10.04 \quad 12.40 \quad 6.63 \quad 4.22 \quad .65
\]

* * p < .05, ** p < .01, *** p < .001.
### TABLE 3. INTERCORRELATIONS OF THE STUDY VARIABLES FOR BOYS AND GIRLS

<table>
<thead>
<tr>
<th>Variables</th>
<th>DS</th>
<th>BD</th>
<th>SE</th>
<th>TI</th>
<th>BMI</th>
<th>PD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Depressive Symptoms</td>
<td>---</td>
<td>.59***</td>
<td>- .63***</td>
<td>.41***</td>
<td>.13</td>
<td>.14</td>
</tr>
<tr>
<td>2. Body Dissatisfaction</td>
<td>.55***</td>
<td>---</td>
<td>- .57***</td>
<td>.61***</td>
<td>.49***</td>
<td>.07</td>
</tr>
<tr>
<td>3. Self-Esteem</td>
<td>-.64***</td>
<td>-.50***</td>
<td>---</td>
<td>-.41***</td>
<td>-.21</td>
<td>-.08</td>
</tr>
<tr>
<td>4. Thin Ideal</td>
<td>.40***</td>
<td>.73***</td>
<td>-.22*</td>
<td>---</td>
<td>.45***</td>
<td>.07</td>
</tr>
<tr>
<td>5. BMI</td>
<td>.44***</td>
<td>.57***</td>
<td>-.32**</td>
<td>.51***</td>
<td>---</td>
<td>.20</td>
</tr>
<tr>
<td>6. Pubertal Development</td>
<td>.16</td>
<td>.20</td>
<td>-.03</td>
<td>.14</td>
<td>.33*</td>
<td>---</td>
</tr>
</tbody>
</table>

*Note. Correlations above the diagonal are for boys (n = 73) and below the diagonal are for girls (n = 91).

* p < .05, ** p < .01, *** p < .001.
The effect of internalization of the thin ideal on depressive symptoms. The hypothesis proposed in this mediational linkage suggested that the relation between the thin ideal and depressive symptoms would be mediated by body dissatisfaction and self-esteem. First, we tested the full model, which included the direct relation between thin ideal and depressive symptoms, and the indirect relations with the two potential mediators, body dissatisfaction and self-esteem (see Figure 4). The two potential mediators were combined in the same model to assess the relative contribution of each variable to the mediation of the relation between the thin ideal and depressive symptoms. The results suggested that the direct relations between the thin ideal and depressive symptoms in the direct model, or bivariate correlations, \( r = .41 \) for boys, and \( r = .40 \) for girls, were significantly reduced when controlling for the indirect effects of body dissatisfaction and self-esteem in the full model, \( _\_ = .04 \) for boys, and \( _\_ = .16 \) for girls. The standardized path coefficients between thin ideal and the potential mediators were significant and in the expected directions for both boys and girls (i.e., positive for body dissatisfaction; negative for self-esteem). The standardized path coefficients between the mediators, body dissatisfaction and self-esteem, and depressive symptoms were all statistically significant except for one. The standardized path coefficient between body dissatisfaction and depressive symptoms for girls was non-significant in the full model. This means that, for girls, we were not able to demonstrate that the proposed body dissatisfaction mediator was correlated with the dependent variable, depressive symptoms, while controlling for the independent variable, thin ideal, a necessary step in establishing mediation (Baron & Kenny, 1986; Kenny, Kashy, & Bolger, 1998). The correlation between the proposed mediators was negative and significant as expected. The chi-square for the full model was non-significant, \( _\_^2 \) (0, \( N = 164 \)) = 0.0, \( p = 1.0 \), indicating
Figure 4. Full Model of Thin Ideal, Body Dissatisfaction, Self-Esteem, and Depressive Symptoms for Boys (Top) and Girls (Bottom)
that the model was saturated and the fit was perfect. This was justified because we did not remove any of the paths from the model, meaning that all of the variables were predicted in every way.

The mediation model determined whether the relation between thin ideal and depressive symptoms was completely mediated by body dissatisfaction and self-esteem. To test for mediation, we removed the direct paths between thin ideal and depressive symptoms by setting the path coefficients equal to zero, and then assessed the fit of the model (see Figure 5). The chi-square for the mediation model was not significant, \( \chi^2 (2, N = 164) = 2.02, p = .36 \), and the RMSEA value of .01, and the SRMR value of .02 all suggested that the model fit well. The results indicated that the more parsimonious mediation model represented the underlying sample data, suggesting that the relation between thin ideal and depressive symptoms was mediated by body dissatisfaction and self-esteem. However, we were not able to establish all of the necessary steps for mediation for the girls. This means that for the boys, the results indicated that the relation between thin ideal and depressive symptoms was mediated by both body dissatisfaction and self-esteem, but for girls, we found that self-esteem mediated the relation between thin ideal and depressive symptoms, but body dissatisfaction did not mediate the relation between the two variables.

