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Body dissatisfaction and disordered eating attitudes in 7- to 11-year-old girls: Testing a sociocultural model

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ABSTRACT

We examined the sociocultural model of body dissatisfaction and disordered eating attitude development in young girls for the first time. According to the model, internalizing an unrealistically thin ideal body increases the risk of disordered eating via body dissatisfaction, dietary restraint, and depression. Girls aged 7–11 years ($N = 127$) completed measures of thin-ideal internalization, body dissatisfaction, dieting, depression, and disordered eating attitudes. Participants' height and weight were measured and their body mass index calculated. Thin-ideal internalization predicted disordered eating attitudes indirectly via body dissatisfaction, dietary restraint, and depression; it also predicted disordered eating attitudes directly. Path analyses showed that a revised sociocultural model fit well with the data. These data show that a sociocultural framework for understanding disordered eating and body dissatisfaction in adults is useful, with minor modifications, in understanding the development of related attitudes in young girls.
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Introduction

For several decades, sociocultural factors have been firmly implicated in the development and expression of body dissatisfaction and disordered eating (Striegel-Moore, Silberstein, & Rodin, 1986). Whilst the societal prevalence of obesity trends upwards, more numerous images of an unhealthily thin, unrealistically proportioned female ideal body populate the visual diet (Nemeroff, Stein, Diehl, & Smilack, 1994; Spitzer, Henderson, & Zivian, 1999). In short, Western females have never been more aware of the socially prescribed thin-ideal and have never been physically further from it (Cusumano & Thompson, 1997).

Children are not immune to these influences; most are exposed to thin beauty ideals before the age of formal schooling (Blowers, Loxton, Grady-Flesser, Occhipinti, & Dawe, 2003; Dittmar, Halliwell, & Ive, 2006). By 6 or 7 years of age, girls' level of awareness of the thin ideal body matches that of girls five or six years their senior (Murnen, Smolak, Mills, & Good, 2003). A wealth of research shows that body dissatisfaction and disordered eating attitudes are also common at this point in childhood, particularly amongst girls (for reviews, see Ricciardelli & McCabe, 2001; Smolak, 2004). Between 40 and 50% of girls aged 7–11 years select an ideal body that is more slender than their current perceived figure (Clark & Tiggemann, 2006; McCabe & Ricciardelli, 2003; Truby & Paxton, 2002). Disordered eating attitudes are reported by 10–20% of girls of this age in school settings (Erickson & Gerstle, 2007; Rolland, Farnhill, & Griffiths, 1997; Sasson, Lewin, & Roth, 1995), encompassing weight concerns (McCabe & Ricciardelli, 2003), fear of fatness (Shapiro, Newcomb, & Loeb, 1997), intentional weight loss behaviours (McCabe, Ricciardelli, & Holt, 2005), and episodes of loss of control over eating (Field, Camarago, Taylor, Berkey, & Colditz, 1999). These interrelated cognitions and behaviours, whilst less serious and vastly more prevalent than full-threshold eating disorders in children (Nicholls, 2004; Nicholls, Lynn, & Viner, 2011), nevertheless threaten girls' growth and nutritional status (Lask & Bryant-Waugh, 2000). They also predict subsequent chronic weight cycling, obesity, depression, and disordered eating (Field et al., 2001, 2002; McVey, Tweed, & Blackmore, 2004; Neumark-Sztainer, Wall, Guo, Story, Haines, & Eisenberg, 2006).

Previous research suggests, then, that girls' disturbances of body image and eating – which were formerly characterized as problems of adolescence – frequently originate well before puberty (Sands, Tricker, Sherman, Armatas, & Maschette, 1997). The process by which these phenomena are differentially experienced and expressed remains under-researched and incompletely understood; specifically, it is not known why certain groups of children are most vulnerable to body dissatisfaction and disordered eating attitudes (Hoek, 1991). The very pervasiveness of cultural standards of thinness means that awareness of them is not a sufficient antecedent to the development of eating and body image disturbance (Polivy & Herman, 2004). Disordered eating attitudes and

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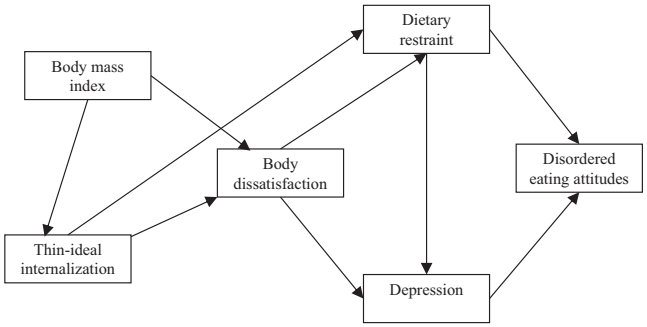

Fig. 1. The sociocultural framework of body dissatisfaction and disordered eating development, incorporating adiposity.

body dissatisfaction are not confined to girls who are, or who risk being, overweight, although both are more common in this group (Ranzenhofer et al., 2008; Smolak, 2004). Further research with girls during middle-childhood is therefore needed to elucidate the sociocultural and psychological context in which body dissatisfaction and disordered eating attitudes develop and operate (Wertheim, Paxton, & Blaney, 2009). Such insights are of considerable value given the threat posed by these phenomena to girls' health, wellbeing, and development. The present research, therefore, sought to characterize and contextualize disordered eating attitudes and body dissatisfaction in a cross-sectional sample of 7- to 11-year-old girls.

To partially account for individual differential vulnerability to disturbances of body image and eating, some researchers have considered thin-ideal internalization, the extent to which one "cognitively 'buys into' socially defined ideals of attractiveness and engages in behaviours designed to produce an approximation of these ideals" (Thompson & Stice, 2001, p. 55). Whilst awareness of the thin-ideal and internalization are necessarily related, thin-ideal internalization accounts for significant additional variance in body dissatisfaction and disordered-eating variables beyond that accounted for by thin-ideal awareness, indicating distinctness (Heinberg, Thompson, & Stormer, 1995). Thin-ideal internalization is a discriminating predictor of body dissatisfaction and disordered eating attitudes, particularly amongst adolescent girls (Groesz, Levine, & Murnen, 2001; Heinberg et al., 1995; Stice, Ng, & Shaw, 2010). However, relatively few studies have focused upon sociocultural factors and body dissatisfaction in girls below the age of 12 years and those that have, have not simultaneously assessed disordered eating attitudes (Blowers et al., 2003; Brown & Slaughter, 2011; Dittmar et al., 2006; Murnen et al., 2003; Phares, Steinberg, & Thompson, 2004). The present study sought to address this research need by examining girls' eating attitudes, body dissatisfaction, and adiposity within a network of related variables known collectively as the sociocultural model (Stice, 2001).

