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Weighing in on Risk Factors for Body Dissatisfaction:
A Prospective Study of Adolescent Girls

by

Amy E. Wojtowicz

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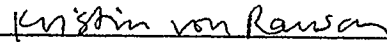
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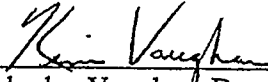
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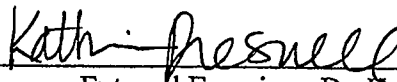
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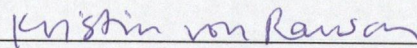
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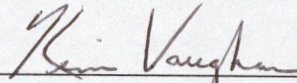
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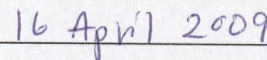


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Abstract

The importance of understanding risk factors for body dissatisfaction is underscored by the fact that this disturbance afflicts a substantial majority of adolescent girls. Body dissatisfaction is concerning because it is associated with emotional stress and a variety of psychological problems. A multitude of risk factors have been proposed as related to the development of body dissatisfaction. Unfortunately the correlational nature of the majority of studies in this area has limited the progression of research. Longitudinal studies, which provide a better opportunity to establish risk factors, are greatly needed. Consequently, the purpose of the present study was to test to what degree a set of sociocultural, biological, and psychological factors predicted prospective changes in body dissatisfaction among adolescent girls. A one-year longitudinal design was used to examine the influences of weight-related teasing, elevated adiposity, low self-esteem, perfectionism, and thin-ideal internalization as risk factors for increases in body dissatisfaction. Three hundred and ninety three 10th- and 11th grade adolescent girls ($M = 15.77$ years of age) were recruited from public and private high schools in Southern Alberta, Canada. At baseline assessment, participants completed a series of questionnaires assessing the predictor and criterion variables and had their height and weight measured. One year later, participants' degree of body dissatisfaction was reassessed ($n = 316$, 80.4% retention rate). Results suggest that low self-esteem was the most potent risk factor for subsequent increases in body dissatisfaction, followed by high levels of adiposity. Despite an accumulation of cross-sectional evidence, weight-related teasing, perfectionism, and thin-ideal internalization did not prove to be risk factors for increases in body dissatisfaction over one year. These results suggest that low self-esteem

and elevated adiposity would be useful screening markers for detecting individuals at risk, and may be useful targets for prevention and treatment efforts aimed at reducing body dissatisfaction among adolescent girls.

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Dedication

This dissertation is dedicated with loving appreciation to my parents, Betty and Wayne Baxter, for their endless encouragement, constant support, and unwavering belief in my abilities.

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Introduction

Body dissatisfaction¹, defined as a negative self-evaluation of one's body shape and weight (Cash & Pruzinsky, 1990), has become a common and troubling concern among adolescent girls (Canpolat, Orsel, Akdemir, & Ozbay, 2005; Grigg, Bowman, & Redman, 1996; Huon, 1994; Paxton et al., 1991; Tiggemann & Pennington, 1990; Tiggemann & Pickering, 1996). By the time they reach high school, girls are three times more likely than boys to perceive themselves as overweight, even if they are underweight or average weight (Pritchard, King, & Czajka-Narins, 1997). In a large sample of youth from British Columbia, 52% of high school girls not only expressed a desire to change their bodies, but were actively dieting in an attempt to lose weight (The McCreary Centre Society, 1999). More recently, similar results were found in Ontario, with 44% of girls aged 15-18 perceiving themselves as overweight and 52% feeling unhappy about their bodies (J. M. Jones, Bennett, Olmsted, Lawson, & Rodin, 2001).

Body dissatisfaction is worrisome because it is associated with a variety of psychological problems including low self-esteem, appearance rumination, unnecessary cosmetic surgery, poorer perceived health, reduced sense of competence and control over life circumstances, need for social approval, social isolation, and suicidal thoughts (Cash & Pruzinsky, 1990; Cook, MacPherson, & Langille, 2007; Health Canada, 1999; Hewitt, Flett, & Ediger, 1995; Meland, Haugland, & Breidablik, 2007; Ohring, Graber, & Brooks-Gunn, 2002; J. K. Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999). Prospective studies have shown body dissatisfaction predicts increases in dieting (Cooley

¹ Researchers have also used other terms to describe body dissatisfaction. These include *body image disturbance*, *body image concerns*, *weight and shape concerns*, *negative body image*, and *poor body image*.

& Toray, 2001; Patton, Johnson-Sabine, Wood, Mann, & Wakeling, 1990; Stice, 2001a; Stice, Mazotti, Krebs, & Martin, 1998) and negative affect (D. A. Cole, Martin, Peeke, Seroczynski, & Hoffman, 1998; Rierdan & Koff, 1991; Stice & Bearman, 2001; Stice, Hayward, Cameron, Killen, & Taylor, 2000). Body dissatisfaction has been shown to predict lower levels of physical activity over time (Neumark-Sztainer, Paxton, Hannan, Haines, & Story, 2006). Moreover, body dissatisfaction is a primary risk factor for the development of eating disorders (Stice & Shaw, 2002), which are very serious conditions associated with severe distress, functional impairment, nutritional deficiencies, comorbid psychopathology, and early mortality (Fairburn, Cooper, Doll, Norman, & O'Connor, 2000; Newman et al., 1996). Despite evidence of these serious consequences, our current appreciation of variables and mechanisms underlying the development of body dissatisfaction is limited (Stice & Whitenton, 2002).

The substantial costs associated with body dissatisfaction warrant attention toward the development of effective prevention programs. However, more longitudinal research is required to identify potential targets for prevention before effective programs can be developed. Although numerous risk factors have been proposed, many have not been tested empirically using longitudinal designs, making it impossible to differentiate a precursor of body dissatisfaction from a consequence or concomitant (Kraemer, Kazdin, Offord, Kessler, & et al., 1997; Stice & Whitenton, 2002). Moreover, many risk factors that have been investigated longitudinally have demonstrated limited predictive power and resulted in conflicting research support. Thus, it is important to attempt to replicate findings while addressing methodological limitations of previous research, as well as to search for additional risk factors. Consequently, the purpose of the present study is to test

the degree to which a set of postulated risk factors predicts longitudinal changes in body dissatisfaction among adolescent girls.

First, I will provide a brief summary of risk factor terminology and study designs typically used for the identification of risk factors. Second, a brief overview of the research that has explored potential risk factors for body dissatisfaction will be presented. Methodological differences or problems are highlighted where findings across studies are inconsistent. Third, I will provide a summary of the limitations of the research to date and the important research questions that need to be addressed. Fourth, I will discuss the rationale for the present study.

Risk Factor Terminology and Study Designs

Risk factor research, which examines the relations among antecedent conditions and subsequent outcomes over time (Kazdin, Kraemer, Kessler, Kupfer, & Offord, 1997), has become increasingly popular in the field of psychology (Jacobi, Hayward, de Zwaan, Kraemer, & Agras, 2004). Such research encompasses a broad range of questions, with researchers exploring causal chains, attempting to understand how to identify individuals at high risk, and searching for answers of how to intervene to prevent aversive outcomes. Unfortunately, as a result of the increased interest in risk research, terms such as *risk*, *risk factor*, and *cause* began appearing in the scientific literature haphazardly (Kraemer et al., 1997). Other terms, such as *vulnerability factor*, *susceptibility factor*, *predisposing factor*, *preceding factor*, *diathesis*, *causal factor*, and *etiology factor*, have also appeared in the risk literature inconsistently (Jacobi et al., 2004; Kraemer et al., 1997). In fact, Kraemer (2003) argued the most salient problem in current risk research is the absence of a common language, which has fostered miscommunication among both researchers and

policy makers alike. Reflecting on the need for a more precise typology, Kraemer and colleagues proposed a set of definitions for risk research terminology and outlined a classification system to determine risk status of any factor in question (Kazdin et al., 1997; Kraemer et al., 1997). Let us begin, then, by clarifying definitions, reviewing the classification system, and examining study designs relevant to risk research.

Risk is defined as the probability of a particular outcome occurring within a given population (Kraemer et al., 1997). The term *outcome* refers to some event or characteristic that is typically aversive or undesirable, and is hoped to be both predictable and preventable (Kazdin et al., 1997). A *risk factor* then, is defined as a measurable characteristic, experience, or event that a) precedes the outcome in question, b) is associated with an increase in the probability of a particular outcome (i.e., risk), and c) can be used to divide a specified population into high and low risk groups (Kazdin et al., 1997; Kraemer et al., 1997). By definition, the probability of the outcome among the high-risk group must be greater than that of the low-risk group (Kraemer et al., 1997). A risk factor that can be shown to change over time, either spontaneously (e.g., age, height) or through an intervention (e.g., self-esteem, weight-related teasing), is called a *variable risk factor*. Conversely, a risk factor that does not change over time (e.g., year of birth, race, gender, genotype), is called a *fixed marker* (Kraemer et al., 1997).

In the classification system proposed by Kraemer and colleagues (Kazdin et al., 1997; Kraemer et al., 1997), the terminology used to delineate the relation between any given antecedent and consequence is largely dependent on the current state of scientific knowledge. As research progresses, the appropriate terminology used to describe an antecedent may change (Kraemer et al., 1997). At the most rudimentary level of the

classification system, the antecedent in question must be shown empirically to correlate with the outcome of interest. In such a situation, if both the antecedent in question and the outcome were assessed simultaneously, or in circumstances that the temporal ordering of the antecedent in question and outcome cannot be determined, the appropriate term for the hypothesized antecedent is *correlate*. The term *marker* indicates a more intermediate risk status, by which the antecedent has met criteria for a risk factor but has not been shown to causally be involved in the outcome. More specifically, the term *variable marker* is used to describe a risk factor which, when tested empirically, does not appear to change the risk of the outcome of interest when manipulated. Variable markers demonstrate risk factor-outcome relations prospectively not because they themselves cause the outcome in question, but because they are correlated with a true causal risk factor (Kraemer, Stice, Kazdin, Offord, & Kupfer, 2001). In situations in which the impact of the manipulation or the capacity of the antecedent to be manipulated has not yet been empirically tested, the appropriate term is *variable risk factor*. At the most progressive level of the classification system, an antecedent that meets the criteria for a risk factor must be empirically shown to play a causal role in the outcome. In other words, if modification of the risk factor has been shown to result in a change in the outcome, the appropriate term for the antecedent becomes *causal risk factor* (Kazdin et al., 1997; Kraemer et al., 1997).

In keeping with the classification system of risk status, a five-step, systematic approach to empirically investigating theoretically derived risk factors has been proposed (Stice, 2002, 2001b). Each step is important in its own right and it is useful to present them separately. However, inferences are based on their convergence and the five steps

should be considered together to fully establish the nature of the relation between any given antecedent and consequence (Stice, 2001b). The first step comprises cross-sectional studies, which permit researchers to assess potential correlations between postulated risk factors and the outcome of interest. Such research is an important preliminary step before testing specific risk (or causal factors) in subsequent longitudinal or experimental studies, which are generally more costly and burdensome (Jacobi et al., 2004). If a correlation were demonstrated, the second step would be to empirically test whether the antecedent in question predicts the outcome of interest in a prospective study. Such a design is required to demonstrate that the postulated risk factor precedes the outcome of interest (Stice & Whitenton, 2002). Solely demonstrating that the antecedent significantly predicts the outcome is necessary, but not sufficient. Specification of at least one definition of high and low risk groups based on the antecedent and an indication of its potency based on that definition is also required (Kraemer et al., 1997). The third step in Stice's approach would be to investigate prospectively the ways in which risk factors work together to promote the outcome of interest, including the examination of possible mediational and moderational pathways. Mediational pathways delineate the process or mechanisms through which a given factor or set of factors produce an outcome, whereas moderational pathways examine variables that influence the presence, direction, and magnitude of the risk factor-outcome relations (Kazdin et al., 1997). The fourth step would be to carry out a laboratory experiment in which participants are randomly assigned to high or low-risk conditions. Such a design would enable researchers to examine the nature of the risk outcome-relation under a controlled environment. Stice (2001b) emphasised that researchers should prioritize ecological experimental designs

over highly contrived laboratory-based experiments in order to increase the generalizability of results. The fifth step would be to conduct an experiment that reduces the postulated risk factor and subsequently assesses whether there is a change in the outcome of interest (e.g., a randomized treatment or prevention trial). If the intervention condition reduces the risk factor and also shows a change in the outcome, especially if greater doses of the intervention are associated with greater change, the risk factor would be considered causally related to the outcome. However, not all risk factors are causally related to the outcome of interest, and those that may be, are not necessarily malleable (Kazdin et al., 1997).

Notably, there is an exception to Stice's (2001b) systematic approach, which relates to fixed markers. A risk factor that is fixed and does not vary over time (e.g., race, genotype, year of birth) by default precedes any potential outcome of interest during the lifetime of an individual. As a result, the burden of establishing temporal precedence is eliminated and the second step in the systematic approach is no longer required. An advantage of fixed markers for researchers is that a single measurement of the risk factor at any time during the lifetime of the individual would suffice (i.e., a cross-sectional study). However, the disadvantages of fixed markers are that they can never be proven to have causal risk factor status and by virtue of not changing over time, are impossible to prevent. As a result, researchers and policy makers tend to be more interested in variable risk factors (Kraemer et al., 1997).

An Overview of Proposed Risk Factors for Body Dissatisfaction

Against the backdrop of the risk factor typology, research that has examined potential antecedents of body dissatisfaction will now be reviewed. Biopsychosocial

models of the etiology of body dissatisfaction postulate that body dissatisfaction results from a combination of sociocultural (e.g., social pressures promoting body consciousness), biological (e.g., heritable influences such as body composition), and psychological factors (e.g., individual characteristics; Wertheim, Paxton, & Blaney, 2004). Using the biopsychosocial framework, the present study examined potential risk factors from each of the three domains. Although a host of putative risk factors have been theorized, the present study focused on five variables for which previous research has demonstrated a correlation between each variable and body dissatisfaction: weight-related teasing, adiposity, low self-esteem, perfectionism, and thin-ideal internalization. These hypothesized risk factors were chosen for at least one of two reasons: 1) previous research has generated conflicting empirical support for each factor's contribution to body dissatisfaction, and/or 2) the variable has not been examined thoroughly using a longitudinal study design. All of the postulated risk factors examined in the present study are variable (i.e., have the capacity to change over time). The following sections elaborate on each of the five potential risk factors in turn.