*The effect of body mass on depressive symptoms.* The hypothesis proposed in this mediational linkage suggested that the relation between body mass and depressive symptoms would be mediated by body dissatisfaction. First, we tested the full model, which included the direct relation between body mass and depressive symptoms, and the indirect relations with the potential mediator, body dissatisfaction and (see Figure 6). The results suggested that the direct relation, or correlation, between body mass and depressive symptoms for boys,
Figure 5. Mediational Model of Thin Ideal, Body Dissatisfaction, Self-Esteem, and Depressive Symptoms for Boys (Top) and Girls (Bottom)
FIGURE 6. Full Model of Body Mass, Body Dissatisfaction, and Depressive Symptoms for Boys (Top) and Girls (Bottom)
was increased when controlling for the indirect effect of body dissatisfaction in the full model, \( \beta = -.21 \) for boys. Because we were not able to show that the independent variable, body mass, was correlated with the dependent variable, depressive symptoms, for boys, we were not able to establish whether there was any relation to be mediated. This meant that we lacked a necessary step in establishing mediation for boys (Baron & Kenny, 1986; Kenny et al., 1998). For girls, the results suggested that the direct relation between body mass and depressive symptoms, \( r = .44 \), was significantly reduced when controlling for the indirect effect of body dissatisfaction in the full model, \( \beta = .19 \) for girls. The standardized path coefficients between body mass and the potential body dissatisfaction mediator were positive and significant as expected for both boys and girls. The standardized path coefficients between the mediator, body dissatisfaction, and depressive symptoms were also both positive and statistically significant. The chi-square for the full model was non-significant, \( \chi^2(0, N = 164) = 0.0, p = 1.0 \), indicating that the model was saturated and the fit was perfect. This was justified because we did not remove any of the paths from the model, meaning that all of the variables were predicted in every way.

The mediation model determined whether the relation between body mass and depressive symptoms was completely mediated by body dissatisfaction. To test for mediation, we removed the direct paths between body mass and depressive symptoms by setting the path coefficients equal to zero, and then assessing the fit of the model (see Figure 7). The chi-square for the mediation model was significant, \( \chi^2(2, N = 164) = 6.89, p = .03 \), suggesting that the model did not fit well. The RMSEA value of .17 and the SRMR value of .052 also indicated that the model was a poor fit. The results suggested that the paths between
FIGURE 7. Mediational Model of Body Mass, Body Dissatisfaction, and Depressive Symptoms for Boys (Top) and Girls (Bottom)
the independent and dependent variables were not equal to zero and were essential elements in the overall fit of the model.

Alternative Hypothesis

When examining the descriptive statistics for our study variables, we noticed that the distributions for boys and girls for our dependent variable, depressive symptoms, were positively skewed and too peaked (skewness = 1.89, kurtosis = 4.16 for boys; skewness = 1.57, kurtosis = 3.05 for girls). Although we could have assumed that our statistical analyses were robust to violations of multivariate normality, we knew that without a large sample size, 200 or more, our robustness was not assured (Tabachnick & Fidell, 1996). We considered transforming the CDI in order to improve its normality, but did not want to sacrifice clarity of the depressive symptoms construct in explaining our results. The option we decided to pursue was to test our mediation models using a proxy dependent variable: self-esteem. Self-esteem was chosen for two reasons: first, several studies have found that self-esteem and depression are highly related constructs (i.e., Harter, 1999; Hirsch & Dubois, 1991; Reinherz et al., 1999), and second, because self-esteem was normally distributed for boys (skewness = -.49, kurtosis = .31) and girls (skewness = -.34, kurtosis = -.55). Therefore, we tested our mediation models again, this time using self-esteem as the proxy dependent variable in place of depressive symptoms (see Figures 8 and 9). Again, the path analysis models were tested for boys and girls in separate models, but within the same LISREL analysis.
The effect of internalization of the thin ideal on self-esteem. The hypothesis proposed in this mediational linkage suggested that the relation between the thin ideal and self-esteem...
would be mediated by body dissatisfaction. First, we tested the full model, which included the direct relation between thin ideal and self-esteem, and the indirect relations with the potential mediator, body dissatisfaction (see Figure 10). Since we were testing the relation between thin ideal and self-esteem as a dependent variable, we could not include self-esteem in the model as a potential mediator per the original model with depressive symptoms (see Figure 2). For boys, the results suggested that the direct relation between the thin ideal and self-esteem in the direct model, or bivariate correlation, $r = -.41$, was significantly reduced when controlling for the indirect effect of body dissatisfaction in the full model, $\beta = -.10$ for boys (see Figure 10). For girls, the results suggested that the direct relation between thin ideal and self-esteem, $r = -.22$, was increased when controlling for the indirect effect of body dissatisfaction in the full model, $\beta = .31$ for girls. The standardized path coefficients between thin ideal and the potential body dissatisfaction mediator were positive and significant as expected for both boys and girls. The standardized path coefficients between body dissatisfaction and self-esteem were all negative and statistically significant as expected for both boys and girls. The chi-square for the full model was non-significant, $\chi^2 (0, N = 164) = 0.0$, $p = 1.0$, indicating that the model was saturated and the fit was perfect.

The mediation model determined whether the relation between thin ideal and self-esteem was completely mediated by body dissatisfaction. To test for mediation, we removed the direct paths between thin ideal and self-esteem by setting the path coefficients equal to zero, and then assessing the fit of the model (see Figure 11). The chi-square for the mediation
FIGURE 10. Full Model of Thin Ideal, Body Dissatisfaction, and Self-Esteem for Boys (Top) and Girls (Bottom)
FIGURE 11. Mediational Model of Thin Ideal, Body Dissatisfaction, and Self-Esteem for Boys (Top) and Girls (Bottom)
The model was significant, \( \chi^2 (2, N = 164) = 6.23, p = .04 \), suggesting that the model did not fit well. The RMSEA value of .16 and the SRMR value of .059 also indicated that the model was a poor fit. The results suggested that the paths between the independent and dependent variables were not equal to zero and were essential elements in the overall fit of the model.