The sociocultural model – one of the most thoroughly supported models of disordered eating – originally described the development of bulimic symptoms, but has since been applied to a range of clinical and non-clinical pathological behaviours around food (Thompson & Stice, 2001). It proposes that thin-ideal internalization leads to body dissatisfaction and thence to an increased risk of disordered eating attitudes via two distinct 'pathways': dietary restraint and depression. Elevated adiposity also acts upon this process, contributing to initial variance in both thin-ideal internalization and body dissatisfaction (Stice & Shaw, 2002). Fig. 1 depicts the sociocultural model, incorporating the influence of adiposity.

Despite the prevalence of disordered eating attitudes amongst young girls, most of the more than 200 studies examining the sociocultural model involve adults and adolescents. There are challenges inherent in measuring the components of the sociocultural model in girls as young as 7 years; tests must be simple and comprehensible, reliable and sensitive enough to show individual variation, and they must exhibit construct validity with the age group in question (Kelly, Ricciardelli, & Clarke, 1999). The use of a range of measurement techniques that meet these criteria has shown that the years between 7 and 11 see the emergence of key concepts and behaviours around food and the body. Thin-ideal internalization has been reported, and the construct validated, in girls as young as 6 years old (Murnen et al., 2003). By 7 years old, girls can reliably report a range of their own eating behaviours (Van Strien & Oosterveld, 2007). By 8 years of age, girls are knowledgeable about the meaning and methods of weight loss strategies, including dietary restraint, increased exercise, and healthy food choices (Schur, Sanders, & Steiner, 2000); by 9 years of age, girls report dietary restraint in proportion to their measured body mass index (BMI; Shunk & Birch, 2004). During these years, to a greater extent than over any preceding period of childhood, considerable proportions of children gain weight to the extent that they become either overweight or obese (Whitaker, Pepe, Wright, Seidel, & Dietz, 1998). Furthermore, many of the individual relationships in the sociocultural model can be observed in this age group. Thin-ideal internalization, for instance, has been shown to partially mediate the relationship between body dissatisfaction and BMI in girls aged 9–12 years (Sands & Wardle, 2003).

Due to its high prevalence, dietary restraint is not a particularly discriminating predictor of disordered eating attitudes on its own (Stice et al., 2010). In adolescents it may, however, mediate the relationship between body dissatisfaction and disordered eating attitudes (Stice, 2002; Stice & Shaw, 2002). Although this mediational relationship has not yet been tested in children, girls' body dissatisfaction at 5 and 7 years of age has been shown to predict subsequent dietary restraint at 9 years old (Davison, Markey, & Birch, 2003) which, in turn, is associated with disordered eating attitudes from 8 years of age (Maloney, McGuire, Daniels, & Specker, 1989). Additionally, in young adult and adolescent females (Stice, 2001; Stice, Mazotti, Weibel, & Agras, 2000), dietary restraint mediates the relationship between thin-ideal internalization and disordered eating attitudes, even in the absence of body dissatisfaction, due to the wish to attain a socially desirable figure (Stice, 2002). Previous research has not examined whether a similar relationship exists in younger girls.

Body dissatisfaction may also lead to disordered eating attitudes by the second of the two pathways shown in Fig. 1, depression (Field et al., 2001; Stice, 2001). In 8-year-old girls, Phares et al. (2004) found that body dissatisfaction was associated with depression, which itself was associated with disordered eating attitudes. The original sociocultural model also posits that dietary restraint predicts depression, as shown in Fig. 1 (Stice & Bearman, 2001). Evidence for this relationship is both limited and mixed in adults and adolescents (Chen, McCloskey, & Keenan, 2009; Stice, 2001; Stice, Hayward, Cameron, Killen, & Taylor, 2000). For example, Stice (2001) found that negative affect and dietary restraint fully mediated the prospective relationship between body dissatisfaction and disordered eating attitudes, directly supporting the dual-pathway model, but failed to find the significant relationship between the two that the sociocultural model posits. In contrast, Sinton and Birch (2005) found that depression in 5- and 7-year-old girls prospectively predicted subsequent dietary restraint although initial dietary restraint was not taken into consideration.

Finally, there is evidence from research with adolescents that thin-ideal internalization influences eating attitudes directly, even when its relationship with intervening variables such as dietary restraint is taken into account (Field et al., 2001; Stice & Agras, 1998; Stice, Presnell, & Spangler, 2002). This pathway does not feature in the original sociocultural model but does feature in a recent extension of it with girls aged 12–14 years (Vander Wal,

Gibbons, & Grazioso, 2008). In intervention studies (e.g., Stice, Marti, Rohde, & Shaw, 2011), reductions in thin-ideal internalization have prospectively predicted reductions in disordered eating symptoms. This notwithstanding, some studies have not shown a direct link between the variables, and this relationship has not been examined in girls aged younger than 12 years (Rodgers, Paxton, & Chabrol, 2009; Wichstrøm, 2000).

As regards age differences in the component variables of the sociocultural model, several cross-sectional studies report lower levels of disordered eating attitudes in older children within the 7- to 11-year-old age group (Flannery-Schroeder & Chrisler, 1996; Smolak & Levine, 1994). The broad participant age range in the current study was purposefully selected to span middle-childhood and to highlight any age-related trends in component variables that previous studies, with narrower participant age ranges, may have failed to detect. Previous research indicates no clear trends in the relationship between age and body dissatisfaction (Smolak, 2004), thin-ideal internalization (Murnen et al., 2003; Sands & Wardle, 2003), dietary restraint (Van Strien & Oosterveld, 2007), or depression (Twenge & Nolen-Hoeksema, 2002). Adiposity reliably increases with age in 7- to 11-year-olds (Cole, Flegal, Nicholls & Jackson, 2007). On the basis of this prior research we expected to find the highest levels of disordered eating attitudes in the youngest children in our sample, to see the inverse trend for adiposity, and to find that the remainder of the variables were age-invariant.

The aims of the current study were to, firstly, describe levels of thin-ideal internalization, body dissatisfaction, dietary restraint, depression, and disordered eating attitudes in girls 7–11 years of age. Secondly, we aimed to examine the extent to which the sociocultural model successfully predicts the relationships between these variables in this population.

Method

Participants

The study utilized a sample of 127 girls aged 7–11 years from seven schools in north east England, of which six were state-run and one was privately run. Four state-run schools were selected from areas of high material deprivation as indicated by an uptake of free school meals above 30% ($n = 75$). The remaining two state schools were in areas of low material deprivation with uptake of free school meals below 7%, and the private school did not provide free school meals to any of its pupils ($n = 52$). All the children were Caucasian except for one of British-Asian heritage. All participants had written consent from their caregiver and assented to participation themselves.

