Body Image 10 (2013) 210–219

Contents lists available at SciVerse ScienceDirect

Body Image

journal homepage: www.elsevier.com/locate/bodyimage

Sport type and interpersonal and intrapersonal predictors of body dissatisfaction in high school female sport participants

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ARTICLE INFO

Article history:
Received 13 January 2012
Received in revised form 2 November 2012
Accepted 5 November 2012

Keywords:
Body dissatisfaction
High school females
Sport participation
Maternal and familial influences
Athletic self-efficacy
BMI

ABSTRACT

Through multiple group structural equation modeling analyses, path models were used to test the predictive effects of sport type and both interpersonal (i.e., mothers' body dissatisfaction, family dynamics) and intrapersonal factors (i.e., athletic self-efficacy, body mass index [BMI]) on high school female sport participants' ($N = 627$) body dissatisfaction. Sport types were classified as esthetic/lean (i.e., gymnastics), non-esthetic/lean (i.e., cross-country), or non-esthetic/non-lean (i.e., softball). Most participants reported low body dissatisfaction, and body dissatisfaction did not differ across sport types. Nevertheless, mothers' body dissatisfaction was positively associated with daughters' body dissatisfaction for non-esthetic/lean and non-esthetic/non-lean sport participants, and high family cohesion was predictive of body dissatisfaction among non-esthetic/lean sport participants. Across sport types, higher BMI was associated with greater body dissatisfaction, whereas greater athletic self-efficacy was associated with lower body dissatisfaction. These findings highlight the complex relationship between interpersonal and intrapersonal factors and body dissatisfaction in adolescent female sport participants.

Introduction

According to objectification theory (Fredrickson & Roberts, 1997; Moradi, 2010), women's internalization of social constructions about the female body leads to "objectified body consciousness" or "self-objectification," which is manifested as body surveillance, internalization of cultural body standards, beliefs about the controllability of appearance and sometimes, body shame. Fredrickson and Roberts (1997) assert that one way girls can resist the internalization of these social constructions is to encourage sports participation and related forms of physical activity. That is, sports promote an active, instrumental experience of the self, and therefore may be less likely to promote self-objectification.

Nevertheless, research has been inconclusive in terms of whether sport participation affords risk to or protects women's psychological well-being, including body dissatisfaction. Findings often vary by sport, level of athletic performance, age of participants, and methodology. In a meta-analysis of 34 studies, Smolak, Murnen, and Ruble (2000) found that body dissatisfaction was lower in high school female sport participants, including gymnasts and cross country runners, than non-sport participants. Additionally, in their meta-analysis of 78 studies, Hausenblas and Downs (2001) found that sport and non-sport participants did not differ on body image measures at the high school level. However, when sports were classified as lean (e.g., gymnastics) or non-lean (e.g., basketball) and compared, lean sports participants reported more eating problems (Smolak et al., 2000). In contrast, high school girls who participated in non-elite, non-lean sports exhibited the lowest levels of eating problems.

Due to these sport-level differences, Parsons and Betz (2001) proposed a metric by which high school female sport participants could be described. This metric includes the degree to which the sport emphasizes physical appearance (i.e., a lean line might increase her judged score). Sports that emphasized physical appearance were more likely to be negatively related to measures of psychological well-being. Coupled with the finding that lean sports might also be negatively related to measures of well-being (Smolak et al., 2000), we distinguished between three types of high school sport participation in the present research, esthetic/lean (i.e., gymnastics), non-esthetic/lean (i.e., cross-country), and non-esthetic/non-lean (i.e., softball).

Gymnastics was considered an esthetic/lean sport because a portion of the participant's score may be based on an esthetic quality of her performance, and a lean physique might enhance one's ability to execute difficult moves. Cross country was considered a non-esthetic/lean sport because performance is not based on

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1740-1445/$ – see front matter © 2012 Published by Elsevier Ltd.
http://dx.doi.org/10.1016/j.bodyim.2012.11.001

appearance, yet a lean physique is often correlated with successful performance (Ferrand, Magnan, & Philippe, 2005). Lastly, softball was defined as a non-esthetic/non-lean sport because neither appearance nor leanness is necessary for enhanced performance. Our classification is consistent with the metric proposed by Parsons and Betz (2001), who found that cross country and softball received lower mean "focus on appearance" ratings than gymnastics.

Since Hausenblas and Downs (2001) and Smolak et al.'s (2000) meta-analytic reviews, more recent research has yielded mixed results with regard to protective and risk factors being associated with sport type participation when esthetic and leanness dimensions were varied. One overarching reason for these inconsistencies in findings may be the range of symptoms measured, including body dissatisfaction, eating attitudes, eating disorders, and general measures of psychological well-being. In the original reviews, age of participants was also found to be a moderately robust determinant of symptoms, with younger, high school-aged girls appearing to be more protected by sport participation than older, college-aged women (e.g., Hausenblas & Downs, 2001; Smolak et al., 2000).

Recent findings have also shown that body attitudes vary by sport type. At the college level, sport participants in esthetic and/or lean sports have reported greater pressures to be thin than females participating in non-esthetic/non-lean sports (Bryne and McLean, 2001; Muscat & Long, 2008). Among high school students, some studies have shown that females participating in esthetic sports reported less body esteem than non-esthetic athletes or controls. For example, Ferrand et al. (2005) found that high school females who participated in synchronized swimming reported greater negative feelings about their appearance, and thought others evaluated their bodies more negatively, than their counterparts participating in non-esthetic sports.

Conversely, one recent study found that girls and women between the ages of 13 and 35 who participated in esthetic sports did not differ from non-athletic controls on any measures of body satisfaction (Bachner-Melman, Zohar, Ebstein, Elizur, & Constantini, 2006). Non-esthetic sport participants reported greater body satisfaction and less drive for thinness than those who did not participate in organized sport activity. Bachner-Melman et al. (2006), however, did not consider age effects at length, with results collapsed across adolescence and adulthood.

Although findings have been mixed, sufficient evidence exists to suggest that participating in an esthetic/lean sport (i.e., gymnastics), and perhaps slightly less so, a non-esthetic/lean sport (i.e., cross country), would result in greater body dissatisfaction than participating in a non-esthetic/non-lean sport (i.e., softball) at the high school level (Bachner-Melman et al., 2006; Ferrand et al., 2005; Ravaldi et al., 2003). However, other variables are likely to predict body dissatisfaction among adolescent girls, including interpersonal (e.g., maternal and familial influences) and intrapersonal factors (e.g., girls' athletic self-efficacy and BMI). Indeed, a wealth of empirical literature has shown that body dissatisfaction in adolescent girls may be the result of a combination of factors, and that research designs that incorporate both interpersonal and intrapersonal factors are necessary in order to account for the complexity of the body dissatisfaction construct (Cash, 2011; Grogan, 2008).