The effect of body mass on self-esteem. The hypothesis proposed in this mediational linkage suggested that the relation between body mass and self-esteem would be mediated by body dissatisfaction. First, we tested the full model, which included the direct relation between body mass and self-esteem, and the indirect relations with the mediator, body dissatisfaction (see Figure 12). The results suggested that the direct relations between the body mass and self-esteem in the direct model, or bivariate correlations, \( r = -.21 \) for boys, and \( r = -.32 \) for girls, were significantly reduced when controlling for the indirect effects of body dissatisfaction in the full model, \( \_ = .09 \) for boys, and \( \_ = .05 \) for girls. The standardized path coefficients between body mass and the potential mediator were positive and significant for both boys and girls. The standardized path coefficients between the mediator, body dissatisfaction and self-esteem were negative and significant for both boys and girls in the full model. The chi-square for the full model was non-significant, \( \chi^2 (0, N = 164) = 0.0, p = 1.0 \), indicating that the model was saturated and the fit was perfect.

The mediation model determined whether the relation between body mass and self-esteem was completely mediated by body dissatisfaction. To test for mediation, we removed the direct paths between body mass and self-esteem by setting the path coefficients equal to zero, and then assessing the fit of the model (see Figure 13). The chi-square for the mediation model was not significant, \( \chi^2 (2, N = 164) = .90, p = .64 \), and the RMSEA value of 0.0, and
FIGURE 12. Full Model of Body Mass, Body Dissatisfaction, and Self-Esteem for Boys (Top) and Girls (Bottom)
FIGURE 13. Mediational Model of Body Mass, Body Dissatisfaction, and Self-Esteem for Boys (Top) and Girls (Bottom)
the SRMR value of .01 all suggested that the model fit well. The results indicated that the more parsimonious mediation model represented the underlying sample data, suggesting that the relation between body mass and self-esteem was mediated by body dissatisfaction for both boys and girls.

Controlling for Pubertal Development

We were also interested in examining whether pubertal development had any effect on the direct relations being tested in our models, either as a control variable or as a moderator. We performed these analyses in two ways: first, by testing the direct relations between the independent variables and the dependent variables while controlling for pubertal development; and second, by testing for any interactions with pubertal development. Because we were no longer testing for indirect effects, we conducted these analyses using multiple regression.

We first examined whether pubertal development had any effect on the direct relations between the independent variables and the dependent variables. Before computing the regression analyses, we centered the variables to ease interpretability of the results and avoid potential problems with multicollinearity (Tabachnick & Fidell, 1996). Next, the sample was divided into boys \((n = 73)\) and girls \((n = 91)\). Simultaneous multiple regression analyses were conducted for each group. In each analysis depressive symptoms and self-esteem were predicted from thin ideal and body mass, as per the four models under examination. We also entered pubertal development into the regression on the same step of the analysis as a main effect (see Table 4). The results suggested that there was essentially no difference in the direct relations once pubertal development was examined as a control variable. All of the betas for pubertal development were non-significant. This was not
surprising, given the lack of significant bivariate relations between pubertal development and the study variables. Although pubertal development was correlated with body mass for girls, the size of the relations stayed the same (i.e., for the relation between body mass and depressive symptoms) or increased slightly from before, \( r = -.32 \), to after, \( r = -.34 \), (i.e., for the relation between body mass and self-esteem) when pubertal development was entered as a control variable.

### TABLE 4. SUMMARY OF SIMULTANEOUS REGRESSION ANALYSES

**CONTROLLING FOR PUBERTAL DEVELOPMENT BY GENDER**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Boys ((n = 73))</th>
<th>Girls ((n = 91))</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Predicting Depressive Symptoms</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thin Ideal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before</td>
<td>.41***</td>
<td>.40***</td>
</tr>
<tr>
<td>After</td>
<td>.41***</td>
<td>.39***</td>
</tr>
<tr>
<td>Body Mass</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before</td>
<td>.13</td>
<td>.44***</td>
</tr>
<tr>
<td>After</td>
<td>.11</td>
<td>.44***</td>
</tr>
<tr>
<td><strong>Predicting Self-Esteem</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thin Ideal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before</td>
<td>-.41***</td>
<td>-.22*</td>
</tr>
<tr>
<td>After</td>
<td>-.41***</td>
<td>-.22*</td>
</tr>
<tr>
<td>Body Mass</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before</td>
<td>-.21</td>
<td>-.32**</td>
</tr>
<tr>
<td>After</td>
<td>-.20</td>
<td>-.34**</td>
</tr>
</tbody>
</table>

*Note.* Each “before” row lists the bivariate correlation between the independent variable and the dependent variable. Each “after” row lists the beta for the independent variable when the control variable, pubertal development, was entered into the regression analysis. Betas for pubertal development were non-significant in all sixteen regression analyses.

* \( * p < .05 \), ** \( ** p < .01 \), *** \( *** p < .001 \).
We also examined whether pubertal development had any moderating effects on the direct relations between the independent and dependent variables in our models. These analyses were conducted using hierarchical regression analysis. We split the sample by gender in order to examine these potential moderating effects separately for boys and girls. Altogether, we conducted eight separate hierarchical regression analyses since we examined each of the models of interest separately by gender. For the first series of regression analyses, we predicted depressive symptoms from thin ideal and then from body mass (see Table 5). For the second series of regression analyses, we predicted self-esteem from thin ideal and then from body mass (see Table 6). Pubertal development was entered as a main effect on the first step of each regression analysis. On the second step, we entered the interaction terms, which were pubertal development by the independent variable for that model (i.e., pubertal development by thin ideal). The regression coefficients for the interaction terms between thin ideal and pubertal development, for both boys and girls, were non-significant, suggesting that the relations between thin ideal and depressive symptoms and thin ideal and self-esteem were not dependent on pubertal development. Similarly, the relation between body mass and self-esteem was not dependent on pubertal development for either boys or girls. Of the eight hierarchical regression analyses we conducted, there was only one significant interaction, pubertal development by body mass in the prediction of depressive symptoms for boys (_ = .26, p < .05). This suggested that, for boys, the relation between body mass and depressive symptoms was dependent on pubertal development. However, the first step of the analysis did not account for a significant proportion of the variance in depressive symptoms (R² = .03, F(2, 70) = 1.06, p = .35). And, although the interaction term of body mass by pubertal development on the second step of the analysis was significant (_R² = .06, _F = 4.75, p <
### TABLE 5. SUMMARY OF HIERARCHICAL REGRESSION ANALYSES