Measures

Adiposity. To assess adiposity, participants were weighed and measured, wearing light indoor clothing and no shoes. Weight was measured accurate to 100 g using SECA 835 portable electronic scales. Repeated measurements were taken until the same weight value was obtained twice. Height was measured accurate to 0.1 cm using a portable Leicester Height Measure, with the head positioned on the Frankfort plane. BMI values were calculated (weight (kg)/height (m)^2).

Body dissatisfaction. Participants' body dissatisfaction was assessed using a novel computer-based figure-choice scale (Evans & Tovée, 2012). Participants selected a figure that they considered most resembled their own (*perceived*) and one they most wished to resemble (*ideal*). The computer program recorded data about the exact lateral position of the cursor on the screen when the participant 'clicked' to endorse a figure. Cursor position ranged from −50 frames to +50 frames and changes in cursor position give rise to changes in the adiposity of the figure displayed. As such this represented a sensitive interval-level figure-choice measure which, nevertheless, permitted the simulated BMI of the figure chosen to be specified. The discrepancy between the two recorded positions was used to indicate the direction and extent of body dissatisfaction where a negative difference indicated a smaller ideal body than perceived.

The initial figure showed a young photorealistic female, generated in Daz Studio 3.1 Version 9 (http://www.daz3d.com) to reflect the proportions of a 9.5-year-old girl (Victoria 4.2 Model) using the "youth" scale on the Morphs++ package. The body shape of this figure was altered to create a continuum of body shapes simulating 12 different adipose levels, which were then rendered and exported as 24-bit colour BMP image files (567 × 846 pixels) for use as stimuli.

The body volume of each figure was measured by exporting each three-dimensional body model into Autodesk 3ds Max Version 8 (http://www.usa.autodesk.com) as a wavefront object, assuming the body had a height of 1.4 m (the average height of the participants in this study). Weight was then estimated, assuming that the bodies had an average density of 1.1 g/cm^3 (Durnin & Taylor, 1960), from which BMI could then be calculated. The figures corresponded consecutively to BMIs on the 2nd, 5th, 10th, 20th, 35th, 50th, 65th, 75th, 85th, 90th, 93rd and >95th percentiles of the Center for Disease Control (CDC) reference (Ogden et al., 2002) for girls aged 9.5 years. The face-on figures shared the same facial 'identity' and wore identical one-piece swimsuits. Unlike similar paper-based scales, which display a sequential array of figures, only one version of the figure was shown on the computer screen. Participants adjusted the dimensions of the figure to resemble their perceived and ideal body size by moving the computer mouse. This increased or decreased the size of the body on view depending on whether the mouse was moved to the left or right, enabling the participant to move up or down the BMI range of the twelve images. Between participants, both the left/right directionality of the size change and the order in which the participant was asked to identify their perceived and ideal figures was randomized. Participants completed a practice trial to familiarize themselves with the paradigm before undertaking the task.

During scale validation, a subsample of children completed a modified version of the task, in which they estimated each dimension twice in succession, resulting in good internal consistency values for ideal ($\alpha = .80$) and perceived ($\alpha = .92$) figure (Evans & Tovée, 2012). Two week test–retest reliability values for ideal ($r = .68$) and perceived ($r = .69$) figure were found to be adequate. These test–retest data are comparable to those obtained with populations of a similar age (Collins, 1991; Truby & Paxton, 2008). Body dissatisfaction scores showed good convergent validity ($r = .70$) with those derived from another figure-choice body dissatisfaction scale (Truby & Paxton, 2002). We elected to use this novel computer-based scale because, in keeping with recent recommendations, it provided a greater number of figures from which to choose than did pre-existing alternatives, thus maximizing scale sensitivity (Gardner & Brown, 2010). In addition, the figures were more realistic than those featured in similar scales (e.g., Collins, 1991), because their adipose variation was based upon anthropometric data rather than an artist's impression. Moreover, images were displayed in full colour and they depicted three-dimensional, rather than two-dimensional, figures.

Thin-ideal internalization. Thin-ideal internalization was assessed using the internalization subscale of the simplified version of the Sociocultural Attitudes Towards Appearance Questionnaire (SATAQ-I; Heinberg et al., 1995) modified by Smolak, Levine, and Thompson (2001). Participants indicated their agreement with seven positively keyed items using a Likert scale that ranged from 1 (*strongly disagree*) to 5 (*strongly agree*). The subscale denotes

internalization, and an example item is, "Photographs of thin women make me wish I was thin". In this sample, the internal consistency α value for the Internalization subscale was .82. This scale has been previously used with participants aged 6 years and above (Murnen et al., 2003). We adopted the same adaptations as did Sands and Wardle (2003) for this young, British population. Standard definitions were provided for words identified as potentially problematic. Age- and culturally-appropriate names of popular magazines were also substituted for the American originals.

Disordered eating attitudes. Disordered eating attitudes were assessed using the Children's Eating Attitude Test, the ChEAT (Maloney et al., 1989), adapted from the abbreviated adult Eating Attitudes Test (Garner & Garfinkel, 1979). This 26-item scale, suitable from age 7 years, addressed concerns about being overweight, binging and purging symptoms, and food pre-occupation (e.g., "I feel very guilty after eating") using a 6-point Likert scale from '6' (*always*) to '1' (*never*). The three most incrementally symptomatic responses for each item were scored 1, 2, and 3, whilst the remainder received zero. Three week test–retest reliability (r) is satisfactory at .81 (Maloney, McGuire, & Daniels, 1988). Internal consistency was .87 in the present sample.

Dietary restraint. Dietary restraint was assessed using the 7-item Dutch Eating Behaviour Questionnaire for Children Restraint subscale, the DEBQ C-R (Van Strien & Oosterveld, 2007). The scale is suitable for children aged 7–12 years. Participants responded *no*, *sometimes*, or *yes* to positively keyed questions scoring 1, 2, or 3 respectively (e.g., "Do you intentionally (on purpose) eat food that makes you lose weight?"). A comparison of the subscale with similar measures of dietary restraint indicated adequate construct validity of $\alpha = .80$ (Van Strien & Oosterveld, 2007). An internal consistency coefficient of $\alpha = .70$ was obtained with the present sample.

Depression. Depression was assessed using the Child Depression Inventory Short Form, the CDI-S (Kovacs, 1992), a simplified version of the Beck Depression Inventory (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) suitable for children from 7 years old. It has 10 items, each comprising three statements. The participants selected the single statement out of 3 that best describes the way he/she has felt during the preceding two weeks (e.g., "I do most things okay", "I do many things wrong", "I do everything wrong"), assigned 0, 1, or 2 from least to most symptomatic. The CDI-S is strongly correlated ($r = .90$) with the longer version of the CDI ($N = 1266$; Kovacs, 1992). In the present sample, an internal consistency value of .91 was obtained.