In regard to interpersonal factors, there is little doubt that mothers are often the source of much information, and a significant source of emotional support, for their adolescent daughters (Hanna & Bond, 2006). Thus, it is not surprising that studies have shown a relationship between maternal factors and daughters' level of sport participation, as well as maternal messages to daughters about daughters' weight and shape and adolescent daughters' body attitudes (e.g., Byely, Archibald, Graber, & Brooks-Gunn, 2000; Hanna & Bond, 2006).

Additionally, parental support in relation to sport participation has been linked with greater engagement in physical activity among adolescent girls (e.g., Holt & Sehn, 2008; Ornelas, Perreira, & Ayala, 2007). In particular, maternal involvement in daughters' sport participation, from enrolling their daughters in sport activities to transportation to and attendance at events, has been associated with increased participation in physical activity and increased positive health behaviors in adolescent girls (see Beets, Cardinal, & Alderman, 2010, for a review). However, while maternal support has been shown to increase daughters' participation in sports and other healthy physical activities, comments regarding a daughter's weight and appearance, as well as mothers' preoccupation with the weight and appearance of their daughters, have been shown to have negative effects on body satisfaction in adolescent girls (e.g., Byely et al., 2000; Hanna & Bond, 2006; Leung, Schwartzman, & Steiger, 1996). In fact, even positive commentary from mothers about weight and appearance has been shown to promote body dissatisfaction and disordered eating symptoms in elementary and high school-aged girls (e.g., Anschutz, Kanters, Van Strien, Vermulst, & Engels, 2009; Wertheim, Martin, Prior, Sanson, & Smart, 2002). Furthermore, mothers' concern about their own weight and appearance has been associated with increased body dissatisfaction in their adolescent daughters (e.g., Canals, Sancho, & Arija, 2009; Elfhag & Linné, 2005; Keery, Eisenberg, Boutelle, Neumark-Sztainer, & Story, 2006).

Degree of conflict within the family, low family cohesiveness, negative expressiveness, and a lack of communication between mothers and daughters have also been shown to be significant predictors of daughters' body dissatisfaction and disordered eating (e.g., Ackard, Neumark-Sztainer, Story, & Perry, 2006; Al Sabbah et al., 2009; Byely et al., 2000). In an study of adolescents from 24 countries, difficulty talking to one's parents and perceived lack of caring by parents were found to be significantly associated with body dissatisfaction in adolescent girls (Al Sabbah et al., 2009). In other studies, including a three-year prospective study of parent–adolescent relationships, May, Kim, McHale, and Crouter (2006) found increases in adolescent girls' weight concerns with corresponding increases in family conflict over time. In a cross-sectional study of adolescent girls and young women, high family conflict was associated with high body dissatisfaction (Hanna & Bond, 2006).

In addition to interpersonal factors, factors specific to adolescent girls can also contribute to body dissatisfaction. As past research has shown, self-efficacy can be vitally important to the adolescents' sense of well-being and belief in themselves (Feltz & Magyar, 2006). From a self-objectification perspective, if sports promote an active and instrumental perception of the self (Fredrickson & Roberts, 1997; Parsons & Betz, 2001), athletic self-efficacy should also impact this perception. Self-efficacy in relation to physical activity in particular has been linked with positive body attitudes and reduced social physique anxiety among women (Annesi, 2010; McAuley, Blissmer, Katula, Duncan, & Mihalko, 2000; McAuley, Marquez, Jerome, Blissmer, & Katula, 2002). Furthermore, it has been found that through engagement in physical activity, females experience fewer concerns about self-presentation and fewer negative attitudes toward one's body (Annesi, 2010; McAuley et al., 2002). It is possible that when a female athlete's perceived self-efficacy is high, she will not only have strong, positive beliefs about her performance, but may also hold strong positive beliefs about her body (Bandura, 1997; Feltz & Magyar, 2006).

Another intrapersonal factor that has been shown to affect body dissatisfaction in adolescent girls is BMI. A number of longitudinal studies have shown that a higher BMI among adolescents is not only predictive of immediate body dissatisfaction, but also predicts body dissatisfaction at later points in time (Jones, 2004; Paxton, Eisenberg, & Neumark-Sztainer, 2006; Presnell, Bearman,

& Stice, 2004; Wojtowicz & von Ranson, 2012). Indeed, in a recent study by Wojtowicz and von Ranson (2012) two intrapersonal factors, self-esteem and BMI, were the most significant risk factors for body dissatisfaction in adolescent girls one year later. Associations between BMI and body dissatisfaction have also been shown in research studies with girls who participate in specific sports, with girls participating in esthetic/lean and non-esthetic/lean sports often reporting lower BMIs than those participating in non-esthetic/non-lean sports (Davis & Cowles, 1989; Ferrand et al., 2005; Ravaldi et al., 2003). However, while participants of esthetic and lean sports have often reported lower BMIs than participants of non-esthetic/non-lean sports, Bachner-Melman et al. (2006) found that these females reported greater body dissatisfaction than participants in non-esthetic/non-lean sports.

Overview of Present Research

Building on previous research, structural equation modeling was used in the present study to examine an integrative model involving both interpersonal (maternal body dissatisfaction, family dynamics, and maternal involvement in sport participation) and intrapersonal (athletic self-efficacy and BMI) as predictors of girls' body dissatisfaction across sport types (see Figs. 1 and 2). For each path in the models described below, we examined whether the strength of the association was similar for esthetic/lean sports (gymnastics), non-esthetic/lean sports (cross country), and non-esthetic/non-lean sports (softball). In light of previous literature, the following predictions were made:

1. Sport type was hypothesized to relate to body dissatisfaction in female sport participants: girls who participate in esthetic/lean sports (gymnasts) were expected to report more body dissatisfaction than girls in non-esthetic/lean sports (cross country runners) and those in non-esthetic/non-lean sports (softball players).
2. High maternal body dissatisfaction was hypothesized to predict high body dissatisfaction among female sport participants (Fig. 1, path a).
3. In general, high family conflict was expected to predict high body dissatisfaction (Fig. 2, path a), whereas high family cohesion (Fig. 2, path b), expressiveness (Fig. 2, path c), and maternal involvement in sport participation (Fig. 1, path b; Fig. 2, path d) were hypothesized to predict low body dissatisfaction among female sport participants.
4. High athletic self-efficacy was hypothesized to predict low body dissatisfaction among female sport participants (Fig. 2, path e).
5. Overall, it was expected that greater BMI would be associated with greater body dissatisfaction among female sport participants (Fig. 1, path c; Fig. 2, path f).