Sociocultural Variables

One of the most frequently cited theoretical explanations for body dissatisfaction is the sociocultural model (Stice & Whitenton, 2002). This model asserts that societal factors promote unrealistic standards of beauty that are impossible for most girls to achieve (Heinberg, Thompson, & Stormer, 1995), which in turn places individuals at risk for body dissatisfaction (Striegel-Moore, Silberstein, & Rodin, 1986). In accordance with this assertion, several studies have documented a shift over recent years in societal preference of a thinner body ideal for females among Western society (Andersen &

DiDomenico, 1992; Garner, Garfinkel, Schwartz, & Thompson, 1980; Lamb, Jackson, Cassiday, & Preist, 1993; Morris, Cooper, & Cooper, 1989; Owen & Laurel-Seller, 2000a, 2000b; Rubinstein & Caballero, 2000; Silverstein, Peterson, & Perdue, 1986; Wiseman, Gray, Mosimann, & Ahrens, 1992), a trend that has been paralleled by a rise in the prevalence of eating disorders, dieting behavior, and body dissatisfaction (Cash & Henry, 1995; Hsu, 1996; Wakeling, 1996).

Weight-related teasing. One way that Western societal preferences about weight are communicated to adolescent girls is through weight-related teasing (Barker & Galambos, 2003). Presumably, repeated teasing related to one's body weight and shape results in body dissatisfaction for girls. A relationship between weight-related teasing and body dissatisfaction is supported by both cross-sectional research (Berscheid, Walster, & Bohrnstedt, 1973; Cash, 1995; Cash, Winstead, & Janda, 1986; Fabian & Thompson, 1989; Lunner et al., 2000; Paxton, Schutz, Wertheim, & Muir, 1999; Stormer & Thompson, 1996; J. K. Thompson, 1991; J. K. Thompson, Covert, Richards, Johnson, & Cattarin, 1995; J. K. Thompson & Psaltis, 1988; van den Berg, Wertheim, Thompson, & Paxton, 2002) and a longitudinal study that found weight-related teasing to predict subsequent increases in body dissatisfaction three years later (Cattarin & Thompson, 1994). Collectively, such findings provide support for the assertion that weight-related teasing is a risk factor for body dissatisfaction. However, other longitudinal studies examining one-year time frames have failed to replicate such results (C. D. Jones, 2004; Stice & Whitenton, 2002). A caveat related to Stice and Whitenton's (2002) study is that the measure of weight-related teasing was crude, consisting of only two items that were each rated on a 5-point scale, which the authors acknowledged had low internal

consistency ($\alpha = 0.67$; Cicchetti, 1994). If these negative results were due in part to unreliability of measurement, further longitudinal research utilizing a more reliable measure of weight-related teasing and consistent time frame should increase our confidence in the findings.

Biological Variables

Adiposity. Certain biological factors may also play a role in the onset of body dissatisfaction. For example, higher levels of adiposity--or body fat--are theorized to promote body dissatisfaction because the current ideal for feminine beauty (in Western societies) is an ultrathin physique (Graber, Brooks-Gunn, Paikoff, & Warren, 1994). Theoretically, the greater the deviation from the ultrathin body ideal, the greater the degree of body dissatisfaction (Stice & Whitenton, 2002). In support of this theory, cross-sectional studies have shown that elevated adiposity is associated with higher levels of body dissatisfaction (Davies & Furnham, 1986a, 1986b; Eisele, Hertsgaard, & Light, 1986; Lunner et al., 2000; McCabe & Ricciardelli, 2001; van den Berg et al., 2002). Further evidence has emerged from several longitudinal studies demonstrating that initial elevations in adiposity significantly predict subsequent increases in body dissatisfaction (Cattarin & Thompson, 1994; Field et al., 2001; C. D. Jones, 2004; Ohring et al., 2002; Presnell, Bearman, & Stice, 2004; Stice & Whitenton, 2002; J. K. Thompson et al., 1995). However, it is also notable that the relationship between adiposity and body dissatisfaction was not replicated in other prospective studies (Bearman, Presnell, Martinez, & Stice, 2006; Byely, Archibald, Graber, & Brooks-Gunn, 2000; Stice & Bearman, 2001). One possible explanation for the discrepant findings is that there may be differences in body mass composition of the samples across studies. For example, Stice

and Bearman (2001) utilized a sample of exclusively private school adolescent girls with an upper socioeconomic status and a restricted range of body mass. Stice and colleagues speculated that the restriction in range of body mass may have attenuated the relation between BMI and body dissatisfaction (Presnell et al., 2004; Stice & Whitenton, 2002). It is also been suggested that the null results in the Byely et al. (2000) study may be attributed to a small sample ($n = 52$) and lack of statistical power (Presnell et al., 2004; Stice & Whitenton, 2002).

Psychological Variables

A third group of variables that has been studied as either correlates of or risk factors for body image concerns are referred to as psychological or individual variables (Wertheim et al., 2004).

Self-esteem. Self-esteem refers to a sense of contentment and self-acceptance that result from a person's appraisal of her self worth (Robson, 1989). It is probable that individuals who have a negative overall view of themselves are more likely to be dissatisfied with their physical appearance than individuals who have a positive overall view of themselves. Numerous cross-sectional studies indicate that low self-esteem is associated with body dissatisfaction (Abell & Richards, 1996; Caldwell, Brownell, & Wilfley, 1997; Fabian & Thompson, 1989; Fingeret & Gleaves, 2004; Fisher, Schneider, Pegler, & Napolitano, 1991; Frost & McKelvie, 2004; Furnham, Badmin, & Sneade, 2002; Hayes, Crocker, & Kowalski, 1999; Henriques & Calhoun, 1999; Koff, Rierdan, & Stubbs, 1990; Martin, Housley, McCoy, & Greenhouse, 1988; Mendelson & White, 1985; Mendelson, White, & Mendelson, 1996; Mintz & Betz, 1988; Webster & Tiggemann, 2003; Williams & Currie, 2000). Additional evidence supporting low self-

esteem as a potential risk factor for body dissatisfaction has been obtained from some (Gilbert & Meyer, 2005; Paxton, Eisenberg, & Neumark-Sztainer, 2006), but not all, longitudinal research (Tiggemann, 2005). One possible explanation for the null findings of Tiggemann (2005) is that a shorter version of the Rosenberg Self-Esteem Scale was used, which could have potentially restricted the range of self-esteem and decreased the probability of detecting a significant predictive effect (Howell, 1999). Thus, further research utilizing the full length Rosenberg Self-Esteem Scale may help tease apart the reasoning behind the inconsistent findings.

Perfectionism. Various theorists have proposed perfectionism as a risk factor for body dissatisfaction (Bruch, 1973). Hewitt and Flett (1991) conceptualized perfectionistic qualities as “setting unrealistic standards and striving to attain those standards, selective attention to and over-generalization of failure, stringent self-evaluations, and a tendency to engage in all-or-none thinking whereby total success or total failure exist as outcomes” (p. 456). Because highly perfectionistic individuals have stringent evaluative criteria for themselves, they may relentlessly pursue an unrealistically thin body ideal, which in turn increases the risk of developing body dissatisfaction (Bruch, 1973). In support of this theory, cross-sectional studies have shown perfectionism to be associated with body dissatisfaction (Ruggiero, Levi, Ciuna, & Sassaroli, 2003), eating disorders (Bastiani, Rao, Weltzin, & Kaye, 1995; Bauer & Anderson, 1989; Rothenberg, 1990; Ruderman, 1986; D. A. Thompson, Berg, & Shatford, 1987; Woodside et al., 2002) and unhealthy eating attitudes and behaviors (Davis, 1997; Hewitt, Flett, & Ediger, 1995; McLaren, Gauvin, & White, 2001). To date, there are no published studies that have tested whether perfectionism prospectively predicts change in body dissatisfaction. Even indirect

evidence taken from longitudinal studies examining perfectionism as a risk factor for eating disorders is difficult to interpret because the results are equivocal. One study found perfectionism significantly predicted the onset of bulimia nervosa (Killen et al., 1994). Conversely, subsequent studies have failed to detect a significant prospective effect of perfectionism for either the onset of bulimia nervosa (Killen et al., 1996) or increases in bulimic symptoms (Shaw, Stice, & Springer, 2004; Vohs, Bardone, Joiner, & Abramson, 1999; Vohs et al., 2001). Taken together, these results suggest perfectionism is unlikely to be a significant risk factor for bulimia nervosa but does not preclude the possibility that it may be involved in the etiology of body dissatisfaction. Further longitudinal research is needed to clarify the possible contribution of perfectionism to the development of body dissatisfaction.

Thin-ideal internalization. Internalization of the thin-ideal, or the extent to which an individual accepts socially defined ideals of attractiveness and overvalues the importance of appearance, is one of the best-supported psychological factors that has been theorized to increase body dissatisfaction. Individuals who internalize the thin-ideal tend to associate thinness with a number of positive attributes such as happiness, desirability, and status (Tiggemann, 2002). Presumably, acceptance of the thin-ideal increases the desire to obtain an often unrealistic thin physique, which in turn produces feelings of inadequacy and displeasure with one's physical appearance (Stice & Whitenton, 2002). A relationship between thin-ideal internalization and body shape concerns is strongly supported by cross-sectional research, with neither age nor ethnicity appearing to moderate the relationship (Cafri, Yamamiya, Brannick, & Thompson, 2005). Several experimental studies have also shown that elevated thin-ideal internalization

predicts vulnerability to reduced body satisfaction following exposure to thin female media images (Cattarin, Thompson, Thomas, & Williams, 2000; Dittmar & Howard, 2004; Durkin, Paxton, & Wertheim, 2005; Heinberg & Thompson, 1995; Stice, Schupak-Neuberg, Shaw, & Stein, 1994). Furthermore, randomized prevention trials aimed at reducing thin-ideal internalization have been shown to successfully reduce body dissatisfaction (Becker, Smith, & Ciao, 2005, 2006; Matusek, Wendt, & Wiseman, 2004b; Roehrig, Thompson, Brannick, & van den Berg, 2006; Stice, Chase, Stormer, & Appel, 2001; Stice, Marti, Spoor, Presnell, & Shaw, 2008; Stice, Mazotti, Weibel, & Agras, 2000; Stice, Presnell, Gau, & Shaw, 2007; Stice, Shaw, Burton, & Wade, 2006). Moreover, several longitudinal studies have shown increased levels of thin-ideal internalization predict subsequent increases in body dissatisfaction (Stice, 2001a; Stice, Presnell, & Bearman, 2001; Stice & Whitenton, 2002). However, not all research supports the theory that thin-ideal internalization is a risk factor for body image concerns. Three recent longitudinal studies unexpectedly found that thin-ideal internalization did not significantly predict subsequent changes in body dissatisfaction (Bearman et al., 2006; C. D. Jones, 2004; Presnell et al., 2004). It is notable that in the Presnell et al. (2004) study, attrition analyses indicated that participants who dropped out of the study prematurely differed significantly from those who completed the study on several baseline predictors (i.e., body dissatisfaction, negative affect, thin-ideal internalization, and pressure to be thin), a result that was not found in the other longitudinal studies. Presnell et al. (2004) did not report the direction of the significant differences (i.e., whether the scores were higher or lower for participants who dropped out prematurely). Nonetheless, as noted by the authors, such results may be biased towards a specific

subgroup of adolescent girls and should be generalized with caution and replicated in other samples. The reason behind the Bearman et al. (2006) and C.D. Jones (2004) null findings remains unclear, and future research is required to make sense of the equivocal findings.

Methodological Considerations

As evidenced by the preceding discussion, there is inconsistent support that weight-related teasing, adiposity, and thin-ideal internalization predict subsequent increases in body dissatisfaction. Additionally, there are no published longitudinal studies that have examined low self-esteem and perfectionism as potential risk factors above and beyond the effects of initial body dissatisfaction among adolescent girls. Thus, many questions remain unanswered and further research investigating the development of body dissatisfaction is warranted.

Unfortunately, advances in understanding the processes that promote the development of negative body image have been constrained by certain methodological shortcomings. First, in general, the majority of research has employed cross-sectional designs, making it impossible to differentiate whether variables are risk factors, concomitants, or consequences of body dissatisfaction (Kraemer et al., 2001). Once cross-sectional studies have determined that a variable is related to body dissatisfaction, longitudinal studies are needed to further advance knowledge regarding the development of body dissatisfaction. Second, many studies have used developmentally suboptimal samples, such as preadolescent girls and university women (e.g., Cash et al., 1986; Cook-Cottone & Phelps, 2003; Gardner, Friedman, & Jackson, 1999; Stormer & Thompson, 1996), to study the development of body dissatisfaction. Effect sizes are smaller for

etiologic studies of preadolescents and adults than studies of adolescents (Stice, 2002). Such findings suggest that it is best to test etiologic theories with data from developmental periods that are characterized by substantial increases in body dissatisfaction, which epidemiological studies have shown occurs during middle adolescence (i.e., ages 15-17; Cooper & Goodyer, 1997; Lewinsohn, Striegel-Moore, & Seeley, 2000). A third limitation of previous research is that several longitudinal studies have neglected to control for initial levels of the body dissatisfaction (e.g., Barker & Galambos, 2003; Button, Sonuga-Barke, Davies, & Thompson, 1996; Gardner et al., 1999; Meyer & Waller, 2001; Newman, Sontag, & Salvato, 2005; Shea & Pritchard, 2007; J. K. Thompson et al., 1995). Studies that do not control for initial levels of body dissatisfaction are problematic because they cannot establish temporal precedence. Correlation of a potential risk factor with future body dissatisfaction may simply reflect the baseline correlation between the risk factor and body dissatisfaction and does not establish whether or not a variable is actually a risk factor (Stice & Whitenton, 2002).