Procedure

The study received approval from Durham University departmental Ethics Committee. Participants completed the questionnaires in groups of eight children or fewer, seated in a quiet classroom during the school day with a teacher or teaching assistant present. Data collection took place during a single session which lasted between 60 and 120 min including two breaks of 20 min to prevent participant fatigue. Participants received written and verbal information about the study and signed a form to indicate their assent. The investigator then read aloud each questionnaire item to the whole group, permitting time for participants to respond and ask questions. Simple standard definitions and/or paraphrasing of potentially problematic terms and ideas were provided in conjunction with the relevant scale/item.

At periodic intervals during the course of the testing session, participants left their seats one-by-one to join the investigator at a computer terminal positioned at one side of the testing room. There, they received verbal and written instructions to enable them to complete the computer-based body dissatisfaction task. Their responses could not be overseen by the rest of the group. Participants were also weighed and measured individually in the presence of another adult. The height measure and weighing scale display were obscured from view although participants received feedback about their weight or height upon request. Upon completion of the study the girls participated in a debriefing session and discussion of the study's purpose, during which any remaining questions were answered. Finally, participants received additional information about the study to read and take home, a certificate of thanks, and a novelty sticker.

Results

Sample Characteristics

Out of a potential participant population of 374, the parents or guardians of 130 girls gave their consent of which three were absent on the day of testing. Overall, this reflected a 33.9% participation rate and a 34.8% response rate. The mean age of participants on the day of testing was 9 years and 6 months ($SD = 14$ months) and ranged from 7 years and 9 months to 11 years and 10 months. The sample comprised twelve 7-year-olds, thirty-eight 8-year-olds, thirty-six 9-year-olds, twenty-five 10-year-olds, and sixteen 11-year-olds.

BMI data were classified using CDC centile cut offs for underweight, normal weight, overweight, and obesity (Ogden et al., 2002). Using these cut-offs one participant was categorized as thin (<1%), 82 participants were of healthy weight (64%), 29 were overweight (23%), and 15 were obese (12%).

Data Screening and Preliminary Analyses

Univariate data were screened for outliers, floor and ceiling effects, and missing data. Fewer than 2% of the data were missing. Data were also examined for normality, and logarithmic transformations were used to correct for positive skew in BMI, depression, and disordered eating attitudes. Item 6 on the CDI-S ("I look ugly") was removed as it may have falsely inflated the amount of shared variance between the CDI and the body size satisfaction scale. Means and standard deviations for each of the key variables are shown in Table 1.

On average, participants identified an ideal body at least one size smaller than their perceived body on the body dissatisfaction scale. The ideal body typically selected by participants corresponded to a BMI of 15 kg/m^2, which represents a point just below the 25th percentile in the CDC reference for girls aged 9.5 years. Seventy-nine girls (65%) identified a smaller ideal body than their own (perceived) body, whilst 21 chose one the same size (17%), and 22 chose a figure that was larger than their own (18%).

Table 1 shows the associations between the component variables of the sociocultural model. Almost all variables showed a significant association with one another, except BMI with depression. For disordered eating attitudes, particularly strong positive associations were seen with depression and thin-ideal internalization. Body dissatisfaction was most strongly negatively associated with BMI. Age was weakly positively associated with BMI and disordered eating attitude score.

The following items are illustrative of the frequency of responses given to the battery of scales. Of 125 respondents on the SATAQ-I, 72 agreed that they would like to look like the models in the magazines they read (58%) but only 56 agreed that seeing photographs of thin women explicitly made them wish that they were thin (44%). Responses to the DEBQ-R indicated that dietary restraint was common, with 69 girls stating that they did, or did sometimes, restrict food intake in order to avoid gaining weight (55%). In contrast, high depression (CDI-S) scores (>9) were not common amongst the

Table 1
Means, standard deviations, and intercorrelations for the study's variables.

	1	2	3	4	5	6	7
1. Age	–						
2. BMI (kg/m^2)	.21*	–					
3. Body dissatisfaction	−.09	−.42***	–				
4. Thin-ideal internalization	−.03	.33***	−.37***	–			
5. Disordered eating attitudes	−.19*	.18*	−.34***	.54***	–		
6. Dietary restraint	.03	.24**	−.33***	.33***	.48***	–	
7. Depression	−.06	.09	−.27**	.22*	.51***	.18*	–
Mean	9.5	18.6	−10.3	24.2	18.7	1.9	4.6
SD	1.0	3.0	17.6	7.6	14.3	0.5	4.1

Note. $N = 125$. All correlations are Pearson's r and represent transformed values.
* $p < 05$.
** $p < .01$.
*** $p < .001$.

sample (9%). Few ChEAT respondents reported engaging in purging behaviours such as vomiting ($n = 6$, 5%) but a far higher number reported worries about food choices, e.g., 59 reported considering the energy/calorie content of food before they ate it (47%).

Testing the Sociocultural Model

Model 1 comprised the original model as shown in Fig. 1. Models 2 and 3 introduced minor modifications to the original based on previous research and statistical significance. At each stage the model was assessed for its fit with the data using path analytic techniques. In contrast to multiple regressions, exploratory path analysis indicates the size of associations in the context of all other variables as well as a comparison of the observed and the predicted data matrices. The fit between the data and the models was assessed using the generalized least squared (GLS) estimation method of path analysis with the AMOS 17^{TM} statistical package, in keeping with the recommendations made for small sample sizes by Fan, Thompson, and Wang (1999). Maximum-likelihood estimation (ML) was used to handle missing data as recommended by Schafer and Graham (2002).

Fit Indices

Multiple goodness-of-fit indicators were reported for each model. The χ^2, corresponding *df*, and CFI were reported. A non-significant χ^2 value ($p > .05$) indicates close fit (Bollen, 1989), as does a Comparative Fit Index (CFI) value at or above .95 (Hu & Bentler, 1999). The Tucker–Lewis Index (TLI), unlike the CFI, is non-standardized and was also reported. As with the CFI, TLI values above .95 indicate good fit. In addition, on the recommendation of MacCallum and Austin (2000), the Root Mean Square of Estimation (RMSEA) was reported. A RMSEA value < .05 and corresponding narrow confidence intervals were taken to indicate good fit. The significance of change in the χ^2 value between models was also reported relative to change in the model *df*.

Model parsimony was also a key requirement – the model should contain the minimum possible number of paths between variables. Consequently, a path was deleted if it did not make a statistically significant ($p < .05$) contribution to the overall model. This was assessed using both the significance of the beta coefficient and the significance of the change to the χ^2 value when the path was omitted or reintroduced. The ratio of the χ^2 value to the *df* should be around 1. A ratio higher than 2 indicated an unsatisfactory model in which too many paths had been dropped.