**Predicting Depressive Symptoms by Gender**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Boys</th>
<th></th>
<th></th>
<th>Girls</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(n = 73)</td>
<td>(n = 91)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>B</td>
<td>SE B</td>
<td></td>
<td>B</td>
<td>SE B</td>
</tr>
<tr>
<td>Thin Ideal</td>
<td></td>
<td>.33</td>
<td>.09</td>
<td>.41***</td>
<td>.19</td>
<td>.05</td>
</tr>
<tr>
<td>Pubertal Development</td>
<td></td>
<td>.86</td>
<td>.88</td>
<td>.11</td>
<td>.55</td>
<td>.53</td>
</tr>
<tr>
<td>$R^2 = .18; F(2, 70) = 7.79***$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$R^2 = .17; F(2, 88) = 9.13***$</td>
<td></td>
</tr>
<tr>
<td>Thin Ideal X Pubertal</td>
<td></td>
<td>.18</td>
<td>.16</td>
<td>.13</td>
<td>-.11</td>
<td>.07</td>
</tr>
<tr>
<td>Development</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body Mass</td>
<td></td>
<td>.11</td>
<td>.12</td>
<td>.11</td>
<td>.40</td>
<td>.09</td>
</tr>
<tr>
<td>Pubertal Development</td>
<td></td>
<td>.91</td>
<td>.97</td>
<td>.11</td>
<td>.07</td>
<td>.54</td>
</tr>
<tr>
<td>$R^2 = .03; F(2, 70) = 1.06$</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$R^2 = .20; F(2, 88) = 10.71***$</td>
<td></td>
</tr>
<tr>
<td>Body Mass X Pubertal</td>
<td></td>
<td>.45</td>
<td>.20</td>
<td>.26*</td>
<td>.02</td>
<td>.17</td>
</tr>
<tr>
<td>Development</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note.* For ease of presentation, results for boys and girls are presented together, although the regression analyses were run separately for each gender. _$R^2 = .06; F = 4.75*$ for Step 2 for Body Mass X Pubertal Development for boys.

*p < .05, **p < .01, ***p < .001.*
<table>
<thead>
<tr>
<th>Variable</th>
<th>Boys (n = 73)</th>
<th>Girls (n = 91)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>SE B</td>
</tr>
<tr>
<td>Thin Ideal</td>
<td>-.90</td>
<td>.24</td>
</tr>
<tr>
<td>Pubertal Development</td>
<td>-1.06</td>
<td>2.38</td>
</tr>
<tr>
<td>$R^2 = .17$; $F(2, 70) = 7.21^{***}$</td>
<td>$R^2 = .05$; $F(2, 88) = 2.26$</td>
<td></td>
</tr>
<tr>
<td>Thin Ideal X Pubertal Development</td>
<td>-.25</td>
<td>.42</td>
</tr>
</tbody>
</table>

**Step 2**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Boys (n = 73)</th>
<th>Girls (n = 91)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>SE B</td>
</tr>
<tr>
<td>Body Mass</td>
<td>-.56</td>
<td>.33</td>
</tr>
<tr>
<td>Pubertal Development</td>
<td>-.79</td>
<td>2.60</td>
</tr>
<tr>
<td>$R^2 = .05$; $F(2, 70) = 1.63$</td>
<td>$R^2 = .11$; $F(2, 88) = 5.24^{**}$</td>
<td></td>
</tr>
<tr>
<td>Body Mass X Pubertal Development</td>
<td>-1.05</td>
<td>.55</td>
</tr>
</tbody>
</table>

**Note.** For ease of presentation, results for boys and girls are presented together, although the regression analyses were run separately for each gender.

† $p < .10$, * $p < .05$, ** $p < .01$, *** $p < .001$. 

---

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.05), the predictors did not account for a significant proportion of the variance in depressive symptoms ($R^2 = .09$, $F(1, 69) = 2.33$, $p = .08$). So, even though the addition of the interaction term pubertal development by body mass on the Step 2 of the analysis was significant for boys, overall, the results suggested that the relation between body mass and depressive symptoms was not dependent on pubertal development for boys or girls.

The results from our analyses with pubertal development suggested that it did not have an effect on the direct relations between our independent and dependent variables for each of the models we examined. In other words, it was not necessary to control for pubertal development in our path analyses, because it did not have an effect on the relations between our variables. In addition, the results from our examination of pubertal development as a potential moderator suggested that the interaction terms were not significant predictors of either depressive symptoms or self-esteem.

Given the research on the theoretical links between the pubertal transition and depressive symptoms in adolescents (see Ge et al., 2003 for a review), we were aware of the possibility that selection of another measure of the pubertal process might yield different relations with our study variables. We chose to examine two different measures of the pubertal transition: perceived pubertal timing and pubertal timing classification. We measured perceived pubertal timing as part of the pubertal development scale (Dubas, Graber, & Peterson, 1991; Petersen, et al., 1988). At the end of the PDS, participants were asked to respond whether they thought their physical development was any earlier or later than most other boys (see Appendix G) or girls (see Appendix H) their age. Responses were coded on a five-point scale, ranging from much earlier (1) to much later (5). For our sample, 4 boys and 7 girls reported they were much earlier, 16 boys and 8 girls reported they were a
little earlier, 42 boys and 50 girls reported they were about the same, 10 boys and 18 girls reported they were a little later, and 1 boy and 8 girls reported they were much later than their peers in terms of physical development. We computed bivariate correlations between the perceived pubertal timing variable and the study variables, separately by gender. The only significant correlations were with pubertal development for both genders ($r = -.74$, $p < .001$ for boys and $r = -.48$, $p < .001$ for girls) and body mass for girls ($r = -.22$, $p < .05$). The significant relations with pubertal development were not surprising given that the variables measured similar constructs. The significant relation with body mass for girls was also not surprising as pubertal development has typically been associated with additional weight gain, as measured by an increase in body mass for girls. Overall, the results suggested that perceived pubertal timing did not have stronger relations with the study variables than pubertal development.