Study Aims

The present longitudinal study was designed to address methodological limitations and inconsistent findings of previous research by examining the association of five variables with changes in body dissatisfaction over time. Thus, the present study tested the hypothesis that among adolescent girls, teasing about weight, increased levels of adiposity, low self-esteem, perfectionism, and thin-ideal internalization will each emerge as risk factors for subsequent increases in body dissatisfaction over one year. The present study's methodology and one year time lapse between the baseline and follow-up assessment was modeled after Stice and Whitenton's (2002) research. In accordance with

Stice's (2002) recommendation, all analyses in the present study controlled for initial levels of body dissatisfaction to ensure that changes in body dissatisfaction are being predicted.

An advantage of the present study is that it focuses on risk factors for body dissatisfaction in middle adolescent girls. Past research by Stice and Shaw (2004) demonstrated that adolescents over age 15, relative to younger adolescents and children, were more likely to show a positive response to prevention programs aimed at preventing and decreasing body dissatisfaction. It has been theorized that such results occur because adolescents younger than 15 may not have experienced sufficient distress related to their body image to motivate them to engage in such a prevention program. Alternatively, younger adolescents and children may not benefit from this type of prevention program because they may not possess enough insight into their body image problems because their abstract reasoning skills have not yet fully developed. Additionally, a floor effect might be involved because the rates of body dissatisfaction are lower during early adolescence and childhood (Stice & Shaw, 2004). Regardless of the mechanism underlying such findings, it is clearly important to investigate risk factors during middle adolescence because this age group appears to respond better to prevention strategies relative to younger samples.

Methods

Prior to data collection, this study was approved by the Conjoint Faculties Research Ethics Board at the University of Calgary (Appendix A) and the following Alberta school boards: the Calgary Board of Education, the Rocky View School Division, the Foothills School Division, and the Grasslands Public School Division.

Participants

An *a priori* power analysis was conducted (using an alpha of 0.05, power of .80, and an effect size f^2 of 0.02), yielding a desired sample size of 395. Grade 10 and 11 high school girls were recruited from schools from February 2006 to June 2006 to participate in the study. Twenty-six public and 12 private high schools in Southern Alberta, Canada (i.e., Calgary, Okotoks, Black Diamond, Airdrie, Brooks, Chestermere, Cochrane, and Springbank) were contacted by the primary investigator as possible candidates for the study. The principals of these schools were sent a letter describing the rationale and methodology of the research (see Appendix B). Approximately two weeks later, the principals were re-contacted by telephone and asked if they would permit students in their schools to participate in the study. Of the schools that were contacted, 14 public ($14/26 = 53.8\%$) and 4 private ($4/12 = 33.3\%$) schools were interested in taking part in the research ($18/38 = 47.4\%$ in total).

In accordance with the requirements of the school boards, an active parental-consent procedure was used to recruit participants. After receiving permission from the principals of the schools, adolescent girls were given a written description of the study along with a parental consent form to take home to their parents (see Appendix C). Three methods were used to distribute the parental consent forms: a) the primary investigator

went to the school to introduce herself, provide a brief description of the study, and hand out the forms, b) teachers were asked to give a brief description of the study and hand out the forms, c) the forms were addressed to the parents and mailed directly to the girls' homes. In order to accommodate the schools' schedules and minimize disruption while gathering data, each school's principal chose which procedure he/she preferred to use at their school. With all three methods, girls who were interested in participating were asked to have a parent or guardian sign the form and hand it in to their teachers. The parental consent forms were distributed approximately two weeks prior to a planned data collection date. Only girls who returned a signed parental consent form were eligible to participate. In total, approximately 1,550 parental consent forms were distributed to girls or parents.

Measures

Sociodemographic information. Participants were given a questionnaire requesting the following demographic information: date of birth, self-reported height, self-reported weight, name of school, grade of schooling, ethnicity, family composition, and educational attainment of parents and/or guardians (see Appendix D). Parental education attainment was chosen as a measure of socioeconomic status because it is highly correlated with many lifestyle characteristics and is typically more stable over the lifespan than either occupation or income (Liberatos, Link, & Kelsey, 1988). Parental academic degrees and certifications were assessed because qualifications are more influential in determining occupational prestige than years of schooling (Faia, 1981).

Perceived and desired weight. Two items from the Project EAT Survey (Neumark-Sztainer, Story, Hannan, Perry, & Irving, 2002) were used to assess perceived

and desired weight (see Appendix E). Participants were asked to provide information on their perception of current body weight and desired weight change, if any. The perceived and desired weight items were administered to participants to provide information that could be used to examine the representativeness of the present sample through comparison to previous research samples.

Weight-related teasing. The Weight Teasing-Frequency subscale of the Perception of Teasing Scale (POTS; J. K. Thompson et al., 1995) is a 6-item self-report measure that was used to assess participants' perception of having been teased about weight (see Appendix F). The POTS included items such as "People made jokes about you being too heavy," and "People pointed at you because you were overweight" that were rated on a 5-point scale, in which higher scores reflected an increasing perception of being teased about weight (i.e., 1 = *never* to 5 = *very often*). The POTS was previously examined in a sample of 263 adolescent girls ($M = 14.3$ years old, $SD = 0.50$) and results indicated that internal consistency was adequate ($\alpha = 0.90$; Lunner et al., 2000).

Height. Using a portable, direct reading stadiometer (i.e., a Seca 214), standing height was measured to the nearest millimeter. To ensure accurate readings, we followed the procedure of Stice and Whitenton (2002): participants were measured without shoes and with the body positioned such that their heels and buttocks were against the vertical support of the stadiometer and their head was aligned so that the participant's auditory canal and the head slide of the stadiometer were in a horizontal plane. Adolescent girls have been shown to both overestimate and underestimate their height (Sherry, Jefferds, & Grummer-Strawn, 2007), emphasizing the importance of obtaining actual measurements rather than relying on self-reported height.

Weight. Using a digital scale (i.e., a Tanita TBF-681), body weight was measured to the nearest 0.1 kg. Following the procedure of Stice and Whitenton (2002), participants were asked to remove their shoes and heavy clothing such as coats prior to being measured. Previous research has shown that adolescent girls typically underestimate their weight (Sherry et al., 2007), again emphasizing the importance of obtaining actual measurements.

Adiposity. Body mass index ($BMI = kg/m^2$) is an indirect measure of adiposity, with higher scores indicating a greater proportion of body fat (Manson, Skerrett, & Willet, 2002). Unlike other, more direct measures of adiposity, BMI is obtained noninvasively (Killen et al., 1994). Prior research has demonstrated that BMI is a valid measure of adiposity for both adolescents and adults (T.J. Cole, 1991; Garrow & Webster, 1985; Kraemer, Berkowitz, & Hammer, 1990). BMI classification cut-off points were derived from T.J. Cole et al. (2000) and were calculated separately for the different age groups studied (i.e., ages 15, 16, and 17).

Self-esteem. The Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965) is a brief self-report measure that was used to assess general feelings of self-worth (see Appendix G). Comprised of 10 items, respondents rated statements on a four point scale ranging from 1 = “strongly agree” to 4 = “strongly disagree.” Five items were reverse-scored and the total scores ranged from 10 to 40, with higher scores indicating higher self-esteem. Sample items include: “I feel that I have a number of good qualities,” and “At times I think I am no good at all.” Developed for use with adolescents, and originally normed on a sample of 5,024 high school students (Rosenberg, 1965), the RSES is widely used as a measure of global self-esteem. The RSES was previously used in a

sample of 323 adolescent girls ($M = 14.0$ years old, $SD = 0.70$) and results suggest adequate internal consistency ($\alpha = 0.85$, Wade & Lowes, 2002).

Perfectionism. A modified version of the Child and Adolescent Perfectionism Scale (CAPS; Flett & Hewitt, 1990) was used to assess perfectionism (see Appendix H). Originally 22 items, the CAPS was modified slightly in the present study (i.e., item 22 was excluded due to an experimenter error). Respondents were asked to rate statements on a 5-point scale ranging from 1 = “not at all true of me” to 5 = “very true of me,” with higher scores indicating higher levels of perfectionism. The CAPS included items such as “I try to be perfect in every thing I do,” and “There are people in my life who expect me to be perfect.” The psychometric properties of the CAPS were previously examined among 71 adolescent girls with anorexia nervosa ($M = 14.6$ years of age, $SD = 2.1$) and 113 adolescent girls from the general population ($M = 15.3$ years of age, $SD = 1.7$). Internal consistency of the scale was adequate for both the anorexia nervosa patients ($\alpha = 0.91$) and the general population ($\alpha = 0.85$). When the two samples were combined, 1 week test-retest reliability was also adequate ($r = 0.80$; Castro et al., 2004).

Thin-ideal internalization. A modified version of the Thinness and Restricting Expectancy Inventory (TREI; Hohlstein, Smith, & Atlas, 1998) was used to assess thin-ideal internalization (see Appendix I). Respondents were asked to rate statements on a 5-point scale ranging from 1 = “strongly disagree” to 5 = “strongly agree,” with higher scores indicating higher levels of thin-ideal internalization. Sample items include: “I would feel like I could conquer things more easily if I were thin,” and “I would feel better about myself if I were thin.” Originally 44 items, the modified version was shortened to only 8 items to ensure that participants would be able to complete their study

participation within one class period (i.e., 50 minutes). Hohlstein and colleagues (1998) examined the psychometric properties of the original TREI among two samples of undergraduate women (M and SD of age were unreported). Both exploratory factor analysis and confirmatory factor analysis suggest that the TREI had only one factor (Hohlstein et al., 1998), suggesting a narrow, tightly defined construct. All items selected for inclusion in the modified version of the TREI for the present study were shown previously by Hohlstein et al. (1998) to have item-total correlations of 0.70 or higher, to preserve the high internal consistency of the measure. By choosing the items based on this approach, it was hoped that a purer measure of the thin-ideal internalization construct would emerge, as the items associated with the most error variance would have been removed from the modified version.

Body dissatisfaction. Modeling after Stice and Whitenton (2002), a modified version of the Satisfaction and Dissatisfaction with Body Parts Scale (SDBPS; Berscheid et al., 1973) was used to assess body dissatisfaction (see Appendix J). Participants were asked to rate their level of satisfaction with 9 body parts using a 5-point scale ranging from 1 = extremely dissatisfied to 5 = extremely satisfied. Originally 21 items, the length of the SDBPS was modified to include only body parts related to body weight and shape (e.g., waist, thighs, buttocks), eliminating other items related to overall appearance (e.g., eyes, face, hair). The SDBPS is scored so that higher scores indicate higher levels of body dissatisfaction. The psychometric properties of the modified version of the SDBPS were previously examined in a sample of 27 females (M and SD of age were unreported) and the internal consistency ($\alpha = 0.94$), 3 week test-retest reliability ($r = 0.90$) and

predictive validity (for future increases in bulimic symptoms) were all acceptable (Stice & Bearman, 2001).

Procedure

Initially, the study was intentionally described vaguely as “an investigation of self-image over time” to both parents and participants to reduce the likelihood of demand characteristics influencing the results. The questionnaire package was piloted on 10 adolescent girls (all age 15) to ensure comprehensibility of all testing materials, and no changes to the questionnaires were made. Girls were assessed at baseline and at a one-year follow-up. The parental consent procedure at baseline covered the assessment completed at baseline as well as the follow-up contact(s). As part of the parental consent form, parents were asked to provide their daughter’s telephone number and e-mail address so they could be contacted to participate at follow-up.

At baseline, data collection was conducted on school grounds in groups during the school day at times convenient for teachers and students. First, an informed consent script was read to participants (see Appendix K). Second, participants were asked to complete the sociodemographic form. Third, participants were asked to complete the perceived and desired weight items, POTS, RSES, CAPS, TREI, and SDPBS. The order of the questionnaires was counterbalanced for each individual to reduce potential order effects. The primary investigator guided participants through the questionnaires and answered questions while a research assistant took height and weight measurements individually in a private, enclosed area. After all the participants in a testing session had completed the questionnaire packages, questionnaires were collected, and participants were read the debriefing script (Appendix L). A partial version of the debriefing script was used at

baseline to reduce the risk that knowledge of study hypotheses would influence responses during the one-year follow-up. Subsequently, in response to a request from the Conjoint Faculties Research Ethics Board at the University of Calgary, all participants received a one-page handout describing ways to improve body image (see Appendix M), which the primary researcher didactically reviewed with groups of participants. The handout and discussion were intended to help counteract any potential negative effects that participating in the study may have had on participants and to provide an educational opportunity for participants.

To help ensure confidentiality, each participant was assigned a unique participant identification number. Consent forms and questionnaires were separated once baseline data collection was completed, with only code numbers used to identify questionnaires. A master list matching these codes to participant names and contact information was kept in a separate, secure location.

At follow-up, participants completed the SDPBS either on-line or by telephone, depending on the availability and preference of participants. The two survey methodologies were used in hopes of facilitating participation and thereby minimizing attrition rates. First, participants who had provided their email address were contacted via e-mail. The e-mail message included an invitation to complete the questionnaire, along with a personalized link to a secure on-line survey website (see Appendix N). When an interested participant clicked on the link, she was automatically taken to the questionnaire. If the participant did not respond to the message, she was sent another e-mail message one week later. If she still did not respond, she was then contacted by telephone to invite her participation (see Appendix O for telephone script). Subsequent to

follow-up data collection, participants were fully debriefed. If participants completed the follow-up assessment via the internet, a website containing the complete debriefing script (see Appendix P) and body image handout (see Appendix M) automatically opened following the completion of the on-line questionnaire. If the follow-up data were collected over the telephone, the debriefing script and body image handout were read verbatim to the participant.

Data Analysis

Data screening. To minimize data entry errors, all data (except data collected via internet) were entered twice and compared, and all discrepancies were corrected by referring to the original completed questionnaire. Prior to analyses, the minimum and maximum values, means, and standard deviations of each variable were screened for plausibility. To correct for positive skewness and to improve normality, a logarithmic transformation was used on BMI (both self-reported and measured), and an inverse transformation was used on POTS. According to convention, however, and to enhance interpretation, raw means and standard deviations for all scores are presented. An alpha level of $p < .05$ was used for all analyses². The magnitude of all effect sizes were determined using Cohen's (1992) guidelines.