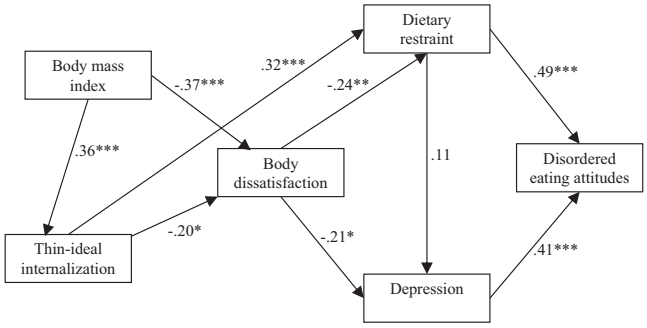

Fig. 2. Model 1: the sociocultural framework of body dissatisfaction and disordered eating development, incorporating adiposity. Path values represent standardized regression coefficients. $^{*}p < .05$, $^{**}p < .01$, and $^{***}p < .001$.

Model Comparison

Table 2 sets out the fit indices for each model. The fit indices for Model 1 – the original sociocultural model incorporating adiposity – indicated a model that did not provide an acceptable fit to the data. The χ^2 value was significant, whilst the CFI, TLI, and RMSEA values were not within the acceptable ranges. The model and its parameter coefficients are shown in Fig. 2. Scrutiny of the parameter coefficients showed that each path functioned in the expected direction and accounted for a significant proportion of variance ($p < .05$) except the path between dietary restraint and negative affect ($p = .27$). Model 1 accounted for 42% of variance in disordered eating attitudes and 23% of variance in body dissatisfaction.

Table 2
Fit indices for Models 1–3.

Model	χ^2	*df*	CFI	TLI	RMSEA	90% CI	$\Delta\chi^2$
1	23.16***	6	.72	.31	.15	.09–.22	
2	24.60***	7	.72	.39	.14	.08–.20	1.44
3	4.54	6	1.00	1.06	.00	.00–.10	−20.06***

Notes. CFI = comparative fit index; TLI = Tucker–Lewis index; RMSEA = root mean square error of approximation. Model 1 (Fig. 2) = original, predicted model; Model 2 (not shown) = Model 1 with path between dietary restraint and negative affect deleted; Model 3 (Fig. 3) = Model 2 with path between thin-ideal internalization and disordered eating attitudes added.
*** $p < .001$.

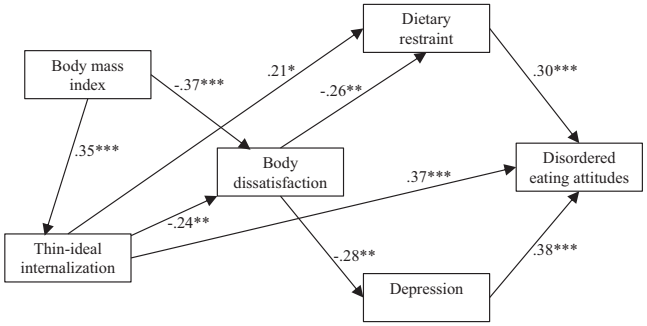

Fig. 3. Model 3: the sociocultural framework with nonsignificant path removed, and additional path. Path values represent standardized regression coefficients. $^{*}p < .05$, $^{**}p < .01$, and $^{***}p < .001$.

Model 2 (not shown) consisted of Model 1 with the nonsignificant path between dietary restraint and negative affect removed. The fit indices indicated a slight improvement to the model (increased TLI and decreased RMSEA) but all values remained outside the required boundaries (see Table 2). All parameter coefficients for the paths in Model 2 were significant.

Model 3, shown in Fig. 3, introduced an additional link between thin-ideal internalization and disordered eating attitudes on the basis of previous findings with young populations (Vander Wal et al., 2008). The resulting model showed excellent fit indices (see Table 2). All the individual parameters of Model 3 were statistically significant. The fit statistics included a large and nonsignificant p value for the χ^2 statistic, and optimal CFI and TLI values. The RMSEA value was also optimal and had a narrow associated 90% confidence interval. Model 3 accounted for 50% of variance in disordered eating attitudes and 23% of variance in body dissatisfaction.

Discussion

Despite considerable recent research attention, the way in which sociocultural, physical, and psychological factors interact to place certain girls at greatest risk of body dissatisfaction and disordered eating attitudes has remained substantially unelucidated. This study sought to explore these interactions in a preadolescent sample using, as a template, the well-supported adult sociocultural model of disordered eating development (Stice & Agras, 1998). Our findings strongly support the usefulness of this framework as a starting point for understanding the probabilistic development of eating and body image disturbance in 7- to 11-year-old girls. Furthermore, our findings support the premise that many of the processes underlying disturbances of eating and body image in young girls are largely established well before adolescence (Clark & Tiggemann, 2006; Sands & Wardle, 2003), possibly even by the age of 7 years.

Previous authors have hypothesized that early exposure to an obesogenic environment in which extreme thinness is highly valued may result in the rapid emergence of thin-ideal internalization and body dissatisfaction in childhood, particularly amongst overweight girls (Gordon, 2000). In keeping with this, we found thin-ideal internalization and body dissatisfaction at similar levels to those found in older samples (Sands & Wardle, 2003; Smolak et al., 2001) and slightly higher than those found by Murnen et al. (2003). Moreover, scrutiny of the path analytic relationships shown in Fig. 3 shows that measured BMI predicted body dissatisfaction both directly and via thin-ideal internalization. This was in keeping with the sociocultural model and with findings from older children (Sands & Wardle, 2003). Therefore, girls with elevated adiposity experienced elevated levels of body dissatisfaction – an almost ubiquitous finding (see Smolak, 2004) – and some but not all of that dissatisfaction could be accounted for by thin-ideal internalization. This prompts one to consider whether age-related increases in adiposity explained its relationship with body dissatisfaction and thin-ideal internalization. However, age's significant relationship with BMI, but not with the latter two variables, indicated that it cannot account for the relationship. Instead, being of elevated adiposity relative to one's age group appeared to explain greater thin-ideal internalization and body dissatisfaction in these girls.

In keeping with numerous previous studies (Ricciardelli & McCabe, 2001), however, we found that body dissatisfaction was not confined to overweight or obese participants, nor indeed those who perceived themselves to be overweight. Specifically, the average ideal figure chosen was extremely slender, and had lower levels of simulated adiposity than either the girls' perceived or measured adiposity. The significant relationships depicted in Fig. 3 show that body dissatisfaction partially mediated the path between thin-ideal internalization and dietary restraint. This mediational role corresponds to findings with adolescent and adult females (Stice, 2001; Stice, Hayward, et al., 2000; Stice, Mazotti, et al., 2000) but has not, to our knowledge, been previously reported in young children. Dietary restraint in pursuit of the thin-ideal, therefore, appears to be possible even in the absence of reported body dissatisfaction. To account for this, Stice (2002) suggested that social approval may motivate dieting efforts without explicit discontent with one's perceived body.