We examined another measure of the pubertal transition, pubertal timing classification. We computed the pubertal timing classification by standardizing the pubertal development scores within each age (11, 12, and 13 years) and gender (boys and girls). Through this procedure, higher pubertal timing scores indicated earlier maturation relative to peers. We classified boys and girls by dividing the sample into early-maturing, on-time, and late-maturing groups according to the statistical distribution of the pubertal development scale (see Ge et al., 2003 for an example of this procedure). Early adolescents whose pubertal timing scores were within one standard deviation of the mean were classified as being on time. Early adolescents whose scores were more than one standard deviation above or below the sample mean were classified as early or late maturing, respectively. Following this classification procedure, for our sixth grade sample, 14 boys and 10 girls were classified as
early, 46 boys and 68 girls as on-time, and 13 boys and 13 girls as late maturers. We computed bivariate correlations between the pubertal timing classification variable (-1 = late, 0 = on time, and 1 = early) and the study variables separately by gender. The only significant correlations with the pubertal timing classification variable were those with pubertal development ($r = .74, p < .001$ for boys and $r = .79, p < .001$ for girls). These significant relations were expected given that pubertal timing classification was computed from the pubertal development scale.

The results of these additional analyses with other measures of the pubertal process suggested that our sample was not far enough along in terms of their pubertal development for the relations with depressive symptoms to emerge. We explored the implications of these results below.
DISCUSSION

The present study addressed several questions by examining the gender-additive model of depression. First, we proposed that the relation between elevated body mass and depressive symptoms would be significant by applying the model to a younger sample of adolescent girls than had been previously studied (Stice & Bearman, 2001). We hypothesized that early adolescents would be at varying stages of pubertal development, the time when girls experience elevated body mass. Our findings were consistent with this hypothesis. Greater body mass in early adolescent girls was associated with greater depressive symptoms. Interestingly, although the girls in our sample were in the early stages of pubertal development, their pubertal development was not related to their depressive symptoms, but was significantly correlated with body mass. These results were consistent with other studies that did not find a relation between pubertal development and depressive symptoms (Wichstrom, 1999).

We were also interested in examining the gender-additive model within a mixed-sex sample. According to the gender-additive model, we hypothesized that certain body-image risk factors would mediate relations with depressive symptoms for girls, but not for boys. We proposed an additional mediator, self-esteem, to the gender-additive model. Our results suggested that self-esteem, but not body
dissatisfaction mediated the relation between thin ideal and depressive symptoms for girls. For boys, both self-esteem and body dissatisfaction mediated the relation between thin ideal and depressive symptoms. Our findings did not support the hypothesis that these mediational linkages with depression were specific to girls. Instead, our results suggested that internalization of the thin ideal seems to contribute to depressive symptoms in both girls and boys. A possible explanation for this is that while the connections between self-esteem and body dissatisfaction have been supported in several studies, self-esteem may not be a gender-specific risk factor. Internalization of the thin ideal may promote decreased self-esteem in both boys and girls because it is unattainable for both genders. It is interesting that in our sample, desire for a thin appearance was mediated by both self-esteem and body dissatisfaction in boys, suggesting that these constructs connect appearance and depression in differently, possibly in global (self-esteem) and specific (body dissatisfaction) ways. Perhaps in girls, these processes were subsumed under the more global construct of self-esteem given the greater connections between self-worth and body image in girls when it comes to appearance.

Another mediational linkage we proposed to examine was whether body dissatisfaction mediated the relation between body mass and depressive symptoms. Our results suggested that, for our sample, body dissatisfaction did not completely mediate the relation between body mass and depressive symptoms for girls or boys. Interestingly, the direct relations between body mass and depressive symptoms were nonsignificant for boys. This result is consistent with our hypothesis that the mediational linkage of body dissatisfaction between body mass and depressive
symptoms would not be supported for boys. However, our results did not support the mediational linkage for girls either, which was consistent with other studies that failed to find that body mass predicted depressive symptoms (Stice & Bearman, 2001). We had predicted that examination of this mediational linkage in a younger sample of early adolescents would capture a greater variance in pubertal development (which produces higher body mass in girls), thus showing that greater body mass predicted depressive symptoms. Our study also failed to find support for body dissatisfaction as a mediator. It is possible that other potential mediators are involved in this relationship. Overall, our results indicate that the relations between body mass and depressive symptoms remain unclear and that there is mixed support for connections between the two constructs. Consistent with our examination of other measures of the pubertal process, it seems that early pubertal development and the variants we examined do not necessarily set the stage for these relations to occur.