Method

Participants

High school girls who were participants of gymnastics, cross-country, and softball teams belonging to the Illinois High School Association (IHSA), along with their mothers, were recruited for participation in the study. The girls were participants of non-elite, structured sports teams that were associated with their respective high schools. Adolescent girls were recruited because they were likely to live in close proximity to their mothers and therefore, to be directly influenced by maternal body dissatisfaction and dynamics within the family.

Across sport types, 239 gymnasts, 253 cross country runners, and 237 softball players were initially contacted for participation in the study. Of those recruited, 202 gymnasts (85%) and 101 of their mothers (42%), 224 cross country runners (89%) and 121 of their mothers (48%), and 201 softball players (85%) and 104 of their mothers (44%) agreed to participate. The total number of participants included 627 sport participants (86%) and 326 mothers (45%). Girls who were excluded from the study chose not to participate, failed to return consent documents, or returned incomplete data. Most girls in the study participated in just one sport type, with fewer than 10% participating in multiple sport types: (for gymnasts: 5% also participated in cross country and 9% participated in softball; for cross country runners: 5% participated in gymnastics and 4% in softball; and for softball players: 1% participated in gymnastics and 7% participated in cross country). Girls who participated in multiple sports were instructed to complete the dependent measures only once, focusing on the particular sport for which they were initially contacted.

Sport participants ranged from 14 to 19 years of age ($M = 15.85$, $SD = 1.15$), and mothers were between 32 and 59 years of age ($M = 47.03$, $SD = 4.54$). The majority of the sample was Caucasian (85%). Differences in sport participants' ages were found across sports, $F(2, 624) = 26.90$, $p < .001$; partial $\eta^2 = .08$: softball players were significantly older ($M = 16.30$, $SD = 1.16$) than gymnasts ($M = 15.51$, $SD = 1.08$) and cross country runners ($M = 15.76$, $SD = 1.09$). Significant differences were not found for sport type in relation to mothers' age or the race of mothers or daughters (all $ps > .05$). Additionally, across sport types, no significant differences were found between girls whose mothers did or did not participate on each of the salient variables (i.e., girls' body dissatisfaction, maternal involvement in sport participation, family conflict, cohesion, expressiveness, girls' BMI, and athletic self-efficacy; all $ps > .05$).

A priori power analyses revealed that the sample sizes for the three sport groups provided sufficient (i.e., 80%; Cohen, 1988) power to detect significant ($p < .05$) effects for: (a) a single independent variable that explains at least 1% of the variance in body dissatisfaction total score in multiple regression analyses; (b) a single independent variable that explains at least 3.5% of the variance in body dissatisfaction total score, when three other independent variables explaining 15% of the variance are also entered, in multiple regression analyses; (c) between-group differences in the magnitude of standardized regression coefficients that are at least .10 in absolute value in multigroup SEM analyses; and (d) mean differences that explain at least 1% of the variance in body dissatisfaction total score in analysis of variance (ANOVA).

Procedure

From a master list of 75 schools belonging to the IHSA and that offered students participation in all three non-elite sports (gymnastics, cross country, and softball), 11 high schools (14.6%) near Chicago, Illinois, agreed to participate in this project. School recruitment involved initial contact about the project with principals, then athletic directors (ADs), and lastly, athletic coaches via email and telephone conversations. Researchers distributed informed consent documents to sport participants following permission from principals, ADs, coaches and the participants themselves. Consent forms and test materials for mothers who wished to participate in the study were given to their daughters during their daughters' regularly scheduled athletic practices. They were instructed to bring this material home to their mothers and to ask their mothers if they wanted to participate in the study. Daughters were asked to bring these materials back approximately one week later, at which point the researchers returned to the sport participants' practice sessions and collected mothers' informed consent documents and completed test materials. It was during this meeting that sport participants who wished to participate completed their packet of test

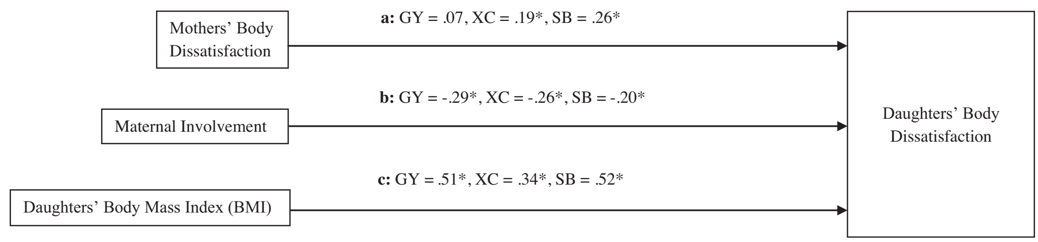

Fig. 1. Path diagram of measured variables including mothers' body dissatisfaction, maternal involvement in sport participation, and daughters' BMI as predictors of daughters' body dissatisfaction (paths a–c). The residual disturbance term for the endogenous variable (i.e., daughters' body dissatisfaction) has been omitted from the figure in order to simplify the diagram. Parameter estimates for the direct effects in the model were analyzed separately for respondents within each sport type and compared across sports. These analyses included pairs of mothers and daughters (gymnasts, $n = 101$; cross-country runners, $n = 121$; softball players, $n = 104$). Paths coefficients in the diagram are standardized regression coefficients indicating the strength of the association between the individual predictor variable and daughters' body dissatisfaction. For each path, coefficients are labeled by sport type (GY = gymnastics, XC = cross country, SB = softball). $p < .05^*$.

materials. This data collection procedure took place mid-season for all sport teams.

Test materials included questionnaires that were number coded in order to ensure participant confidentiality and to create matched-pairs of participating mothers and daughters. Questionnaires were also collated and counter-balanced to avoid order effects. Each participating athletic team was compensated with a $100 team donation. This project was approved by the affiliated University Institutional Review Board.

Measures

Participant demographic characteristics. Demographic questionnaires were developed for both mothers and daughters to gather information about type of sport participation, age, race, and self-reported height and weight. Height and weight self-report information was collected in order to calculate a BMI (kg/m^2) for each participant. Maternal involvement in sport participation, measured as the frequency of conversations between mothers and daughters about sport participation, was scored on a 5-point scale: *never*, *rarely*, *occasionally*, *daily*, and *multiple times a day*.

Body dissatisfaction. Mothers and daughters completed the Body Dissatisfaction subscale of the Eating Disorder Inventory-3 (EDI-3; Garner, 2004) because it measures satisfaction with body shape in general (e.g., "I feel satisfied with the shape of my body."), as well as thoughts about specific body regions (e.g., "I think that my stomach is just the right size."). Ten self-report questions are rated, using Garner's original scoring format, on a 6-point scale by how much they apply to the individual: *always* (scored as 3), *usually* (2), *often* (1), *sometimes* (0), *rarely* (0), or *never* (0). Higher summed scores indicate a greater level of body dissatisfaction. Strong internal consistency has been found for adolescent eating-disordered samples ($\alpha s \leq .91$), and test–retest stability for samples of adolescent and adult women is also high ($r = .95$; Garner, 2004). In the present study, the Cronbach's alpha reliability coefficients for the Body Dissatisfaction subscale were acceptable for both mothers and daughters across all three sports (daughters: gymnastics, $\alpha = .85$, cross-country, $\alpha = .88$, softball, $\alpha = .86$; mothers: gymnastics, $\alpha = .90$, cross-country, $\alpha = .92$, softball, $\alpha = .90$).