Turning to disordered eating attitudes themselves, the mean level in this sample was higher than is typical of general-population samples of children (e.g., Lattimore & Halford, 2003; McVey et al., 2004). However, the current participants were both younger and more overweight than most previous samples, limiting comparability. As hypothesized, younger girls reported slightly higher levels of disordered eating attitudes than older girls, in keeping with previous findings. Explanations for this include the limitations of the ChEAT itself (Erickson & Gerstle, 2007) or genuine reductions in eating pathology that occur over the pre-adolescent period. Participants' depression scores were also towards the higher end of the normal range seen previously in young girls (Banerjee & Watling, 2010). In contrast, the mean dietary restraint score was similar to that obtained from the scale's normative population (Van Strien & Oosterveld, 2007).

As shown in Fig. 3, dietary restraint and depression fully mediated two separate paths between body dissatisfaction and disordered eating attitudes, in keeping with the dual pathway model (Stice, 2001). Theoretically, body dissatisfaction motivates weight reduction intentions (dietary restraint) which may lead to disordered eating behaviours as more extreme weight reduction efforts are exerted (Stice, 2002). Body dissatisfaction might also result in depression due to the salience of appearance in girls' self-evaluation, leading to disordered eating behaviours as a strategy to relieve negative affect (Stice & Agras, 1998). The relationships between body dissatisfaction, depression, and disordered eating attitudes were similar to those found by Phares et al. (2004) in their sample of 8- to 10-year-old girls. The dietary restraint pathway has not, to our knowledge, been reported before in young children although it corresponds to findings with adults (Stice, 2001).

When examining the model as a whole, path analyses indicated that the original model (Model 1, see Fig. 2) provided a poor fit to the data. Notably, the path between dietary restraint and depression did not significantly contribute to the model, although it was in the predicted direction. Notwithstanding equivocal evidence for the significance of this pathway in studies of adults and adolescents (Chen et al., 2009; Stice, 2001; Stice, Hayward, et al., 2000) it may be that the pathway is not important amongst preadolescents. The additional path that was introduced to the model between thin-ideal internalization and disordered eating attitudes (Model 3; see Fig. 3) is not a feature of Stice's (2001) original model, but nor is

it without precedent. In a number of previous studies with adults and older children (e.g., Heinberg et al., 1995; Vander Wal et al., 2008) thin-ideal internalization has accounted for unique variance in disordered eating above and beyond that explained by the other variables in the model. It has been suggested that expectations of the benefits of being extremely thin – such as social acceptance and self-esteem – are necessarily internalized alongside the thin-ideal (Thompson & Stice, 2001). Fears of the consequences of not being thin – such as social rejection, failure, and loneliness – are also internalized with the thin-ideal (Harrison, 2001). It is feasible that these cognitions motivate pathological eating behaviours even in the absence of elevated BMI, body dissatisfaction, dietary restraint, or depression. This addition to the model, therefore, is both empirically and theoretically justifiable.

Because the sample size was small and the design cross-sectional, extension and replication of these findings in a larger, longitudinal study is required before any prognostic inferences can be drawn. The use of an exploratory path analytic approach leaves open an increased possibility of a Type I error. Although the authors purposefully recruited participants from schools in areas that varied widely in their material affluence, the study's low participation rate (34.8%) limits the extent to which the sample was socially representative of contemporary preadolescents. This notwithstanding, the prevalence of obesity and overweight in the sample closely resembled the national and regional prevalence (National Health Service Information Centre, 2011).

The prevalence of body dissatisfaction and disordered eating attitudes in the 7- to 11-year-old age group is well-documented, as are their concomitant and prospective risks to girls' well-being and development. The present study has contributed to the growing literature on how body image and eating disturbance develop by examining the sociocultural model for the first time in a preadolescent population. Support was found for the role of thin-ideal internalization in predicting disordered eating attitudes, both directly and indirectly, via body dissatisfaction, dietary restraint, and depression. Adiposity predicted body dissatisfaction, partially mediated by thin-ideal internalization. The sociocultural model, with minor modifications, provides a useful and well-fitting account of the expression of body dissatisfaction and disordered eating attitudes in this group. These findings suggest that eating attitude and body image intervention programs (e.g., Stice et al., 2011) might profitably focus upon younger girls than has previously been considered necessary given that the 'building blocks' of disordered eating patterns appear to be in place several years before the onset of puberty. They also suggest that girls that are overweight or obese, and who internalize the socially prescribed thin ideal body to a high degree, may be particularly vulnerable to experiencing body image and eating disturbances.

References

Banerjee, R., & Watling, D. (2010). Self-presentational features in childhood social anxiety. *Journal of Anxiety Disorders*, *24*, 34–41.

Beck, A. T., Ward, C., & Mendelson, M. (1961). An inventory for measuring depression. *Archives of General Psychiatry*, *4*, 561–571.

Blowers, L. C., Loxton, N. J., & Grady-Flesser, M. (2003). The relationship between sociocultural pressure to be thin and body dissatisfaction in preadolescent girls. *Eating Behaviors*, *4*, 229–244.

Bollen, K. A. (1989). *Structural equations with latent variables*. New York, NY: Wiley.

Brown, F. L., & Slaughter, V. (2011). Normal body, beautiful body: Discrepant perceptions reveal a pervasive 'thin ideal' from childhood to adulthood. *Body Image*, *8*, 119–125.

Chen, E. Y., McCloskey, M. S., & Keenan, K. E. (2009). Subtyping dietary restraint and negative affect in a longitudinal community sample of girls. *International Journal of Eating Disorders*, *42*, 275–283.

Clark, L., & Tiggemann, M. (2006). Appearance culture in nine- to 12-year-old girls: Media and peer influences on body dissatisfaction. *Social Development*, *15*, 628–643.

Cole, T. J., Flegal, K. M., & Nicholls, D. (2007). Body mass index cut offs to define thinness in children and adolescents: International survey. *British Medical Journal*, *335*, 194–202.

Collins, M. (1991). Body figure perceptions and preferences among pre-adolescent children. *International Journal of Eating Disorders*, *10*, 199–208.

Cusumano, D., & Thompson, J. (1997). Body image and body shape ideals in magazines: Exposure, awareness, and internalization. *Sex Roles*, *37*, 701–721.

Davison, K., Markey, C. N., & Birch, L. L. (2003). A longitudinal examination of patterns in girls' weight concerns and body dissatisfaction from ages 5 to 9 years. *International Journal of Eating Disorders*, *33*, 320–332.

Dittmar, H., Halliwell, E., & Ive, S. (2006). Does Barbie make girls want to be thin? The effect of experimental exposure to images of dolls on the body image of 5- to 8-year-old girls. *Developmental Psychology*, *42*, 283–292.

Durnin, J., & Taylor, A. (1960). Replicability of measurements of density of the human body as determined by underwater weighing. *Journal of Applied Physiology*, *15*, 142–144.