For theoretical and distributional reasons, we chose to examine these mediational linkages with a proxy-dependent variable, self-esteem. These analyses contrasted with those that looked at depressive symptoms as a dependent variable. We found that body dissatisfaction did not mediate the relation between thin ideal and self-esteem for boys or girls. It seems that the direct relation between the thin ideal and self-esteem was an essential path in the model. What this seems to illustrate is that early adolescents who have internalized the thin ideal have less self-perceived competence, and this process is not merely within the realm of body image. Instead, we see again that wanting to be thin seems to impact early adolescents on a more global level of their view of themselves than merely their bodies.
We also examined whether body dissatisfaction would mediate the relation between body mass and self-esteem. We found support for this mediational linkage for both boys and girls. This suggests that greater body mass results in body dissatisfaction because being overweight is undesirable (Stice & Bearman, 2001). Having an undesirable appearance may promote decreased self-esteem because appearance is important to early adolescents. This particular body dissatisfaction mediational linkage is interesting because it was supported when self-esteem was the dependent variable, but not when depressive symptoms was the dependent variable. It seems that greater body mass is more of a self-esteem problem than one that promotes depressive symptoms. Although self-esteem has been studied as both an antecedent and a consequence of depression (i.e., Cole et al., 1998), our study seems to be consistent with the idea that self-esteem is an antecedent to depression. It is possible that over time, elevated body mass may be promote depression through body dissatisfaction, and not merely lowered self-esteem.

One of the main goals of the present study was to examine the gender difference in depressive symptoms in a sample of early adolescents. Previous studies have suggested that this gender difference emerges in puberty and continues from adolescence through adulthood. It is interesting then, that within our sample there was virtually no difference between the means of depressive symptoms for girls and boys, yet the girls had significantly higher pubertal development scores. One possibility for these findings could be that the early adolescents in our sample were still in the very early stages of puberty, and hence, were not yet subjected to the emotional difficulties early maturers are theorized to face (Peskin, 1973). Our findings indicate that the
average male in our study would be classified as beginning pubertal while the average girl in our study would be midpubertal (see Crockett, n.d.; Petersen, personal communication, October 30, 1995). Although these stages of puberty would still be considered as either early or at the mid-point of puberty, the average early adolescent in our study was not prepubertal. The pubertal development scores for our sample were also consistent with those from mixed-sex samples in similar studies (i.e., Ge et al., 2003).

We also considered whether pubertal development had a main effect on the proposed mediational relations with depressive symptoms, as well as any potential moderating effects. Furthermore, we examined whether different measures of the pubertal transition, namely, perceived pubertal development or pubertal timing classification, would have different relations with the study variables. Taken together, it seems that for our sample, measures of the pubertal transition are not related to either depressive symptoms, or the other body-image related factors, as control variables, moderators, or predictors of depressive symptoms. The only significant relation was the correlation between body mass and pubertal development for girls. While we were not able to replicate findings from previous studies (Ge et al., 2003, Hankin, Abramson, Moffitt, Silva, McGee, & Angell, 1998) demonstrating that gender differences in depression emerged during the pubertal transition, our results suggest that the timing of the gender difference does not occur in the early or middle stages of puberty. Instead, the gender difference in depressive symptoms may emerge in the mid to late stages of pubertal development.
Contributions

The contributions of the present study included an examination of the gender-additive model of depression within a younger sample than had previously been studied with this model. Further, our study tested the model with a mixed-sex sample. Ours was the first study, to our knowledge, to examine this specific theory within a mixed-sex sample. Another contribution of our study was inclusion of self-esteem as a mediator in the proposed relations between thin ideal and depression and body mass and depression. Interestingly, self-esteem was shown to be a better mediator than body dissatisfaction in these relations for girls. Our results suggest, however, that self-esteem may not be a gender-specific risk factor.

Limitations

Several of our study variables had positively skewed distributions, including the distribution for the main, proposed dependent variable, depressive symptoms. We attempted to account for this limitation by substituting self-esteem as a proxy dependent variable, given both its theoretical and empirical relation to depression as well as its normal distribution.

Another limitation of the present study was the lack of empirical attention given to internalization of the thin ideal construct with male samples. Although the measure we chose to represent this construct has been normed on both early and late adolescent males, measures for the thin ideal construct are still not widely-agreed upon by researchers. It is also important to remember that our findings were from a cross-sectional sample, so we cannot make any inferences regarding prediction of
these relations. Finally, it may be difficult to generalize our findings to ethnic and racial minorities because our sample lacked such diversity.

Future Research

Although our study focused on testing body-image related factors within the gender-additive model of depression, future studies should also focus on similar factors that both mediate such processes and maintain risk factors for depression for adolescent girls and women. Further research is needed however, in order to clarify timing and the impact the pubertal transition may have on both initiating and maintaining the gender difference in depression. Longitudinal studies are needed to assess change in depressive symptoms through the transition of puberty and on into adulthood.
APPENDIX A

On this page, I want you to pick one sentence from each group that best fits you for the past two weeks. After you pick a sentence from the first group, we will go on to the next group. There are no right or wrong answers. Just be as honest as possible.

1. ___ I am sad once in a while.
   ___ I am sad many times.
   ___ I am sad all the time.

2. ___ Nothing will ever work out for me.
   ___ I am not sure if things will work out for me.
   ___ Things will work out for me O.K.

3. ___ I do most things O.K.
   ___ I do many things wrong.
   ___ I do everything wrong.

4. ___ I have fun in many things.
   ___ I have fun in some things.
   ___ Nothing is fun at all.

5. ___ I am bad all the time.
   ___ I am bad many times.
   ___ I am bad once in a while.

6. ___ I think about bad things happening to me once in a while.
   ___ I worry that bad things will happen to me.
   ___ I am sure that terrible things will happen to me.

7. ___ I hate myself.
   ___ I do not like myself.
   ___ I like myself.

8. ___ All bad things are my fault.
   ___ Many bad things are my fault.
   ___ Bad things are not usually my fault.
9. ___ I feel like crying every day.
   ___ I feel like crying many days.
   ___ I feel like crying once in a while.