Similar to previous research (von Ranson, Klump, Iacono, & McGue, 2005), the following rules were adopted for handling missing questionnaire data measuring predictor and criterion variables: a) if an individual was missing less than 10% of the items on any given scale, scores were prorated using the individual's mean scale

² The only exception was when Mahalanobis distances were examined (see below).

score³, b) if an individual had more than 10% of items missing on any scale, the total score on that scale was coded as missing.

Multiple regression models were carried out throughout the data analysis. With each regression model, a number of steps were used to ensure that the statistical assumptions required for such an analysis were being met. First, to protect against multicollinearity, correlations between each of the predictors were examined to ensure that the relationship was not too strong, using a maximum of $r = \pm 0.70$ (Tabachnick & Fidell, 2001). Using the guidelines of Pallant (2005), collinearity diagnostics were examined to ensure that the Tolerance value was > 0.10 and the Variance Inflation Factor (VIF) was < 10 . The assumption of normality was checked by examining both the residuals scatterplot and the normal probability plot of the regression standardised residuals. The presence of outliers was checked by comparing the value of the Mahalanobis distances to the critical chi-square value obtained from Tabachnick and Fidell (2001) using the recommended alpha level of 0.001. The Casewise Diagnostics table was also examined (Pallant, 2005). Lastly, the residual statistic Cook's Distance was inspected using a maximum cut-off value > 1 (Tabachnick & Fidell, 2001).

Preliminary analyses. First, to determine representativeness of the study sample and explore the potential of volunteer bias, demographic characteristics of the study sample were compared to both national census data and previous, published adolescent body image research using Pearson chi-square tests. Second, demographic characteristics

³ All major analyses were also conducted without using prorated scores and removing all participants with any missing values. However, the results using this alternative method did not differ from the ones utilizing the prorated method. Thus, for reasons of parsimony, only the results using the prorated scoring protocol are presented, as they allowed for inclusion of more participants.

of both completers and non-completers were compared to identify any systematic attrition.

Cross-sectional analyses. Modeling after Stice and Whitenton (2002), the relationship between each hypothesized risk factor and body dissatisfaction was first examined cross-sectionally. Such analyses, when compared to previous research, provided the opportunity to examine the validity of the study's self-report measures prior to entering them into the prospective analyses.

Evaluation of the cross-sectional prediction of baseline body dissatisfaction by the postulated risk factors was carried out in three steps. First, Pearson correlations were calculated between each postulated risk factor and baseline body dissatisfaction scores. Second, participants who reported initial body dissatisfaction at baseline were compared with participants who did not report body dissatisfaction at baseline on all of the postulated risk factors using independent samples *t* tests and Pearson chi-square tests. Third, all postulated risk factors were included in a simultaneous multivariate multiple regression model to examine the unique contribution of each to the prediction of baseline body dissatisfaction. Within this model, baseline body dissatisfaction was regressed on all hypothesized predictors concurrently.

Change in Body Dissatisfaction Over One Year. Change scores were calculated by subtracting body dissatisfaction scores at baseline from those at follow-up. To ensure that such changes in body dissatisfaction were not a mere artifact of measurement error, the Reliable Change Index (RCI) was calculated (Jacobson & Truax, 1991).

Longitudinal analyses. The prospective prediction of changes in body dissatisfaction by the postulated risk factors was carried out in a number of steps. First,

Pearson correlations were calculated between each postulated risk factor and follow-up body dissatisfaction scores. Second, the relations between each hypothesized risk factor and follow-up body dissatisfaction were examined individually, to gain an understanding of these relations without the complication of multicollinearity (Presnell et al., 2004; Stice & Whitenton, 2002). Using individual hierarchical multiple regression models, follow-up body dissatisfaction scores were regressed on each of the hypothesized predictors in separate equations controlling for baseline body dissatisfaction scores. Third, risk factors that showed significant univariate relations were then included in a multivariate hierarchical multiple regression model to assess the unique effect of each predictor while controlling for all other predictors. Within this model, follow-up body dissatisfaction was regressed on all significant predictors, once again controlling for initial levels of body dissatisfaction. Fourth, as recommended by Kraemer (2003), age was incorporated in the analyses of the risk factors to determine if it moderated risk factor-outcome relations. A univariate hierarchical multiple regression model was used to examine the potential relationship between age and increases in body dissatisfaction (Stice & Whitenton, 2002). To ensure that the relationships between postulated risk factors and body dissatisfaction were consistent across the age range of participants, the conditional relationships between each postulated risk factor and age were tested in separate univariate hierarchical multiple regression models (Stice & Whitenton, 2002). Fifth, longitudinal regression model analyses were re-examined after excluding participants who reported initial body dissatisfaction to determine if risk factors for increases in body dissatisfaction were different for populations that were free of the condition at entry (Kraemer, 2003). Sixth, risk potency effect sizes were calculated for

each of the significant predictors of body dissatisfaction found in each of the univariate hierarchical multiple regression models, to provide an indicator of the strength of each risk factor.

Results

Preliminary Analyses

Considerable efforts were made to recruit a large sample size at baseline, with the goal of enrolling enough participants to achieve the desired sample size at follow-up (i.e., $n = 395$), while allowing for attrition from the study. Despite these efforts, a total of 408 adolescent girls obtained parental consent and agreed to participate in the study, yielding a response rate of approximately 26.3% (408/1550). Of these, 15 participants were excluded because they were in grade 12 and/or > 17 years of age⁴ (see summary of participant flow in Figure 1). The number of participants missing data from the self-reported postulated risk factors and body dissatisfaction measure at baseline are presented in Appendix Q. Height and weight data were collected on 100% of participants; consequently there were no missing BMI data.

Of the 393 eligible participants, 77 (19.6%) did not provide data at follow-up, yielding a retention rate of 80.4%. Of the participants who completed follow-up data collection, 166 (52.5%) responded on the internet and 150 (47.5%) responded over the telephone (Figure 1). The number of participants missing data from the follow-up body dissatisfaction measure is presented in Appendix Q. The average time between baseline and follow-up assessments was 51.9 weeks ($SD = 2.53$).

Demographic characteristics of the total sample, completers, and non-

⁴ As mentioned previously, 10th and 11th – grade girls were targeted because this age group has been shown to experience high levels of body dissatisfaction (Cooper & Goodyer, 1997; Lewinsohn et al., 2000). Participants in grade 12 and/or > 17 years of age were excluded because it was felt that they were not representative of middle adolescence.

completers are presented in Table 1⁵. Pearson chi-square tests were used to compare the study sample to national census data and previous body image research. As depicted in Table 2, the ethnic distribution of the sample is representative of that observed in the most recent Canadian census data available examining ethnic origin among adolescents (Health Canada, 1999). With regard to family structure, approximately 1 in 5 children in Canada (20%) live with a lone parent (Canadian Council on Social Development, 1996), which is comparable to the 16.80% ($n = 66$) found in the present study. The national prevalence of overweight (25%) and obese (7%) adolescents (Shields, 2004) is comparable to the prevalence of each found in the study sample ($n = 79$, 20.10% and $n = 21$, 5.34%, respectively). The only statistically significant deviation of sample representation found was that the highest level of parental educational attainment differed to some extent from Canadian census data (Statistics Canada, 2008), $X^2(3, N = 17365014) = 190.55, p < 0.001$, with the distribution of the study sample more polarized on the high and low ends of the spectrum relative to national norms (see Table 3). In addition to census data, the study sample was compared to previous research on high school girls conducted in Nova Scotia (Cook et al., 2007). As illustrated in Table 4, body weight perceptions and the pattern of desired weight control are comparable among the two samples.

Independent sample t tests and Pearson chi-square tests were used to compare baseline data of completers and non-completers⁶. There were no statistically significant

⁵ Analyses were conducted to explore potential differences in demographic characteristics among participants who completed follow-up data collection on the internet and participants who completed it over the telephone. None of the group comparisons was statistically significant.

differences between completers and non-completers on any of the baseline demographic characteristics or the postulated risk factors measured. Such results suggest that there is a reduced likelihood that the study's findings were compromised due to attrition bias (Stice & Whitenton, 2002). Observed means, standard deviations, and internal consistency reliability (alpha) coefficients for postulated risk factors and body dissatisfaction measures for the two groups are presented in Table 5.

Internal reliability coefficients were calculated for the follow-up body dissatisfaction scale separately for internet users and telephone users ($\alpha = 0.91$ and $\alpha = 0.88$ respectively). According to guidelines proposed by Cicchetti (1994), the reliability coefficients for all of the scales are acceptable. Concurrent validity of BMI was assessed by computing intra-class correlation coefficients between self-reported BMI and measured BMI, $r = 0.86$, $p < 0.01$, for the total sample, $r = 0.86$, $p < 0.01$, for completers, and $r = 0.87$, $p = 0.01$ for non-completers. The intra-class coefficient between self-reported BMI and measured BMI for the total sample is consistent with findings from previous research ($r = 0.88$; Elgar, Roberts, Tudor-Smith, & Moore, 2005), $z = 0.96$, $p > 0.05$.

⁶ The Pearson chi-square test is problematic when the expected frequencies are too small because it has insufficient power to detect a false null hypothesis (Howell, 1999). Taking a conservative approach (that all expected frequencies should be at least 5), the Pearson chi-square tests for ethnicity, living arrangements, and highest level of parental educational attainment in the household (in Table 1) all had expected frequencies that were too small. Thus, uncertainty coefficients, a measure of association that indicates the proportional reduction in error when values of one variable are used to predict values of the other variable, were calculated for these variables (Elliot & Woodward, 2007). None of the uncertainty coefficients was statistically significant.

Cross-Sectional Analyses

Pearson correlations among postulated risk factors and baseline body dissatisfaction scores are presented in Table 6. All of the cross-sectional correlations between baseline body dissatisfaction and the postulated risk factors were statistically significant, confirming the expected relations. With regard to effect sizes, the magnitudes of the observed relations with baseline body dissatisfaction were large for both low self-esteem and thin-ideal internalization. Conversely, the magnitudes of the observed relations with baseline body dissatisfaction were medium for both weight-related teasing and BMI. Although the correlation of perfectionism with baseline body dissatisfaction was statistically significant, its relationship with baseline body dissatisfaction was small.

Independent samples *t* tests were used to compare participants who reported initial body dissatisfaction at baseline with participants who did not report body dissatisfaction at baseline on all of the postulated risk factors, and effect sizes were calculated for each comparison. Borrowing from the methodology of Stice and colleagues, body dissatisfaction was defined as an average score that corresponds to the anchors “dissatisfied” or “extremely dissatisfied” on the body dissatisfaction scale (i.e., ≥ 4 ; Presnell et al., 2004; Stice & Whitenton, 2002). As indicated in Table 7, participants who reported initial body dissatisfaction, when compared to those who did not, had significantly higher levels of weight-related teasing, body mass index, perfectionism, and thin-ideal internalization, and significantly lower levels of self-esteem. The magnitudes of group differences were large for all of the predictors except perfectionism, which demonstrated a small effect.

Results from the simultaneous multivariate multiple regression model examining the postulated risk factors and baseline body dissatisfaction are presented in Table 8. The hypothesized risk factors in combination accounted for statistically significant variability in baseline body dissatisfaction, $F(5,373) = 79.94, p < 0.001$ ($R^2 = 0.51$). When the postulated risk factors were considered individually, low self-esteem made the largest unique contribution to explaining the variance in baseline body dissatisfaction (a medium effect size), followed by thin-ideal internalization, BMI, and weight-related teasing (all of which were small effect sizes). Perfectionism did not make a statistically significant unique contribution.

Change in Body Dissatisfaction Over One Year

As indicated in Table 6, test-retest reliability for the body dissatisfaction scale was $r = 0.65, p = 0.01^7$. The mean body dissatisfaction score was 2.88 at baseline and 2.64 at follow-up (see Table 2), indicating a small but significant decrease in the overall level of body dissatisfaction over time, $t(311) = -5.89, p < 0.001, d = 0.33$. The average response for both times corresponds to a point between the anchors “moderately satisfied” and “neutral” on the body dissatisfaction scale. Change scores were calculated by subtracting body dissatisfaction scores at baseline from those at follow-up, and analyses indicated that both increases and decreases in body dissatisfaction occurred over time at the individual level. To ensure that such changes in body dissatisfaction were not a mere artifact of measurement error, the Reliable Change Index (RCI) was calculated (Jacobson & Truax, 1991). As recommended by C. Evans, Margison, and Barkham

(1998), Cronbach's alpha (0.91) was used in place of test-retest reliability in the calculation of the RCI. The rationale for this replacement is that test-retest reliability may overestimate measurement error because it not only includes simple unreliability of the measure, but also any real changes that occurred in body dissatisfaction scores over time. The RCI was 0.77, indicating that change in body dissatisfaction scores exceeding this cut-off in either direction were unlikely to occur more than 5% of the time by unreliability of the measure alone, and can therefore be regarded as reliable (Jacobson & Truax, 1991). Based on the RCI criterion, 79 participants (25.0 %) reported increases in body dissatisfaction, 4 (1.3%) remained stable, and 233 (73.7 %) reported decreases in body dissatisfaction. If body dissatisfaction is once again defined by an average score ≥ 4 on the body dissatisfaction scale (Presnell et al., 2004; Stice & Whitenton, 2002), the number of completers meeting criteria for body dissatisfaction at baseline and follow-up are 44 (11.2%) and 20 (6.3%), respectively. Only 8 (2.6%) participants who did not meet criteria for body dissatisfaction at baseline met criteria at follow-up. Conversely, 32 (10.3%) participants meeting criteria for body dissatisfaction at baseline did not meet criteria at follow-up.