Erickson, S. J., & Gerstle, M. (2007). Developmental considerations in measuring children's disordered eating attitudes and behaviors. *Eating Behaviors*, *8*, 224–235.

Evans, E., & Tovée, M. (2012). *A computer-based body morphing technique to assess children's body dissatisfaction*. Manuscript in preparation.

Fan, X., Thompson, B., & Wang, L. (1999). Effects of sample size, estimation methods, and model specification on structural equation modeling fit indexes. *Structural Equation Modeling*, 56–83.

Field, A. E., Austin, S. B., & Frazier, A. L. (2002). Smoking, getting drunk, and engaging in bulimic behaviors: In which order are the behaviors adopted? *Journal of the American Academy of Child and Adolescent Psychiatry*, *41*, 846–853.

Field, A. E., Camarago, A. C., & Taylor, B. C. (1999). Relation of peer and media influences to the development of purging behaviors among preadolescent and adolescent girls. *Archives of Pediatric and Adolescent Medicine*, *153*, 1184–1189.

Field, A. E., Camargo, C. A., & Taylor, B. (2001). Peer, parent and media influences on the development of weight concerns and frequent dieting among preadolescent and adolescent girls and boys. *Pediatrics*, *107*, 54–60.

Flannery-Schroeder, E. C., & Chrisler, J. C. (1996). Body esteem, eating attitudes, and gender-role orientation in three age groups of children. *Current Psychology*, *15*

Gardner, R. M., & Brown, D. L. (2010). Body image assessment: A review of figural drawing scales. *Personality and Individual Differences*, *48*.

Garner, D. M., & Garfinkel, P. E. (1979). Eating Attitudes Test: Index of the symptoms of anorexia–nervosa. *Psychological Medicine*, *9*, 273–279.

Gordon, R. (2000). *Eating disorders: Anatomy of a social epidemic* (2nd ed.). Oxford, UK: Blackwell.

Groesz, M. L., Levine, M. P., & Murnen, S. K. (2001). The effect of experimental presentation of thin media images on body satisfaction: A meta-analytic review. *International Journal of Eating Disorders*, *31*, 1–16.

Harrison, K. (2001). Ourselves, our bodies: Thin-ideal media, self-discrepancies and eating disorder symptompatology in adolescents. *Journal of Social and Clinical Psychology*, *20*, 289–323.

Heinberg, L. J., Thompson, J. K., & Stormer, S. (1995). Development and validation of the Sociocultural Attitudes Towards Appearance Questionnaire. *International Journal of Eating Disorders*, *17*, 81–89.

Hoek, H. W. (1991). The incidence and prevalence of anorexia–nervosa and bulimia–nervosa in primary care. *Psychological Medicine*, *21*, 455–460.

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modelling*, *6*, 1–55.

Kelly, C., Ricciardelli, L. A., & Clarke, J. D. (1999). Problem eating attitudes and behaviors in young children. *International Journal of Eating Disorders*, *25*, 281–286.

Kovacs, M. (1992). *Children's Depression Inventory manual*. North Tonawanda, NY: Multi-Health Systems Inc.

Lask, B., & Bryant-Waugh, R. (2000). *Anorexia nervosa and related eating disorders in childhood and adolescence*. Hove, UK: Psychology Press.

Lattimore, P. J., & Halford, J. C. G. (2003). Adolescence and the diet-dieting disparity: Healthy food choice or risky health behaviour? *British Journal of Health Psychology*, *8*, 451–464.

MacCallum, R. C., & Austin, J. T. (2000). Applications of structural equation modelling in psychological research. *Annual Review of Psychology*, *51*, 201–226.

Maloney, M. J., McGuire, J., & Daniels, S. R. (1989). Dieting behaviour and eating attitudes in children. *Pediatrics*, *84*, 482–489.

Maloney, M. J., McGuire, J. B., & Daniels, S. R. (1988). Reliability testing of a children's version of the Eating Attitude Test. *Journal of the American Academy of Child and Adolescent Psychiatry*, *27*, 541–543.

McCabe, M. P., & Ricciardelli, L. A. (2003). Body image and strategies to lose weight and increase muscle among boys and girls. *Health Psychology*, *22*, 39–46.

McCabe, M. P., Ricciardelli, L. A., & Holt, K. (2005). A longitudinal study to explain strategies to change weight and muscles among normal weight and overweight children. *Appetite*, *45*, 225–234.

McVey, G., Tweed, S., & Blackmore, E. (2004). Dieting among preadolescent and young adolescent females. *Journal of the Canadian Medical Association*, *170*, 1559–1561.

Murnen, S. K., Smolak, L., & Mills, J. A. (2003). Thin, sexy women and strong, muscular men: Grade-school children's responses to objectified images of women and men. *Sex Roles*, *49*, 427–437.

National Health Service Information Centre (2011). *National Child Measurement Programme: England, 2010/11 school year*. Retrieved from http://www.ic.nhs.uk/webfiles/publications/003_Health_Lifestyles/ncmp%202010-11/NCMP_2010_11_Report.pdf