10. ___ Things bother me all the time.
    ___ Things bother me many times.
    ___ Things bother me once in a while.

11. ___ I like being with people.
    ___ I do not like being with people many times.
    ___ I do not want to be with people at all.

12. ___ I cannot make up my mind about things.
    ___ It is hard to make up my mind about things.
    ___ I make up my mind about things easily.

13. ___ I look O.K.
    ___ There are some bad things about my looks.
    ___ I look ugly.

14. ___ I have to push myself all the time to do my schoolwork.
    ___ I have to push myself many times to do my schoolwork.
    ___ Doing schoolwork is not a big problem.

15. ___ I have trouble sleeping every night.
    ___ I have trouble sleeping many nights.
    ___ I sleep pretty well.

16. ___ I am tired once in a while.
    ___ I am tired many days.
    ___ I am tired all the time.

17. ___ Most days I do not feel like eating.
    ___ Many days I do not feel like eating.
    ___ I eat pretty well.

18. ___ I do not worry about aches and pains.
    ___ I worry about aches and pains many times.
    ___ I worry about aches and pains all the time.

19. ___ I do not feel alone.
    ___ I feel alone many times.
    ___ I feel alone all the time.
20. ___ I never have fun at school.
    ___ I have fun at school only once in a while.
    ___ I have fun at school many times.

21. ___ I have plenty of friends.
    ___ I have some friends but I wish I had more.
    ___ I do not have any friends.

22. ___ My schoolwork is alright.
    ___ My schoolwork is not as good as before.
    ___ I do very badly in subjects I used to be good in.

23. ___ I can never be as good as other kids.
    ___ I can be as good as other kids if I want to.
    ___ I am just as good as other kids.

24. ___ Nobody really loves me.
    ___ I am not sure if anybody loves me.
    ___ I am sure that somebody loves me.

25. ___ I usually do what I am told.
    ___ I do not do what I am told most times.
    ___ I never do what I am told.

26. ___ I get along with people.
    ___ I get into fights many times.
    ___ I get into fights all the time.
This is a scale which measures a variety of attitudes, feelings, and behaviors. Some of the items relate to food and eating. Others ask you about your feelings about yourself. THERE ARE NO RIGHT OR WRONG ANSWERS SO TRY VERY HARD TO BE COMPLETELY HONEST IN YOUR ANSWERS. RESULTS ARE COMPLETELY CONFIDENTIAL. Read each question and circle the number under the column which applies best for you. Please answer each question very carefully. Thank you.

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Usually</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>I think that my stomach is too big.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>8.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>I think that my thighs are too large.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>10.</td>
<td>*I think that my stomach is just the right size.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>17.</td>
<td>*I feel satisfied with the shape of my body.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>29.</td>
<td>*I like the shape of my buttocks.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>42.</td>
<td>I think my hips are too big.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>54.</td>
<td>*I think that my thighs are just the right size.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>56.</td>
<td>I think my buttocks are too large.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>59.</td>
<td>*I think that my hips are just the right size.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

* Negatively keyed items.
### APPENDIX C

Which kinds of kids are more like you?

<table>
<thead>
<tr>
<th>Which kinds of kids are more like you?</th>
<th>Is this really or sort of true for you?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Some kids feel that they are very good at their school work</td>
<td>Other kids worry about whether they can do the school work assigned to them.</td>
</tr>
<tr>
<td>2. Some kids find it hard to make friends</td>
<td>Other kids find it’s easy to make friends.</td>
</tr>
<tr>
<td>3. Some kids do very well at all kinds of sports</td>
<td>Other kids don’t feel that they are very good when it comes to sports.</td>
</tr>
<tr>
<td>4. Some kids are happy with the way they look</td>
<td>Other kids are not happy with the way they look</td>
</tr>
<tr>
<td>5. Some kids often do not like the way they behave</td>
<td>Other kids usually like the way they behave</td>
</tr>
<tr>
<td>6. Some kids feel like they are just as smart as other kids their age</td>
<td>Other kids aren’t so sure and wonder if they are as smart.</td>
</tr>
<tr>
<td>7. Some kids have a lot of friends</td>
<td>Other kids don’t have very many friends.</td>
</tr>
<tr>
<td>8. Some kids wish they could be a lot better at sports</td>
<td>Other kids feel they are good enough at sports.</td>
</tr>
<tr>
<td>9. Some kids are happy with their height and weight</td>
<td>Other kids wish their height and weight were different</td>
</tr>
</tbody>
</table>
10. Some kids usually do the right thing. Other kids often don’t do the right thing. Sort of true Really true

11. Some kids are pretty slow in finishing their school work. Other kids can do their school work quickly. Sort of true Really true

12. Some kids would like to have a lot more friends. Other kids have as many friends as they want. Sort of true Really true

13. Some kids think they can do well at just about any new sports activity they haven’t tried before. Other kids are afraid they might not do well at sports they haven’t ever tried. Sort of true Really true

14. Some kids wish their body was different. Other kids like their body the way it is. Sort of true Really true

15. Some kids usually act the way they know they are supposed to. Other kids often don’t act the way they are supposed to. Sort of true Really true

16. Some kids often forget what they learn. Other kids can remember things easily. Sort of true Really true

17. Some kids are always doing things with a lot of kids. Other kids usually do things by themselves. Sort of true Really true

18. Some kids feel that they are better than others their age at sports. Other kids don’t feel they can play sports as well. Sort of true Really true

19. Some kids wish their physical appearance (how they look) was different. Other kids like their physical appearance the way it is. Sort of true Really true

20. Some kids usually get in trouble because of things they do. Other kids usually don’t do things that get them in trouble. Sort of true Really true