Longitudinal Analyses

Pearson correlations among postulated risk factors and follow-up body dissatisfaction scores are presented in Table 6. Similar to the cross-sectional correlations, all of the correlations between follow-up body dissatisfaction and the

⁷When examined separately for internet and telephone users, test-retest reliability was correspondingly $r = 0.66, p = 0.01$ and $r = 0.70, p = 0.01$.

postulated risk factors were statistically significant, once again confirming the expected relations. The magnitudes of the observed relations with follow-up body dissatisfaction were medium for low self-esteem, BMI, and thin-ideal internalization. Conversely, the magnitude of the observed relation for follow-up body dissatisfaction and weight-related teasing was small. The relationship between follow-up body dissatisfaction and perfectionism was once again small.

Results of the univariate hierarchical multiple regression models are presented in Table 9. In the first block of the regression model, baseline body dissatisfaction was entered, and in the second block, the respective postulated risk factors were entered simultaneously. As hypothesized, both BMI and low self-esteem prospectively predicted increases in body dissatisfaction, $F(1,310) = 5.81, p < 0.05$ (R^2 change = 0.011) and $F(1,306) = 5.58, p < 0.05$ (R^2 change = 0.010), respectively. Although both BMI and low self-esteem had statistically significant associations with follow-up body dissatisfaction, effect sizes demonstrate that the magnitudes of the relations were small. Contrary to our hypothesis, weight-related teasing, perfectionism, and thin-ideal internalization did not show statistically significant prospective predictions⁸.

In light of the null findings that emerged, it is important to consider that the

⁸ In addition to a total score, the perfectionism measure (i.e., the CAPS) also generates two subscale scores. The self-oriented perfectionism subscale measures individuals' tendency to self-impose unrealistic personal standards on themselves, whereas the socially prescribed perfectionism subscale measures the extent to which an individual feels that others are demanding perfection from them (Flett & Hewitt, 1991). Cross-sectional research suggests that socially prescribed perfectionism is more strongly associated with body dissatisfaction than self-oriented perfectionism (E. Evans, Bowes, & Drewett, 2008). In the present study, exploratory univariate hierarchical multiple regression models were used to separately examine self-oriented perfectionism and socially prescribed perfectionism as predictors of increases in body dissatisfaction over time. Both types of perfectionism produced null results (see Appendix R).

present sample may have been too small, and thus insufficiently powered, to detect some of the hypothesized prospective predictions. Several authors recommend calculating confidence intervals (CI) around effect sizes as a way of evaluating null findings, in lieu of post hoc power calculations, which can be inappropriate and misleading (M. Levine & Ensom, 2001; T. Levine, Weber, Park, & Hullett, 2008; Smithson, 2001). Thus, 95% CI for the effect sizes in the univariate hierarchical multiple regression models associated with weight-related teasing (CI = -0.002, 0.002), perfectionism (CI = -0.008, 0.010), and thin-ideal internalization (CI = -0.005, 0.007) were calculated using the formula derived from Alf and Graf (1999). The fact that zero is contained in each of the CI suggests an increased likelihood that a true association does not exist between weight-related teasing, perfectionism, and thin-ideal internalization, and subsequent increases in body dissatisfaction. In addition, the magnitudes of the upper limit of each CI calculated for the effect sizes associated with the non-significant predictors were all ≤ 0.010 , suggesting that any actual risk factor-outcome relations that may exist are likely smaller than the cut-off of a small effect size (Cohen, 1992).

Results of the multivariate hierarchical multiple regression model are presented in Table 10. In the first block of the regression model, baseline body dissatisfaction was entered, and in the second block, BMI and low self-esteem were entered simultaneously. Together, BMI and low self-esteem accounted for statistically significant variability in follow-up body dissatisfaction after controlling for baseline body dissatisfaction, $F(1,306) = 6.81, p < 0.001$ (R^2 change = 0.025). When the incremental variance of each predictor was examined, BMI and low self-esteem made equivocal unique contributions to explaining the variance in the increase of body dissatisfaction over time. Despite both

making a statistically significant contribution, the magnitudes of the associated effects were once again small.

As recommended by Kraemer (2003), age was incorporated in the analyses of the risk factors to determine if it moderated risk factor-outcome relations. First, a univariate hierarchical multiple regression model was used to examine the potential relationship between age and increases in body dissatisfaction (Stice & Whitenton, 2002). In the first block of the regression model, baseline body dissatisfaction was entered, and in the second block, age was entered. The criterion variable was follow-up body dissatisfaction. The analysis indicated that age was not significantly related to increases in body dissatisfaction (see Appendix S). Second, to ensure that the observed effects were consistent across the age range of participants (Stice & Whitenton, 2002), the conditional relationships between each postulated risk factor and age were tested in separate univariate hierarchical multiple regression models (see Appendix S). In the first block of each model, baseline body dissatisfaction, age, and the hypothesized risk factor of interest were entered. In the second block, the conditional relationship between age and the risk factor of interest was entered (by multiplying the variables together). Again the criterion variable was follow-up body dissatisfaction. None of the conditional relationships reached statistical significance, suggesting that the observed effects were not moderated by age.

All the longitudinal regression model analyses were re-examined after excluding participants who reported initial body dissatisfaction to determine if risk factors for increases in body dissatisfaction were different for populations that were free of the condition at entry (Kraemer, 2003). The analyses using this alternative method did not

differ from the original analyses, indicating that the observed effects did not differ for the original sample and participants without initial body dissatisfaction. Thus, for reasons of parsimony, only the results of the initial analyses are presented.

To be considered a true risk factor, the variable not only has to be shown to precede the outcome of interest, but it also must be shown that it can be used to dichotomize the total population into two subpopulations of high and low risk (Kraemer et al., 1999). For example, to show that BMI is a true risk factor for body dissatisfaction, one would have to show that there is at least one cut-off point (e.g., the “overweight” range of BMI) at which body dissatisfaction is more likely among individuals above the cut-off point than those below. A measure of risk potency is a special type of effect size that describes the extent to which high and low risk subpopulations, defined by a risk factor in question, differ in risk (Kraemer et al., 1999). It is essential that risk research include a measure of risk potency to determine whether the relationships found among variables are large enough to be meaningful and useful (Kraemer et al., 1999; Kraemer et al., 2003).

The number needed to treat (NNT) is an epidemiological measure that can be used to indicate risk potency. Although NNT is typically used in treatment studies, it can also be used in risk research. Mathematically, NNT is the reciprocal of the risk difference (also called absolute risk), and indicates the number of individuals who would need to be exposed to a particular risk factor to generate one more case of the outcome of interest than if no one had been exposed (Kraemer et al., 2003). A result of 1.0 would mean that every individual who is exposed to the risk factor would have the outcome of interest and

every individual who was not exposed to the risk factor would not have the outcome of interest. The larger the NNT, the less potent the risk factor, and vice-versa.

Following the methodology of Agras, Bryson, Hammer, and Kraemer (2007), NNT and Cohen's d were calculated for both BMI and low self-esteem as estimates of risk potency (see Tables 11 and 12). Individuals were classified as having high BMI if they reached the cut-off points for overweight and obesity. Follow-up body dissatisfaction was once again defined as a mean score of ≥ 4 on the body dissatisfaction measure (Presnell et al., 2004; Stice & Whitenton, 2002). Following the methodology of Vohs et al. (2001), low self-esteem was defined as a score 1.5 standard deviations below the mean (i.e., ≥ 22.11 in the present study). Examining the magnitudes of the risk potency by referring to the associated Cohen's d values indicated that BMI had medium risk potency and low self-esteem had large risk potency.

Discussion

The purpose of the present study was to test the degree to which a set of postulated risk factors predicted prospective changes in body dissatisfaction among adolescent girls. As hypothesized, initial low self-esteem and elevations in adiposity emerged as variable risk factors for increases in body dissatisfaction over one year. Contrary to expectation, weight-related teasing, perfectionism, and thin-ideal internalization were not significant predictors. Such results suggest that low self-esteem and elevated adiposity may be useful screening markers for detecting adolescent girls who may be at risk for subsequent increases in body dissatisfaction. In addition, the success of both preventive and treatment programs for body dissatisfaction may be enhanced if low self-esteem and elevated adiposity are targeted for change. The longitudinal design of the present study enabled the establishment of the temporal precedence of low self-esteem and elevated adiposity as risk factors, and the large community-recruited sample, direct height and weight measurements, and statistical control of baseline body dissatisfaction increased the validity of the results.

The present findings will be discussed in further detail through a number of steps. First, the representativeness of the sample will be explored to provide a context for the interpretation of the results. Second, the cross-sectional findings will be addressed. Third, the longitudinal findings will be explored, with each of the five predictors presented in turn, including study limitations and future directions as they relate to each specific predictor. Fourth, implications of the present findings will be highlighted. Fifth, limitations of the overall study design will be acknowledged. Sixth, future considerations for research exploring risk factors for body dissatisfaction more broadly will be proposed.

Representativeness of Sample

Before drawing firm conclusions from research, it is important to consider dimensions of generalizability, the representativeness of the study sample, and applicability of findings (Glasgow et al., 2006). It should be noted that the response rate of the present study (approximately 26.3%) was markedly lower than previous school-recruited adolescent samples utilizing an active consent procedure (e.g., 53-75%; Bearman et al., 2006; C. D. Jones, 2004; Stice & Whitenton, 2002). Plausible explanations for the reduced response rate are that previous studies had younger samples (i.e., middle school students), included male participants, and/or provided compensation to adolescent girls for participating in research (e.g., a \$15 gift certificate to a local book or music store). The current study was unable to provide such incentives because the school boards prohibited the use of compensation due to concerns that girls might feel coerced into participating in the research. In addition, previous researchers mailed consent forms with stamped self-addressed return envelopes, following up with multiple mail outs to nonresponders (e.g., Stice & Whitenton, 2002), both of which did not occur in the present study because of financial constraints. In addition to the low response rate, despite the use of two survey methodologies (i.e., collecting follow-up data on the internet and over the telephone), the attrition rate in the present study (19.6 %) was noticeably higher than some (e.g., 2-3%; Bearman et al., 2006; Stice & Whitenton, 2002), but not all previous samples (e.g., 25%, C. D. Jones, 2004). However, it should be noted that the distribution of a number of demographic characteristics, BMI, body weight perceptions, and the pattern of desired weight control of the present sample appeared to be representative of that observed in previous research (Canadian Council on Social

Development, 1996; Cook et al., 2007; Elgar et al., 2005; Health Canada, 1999; Shields, 2004), allowing greater confidence in generalizing the findings.

The only notable exception of sample representation found was that the highest level of parental educational attainment in the current sample was more polarized on the high and low ends of the spectrum than national norms (Statistics Canada, 2008). Unfortunately, a number of adolescent girls in the present study ($n = 111$, 28.2 %) reported not knowing the educational attainment of their parents. It is possible that if such data had not been missing, the middle section of the educational attainment continuum may have been better represented by the present sample. Perhaps it is more memorable for participants, when their parents' educational attainment falls on either the high or low end of the spectrum, than the middle. A review of existing research highlights the difficulties of obtaining information from adolescents on traditional socioeconomic markers such as parental education, occupation, and income because of high levels of missing or invalid data (Goodman, 1999; Lien, Friestad, & Klepp, 2001; Tuinstra, Groothoff, van den Heuvel, & Post, 1998). An alternative or additional measure to assess socioeconomic status would have been beneficial in the current study. One potentially promising alternative would be to ask adolescents about material indicators of socioeconomic status, such as car ownership, number of telephones in the home, and whether or not they share a bedroom (Abramson, Gofin, Habib, Pridan, & Gofin, 1982; Currie, Elton, Todd, & Platt, 1997).

Regarding attrition, analyses indicated that participants who dropped out of the study did not differ significantly from completers on any of the demographic factors, predictors, or the criterion measured. Such results suggest that attrition did not introduce

any systematic bias that would compromise the generalizability of the findings. It is possible that the attrition rate would have been lower had participants been offered some sort of compensation for their time. Nonetheless, the sample appears to be broadly representative of Canadian girls aged 15-17, thus allowing for the extrapolation of current findings to a larger population of adolescent girls.

Cross-Sectional Findings

Over half of the girls in the present sample reported that they were trying to lose weight at the baseline assessment. Such results are surprising considering the relatively small number of girls (11.3%, $n = 44$) who met criteria for having body dissatisfaction at baseline. Interestingly, 42.4 % ($n = 165$) of the girls who did not meet criteria for body dissatisfaction at baseline reported that they were actively trying to lose weight. The fact that some girls were trying to lose weight in the absence of body dissatisfaction is consistent with previous research (Cook et al., 2007). Such results could be interpreted in a number of different ways. It is possible that the desire to lose weight has become so pervasive among adolescent girls that body dissatisfaction is no longer required to initiate the desire. Alternatively, it may be more socially desirable for girls to report that they are actively trying to lose weight than not trying to change their bodies because weight-loss behaviour is viewed favourably in Western culture, perhaps symbolizing determination, strength, and willpower. It could also be argued that body dissatisfaction is reduced during periods of time that girls are actively attempting to lose weight. If girls are putting forth an effort to lose weight, perhaps they feel more satisfied with their bodies.

The statistical significance of the cross-sectional correlations between each of the predictors and body dissatisfaction confirmed the expected relations. Consistent with

previous cross-sectional research, low self-esteem (Canpolat et al., 2005; Graham, Eich, Kephart, & Peterson, 2000) and internalization of the thin-ideal (Canpolat et al., 2005) were more strongly related to body dissatisfaction than actual body weight. The fact that our results are consistent with other cross-sectional data provides support for the validity of the self-report measures. However, because statistical significance of correlations can be influenced by a large sample size, effect sizes were also examined. The magnitudes of the observed relations with baseline body dissatisfaction were large for both low self-esteem and thin-ideal internalization, medium for both weight-related teasing and BMI, and small for perfectionism (Cohen, 1992). Similarly, cross-sectional analysis showed that girls who reported initial body dissatisfaction, when compared to those who did not, had significantly higher levels of thin-ideal internalization, weight-related teasing, body mass index, and perfectionism, and significantly lower levels of self-esteem. All of the group differences demonstrated a large effect size, with the exception of perfectionism, which demonstrated a small effect size. When the postulated risk factors were simultaneously regressed onto baseline body dissatisfaction, low self-esteem made the largest unique contribution (a medium effect size), followed by thin-ideal internalization, BMI, and weight-related teasing (all of which were small effect sizes). Notably, perfectionism did not make a statistically significant unique contribution above and beyond the other predictors.