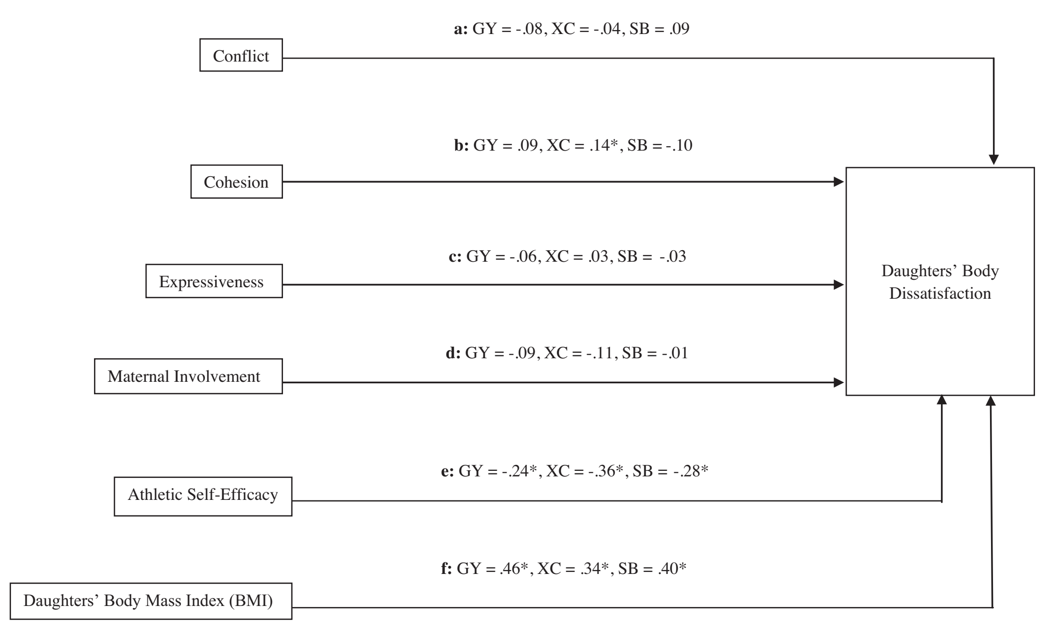

Fig. 2. Path diagram of measured variables including family conflict, cohesion, expressiveness, maternal involvement in sport participation, daughters' body mass index (BMI), and athletic self-efficacy as predictors of daughters' body dissatisfaction (paths a–f). The residual disturbance term for the endogenous variable (i.e., daughters' body dissatisfaction) has been omitted from the figure in order to simplify the diagram. Predictors in the conceptual model were allowed to correlate, but these correlations have also been omitted from the figure to simplify presentation. Parameter estimates for the direct effects in the model were analyzed separately for respondents within each sport type and compared across sports (gymnasts, $n = 202$; cross-country runners, $n = 224$; softball players, $n = 201$). Paths coefficients in the diagram are standardized regression coefficients indicating the strength of the association between the individual predictor variables and daughters' body dissatisfaction. For each path, coefficients are labeled by sport type (GY = gymnastics, XC = cross country, SB = softball). $p < .05^*$.

Family dynamics. The Family Environment Scale (FES; Moos & Moos, 1986) was used to examine daughters' perceptions of their families' interaction patterns. Participants' responses were recorded using a 5-point scoring format: *strongly disagree* (scored as 1), *disagree* (2), *neutral* (3), *agree* (4), and *strongly agree* (5) with higher summed scores indicating a greater level of each respective characteristic. For adolescents, each of the 10 subscales has shown to yield stable scores over an 8-week period (average $r = .80$), and low subscale intercorrelations, suggesting discriminant validity (average $r = .25$; Moos & Moos, 1986).

Three subscales from the FES were used in the present study: Conflict, Cohesion, and Expressiveness. The Conflict subscale assesses how family members typically respond to controversy (e.g., "Family members often criticize each other."), the Cohesion subscale examines the degree of family unity or connectedness (e.g., "Family members really support one another."), and the Expressiveness subscale measures the ability to share your feelings with other family members (e.g., "Family members often keep their feelings to themselves."). Higher summed scores on each of these subscales indicate a greater level of that specific family characteristic. These subscales have yielded acceptable internal consistency scores for samples of adolescents and adults (Conflict: $\alpha = .75$; Cohesion: $\alpha = .78$, Expressiveness: $\alpha = .70$; Moos & Moos, 1986). In the present study, the internal consistency reliability coefficients for these subscales were acceptable across all sport types (Conflict: gymnastics, $\alpha = .74$, cross-country, $\alpha = .74$, softball, $\alpha = .75$; Cohesion: gymnastics, $\alpha = .80$, cross-country, $\alpha = .81$, softball, $\alpha = .74$; Expressiveness: gymnastics, $\alpha = .79$, cross-country, $\alpha = .81$, softball, $\alpha = .80$).

Athletic self-efficacy. Self-efficacy was assessed by the New General Self-efficacy Scale (NGSE; Chen, Gully, & Eden, 2001), an 8-item self-report tool that has been shown to demonstrate internally consistent ($\alpha s \geq .85$) and stable scores across a 2-month period for undergraduates ($r = .62$). This instrument was revised for use in the athletic environment by rephrasing items to reflect experiences related to sport participation (e.g., "I believe I can succeed at most athletic endeavors to which I set my mind."). Each item was scored using a 5-point Likert scale with scale anchors ranging from 1 to 5: *strongly disagree* (1), *disagree* (2), *neutral* (3), *agree* (4), and *strongly agree* (5). Higher summed scores on the NGSE reflect greater athletic self-efficacy. In the present study, the NGSE demonstrated internally consistent scores across all three sports (gymnastics, $\alpha = .88$; cross-country, $\alpha = .91$; softball, $\alpha = .89$).