21. Some kids do very well at their classwork. Other kids don’t do very well at their classwork. Sort of true Really true
<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>22. Some kids wish that more people their age liked them</td>
<td>Other kids feel that most people their age do like them.</td>
<td>Sort of</td>
<td>Really</td>
</tr>
<tr>
<td>23. In games and sports some kids usually watch instead of play</td>
<td>Other kids usually play rather than just watch.</td>
<td>Sort of</td>
<td>Really</td>
</tr>
<tr>
<td>24. Some kids wish something about their face or hair looked different</td>
<td>Other kids like their face and hair the way they are.</td>
<td>Sort of</td>
<td>Really</td>
</tr>
<tr>
<td>25. Some kids do things they know they shouldn’t do</td>
<td>Other kids hardly ever do things they know they shouldn’t do.</td>
<td>Sort of</td>
<td>Really</td>
</tr>
<tr>
<td>26. Some kids have trouble figuring out the answers in school</td>
<td>Other kids almost always can figure out the answers.</td>
<td>Sort of</td>
<td>Really</td>
</tr>
<tr>
<td>27. Some kids are popular with others their age</td>
<td>Other kids are not very popular.</td>
<td>Sort of</td>
<td>Really</td>
</tr>
<tr>
<td>28. Some kids don’t do well at new outdoor games</td>
<td>Other kids are good at new games right away.</td>
<td>Sort of</td>
<td>Really</td>
</tr>
<tr>
<td>29. Some kids think that they are good looking</td>
<td>Other kids think that they are not very good looking</td>
<td>Sort of</td>
<td>Really</td>
</tr>
<tr>
<td>30. Some kids behave themselves very well</td>
<td>Other kids often find it hard to behave themselves</td>
<td>Sort of</td>
<td>Really</td>
</tr>
</tbody>
</table>
# APPENDIX D

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Usually</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. <em>I eat sweets and carbohydrates without feeling nervous.</em></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>6. I think about dieting.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>9. I feel extremely guilty after overeating.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>13. I am terrified of gaining weight.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>22. I exaggerate or magnify the importance of weight (i.e., make it a big deal).</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>30. I am preoccupied with the desire to be thinner.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>48. If I gain a pound, I worry that I will keep gaining.</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

* Negatively keyed item.
APPENDIX E

We’d like to ask you some questions about your growth and development. As kids grow and become teenagers, they get taller, might get pimples, and their bodies look more grown up. We’d like to ask you to tell us if you’ve experienced any of these kinds of changes yet. Remember that no one will see your answers other than the researchers doing this study. Please be as honest as possible since only your honest answers can help us learn about boys your age. To answer each question, please circle the number in front of the answer that best describes what is happening to you. Please read through ALL of the choices before circling your answer.

A. Would you say that your growth in height:

1. has not yet begun to spurt (“spurt” means more growth than usual)
2. has started
3. is clearly underway
4. seems done (completed)

B. Have you noticed any changes in your skin, especially pimples (“zits”)?

1. no changes yet
2. have started showing changes
3. skin changes are clearly underway
4. skin changes seem done—my skin seems pretty much like a young adult’s

C. How about your body hair (“body hair” means underarm and pubic hair)? Would you say that your body hair:

1. has not started growing yet
2. has started growing
3. growth is clearly underway
4. seems done—my body hair is pretty much like a young adult’s

D. Is your voice getting deeper?

1. had not started getting deeper
2. has started getting deeper
3. voice change is clearly underway
4. voice change seems done—my voice sounds pretty much like a young adult’s
E. Have you started to grow hair on your face?

1. not yet started growing hair
2. have started growing hair
3. hair growth is clearly underway
4. hair growth seems done—my facial hair is pretty much like a young adult’s
APPENDIX F

We’d like to ask you some questions about your growth and development. As kids grow and become teenagers, they get taller, might get pimples, and their bodies look more grown up. We’d like to ask you to tell us if you’ve experienced any of these kinds of changes yet. Remember that no one will see your answers other than the researchers doing this study. Please be as honest as possible since only your honest answers can help us learn about girls your age. To answer each question, please circle the number in front of the answer that best describes what is happening to you. Please read through ALL of the choices before circling your answer.

A. Would you say that your growth in height:
   1. has not yet begun to spurt (“spurt” means more growth than usual)
   2. has started
   3. is clearly underway
   4. seems done (completed)

B. Have you noticed any changes in your skin, especially pimples (“zits”)?
   1. no changes yet
   2. have started showing changes
   3. skin changes are clearly underway
   4. skin changes seem done—my skin seems pretty much like a young adult’s

C. How about your body hair (“body hair” means underarm and pubic hair)? Would you say that your body hair:
   1. has not started growing yet
   2. has started growing
   3. growth is clearly underway
   4. seems done—my body hair is pretty much like a young adult’s

D. Have your breasts started to grow?
   1. have not started growing yet
   2. have started growing
   3. breast growth is clearly underway
   4. breast growth seems done—my breasts seems pretty much like a young adult’s
E. Have you begun to menstruate (gotten your period) yet? Please circle one answer.

1. no
2. yes*

*Scored as 4, not 2.
APPENDIX G

F. Do you think your physical development is any earlier OR later than most other boys your age? Please choose one answer below.

1. my development is much earlier than other boys my age
2. my development is a little earlier than other boys my age
3. my development is about the same as other boys my age
4. my development is a little later than other boys my age
5. my development is much later than other boys my age
E. Do you think your physical development is any *earlier OR later* than most other girls your age? Please choose one answer below.

6. my development is *much earlier* than other girls my age
7. my development is a *little earlier* than other girls my age
8. my development is *about the same* as other girls my age
9. my development is a *little later* than other girls my age
10. my development is *much later* than other girls my age
REFERENCES