Longitudinal Findings

Change in body dissatisfaction. Consistent with previous research (Attie & Brooks-Gunn, 1989; Presnell et al., 2004), average body dissatisfaction scores decreased over time. Interestingly, three-quarters of the present sample became more satisfied with

their bodies, whereas a quarter reported increases in body dissatisfaction. The fact that body dissatisfaction reports shifted over time underscores the importance of tracking it longitudinally to fully understand etiologic influences.

Self-esteem. Consistent with some previous research (Gilbert & Meyer, 2005; Paxton, Eisenberg, & Neumark-Sztainer, 2006), negative self-evaluations were shown to increase risk for developing subsequent body dissatisfaction among adolescent girls. It is notable however, that such results are inconsistent with the findings of Tiggemann (2005). A potential explanation for the inconsistent findings is that Tiggemann (2005) used a shorter version of the Rosenberg Self-Esteem Scale, which could have potentially restricted the range of self-esteem and decreased the probability of detecting a significant predictive effect (Howell, 1999). Conversely, the present study utilized the full version of the Rosenberg Self-Esteem Scale and found a significant effect. The exact mechanism underlying the relationship between low self-esteem and subsequent body dissatisfaction is unknown. However, it is plausible that individuals who perceive themselves to have low overall self-worth may have a tendency to view most, if not all, aspects of themselves negatively, including their bodies.

Initially examining the relationship between low self-esteem and body dissatisfaction by preserving low self-esteem as a continuous variable is wise because dichotomizing predictors results in a reduction of statistical power (Cohen, 1983; Kraemer et al., 1999). However, statistical significance of a predictor-outcome correlation, although necessary, is not sufficient because any non-random association between a risk factor and an outcome, regardless of how trivial, can reach statistical significance if a large enough sample size is used (Kraemer et al., 1999). For this reason,

the report of statistical significance of any risk factor should ideally be accompanied by further information about the size of the effect, to permit evaluation of its practical significance (Kraemer, 1992). Given the lack of a “gold standard” for a choice of a risk potency effect size measure (Kraemer et al., 1999), the present study borrowed from the methodology of Agras, Bryson, Hammer, and Kraemer (2007) and calculated both the number needed to treat (NNT) and Cohen’s *d* for all statistically significant predictors, demonstrating that low self-esteem had a large risk potency (Cohen, 1992). Utilizing low self-esteem to dichotomize girls into high and low-risk groups subsequent to finding a nonzero predictor-outcome correlation is beneficial because it enables the expression of risk potency in a way that is more interpretable and meaningful for guiding both assessment, screening, and policy decisions (Kraemer et al., 1999). Such an analysis bridges the gap between research and practice. After all, most practical decisions based on risk estimation tend to be binary in nature (Kraemer et al., 1997). For example, providers of prevention programs make decisions on whether a particular individual is at high enough risk for body dissatisfaction to warrant an intervention.

In the present study, low self-esteem emerged as the most potent variable risk factor among the predictors measured, when used to dichotomize the girls into two subpopulations of high and low-risk groups. Such a finding is unique to the present study because to date no other published prospective studies have examined risk potency of low self-esteem among high and low-risk groups. Clearly, replication of the present finding is warranted. Nonetheless, in accordance with cross-sectional findings (e.g., the present study; Canpolat et al., 2005; Graham et al., 2000), low self-esteem appeared to be a stronger predictor than body mass, suggesting that girls’ appraisal of their overall sense

of worth may be more influential in developing body dissatisfaction than actual physical deviation from the culturally defined thin body ideal. Such findings may partially explain the high prevalence of dieting among normal weight adolescents (Canpolat et al., 2005).

Adiposity. Elevated adiposity demonstrated a medium effect size (Cohen, 1992), emerging as the second most potent risk factor for body dissatisfaction, when used to dichotomize high and low-risk groups. Consistent with the present study, the vast majority of longitudinal research has found elevated adiposity to significantly predict increases in body dissatisfaction over time (Cattarin & Thompson, 1994; Field et al., 2001; C. D. Jones, 2004; Ohring et al., 2002; Presnell et al., 2004; Stice & Whitenton, 2002; J. K. Thompson et al., 1995), with only a few exceptions (Bearman et al., 2006; Byely et al., 2000; Stice & Bearman, 2001). Stice and colleagues speculated that the nonsignificant findings of Byely (2000) may have resulted from a small sample size ($n = 52$) and lack of statistical power. Conversely, they speculated the null findings of Stice and Bearman (2001) may have emerged by using a sample of exclusively private school students with a restricted range of body mass (Presnell et al., 2004; Stice & Whitenton, 2002). Interestingly, Stice and Whitenton (2002) found that girls from a private school had significantly lower mean body mass than girls from public schools, but they did not find the interaction between school type and BMI to significantly predict increases in body dissatisfaction over time. When BMI of private school girls and public schools girls were compared in the present sample, null results emerged. Similarly, the interaction between school type and BMI was nonsignificant, suggesting that type of school is not associated with the extent to which elevated adiposity is a risk factor for body

dissatisfaction in the present sample. Regardless, the preponderance of evidence (including the present study) supports the assertion that the further an adolescent girls' body type deviates from the current Western cultural thin-ideal, the greater the degree of body dissatisfaction they will experience (Graber et al., 1994; Stice & Whitenton, 2002). From a theoretical point of view, the present findings support Jones' (2004) notion that elevated adiposity should be considered a necessary factor and included in all future developmental models of body dissatisfaction for girls. It might also be beneficial for future research to examine additional aspects of weight history, such as the highest past weight, most recent weight gain, or estimated non-dieting weight, in order to assess whether such variables predict subsequent body dissatisfaction as well (Stice, 2001b).

Thin-ideal internalization. Perhaps the most surprising result of the present study was that thin-ideal internalization was not a significant risk factor for increases in body dissatisfaction over one year. With a few exceptions (Bearman et al., 2006; C. D. Jones, 2004; Presnell et al., 2004), the accumulation of previous longitudinal research has supported the assertion that thin-ideal internalization is a risk factor for body dissatisfaction (Stice, 2001a; Stice, Presnell et al., 2001; Stice & Whitenton, 2002). Experimental studies have provided strong empirical support that elevated thin-ideal internalization predicts vulnerability to increased body dissatisfaction following exposure to thin-ideal media images (Cattarin et al., 2000; Dittmar & Howard, 2004; Durkin et al., 2005; Heinberg & Thompson, 1995; Stice et al., 1994). Furthermore, a fast growing area of research has demonstrated that prevention efforts designed to decrease thin-ideal internalization are also successful at reducing body dissatisfaction (Becker et al., 2005, 2006; Matussek, Wendt, & Wiseman, 2004a; Roehrig et al., 2006; Stice, Chase et al.,

2001; Stice et al., 2008; Stice, Mazotti et al., 2000; Stice, Presnell et al., 2007; Stice, Shaw, Burton et al., 2006).

To reduce data collection time and the burden on students and teachers, the present study used a modified, shorter version of a psychometrically sound thin-ideal internalization measure. It has been well documented in psychological literature that it can be a mistake for researchers to assume that the reliability and validity associated with an original full length measure automatically transfers over to an abbreviated measure (Smith, McCarthy, & Anderson, 2000). However, it is encouraging that the correlations found between thin-ideal internalization and body dissatisfaction ($r = 0.59$ at baseline and $r = 0.40$ at follow-up), are consistent with those found in Stice and Whitenton (2002) who used the original measure ($r = 0.46$ at baseline and $r = 0.40$ at follow-up; $z = 1.18$, $p > 0.05$, and $z = 0$, $p > 0.05$ respectively). In addition, the internal consistency reliability coefficient for the modified version ($\alpha = 0.92$ for the total sample and $\alpha = 0.93$ for completers only) was excellent according to Cicchetti's (1994) guidelines. It could be argued, however, that the shorter version of the measure served to restrict the range of thin-ideal internalization, which may have decreased the probability of detecting a significant predictive effect (Howell, 1999).

Excluding a potential measurement artifact in the present study, it remains unclear why other prospective research examining thin-ideal internalization as a risk factor for body dissatisfaction has produced null results (Bearman et al., 2006; Presnell et al., 2004). One potential explanation is that there may be an unknown moderator attenuating the risk potency. The present results in combination with the previous findings suggest a

potentially more conditional role in thin-ideal internalization predicting increases in body dissatisfaction prospectively.

Weight-related teasing. The present study did not support the assertion that weight-related teasing results in subsequent increases in body dissatisfaction over one year. Such results are consistent with some (C. D. Jones, 2004; Stice & Whitenton, 2002) but not all (Cattarin & Thompson, 1994) previous longitudinal studies. The fact that the majority of prospective research has produced null results raises the question that the role of weight-related teasing as a risk factor for body dissatisfaction may have been overestimated by cross-sectional data (C. D. Jones, 2004). Such results are difficult to comprehend, as anecdotal accounts strongly attest to the perceived importance of weight-related teasing in promoting subsequent body dissatisfaction (Gowers & Shore, 2001; C. D. Jones, 2004). It is notable that anecdotal accounts of weight-related teasing often describe single experiences (Gowers & Shore, 2001). Such a restricted range may make it difficult to detect weight-related teasing as a statistically significant predictor of subsequent body dissatisfaction (Howell, 1999). It is also important to consider that information obtained retrospectively can be problematic not only because participants forget certain details, but they also have a tendency to reinterpret past events in light of subsequent life experience (Kraemer et al., 1997). In fact, data suggests that the accuracy of retrospective recall can be barely above chance when compared to the same information collected longitudinally (Henry, Moffitt, Caspi, Langle, & Silva, 1994). Taken together, the data thus far suggest that weight-related teasing may not impact body dissatisfaction in the way it has been previously theorized.

Nonetheless, it is certainly premature to conclude that weight-related teasing does not play a role in the development of body dissatisfaction. Cattarin and Thompson's (1994) study, which found weight-related teasing to prospectively predict body dissatisfaction, used a sample of younger adolescents (ages 10-15) and an extended time period of 3 years instead of one year, providing potential explanations for the discrepant findings. It is possible that the present study did not assess the appropriate developmental period or time frame to capture weight-related teasing as a risk factor for body dissatisfaction. Further prospective studies among various age groups of children and preadolescents may clarify the discrepant findings. It should also be noted that weight-related teasing as a moderator of subsequent body dissatisfaction cannot be ruled out. As Stice (2002) noted, a moderator does not have to show a significant univariate relation to body dissatisfaction to qualify the magnitude and/or direction of the relation between another risk factor and body dissatisfaction.

Interestingly, prospective research has shown that weight-related teasing was predictive of disordered eating behaviours among males but not females (Gardner, Stark, Friedman, & Jackson, 2000; Haines, Neumark-Sztainer, Eisenberg, & Hannan, 2006). Such findings led to the hypothesis that weight-related teasing does not independently explain as much variance in disordered eating behaviour in females as it does in males, because females receive more messages about achieving the 'thin-ideal' from a larger range of sociocultural sources than their male counterparts (Haines & Neumark-Sztainer, 2006). One could extend this hypothesis beyond disordered eating behaviours to explain the null findings of weight-related teasing as a predictor of body dissatisfaction among adolescent girls.

The present study relied on adolescent girls' perception of the degree to which they have been teased about their weight and shape, which may be inaccurate. Thus, future research may benefit from collecting multi-informant data on weight-related teasing to verify that the perceived degree of teasing is similar to that observed by others (Stice & Whitenton, 2002). Also noteworthy is the fact that the present study did not differentiate between different sources of weight-related teasing. It is possible that weight-related teasing from one source (e.g., peers) may be a more potent risk factor than teasing from another source (e.g., siblings). In support of this assertion, cross-sectional research has shown that weight-related teasing by fathers and older brothers is more highly associated with body dissatisfaction than appearance-related feedback from mothers, sisters, and younger brothers (Keery, Boutelle, van den Berg, & Thompson, 2005). A recent prospective study differentiated weight-related teasing initiated by friends and initiated by other peers, but neither type was shown to be a significant predictor of body dissatisfaction (C. D. Jones, 2004). Further prospective research differentiating sources of weight-related teasing would be beneficial.

Perfectionism. The present study did not find that elevated levels of perfectionism predicted subsequent increases in body dissatisfaction over one year. Such results suggest that adolescent girls develop negative evaluations of their bodies, independent of any tendency they might have towards perfectionism. Perhaps body dissatisfaction has become so prevalent among adolescent girls that it is no longer necessary for individuals to have overly high expectations for themselves in order to elicit feelings of inadequacy in relation to body weight and shape. Although this is the only known longitudinal study to examine perfectionism as a predictor of body dissatisfaction to date, the present null

longitudinal findings, in combination with the non-significant incremental contribution of perfectionism that we found cross-sectionally, raises questions about the assertion that perfectionism is a potential risk factor for body dissatisfaction. Future research replicating these findings is required before drawing firm conclusions.

Failure of the current study to identify perfectionism as a significant predictor suggests that perfectionism may in fact be influenced by body dissatisfaction rather than vice versa. For example, individuals may first become dissatisfied with their bodies and subsequently develop perfectionism as a way to compensate for their perceived appearance failures. In other words, perfectionism may be a consequence of body dissatisfaction rather than a risk factor.

It is also possible that the type of measurement utilized in the present study may explain the null findings related to perfectionism. One could argue that global perfectionism (used as a predictor in the present study) may be too broad a construct. Theoretically, it could be hypothesized that perfectionism in some domains (e.g., appearance) may have higher risk potency than other domains (e.g., academic). Future research may benefit from breaking down global perfectionism into different subcomponents.

Implications

Both low self-esteem and elevated adiposity at baseline were shown to predict increases in body dissatisfaction over one year, suggesting they could be used to identify high-risk groups for selective primary prevention programs. Both low self-esteem and elevated adiposity can be assessed quickly, easily, and relatively inexpensively. Cost-effective screening procedures are increasingly sought after in light of the findings that

selective prevention programs appear to be more effective than universal prevention programs (Killen et al., 1993; Stice, Mazotti et al., 2000; Stice & Shaw, 2004; Stice, Shaw, & Marti, 2007). Such results suggest that rather than targeting the entire adolescent girl population, prevention efforts might more profitably focus on high-risk individuals (Stice & Shaw, 2004). Of course, effective referral systems and remedial resources for adolescent girls suspected of being at risk for body dissatisfaction have to be in place in order for such screening procedures to be useful.