Design and Analysis

The present study tested two path models of the determinants of girls' body dissatisfaction that included seven predictor variables (mothers' body dissatisfaction, conflict, cohesion, expressiveness, maternal involvement in sport participation, athletic self-efficacy, BMI), using only measured variables in the models (Jaccard & Wan, 1996). Because mothers of some participants chose to not participate in the study, the association between mothers' body dissatisfaction and daughters' body dissatisfaction were examined in a separate path model in order to maximize sample size (see Table 2 and Fig. 1), and the other predictors were examined in another separate path model (see Table 3 and Fig. 2). Maternal involvement in sport participation and BMI were additional predictors included in both path models. Analyzing all predictors of daughters' body dissatisfaction in the same path model would require us either to omit the data of daughters whose mothers did not provide ratings of mothers' body dissatisfaction (which would cut sample size nearly in half) or impute missing maternal responses for more than half of the sample (which is not recommended; Leong & Austen, 2006). Using separate path models not only maximizes sample size and statistical power, but also enhances the external validity of our results for girls. Following established procedures for analyzing structural invariance (Augustus-Horvath & Tylka, 2011), multiple group structural equation modeling (SEM) with tests of model invariance via LISREL 8 (Jöreskog & Sörbom, 1996) was used to examine whether the path coefficients for the seven predictor variables were equivalent in strength across the three sport types (gymnastics, cross country, and softball). Covariance matrices among all variables in the path model were analyzed using maximum-likehood estimation. All predictors in the model were allowed to intercorrelate, but these intercorrelations are not reported because they are not of conceptual interest in this study. Because missing responses were minimal among the daughters' data across both path models, listwise deletion reduced the size of the initial sample of daughters by less than 5%.

Path Analysis with Structural Equation Modeling

Multiple group path analysis via SEM was used to test hypotheses about associations between predictors of body dissatisfaction across sport types within each of the two proposed path models by comparing the strength of path coefficients across sports (Augustus-Horvath & Tylka, 2011; Jaccard & Wan, 1996). As noted earlier, to maximize sample size, one model (see Fig. 1) used responses from both mothers (i.e., mothers' body dissatisfaction) and daughters (i.e., maternal involvement in sport participation, daughters' BMI) to predict daughters' body dissatisfaction; and the other model (see Fig. 2) used responses of daughters only (i.e., conflict, cohesion, expressiveness, maternal involvement in sport participation, athletic self-efficacy, and BMI) to predict daughters' body dissatisfaction. Thus, in predicting daughters' body dissatisfaction, the first path model included 3 path coefficients, and the second path model included 6 path coefficients, so that across the two models 9-pathways were estimated for each of the three sports, producing a total of 9×3, or 27 path coefficients. Fifteen of the 27 path coefficients were statistically significant (gymnastics = 4, or 27%; cross country = 6, or 40%; softball = 5, or 33%).

Structural invariance analyses. Two multiple group models were tested in order to identify differences in path coefficients across sport types. First, the variant model allowed the seven pathways to vary freely in order to estimate different structural paths for each of the three sports. In this analysis, LISREL identified unique path coefficients for each group (Jaccard & Wan, 1996). Second, in the invariant model, we constrained the structural paths to be equal, thus making the value of each pathway in the model to be the same across all three sport types. In this analysis, LISREL determined one set of parameter estimates that best accounted for the covariance structure across the sports. To ensure that the constructs were measured similarly across groups, the factor loadings between groups were constrained, yet the error variances were allowed to vary. The difference between the chi-square values of these two models ($\Delta\chi^2$, with difference in degrees of freedom) was then calculated to determine whether or not the values of the path coefficients differed overall across sport types (Jaccard & Wan, 1996). If the models differ in fit, then a significant difference in the chi-square values would indicate that one or more of the structural paths would differ in strength. If the models do not differ in fit, then the strength of the structural path coefficients would be similar across sports.

As noted earlier, to maximize sample size and generalizability, the variant and invariant models were tested in two separate analyses: (a) the test of the association between mothers' body dissatisfaction and daughters' body dissatisfaction for each of the three sports, and (b) the test of the associations between the remaining predictor variables (conflict, cohesion, expressiveness, maternal involvement in sport participation, athletic self-efficacy, and BMI) with daughters' body dissatisfaction for each of the three sports. Tests of the equivalence of the predictive effects for mothers' body dissatisfaction, BMI, and athletic self-efficacy on girls' body dissatisfaction across sport types were conducted given that these variables have been conceptualized in regard to body features including body image perception, body measurement, and self-confidence in one's physical capability within sport (e.g., Annesi, 2010; Canals et al., 2009; Jones, 2004; Keery et al., 2006; McAuley et al., 2000, 2002; Paxton et al., 2006; Presnell et al., 2004; Wojtowicz & von Ranson, 2012). However, because factors such as maternal involvement in sport participation and family conflict, cohesion, and expressiveness are general measurements of parental support and family dynamics and thus not inherently connected with factors associated with body dissatisfaction, these tests were not conducted given that a strong theoretical basis was not identified for deriving a priori hypotheses for these variables predicting body dissatisfaction across sport types (e.g., Al Sabbah et al., 2009; Beets et al., 2010; Hanna & Bond, 2006; May et al., 2006). In addition to estimating the statistical significance of the differences in the strength of path coefficients across sport types, we also report effect size (w^2; Cohen, 1988) for each comparison of path coefficients. In accord with Cohen (1988) and Johnson (1993), Pearson correlation coefficients (*r*s) were also calculated as indices of effect size for all regression coefficients.

Results

Preliminary Statistical Analyses

Preliminary univariate analyses of variance were conducted to assess differences across sport types on all salient variables (i.e., mothers' body dissatisfaction, conflict, cohesion, expressiveness, maternal involvement in sport participation, athletic self-efficacy, BMI, and daughters' body dissatisfaction, see Table 1). Although group differences were found across many variables, contrary to hypotheses, a main effect was not found for sport type in relation to body dissatisfaction, $F(2, 624) = 1.42$, $p = .242$.

Pathways Between Mothers' Body Dissatisfaction and Daughters' Body Dissatisfaction

We first estimated the variant SEM model that did not constrain the path coefficients to be equal for each sport type, in order to determine the predictive value of mothers' body dissatisfaction, maternal involvement in sport participation, and daughters' BMI in relation to daughters' body dissatisfaction (see Table 2 and Fig. 1). The set of predictors, including mothers' body dissatisfaction and the additional predictors, accounted for the following percentages of variance in daughters' body dissatisfaction: gymnastics = 34%, cross-country = 26%, softball = 34%. For gymnasts, mothers' body dissatisfaction did not significantly predict daughters' body dissatisfaction ($p = .38$). However, mothers' body dissatisfaction was positively related to body dissatisfaction for cross country runners ($p = .02$) and softball players ($p = .001$). Thus, for a one *SD* increase in mothers' body dissatisfaction, daughters' body dissatisfaction is expected to increase by 0.17 *SD* for cross country runners ($\beta = .19$), and by 0.23 *SD* for softball players ($\beta = .26$).