Nemeroff, C. J., Stein, R. I., & Diehl, N. S. (1994). From the Cleavers to the Clintons: Role choices and body orientation as reflected in magazine article content. *International Journal of Eating Disorders*, *16*, 167–176.
Neumark-Sztainer, D., Wall, M., & Guo, J. (2006). Obesity, disordered eating, and eating disorders in a longitudinal study of adolescents: How do dieters fare 5 years later? *Journal of the American Dietetic Association*, *106*, 559–568.
Nicholls, D. (2004). Eating problems in childhood and adolescence. In J. K. Thompson (Ed.), *Handbook of eating disorders and obesity* (pp. 635–655). New Jersey, NJ: Wiley.
Nicholls, D., Lynn, R., & Viner, R. (2011). Childhood eating disorders: British national surveillance study. *British Journal of Psychiatry*, *198*, 295–301.
Ogden, C. L., Kuczmarski, R. J., & Flegal, K. M. (2002). Centers for Disease Control and Prevention 2000 growth charts for the United States: Improvements to the 1977 National Center for Health Statistics version. *Pediatrics*, *109*, 45–60.
Phares, V., Steinberg, A. R., & Thompson, J. K. (2004). Gender differences in peer and parental influences: Body image disturbance, self-worth and psychological functioning in preadolescent children. *Journal of Youth and Adolescence*, *33*, 421–429.
Polivy, J., & Herman, C. P. (2004). Sociocultural idealization of thin female body shapes: An introduction to the special issue on body image and eating disorders. *Journal of Social and Clinical Psychology*, *23*, 1–6.
Ranzenhofer, L. M., Tanofsky-Kraff, M., & Menzie, C. M. (2008). Structure analysis of the Children's Eating Attitudes Test in overweight and at-risk for overweight children and adolescents. *Eating Behaviors*, *9*, 218–227.
Ricciardelli, L. A., & McCabe, M. P. (2001). Children's body image concerns and eating disturbance: A review of the literature. *Clinical Psychology Review*, *21*, 325–344.
Rodgers, R. F., Paxton, S. J., & Chabrol, H. (2009). Effects of parental comments on body dissatisfaction and eating disturbance in young adults: A sociocultural model. *Body Image*, *6*, 171–177.
Rolland, K., Farnhill, D., & Griffiths, R. A. (1997). Body figure perceptions and eating attitudes among Australian schoolchildren aged 8 to 12 years. *International Journal of Eating Disorders*, *21*, 273–278.
Sands, R., Tricker, J., & Sherman, C. (1997). Disordered eating patterns, body image, self-esteem, and physical activity in preadolescent school children. *International Journal of Eating Disorders*, *21*, 159–166.
Sands, R., & Wardle, J. (2003). Internalization of ideal body shapes in 9–12-year-old girls. *International Journal of Eating Disorders*, *33*, 193–204.
Sasson, A., Lewin, C., & Roth, D. (1995). Dieting behavior and eating attitudes in Israeli children. *International Journal of Eating Disorders*, *17*, 67–72.
Schafer, J. L., & Graham, J. W. (2002). Missing data: Our view of the state of the art. *Psychological Methods*, *7*, 147–177.
Schur, E. A., Sanders, M., & Steiner, H. (2000). Body dissatisfaction and dieting in young children. *International Journal of Eating Disorders*, *27*, 74–82.
Shapiro, S., Newcomb, M., & Loeb, T. B. (1997). Fear of fat, disregulated-restrained eating, and body-esteem: Prevalence and gender differences among eight- to ten-year-old children. *Journal of Clinical Child Psychology*, *26*, 358–365.
Shunk, J. A., & Birch, L. L. (2004). Validity of dietary restraint among 5- to 9-year old girls. *Appetite*, *42*, 241–247.
Sinton, M. M., & Birch, L. L. (2005). Weight status and psychosocial factors predict the emergence of dieting in preadolescent girls. *International Journal of Eating Disorders*, *38*, 346–354.
Smolak, L. (2004). Body image in children and adolescents: Where do we go from here? *Body Image*, *1*, 15–28.
Smolak, L., & Levine, M. O. (1994). Psychometric properties of the Children's Eating Attitudes Test. *International Journal of Eating Disorders*, *16*, 275–282.
Smolak, L., Levine, M. P., & Thompson, J. K. (2001). The use of the Sociocultural Attitudes Towards Appearance Questionnaire with middle school boys and girls. *International Journal of Eating Disorders*, *29*, 216–223.
Spitzer, B. L., Henderson, K. A., & Zivian, M. T. (1999). Gender differences in population versus media body sizes: A comparison over four decades. *Sex Roles*, *40*, 545–565.
Stice, E. (2001). A prospective test of the dual-pathway model of bulimic pathology: Mediating effects of dieting and negative affect. *Journal of Abnormal Psychology*, *110*, 124–135.
Stice, E. (2002). Risk and maintenance factors for eating pathology: A meta-analytic review. *Psychological Bulletin*, *128*, 825–848.
Stice, E., & Agras, W. S. (1998). Predicting onset and cessation of bulimic behaviors during adolescence: A longitudinal grouping analysis. *Behavior Therapy*, *29*, 257–276.
Stice, E., & Bearman, S. K. (2001). Body-image and eating disturbances prospectively predict increases in depressive symptoms in adolescent girls: A growth curve analysis. *Developmental Psychology*, *37*, 597–607.
Stice, E., Hayward, C., & Cameron, R. P. (2000). Body-image and eating disturbances predict onset of depression among female adolescents: A longitudinal study. *Journal of Abnormal Psychology*, *3*, 438–444.
Stice, E., Marti, N., & Rohde, P. (2011). Testing mediators hypothesized to account for the effects of a dissonance-based eating disorder prevention program over longer term follow-up. *Journal of Consulting and Clinical Psychology*, *79*, 398–405.
Stice, E., Mazotti, L., & Weibel, D. (2000). Dissonance prevention program decreases thin-ideal internalization body dissatisfaction, dieting, negative affect and bulimic symptoms: A preliminary experiment. *International Journal of Eating Disorders*, *27*, 206–217.
Stice, E., Ng, J., & Shaw, H. (2010). Risk factors and prodromal eating pathology. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, *51*, 518–525.
Stice, E., Presnell, K., & Spangler, D. (2002). Risk factors for binge eating onset in adolescent girls: A 2-year prospective investigation. *Health Psychology*, *21*, 131–138.
Stice, E., & Shaw, H. E. (2002). Role of body dissatisfaction in the onset and maintenance of eating pathology: A synthesis of research findings. *Journal of Psychosomatic Research*, *53*, 985–993.
Striegel-Moore, R. H., Silberstein, L. R., & Rodin, J. (1986). Toward an understanding of risk-factors for bulimia. *American Psychologist*, *41*, 246–263.
Thompson, J. K., & Stice, E. (2001). Thin-ideal internalization: Mounting evidence for a new risk factor for body-image disturbance and eating pathology. *Current Directions in Psychological Science*, *10*, 181–183.
Truby, H., & Paxton, S. J. (2002). Development of the Children's Body Image Scale. *British Journal of Clinical Psychology*, *41*, 185–203.
Truby, H., & Paxton, S. J. (2008). The Children's Body Image Scale: Reliability and use with international standards for body mass index. *British Journal of Clinical Psychology*, *47*, 119–124.
Twenge, J. M., & Nolen-Hoeksema, S. (2002). Age, gender, race, socioeconomic status, and birth cohort differences on the Children's Depression Inventory: A meta-analysis. *Journal of Abnormal Psychology*, *111*, 578–588.
Van Strien, T., & Oosterveld, P. (2007). The children's DEBQ for assessment of restrained, emotional and external eating in 7- to 12-year-old children. *International Journal of Eating Disorders*, *41*, 72–81.
Vander Wal, J. S., Gibbons, J. L., & Grazioso, M. (2008). The sociocultural model of eating disorder development: Application to a Guatemalan sample. *Eating Behaviors*, *9*, 277–284.
Wertheim, E. H., Paxton, S. J., & Blaney, S. (2009). Body image in girls. In L. Smolak & J. K. Thompson (Eds.), *Body image, eating disorders and obesity in youth: Assessment, prevention and treatment* (2nd ed., pp. 47–76). Washington, DC: American Psychological Association.
Whitaker, R. C., Pepe, M. S., & Wright, J. A. (1998). Early adiposity rebound and the risk of adult obesity. *Pediatrics*, *101*, E5.
Wichstrøm, L. (2000). Psychological and behavioral factors unpredictive of disordered eating: A prospective study of the general adolescent population in Norway. *International Journal of Eating Disorders*, *28*, 33–42.