The present findings also provide empirical support for expanding current body dissatisfaction prevention and treatment programs, to include greater attention to girls' overall sense of self-worth. When developing interventions, researchers, health professionals, and policy makers all face the enormous task of deciding which aversive outcomes should take priority. Body dissatisfaction is only one of many potential problems faced by adolescent girls. However, interventions that are successful (or even partially successful) at reducing risk factors that are associated with numerous aversive outcomes are typically favored because of their widespread impact on reducing both personal suffering and social costs (Kazdin et al., 1997). In addition to body dissatisfaction, low self-esteem has been shown to be associated with other undesirable outcomes such as higher rates of teen pregnancy, alcohol and drug abuse, juvenile delinquency, suicide, loneliness, depression, social anxiety, poorer academic performance, and alienation (Blasecovich & Tomaka, 1991; Delugach, Bracken, Bracken, & Schicke, 1992; Gurney, 1986; Shirk, 1988). Thus, prevention or treatment programs designed to increase self-esteem among adolescent girls should arguably be given high priority.

Recent research on a prevention program that incorporated self-esteem enhancement components appeared to be successful at reducing body dissatisfaction among middle school girls. Improvements were maintained at a one-year follow-up for subgroups of students who were either overweight or had low self-esteem and high trait anxiety (O'Dea & Abraham, 2000). One of the difficulties in interpreting such results is that the intervention contained several modules above and beyond self-esteem enhancement (e.g., stress management, media literacy, communication skills). Thus, dismantling studies are required in order to determine what specific component(s) of the prevention programs were responsible for the observed changes. It should also be noted independent researchers have subsequently tried to replicate the findings with little success (McVey & Davis, 2002; McVey, Davis, Tweed, & Shaw, 2004), suggesting that further refinement of the prevention program may be warranted.

Increasing the efficacy of selective body dissatisfaction prevention programs to specifically target adolescent girls with low self-esteem will likely prove to be challenging. Recent research examining the responses to messages perceived as typical of eating disorder and body dissatisfaction prevention programs have found that adolescent girls with low self-esteem rate the messages conveyed by prevention programs as less believable when compared to those with higher self-esteem. Interestingly, girls with low self-esteem appear to particularly question the credibility of messages aimed at reducing thin-ideal internalization. More specifically, messages suggesting that thinness does not equal attractiveness and that the ideal body shape changes throughout history and between cultures appear to be particularly difficult for adolescent girls with low self-esteem to accept as true (Durkin et al., 2005). The authors acknowledged that the findings

reflect girls' perception of the effectiveness of such messages rather than an actual examination of the effectiveness of the messages themselves. Nonetheless, such results suggest limited utility of such messages among a subgroup of adolescent girls. Moreover, prevention programs targeted towards reducing thin-ideal internalization have not demonstrated advantageous effects on low self-esteem (Matusek et al., 2004a). Taken together, such findings provide an empirical basis for expanding prevention and remedial programs beyond predominantly focusing on thin-ideal internalization to include other targets, particularly if selective prevention programs are designed to target adolescent girls with low self-esteem.

In addition to low self-esteem, the present study identified elevated adiposity as a risk factor for body dissatisfaction. Such a finding is concerning when one considers a recent Canadian study that revealed the prevalence of obesity in children has doubled over the past 20 years (Tremblay & Willms, 2000). It has also been recently documented that obesity is on the rise among Canadian adolescents (Plotnikoff, Bercovitz, & Loucaides, 2004). Taken together, it may be tempting to begin advocating for more efforts to be placed in implementing healthy weight-loss programs targeted towards overweight and obese pediatric and adolescent populations. However, the accumulation of research suggests that losing weight in the short term may be achievable, but maintaining weight loss over long periods of time has proven to be exceedingly difficult for the majority of individuals (Rosenbaum & Leibel, 1998; Wadden, 1993). At least part of the explanation for the difficulty of maintaining a reduced body weight relates to metabolic changes that occur in the body in response to weight loss (Dokken & Tsu-Shuen, 2007). In addition, numerous studies have demonstrated the importance of genetic

factors in the maintenance of body weight (Loss & Rankinen, 2005). Thus, if weight loss is targeted in treatment programs aimed at reducing body dissatisfaction, adolescents should be educated about the important contribution of genetics in weight maintenance, the complex nature of weight regulation, and the accumulation of research demonstrating that long-term weight loss is difficult and uncommon. Such education would hopefully assist adolescents in developing realistic expectations for themselves.

Perhaps a more fruitful approach would be to place efforts on prevention strategies in hopes of reducing the progression of weight gain over time or preventing obesity from occurring in the first place. Traditionally, prevention efforts have been targeted separately towards either risk factors of eating disorders (e.g., body dissatisfaction, thin-ideal internalization, dieting behaviours) or obesity (Neumark-Sztainer, 2007). However, there has been a recent movement in the field of prevention advocating for the development of programs aimed at preventing a broader spectrum of weight-related problems (Austin, 2000; Battle & Brownell, 1996; Haines & Neumark-Sztainer, 2006; Irving & Neumark-Sztainer, 2002; Neumark-Sztainer, 2005, 2007; Shaw, Ng, & Stice, 2007). Neumark-Sztainer (2007) outlined a number of conceptual and practical reasons for developing a more integrated approach to prevention. First, implementing one approach is more cost-effective than implementing two separate programs. Second, an integrated approach reduces the probability that prevention efforts for eating disorders and obesity will be teaching conflicting messages. Third, if adolescents are exposed to prevention aimed at only one spectrum of weight-related problems, it may inadvertently increase risk for a problem that is not being addressed. Fourth, various weight-related problems are not completely distinct from one another.

Weight-related problems can co-occur simultaneously in the same individual and it is not uncommon for individuals to cross over from one weight-related problem to another over time (Neumark-Sztainer, 2007).

How should prevention programs integrate a broad range of weight-related problems? According to Neumark-Sztainer (2007), prevention efforts should be designed to “help adolescents feel good about themselves and their bodies so that they will want to nurture their bodies through healthful eating, enjoyable physical activities, and positive self-talk” (p. 12). Such a recommendation has been drawn from research demonstrating that adolescents who are more satisfied with their bodies are more likely to engage in healthier lifestyles including healthier eating, physical activity, and the avoidance of unhealthy weight control practices (Neumark-Sztainer et al., 2006).

Recently, researchers have started to include both disordered eating and obesity measures as outcome variables in randomized efficacy trials (Shaw et al., 2007), and prevention programs are producing promising results with a broad spectrum of weight-related difficulties (Stice, Orjada, & Tristan, 2006; Stice & Ragan, 2002; Stice, Shaw, Burton et al., 2006; Stice, Trost, & Chase, 2003). Particularly promising is a 3-hour healthy weight control program targeting adolescent girls with body dissatisfaction who do not meet criteria for an eating disorder (Stice et al., 2008; Stice et al., 2007; Stice, Shaw, Burton et al., 2006). The selective prevention program is designed to promote healthy dietary improvements and exercise as a way of improving body satisfaction. Throughout the program, participants learn about the determinants of weight and are encouraged to gradually partake in healthy lifestyle choices. Compared to an assessment-only control condition, the healthy weight control program produced greater reductions in

thin-ideal internalization, body dissatisfaction, negative affect, and initial eating disorder symptoms. In addition, the weight control program produced a 55% reduction in risk for obesity onset and smaller increases in BMI when compared to the control condition. Perhaps what is most exciting about such results is that they were maintained when assessed at a 3-year follow-up (Stice et al., 2008). Such results are encouraging given a recent meta-analysis that failed to identify a single obesity prevention program that has been shown to reduce weight gain over such an extended period of time (Stice, Shaw, & Marti, 2006). In light of the current findings, continually refining obesity prevention programs, particularly those that simultaneously reduce risk for body dissatisfaction and eating disorders, is strongly encouraged.

Limitations of the Overall Study Design

Although the present study has several strengths and important implications, certain limitations of the overall study design should be acknowledged. First, the inability to obtain the desired sample size based on the *a priori* power analysis, and the null findings associated with three of the predictors, indicate that the present study may have been underpowered. Thus, it is possible that if a larger sample size was utilized, thin-ideal internalization, weight-related teasing, and perfectionism may have emerged as statistically significant predictors. Second, the present study involved a one year time period. Different results may have occurred if the present sample had been followed for a longer duration of time (C. D. Jones, 2004; Stice & Whitenton, 2002). As noted by Presnell et al. (2004), a short follow-up period may limit the amount of change that is observed in body dissatisfaction, making it more difficult to detect significant predictors of such change. Third, risk factors for body dissatisfaction may differ across different age

groups (Stice & Whitenton, 2002). In fact, there may be different sets of risk factors for early onset versus late onset body dissatisfaction. Fourth, with the exception of height and weight measurements, the present study relied exclusively on self-report measures. Reliance on self-report methodology as the primary data source can pose concerns about the validity of study findings for a number of reasons. Under such conditions, participants' response styles (e.g., acquiescence, extreme, moderacy, or social desirability response styles) can bias results, regardless of the content of test items (Kazdin, 2002). In addition, the present study's heavy reliance on self-report methodology may have introduced a mono-method bias that may have potentially inflated the magnitude of the observed effects (Stice & Whitenton, 2002). Furthermore, because single measures were used to assess each predictor and the criterion, a mono-operational bias could potentially pose a threat to the study's construct validity. Solitary methods of assessment pose the risk of under-representing or measuring irrelevant facets of constructs of interest (Kazdin, 2002). Fifth, the postulated risk factors of interest were only measured at baseline in the present study. Incorporating multiple assessments of predictors into the longitudinal study design would likely provide useful information on how the changes in the predictors across time contribute to the development of body dissatisfaction. Sixth, the present study used a nonexperimental longitudinal design, which does not permit ruling out third-variable explanations for the significant effects found. In other words, some unknown variable may be responsible for increasing both the risk factor(s) and body dissatisfaction (C. D. Jones, 2004; Presnell et al., 2004; Stice & Whitenton, 2002). A factor may appear to be a risk factor in prospective studies, but in reality it may be acting as a surrogate for some other factor that is not being assessed or considered (e.g., elevated

adiposity as a surrogate for physical health status; Kazdin et al., 1997). Lastly, subsequent to the baseline assessment, in response to a request from the Conjoint Faculties Research Ethics Board at the University of Calgary, all participants received a one-page handout and a brief didactic presentation describing ways to improve body image. One could argue that the debriefing procedure may have had either preventive or remedial effects and could have impacted the results of the follow-up assessment. However, a recent meta-analytic review of prevention programs aimed at body dissatisfaction (Stice, Shaw et al., 2007) demonstrated that several components of the debriefing procedure made it unlikely to have lasting positive effects. For example, the debriefing procedure was didactic (versus interactive), a single session (versus multisessional), and universal to all participants (versus selective), characteristics which have all been shown to reduce the efficacy of prevention programs.

Future Considerations

Researchers have just begun to scratch the surface of examining risk factors for body dissatisfaction and several plausible paths for future research remain. Take, for example, the issue of timing and how it relates to risk factor-outcome relations. Time can be measured in longitudinal research numerous ways such as calendar time, chronological age, or some other event (e.g., time of menarche, entering school, starting postsecondary education; Kraemer et al., 1997). Some risk factors may be specific to a particular developmental phase (e.g., post-pubertal) while others remain consistent throughout the lifespan (Jacobi et al., 2004). Future body dissatisfaction research should incorporate different time frames and multi-time point assessments to determine if

previously supported risk factor-outcome relations and potency are consistent across different developmental phases and time periods.

Just as the potency of a risk factor for body dissatisfaction can vary across time, a potent risk factor in one population may not be of similar potency or even a risk factor at all in other populations. For example, risk factors may vary among adolescents across cultures, social class, geographic locations, and gender (Kraemer et al., 1997).

Accordingly, prospective research demonstrated that the relationship between elevated adiposity and subsequent increases in body dissatisfaction differs by gender. More specifically, high school boys appear to be at risk for body dissatisfaction when they are either below or above average weight, whereas girls show a more linear relationship, becoming more at risk only when their body weight increases (Presnell et al., 2004). Interestingly, such a relationship between body mass index and body dissatisfaction was not found among middle school boys (Bearman et al., 2006). For these reasons, caution is required when generically referring to the risk factors of any given outcome because the profile of risk may depend on specific population characteristics (Kraemer et al., 1997). A challenge for future research is to determine which risk factors increase the probability of subsequent body dissatisfaction, for what specific population, at what specific time.

In addition to timing and population conditions, risk factor-outcome relations are highly dependent on the specific characteristics of the risk factor itself, such as the duration and intensity of exposure to the risk factor (Kazdin et al., 1997), and the way in which the risk factor is conceptualized and measured. For example (hypothetically), being teased about weight and shape by one or two people may not serve as a risk factor, but being teased by three or more people may be the threshold at which weight-related

teasing increases risk of body dissatisfaction. Depending on the specific measurement procedures researchers use to assess weight-related teasing, such specific dose-response patterns may not be detected. In addition, if the study sample is homogeneous (i.e., there is little variability of the risk factor in the population), then the factor is unlikely to be shown as a risk factor, although it may in reality increase risk. Taking the previous example, if very few people in the population being studied had been teased by three or more people, it will be difficult to document weight-related teasing as a risk factor (Kraemer et al., 1997). As such, future body dissatisfaction risk research would benefit by exploring diverse and innovative assessment methodologies to measure postulated risk factors.