Additionally, maternal involvement in sport participation was inversely related to body dissatisfaction across all sport types (see Fig. 1, path b; $p \leq .001$). These findings indicate that for a one *SD* increase in maternal involvement in sport participation, body dissatisfaction is expected to decrease by 0.29 *SD* for gymnasts ($\beta = -.29$), by 0.26 *SD* for cross country runners ($\beta = -.26$), and by 0.20 *SD* for softball players ($\beta = -.20$). BMI also positively related to body dissatisfaction across all sport types (see Fig. 1, path c; $p \leq .001$). These findings indicate that for a one *SD* increase in BMI, body dissatisfaction is expected to increase by 0.51 *SD* for gymnasts ($\beta = .51$), by 0.34 *SD* for cross country runners ($\beta = .34$), and by 0.52 *SD* for softball players ($\beta = .52$). Because maternal involvement in sport participation and BMI were also assessed within the second path model (see Table 3 and Fig. 2, paths d and f), the test of the equivalence of the predictive effects of BMI on daughters' body dissatisfaction was conducted only once, with the larger sample examined in Fig. 2.

To test the equivalence of the predictive effect of mothers' body dissatisfaction on daughters' body dissatisfaction across sport types, we next estimated the invariant SEM model, which constrained these path coefficients to be equal across sport types. Contrary to hypotheses, a nonsignificant goodness-of-fit statistic emerged, $\Delta\chi^2$ (2, $N = 326$) = 3.41, $p = .18$, $w^2 = .01$, indicating that the strength of the link between mothers' body dissatisfaction and daughters' body dissatisfaction did not significantly differ across sport types.

Model Pathways

We estimated the variant SEM model that did not constrain the path coefficients to be equal for each sport type, in order to determine the predictive value of the family dynamics, athletic self-efficacy, and BMI variables in relation to body dissatisfaction (see Table 3 and Fig. 2). The set of predictors explained the following percentages of variance in daughters' body dissatisfaction: gymnastics = 34%, cross-country = 34%, softball = 28%.

Regardless of sport type, significant effects were not found for family conflict (gymnastics, $p = .19$; cross country, $p = .48$; softball, $p = .13$; see Table 3 and Fig. 2, path a), expressiveness (gymnastics, $p = .36$; cross country, $p = .53$; softball, $p = .67$; see Table 3 and Fig. 2, path c), or maternal involvement in sport participation (gymnastics, $p = .16$; cross country, $p = .07$; softball, $p = .95$; see Table 3 and Fig. 2, path d) in relation to body dissatisfaction. Cohesion was unrelated to body dissatisfaction among softball players ($p = .12$) and gymnasts ($p = .14$); however, cohesion was positively associated with body dissatisfaction among cross country runners (Table 3 and Fig. 2, path b; $p = .02$). Thus, for a one *SD* increase in cohesion, body dissatisfaction is expected to increase by 0.44 *SD* for cross country runners ($\beta = .14$).

Interestingly, BMI was positively related to body dissatisfaction across all sport types (see Fig. 2, path f; $p \leq .001$). These findings indicate that for a one *SD* increase in BMI, body dissatisfaction is expected to increase by 0.46 *SD* for gymnasts ($\beta = .46$), by 0.34 *SD* for cross country runners ($\beta = .34$), and by 0.40 *SD* for softball players ($\beta = .40$).

In summary, across the family dynamics variables, cross country runners reported higher body dissatisfaction if they reported higher family cohesion. Greater BMI was predictive of higher body dissatisfaction across all sport types. The effect sizes for these results ranged from small to large in magnitude (see Table 3).

Athletic self-efficacy was negatively related to body dissatisfaction across all sports (see Table 3 and Fig. 2, path e; *ps* $\leq .001$). These results indicate that for a one *SD* increase in athletic self-efficacy, body dissatisfaction is expected to decrease by 0.24 *SD* for gymnasts ($\beta = -.24$), by 0.36 *SD* for cross country runners ($\beta = -.36$), and by 0.28 *SD* for softball players ($\beta = -.28$). That is, greater athletic self-efficacy predicts less body dissatisfaction among sport participants of all sport types. The effect sizes for these findings were medium in magnitude (see Table 3).

To test the equivalence of the predictive effect of athletic self-efficacy on body dissatisfaction across sport types, we next estimated the invariant SEM model, which constrained these path coefficients to be equal across sport types. Contrary to hypotheses, a nonsignificant goodness-of-fit statistic emerged, $\Delta\chi^2$ (2, $N = 627$) = 1.13, $p = ns$, $w^2 = .002$, indicating that the strength of the

Table 1
Test of group differences across sport types.

Sport type	Gymnastics *M* (*SD*)	Cross country *M* (*SD*)	Softball *M* (*SD*)	*F*(*df*)	*p*
Mothers' body dissatisfaction	16.48 (9.58)	14.25 (9.41)[a]	17.43 (9.02)[b]	3.47 (2, 323)	.030
Conflict	25.30 (2.44)[b]	25.55 (2.40)[b]	19.56 (2.44)[a]	400.11 (2, 624)	.001
Cohesion	20.45 (2.35)[a]	20.80 (2.74)[a]	25.06 (2.44)[b]	210.94 (2, 624)	.001
Expressiveness	22.21 (2.69)[a]	22.36 (2.14)[a]	23.00 (2.26)[b]	6.14 (2, 624)	.002
Maternal involvement	2.71 (0.73)[b]	2.47 (0.87)[a]	2.80 (0.75)[b]	10.37 (2, 624)	.001
Athletic self-efficacy	30.31 (4.78)[a]	30.12 (4.96)[a]	32.98 (4.26)[b]	23.92 (2, 624)	.001
Daughters' BMI	20.96 (2.68)[a]	20.42 (2.40)[a]	22.50 (2.79)[b]	35.51 (2, 624)	.001
Daughters' body dissatisfaction	10.46 (7.46)	10.63 (8.32)	11.68 (7.82)	1.42 (2, 624)	.242

Note. M = mean. *SD* = standard deviation. BMI = body mass index. Different letter superscripts indicate statistically significant between-group comparisons with Bonferroni correction.

Table 2
Results of path analysis using mothers' body dissatisfaction to predict daughters' body dissatisfaction across sport types.

Sport type	*N*	R^2	*b*	*SE*	*β*	*Z*	*p*	*r*	r^2
Gymnastics	101	.34							
Mothers' body dissatisfaction			.06	.07	.07	0.88	.38	.06	.004
Maternal involvement			−3.08	.87	−.29	3.55	< .001	.20	.04
Daughters' BMI			1.46	.24	.51	6.05	< .0001	.46	.21
Cross-country	121	.26							
Mothers' body dissatisfaction			.17	.07	.19	2.38	.02	.09	.01
Maternal involvement			−2.44	.75	−.26	3.25	< .01	.21	.04
Daughters' BMI			1.13	.27	.34	4.26	< .0001	.31	.10
Softball	104	.34							
Mothers' body dissatisfaction			.23	.07	.26	3.27	< .001	.13	.02
Maternal involvement			−2.07	.86	−.20	2.40	< .05	.18	.03
Daughters' BMI			1.32	.21	.52	6.43	< .0001	.47	.22

Note. R^2 = squared multiple correlation, or the proportion of variance in daughter's body dissatisfaction that the set of independent variables explains. *b* = unstandardized regression coefficient. *SE* = standard error. *β* = standardized regression (path) coefficient. *Z* = Wald statistic assessing statistical significance of regression coefficient. *r* = Pearson correlation coefficient as a measure of effect size. r^2 = squared Pearson correlation, or the proportion of variance in daughter's body dissatisfaction that the particular independent variable explains. BMI = body mass index.
[+] $|r| \leq .1$ = small effect size.
[++] $.1 < |r| \leq .3$ = medium effect size.
[+++] $.3 < |r|$ = large effect size.

Table 3
Results of path analysis using family dynamics and athletic self-efficacy to predict daughters' body dissatisfaction across sport types.

Sport Type	*N*	R^2	*b*	*SE*	*β*	*Z*	*p*	*r*	r^2
Gymnastics	202	.34							
Conflict			−0.15	.17	−.08	1.30	.19	.07	.005
Cohesion			0.29	.19	.09	1.48	.14	.10	.01
Expressiveness			−0.15	.17	−.06	0.92	.36	.05	.0025
Maternal involvement			−0.88	.62	−.09	1.41	.16	−.07	.005
Athletic self-efficacy			−0.38	.10	−.24	3.99	<.0001	−.20	.04
BMI			1.27	.16	.46	7.73	<.0001	.39	.15
Cross-country	224	.34							
Conflict			−0.13	.19	−.04	0.70	.48	−.03	.0009
Cohesion			0.44	.18	.14	2.50	.02	.11	.01
Expressiveness			0.13	.21	.03	0.63	.53	.03	.0009
Maternal involvement			−1.03	.55	−.11	1.86	.07	−.09	.008
Athletic self-efficacy			−0.60	.09	−.36	6.54	<.0001	−.29	.08
BMI			1.17	.19	.34	6.15	<.0001	.29	.08
Softball	201	.28							
Conflict			0.30	.20	.09	1.51	.13	.08	.006
Cohesion			−0.32	.20	−.10	1.57	.12	−.08	.006
Expressiveness			−0.09	.21	−.03	0.42	.67	−.02	.0004
Maternal involvement			−0.04	.66	−.01	0.06	.95	−.003	<.0001
Athletic self-efficacy			−0.52	.11	−.28	4.60	<.0001	−.22	.05
BMI			1.11	.17	.40	6.50	<.0001	.29	.08

Note. R^2 = squared multiple correlation, or the proportion of variance in daughter's body dissatisfaction that the set of independent variables explains. *b* = unstandardized regression coefficient. *SE* = standard error. *β* = standardized regression (path) coefficient. *Z* = Wald statistic assessing statistical significance of regression coefficient. *r* = Pearson correlation coefficient as a measure of effect size. r^2 = squared Pearson correlation, or the proportion of variance in daughter's body dissatisfaction that the particular independent variable explains. BMI = body mass index. Values reported for Maternal Involvement and BMI are based on the full sample and differ slightly from those reported in Table 2, which are based only on daughters whose mothers provided body dissatisfaction ratings.
[+] $|r| \leq .1$ = small effect size.
[++] $.1 < |r| \leq .3$ = medium effect size.
[+++] $.3 < |r|$ = large effect size.

link between athletic self-efficacy and body dissatisfaction did not significantly differ across sport types.

Finally, we estimated an invariant SEM model to test the equivalence of the predictive effect of BMI on body dissatisfaction across sport types. Also contrary to hypotheses, the strength of the link between BMI and body dissatisfaction did not differ significantly across sport types, $\Delta\chi^2$ (2, N = 627) = 0.60, $p = ns$, $w^2 < .001$. Tests of the equivalence of the predictive effects for maternal involvement in sport participation and the family dynamics variables on body dissatisfaction across sport types were not conducted because there was no strong theoretical basis for deriving a priori hypotheses.

Discussion

Across all three sport types (esthetic/lean, non-esthetic/lean, and non-esthetic/non-lean), findings in the present study indicated unique, direct associations between predictors and body dissatisfaction. For non-esthetic/lean sport participants (cross country runners), two predictors were associated with female sports' participants' body dissatisfaction: mothers' body dissatisfaction and family cohesion. One unique predictor, mothers' body dissatisfaction, was associated with non-esthetic/non-lean sport participants (softball players). BMI and athletic self-efficacy were predictive of body dissatisfaction for all sport types. Of the 27 pathways in the models, 15 pathways predicted body dissatisfaction.

Mothers' body dissatisfaction was positively associated with daughters' body dissatisfaction for non-esthetic/lean (cross country) and non-esthetic/non-lean (softball) sport participants. Negative body attitudes among mothers of cross country runners and mothers of softball players may indeed be passed on to daughters. This finding provides further support for studies that have noted links between mothers and daughters in regard to body dissatisfaction (e.g., Elfhag & Linné, 2005; Keery et al., 2006; Mizra, Mackey, Armstrong, Jaramillo, & Palmer, 2011; Neumark-Sztainer, Bauer, Friend, Hannan, Story, & Berge, 2010; Steinberg & Phares, 2001; van den Berg, Keery, Eisenberg, & Neumark-Sztainer, 2010). In contrast, mothers' body dissatisfaction and daughters' body dissatisfaction were unrelated for esthetic/lean sport participants (gymnasts). Body attitudes among gymnasts may be shaped by factors other than their mothers' body attitudes, such as individual personality traits, perceptions of athletes within the media, experiences with coaches and peers, and factors unique to the sport itself (Oh, Wiseman, Hendrickson, Phillips, & Hayden, 2012; Smolak et al., 2000).

There were mixed findings for the association between family cohesion and body dissatisfaction. For those who participated in the non-esthetic/lean sport (cross country), high family cohesiveness was linked to greater body dissatisfaction; although it is unclear why this perception would emerge only for this sport. It may be that characteristics of individuals who are attracted to cross country running, in particular, the individualistic nature of running (i.e., as opposed to being in a gym or on a softball field with other teammates), increases the likelihood that others' involvement, including family members, is viewed as intrusive. Also, greater family involvement among runners may increase the likelihood of conversations about thinness. Family cohesion was not associated with body dissatisfaction for either participants of the esthetic/lean sport (gymnastics) or the non-esthetic/non-lean sport (softball). These results suggest the need for future research to more precisely examine daughters' perceptions of their families.

In the present study, girls' reports of family conflict and expressiveness were unrelated to their levels of body dissatisfaction. These results support findings from previous studies that have shown that the combination of multiple factors are better predictors of body dissatisfaction among adolescent girls than the independent direct effects of family factors (e.g., Dunkley, Wertheim, & Paxton, 2001; Ricciardelli & McCabe, 2003; Shroff & Thompson, 2006). Thus, it may be that the combination of family characteristics with other interpersonal factors, altogether contribute to body dissatisfaction among young girls who participate in sport. However, mixed findings were found across both path models for the association between maternal involvement in sport participation and body dissatisfaction. Future examinations of interpersonal factors and body dissatisfaction among high school female sport participants are necessary in order to better understand these associations.

Contrary to expectations, group differences on body dissatisfaction were not found across sport types. This result is consistent with an increasing number of studies that have shown that sport type is not associated with body dissatisfaction among female sport participants (e.g., Haase & Prapavessis, 2001; Hausenblas & Downs, 2001; Smolak et al., 2000). One potential explanation for the absence of effects for sport type is that the sport participants in this study hold reasonably healthy body attitudes. It may also be that body image problems typically associated with esthetic and lean sports have been reduced by heightened awareness of the problem, and more positive attitudes about a range of body sizes participating in these sports by coaches and others, at least at the high school level (Bachner-Melman et al., 2006; Robinson & Ferraro, 2004). Slightly over a decade ago, Smolak et al. (2000) made a similar argument in explaining the lack of effects for esthetic sports on body dissatisfaction in high school girls. Perhaps the sport programs recruited in the present study promote healthy body attitudes among female sport participants by discouraging excessive worry about weight and body image. Among college sport participants, or among more elite athletes, involvement in esthetic and lean sports may produce different effects.

Across all sport types, BMI was predictive of body dissatisfaction, with higher BMI associated with greater body dissatisfaction. These results provide additional evidence, and add to the growing body of literature, that suggests that BMI significantly contributes to body dissatisfaction among young girls who participate in sport (Jones, 2004; Presnell et al., 2004; Wojtowicz & von Ranson, 2012). These findings for BMI, however, did not differ by sport type. That is, even though non-esthetic/non-lean sport participants (softball players) had higher BMI than esthetic/lean (gymnasts) and non-esthetic/non-lean (cross country runners) participants, no significant differences were found across sport type on the body dissatisfaction measure.

As predicted, athletic self-efficacy was related to lower body dissatisfaction among female sport participants. This finding supports previous studies with college athletes that have shown associations between high self-efficacy and high body esteem (Bachner-Melman et al., 2006; Parsons & Betz, 2001). The present findings are also consistent with research that has shown that athletic self-efficacy facilitates self-worth and may reduce psychological distress among women (e.g., Bowker, 2006; Parsons & Betz, 2001).

Limitations and Directions for Future Research

Several limitations of the current study must be recognized. First, it is impossible to determine the causal association between the hypothesized predictors and body dissatisfaction among adolescent female sport participants due to the cross-sectional design. Second, a control group of high school females not involved in sports was not included in this study. It may be that while body dissatisfaction was similar for all sport types, sport participation in general might be related to lower body dissatisfaction, which we are unable to determine from our study. Therefore, future research that includes additional comparison groups, including non-sport participants, is necessary in order to isolate factors and to determine the direction of the relation between parent–child behaviors in association with body dissatisfaction (Stice, 2001).

Because participant data were collected through suburban schools outside a large urban area, it is possible that the findings reflect a special population of sport participants and their mothers. The suburban environment may reflect a category of sport participants who represent a level of race, ethnicity, and socioeconomic status which differs from characteristics of sport participants from metropolitan or rural areas. Also, because only a subset of sport participants' mothers chose to participate in the study, it is possible that the mothers who did participate represent a group who differ in important ways, including levels of body dissatisfaction, from those who chose not to participate.

Although another potential limitation of the present research is the use of self-reported height and weight for the calculation of participant BMI. Past research has shown that self-reported information is strongly correlated with objective participant measurements among adolescents (e.g., Ambrosi-Randic & Bulian, 2007) and college students (e.g., Shapiro & Anderson, 2003). Despite the possibility for adolescents to underestimate their weight and to overestimate their height, the degree of measurement error due to self-report does not appear to influence assessment reliability when compared to objective measurements (Fonseca et al., 2009). Thus, the use of self-report information for assessing BMI within the present study likely functions as an adequate estimate of participant characteristics.

One final variable that was not assessed in the present study, but should be considered in future work, is level of sport participation. A lack of differences between girls participating in esthetic/lean, non-esthetic/lean, and non-esthetic/non-lean sports could be due to the fact that these girls were competing in these sports at a non-elite level. At the elite level, a different pattern may emerge. For example, research has shown that at the elite level college-aged women more likely to show disordered eating and disordered beliefs about appearance than non-athletes (e.g., Taylor & Ste-Marie, 2001). Future research is needed to determine the extent to which elite versus non-elite sport participation at the high school level affects these findings.

Conclusions

Across all sport types, high school females in the present study showed low levels of body dissatisfaction. Furthermore, a direct comparison of EDI-3 scores for our overall sample ($N = 627$) versus Garner's (2004) control sample of non-clinical adolescents ($N = 1074$) revealed that the present sample of female sport participants had a significantly lower mean EDI-3 score than did Garner's non-clinical adolescent sample, $t(1699) = 9.32$, $p < .0001$, $d = 0.47$. Thus, future studies should evaluate the possible protective role of sport activities on body dissatisfaction in this population.

This research also provides evidence that both interpersonal and intrapersonal factors are related to body dissatisfaction in high school female sport participants. Family variables contributed to body dissatisfaction, although these associations varied by sport type. Regardless of sport type, greater levels of maternal body dissatisfaction and daughters' BMI were related to higher levels of body dissatisfaction, whereas athletic self-efficacy was associated with lower body dissatisfaction. The fact that athletic self-efficacy was associated with less body dissatisfaction suggests the need for coaches, parents, and clinicians to promote positive feelings about sport participation among high school females. By encouraging young girls who participate in sports to focus more on the strength and function of their bodies, and less on their weight and body shape, parents and health professionals may help to reduce the risk for body dissatisfaction among adolescent sport participants (Bachner-Melman et al., 2006; Oh et al., 2012; Robinson & Ferraro, 2004; Smolak et al., 2000). Also, by conveying positive attitudes about healthy behaviors as opposed to thinness in regard to sport, young girls may internalize messages that a healthy body is more important than a thin physique for optimal sport performance. Contrary to expectation, participation in esthetic and lean sports was not associated with body dissatisfaction in high school girls. We hope this result helps to highlight the psychological benefits of high school sport participation in a climate that promotes girls' athletic self-confidence.

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