To date, body dissatisfaction risk research has relied predominantly on self-report methodology. As Stice (2002) pointed out, it was previously widely accepted based on self-report data that obese individuals did not consume more calories than nonobese individuals. However, with the inclusion of additional measures of caloric intake, it was found that obese individuals tend to underreport caloric intake compared to nonobese individuals. Such findings emphasize the importance of the method of data collection. Future researchers are encouraged to gather information from multiple informants (e.g., family members, friends, teachers, and peers) or use observational study designs to further advance our understanding of etiological risk factors for body dissatisfaction (C. D. Jones, 2004; Stice, 2002, 2001b; Stice & Whitenton, 2002).

As with risk factors, specific parameters such as when and how body dissatisfaction is measured, and how it is dichotomized, can have an enormous impact on the findings. For example, to calculate the NNT for the significant predictors in the

present study, body dissatisfaction was dichotomized using the cut-off score derived from previous research (Presnell et al., 2004; Stice & Whitenton, 2002). In other words, participants who scored above or equal to the cut-off score were considered to have body dissatisfaction, and participants below the cut-off score were considered to not have body dissatisfaction. The reality is that there are numerous cut-off points that could have been used to define the outcome of high and low body dissatisfaction, all of which could potentially alter the NNT value. Whenever cut-off scores are used, there is always a trade-off between false-positive and false-negative outcomes⁹. It is up to researchers and policy makers to decide the relative seriousness of the types of error that cut-off scores produce (i.e., costs and benefits of Type I (false-negative) and Type II (false-positive) errors; Kamphuis & Finn, 2002). It could be argued that failing to identify body dissatisfaction is more detrimental than overidentifying it. However, when prevention resources are scarce, overidentifying body dissatisfaction is undesirable. On the one hand, for the purpose of risk research, all that is required by definition to determine if a variable is in fact a true risk factor is one explicit demonstration that the variable can be used to dichotomize the population into high and low risk groups, regardless of the exact cut-off score used (Kraemer et al., 1997). On the other hand, researchers and policy makers are ultimately looking for the maximal discrepancy achievable using the risk factor to dichotomize the population, which can only result from continued accumulation of data and further trial and error in defining cut-off points.

⁹ The same argument holds true for the way in which low self-esteem and elevated adiposity were dichotomized into high and low groups. The cut-off scores for each risk factor were also derived from previous research (T.J. Cole et al., 2000; Vohs et al., 2001).

In the present study, body dissatisfaction was the outcome of interest, a construct which was theorized to assess individuals' subjective evaluation or level of satisfaction with their body weight and shape. However, there are several closely related constructs that may be of interest for future research. Cash (2002) distinguished among individuals' perception of their body, their evaluation of their body, and their cognitive-behavioural investment related to their bodies. It is possible that research will reveal a different set of risk factors for each of these body-related constructs. Rather than relying on simplistic conceptualizations of body dissatisfaction as a unitary construct, future researchers would likely benefit from defining body dissatisfaction more broadly and incorporating multiple assessment methods. The outcome measure in the present study did not distinguish between body dissatisfaction with body parts that are perceived to be too small versus body parts perceived to be too large (Bearman et al., 2006). Body dissatisfaction scales that ask specifically about the nature of the dissatisfaction rather than simply the extent of dissatisfaction would be beneficial (Presnell et al., 2004). It is also important to consider that the present study focused specifically on the evaluation of body parts related to weight and shape (e.g., waist, thighs, buttocks). Future research may benefit from exploring body dissatisfaction as it relates to overall appearance, including other body parts (e.g., arms, shoulders, chest).

In keeping with the conceptual contributions of the risk factor typology (Kazdin et al., 1997; Kraemer et al., 1997; Stice, 2002, 2001b), prospective studies examining the ways in which risk factors work together in combination to promote body dissatisfaction are greatly needed. There have been very few rigorous empirical studies that have tested mediational and moderational relations among postulated risk factors of body

dissatisfaction. It is important to examine how risk factors work together simultaneously, as several risk factors used in combination would likely increase risk potency and more accurately define high-risk groups (Kraemer et al., 1997).

In addition to examining how risk factors work together, body dissatisfaction risk research would benefit from laboratory experiments in which participants are randomly assigned to high- or low-risk conditions. Not only do experimental studies demonstrate temporal precedence of risk factors, but they also enable researchers to rule out third-variable explanations of an effect, which is something that longitudinal studies cannot accomplish (Stice, 2001b). However, for obvious reasons researchers cannot always practically and ethically intervene and randomly assign participants to such conditions (Kazdin et al., 1997). For example, it would be unethical, not to mention arguably impossible, to randomly assign participants into high and low adiposity conditions. Stice (2001b) suggests that randomized prevention trials that are aimed at reducing a suspected risk factor, followed by a subsequent assessment of the effects on change in body dissatisfaction, can help circumvent such dilemmas. A potential challenge with this type of research is that often prevention and remedial studies rely on comprehensive intervention packages that attempt to target multiple correlates and risk factors (Kazdin et al., 1997). Although it is clear that the intention of such an approach is to increase the strength of the intervention condition, it is cumbersome in terms of increasing our knowledge of causal risk factors because the results are not readily interpretable. Randomized prevention trials focused on only one risk factor at a time provide stronger etiological tests, particularly when a placebo control condition is utilized, allowing greater confidence in ruling out non-specific factors (Stice, Shaw et al., 2007).

Considering the amount of variability that remained unaccounted for in the present study when predicting body dissatisfaction using low self-esteem and elevated adiposity combined, future researchers are encouraged to continue searching for additional risk factors. The range of potential factors that could play a role in shaping body dissatisfaction is vast. As noted by Kazdin et al. (1997), risk factors can emerge from multiple domains (e.g., sociocultural, psychological, biological) and different levels within each domain (e.g., genetic, biochemical, cognitive, behavioural).

Finally, risk factors influence the likelihood of developing body dissatisfaction, but they do not determine the outcome invariably. It is highly unlikely that one risk factor, or even a set of risk factors would ever be sufficient for body dissatisfaction to occur undoubtedly (Kazdin et al., 1997). Even among individuals identified as high risk for body dissatisfaction, many may not go on to develop it. More effort should be devoted to uncovering characteristics, events, or experiences that are associated with a decrease in risk among high risk individuals (Kazdin et al., 1997).

Conclusion

In summary, the present longitudinal study provides new insights into the development of body dissatisfaction among adolescent girls. The prospective analyses confirmed previous findings about the importance of elevated adiposity and low self-esteem as variable risk factors for body dissatisfaction. Despite the accumulation of support from the cross-sectional literature, the present study did not find support for the assertion that weight-related teasing, perfectionism, and thin-ideal internalization promote subsequent increases in body dissatisfaction over one year. Such results underscore the importance of following up cross-sectional research with longitudinal

designs. Although the present study found elevated adiposity and low self-esteem predicted subsequent body dissatisfaction, substantial variability in follow-up body dissatisfaction remains unaccounted for. Research examining risk factors for body dissatisfaction is still in its infancy, and considerable work remains. It will be important for researchers to continue to investigate body dissatisfaction risk factors in hopes of improving screening procedures, strengthening prevention and remedial efforts, and reducing the unfortunately prevalent struggle among adolescent girls.

References

- Abell, S. C., & Richards, M. H. (1996). The relationship between body shape satisfaction and self-esteem: An investigation of gender and class differences. *Journal of Youth and Adolescence*, 25(5), 691-703.
- Abramson, J. H., Gofin, R., Habib, J., Pridan, H., & Gofin, J. (1982). Indicators of social class. A comparative appraisal of measures for use in epidemiological studies. *Social Science and Medicine*, 16, 1739-1749.
- Agras, W. S., Bryson, S., Hammer, L., D., & Kraemer, H. C. (2007). Childhood risk factors for thin body preoccupation and social pressure to be thin. *Journal of the American Academy of Child & Adolescent Psychiatry*, 42(2), 171-178.
- Alf, E.F., Jr., & Graf, R.G. (1999). Asymptotic confidence limits for the difference between two squared multiple correlations: A simplified approach. *Psychological Methods*, 4, 70-75.
- Andersen, A. E., & DiDomenico, L. (1992). Diet vs. shape content of popular male and female magazines: A dose-response relationship to the incidence of eating disorders? *International Journal of Eating Disorders*(11), 283-287.
- Attie, I., & Brooks-Gunn, J. (1989). Development of eating problems in adolescent girls: A longitudinal study. *Developmental Psychology*, 25, 70-79.
- Austin, S. B. (2000). Prevention research and eating disorders: Theory and new directions. *Psychological Medicine*, 30, 1249-1262.
- Barker, E. T., & Galambos, N. L. (2003). Body dissatisfaction of adolescent girls and boys: Risk and resources factors. *Journal of Early Adolescence*, 23(2), 141-165.

- Bastiani, A. M., Rao, R., Weltzin, T., & Kaye, W. H. (1995). Perfectionism in anorexia nervosa. *International Journal of Eating Disorders*, 17(2), 147-152.
- Battle, E. K., & Brownell, K. D. (1996). Confronting a rising tide of eating disorders and obesity: Treatment vs. prevention and policy. *Addictive Behaviors*, 21, 755-765.
- Bauer, B. G., & Anderson, W. P. (1989). Bulimic beliefs: Food for thought. *Journal of Counseling & Development*, 67(7), 416-419.
- Bearman, S. K., Presnell, K., Martinez, E., & Stice, E. (2006). The skinny on body dissatisfaction: A longitudinal study of adolescent girls and boys. *Journal of Youth and Adolescence*, 35(2), 229-241.
- Becker, C. B., Smith, L. M., & Ciao, A. C. (2005). Reducing eating disorder risk factors in sorority members: A randomized trial. *Behavior Therapy*, 36, 245-254.
- Becker, C. B., Smith, L. M., & Ciao, A. C. (2006). Peer-facilitated eating disorder prevention: A randomized effectiveness trial of cognitive dissonance and media advocacy. *Journal of Counseling Psychology*, 53(4), 550-555.
- Berscheid, E., Walster, E., & Bohrnstedt, G. (1973). The happy American body: A survey report. *Psychology Today*, 7(6), 119-131.
- Blasecovich, J., & Tomaka, J. (1991). Measures of self-esteem. In J. P. Robinson, P. R. Shaver & L. S. Wrightsman (Eds.), *Measures of personality and social psychological attitudes*. San Diego: Academic.
- Bruch, H. (1973). *Eating disorders: Obesity, anorexia nervosa, and the person within*. New York: Basic Books.

- Button, E., Sonuga-Barke, E., Davies, J., & Thompson, M. (1996). A prospective study of self-esteem in the prediction of eating problems in adolescent schoolgirls: Questionnaire findings. *British Journal of Clinical Psychology*, 35(2), 193-203.
- Byely, L., Archibald, A. B., Graber, J., & Brooks-Gunn, J. (2000). A prospective study of familial and social influences on girls' body image and dieting. *International Journal of Eating Disorders*, 28(2), 155-164.
- Cafri, G., Yamamiya, Y., Brannick, M., & Thompson, J. (2005). The influence of sociocultural factors on body image: A meta-analysis. *Clinical Psychology: Science and Practice*, 12(4), 421-433.
- Caldwell, M. B., Brownell, K. D., & Wilfley, D. E. (1997). Relationship of weight, body dissatisfaction, and self-esteem in African American and White female dieters. *International Journal of Eating Disorders*, 22(2), 127-130.
- Canadian Council on Social Development. (1996). *The progress of Canada's children-1996*. Ottawa: Author.
- Canpolat, B. I., Orsel, S., Akdemir, A., & Ozbay, M. H. (2005). The relationship between dieting and body image, body ideal, self-perception, and body mass index in Turkish adolescents. *International Journal of Eating Disorders*, 37, 150-155.
- Cash, T. F. (1995). Developmental teasing about physical appearance: Retrospective descriptions and relationships with body image. *Social Behavior and Personality*, 23(2), 123-129.
- Cash, T. F. (2002). Cognitive-behavioural perspectives on body image. In T. F. Cash & T. Pruzinsky (Eds.), *Body image: A handbook of theory, research, and clinical practice* (pp. 38-46). New York: Guilford.

- Cash, T. F., & Henry, P. E. (1995). Women's body images: The results of a national survey in the U.S.A. *Sex Roles*, 33, 19-28.
- Cash, T. F., & Pruzinsky, T. (Eds.). (1990). *Body images: Development, deviance, and change*. New York, NY: Guilford Press.
- Cash, T. F., Winstead, B. A., & Janda, L. H. (1986). The great American shape-up. *Psychology Today*, 20(4), 30-37.
- Castro, J., Gila, A., Gual, P., Lahortiga, F., Saura, B., & Toro, J. (2004). Perfectionism dimensions in children and adolescents with anorexia nervosa. *Journal of Adolescent Health*, 35(5), 392-398.
- Cattarin, J. A., & Thompson, J. (1994). A three-year longitudinal study of body image, eating disturbance, and general psychological functioning in adolescent females. *Eating Disorders: The Journal of Treatment & Prevention*, 2(2), 114-125.
- Cattarin, J. A., Thompson, J. K., Thomas, C., & Williams, R. (2000). Body image, mood, and televised images of attractiveness: The role of social comparison. *Journal of Social and Clinical Psychology*, 19(2), 220-239.
- Cicchetti, D. V. (1994). Guidelines, criteria, and rules of thumb for evaluating normed and standardized assessment instruments in psychology. *Psychological Assessment*, 6(4), 284-290.
- Cohen, J. (1983). The cost of dichotomization. *Applied Psychological Measurement*, 7, 249-253.
- Cohen, J. (1992). A power primer. *Psychological Bulletin*, 112(1), 155-159.
- Cole, D. A., Martin, J. M., Peeke, L. G., Seroczynski, A., & Hoffman, K. (1998). Are cognitive errors of underestimation predictive or reflective of depressive

- symptoms in children: A longitudinal study. *Journal of Abnormal Psychology*, 107(3), 481-496.
- Cole, T. J. (1991). Weight-stature indices to measure underweight, overweight, and obesity. In J. H. Himes (Ed.), *Anthropometric assessment of nutritional status*. New York: Wiley and Sons.
- Cole, T. J., Bellizzi, M. C., Flegal, K. M., & Dietz, W. H. (2000). Establishing a standard definition for child overweight and obesity worldwide: international survey. *British Medical Journal*, 320, 1240-1243.
- Cook, S. J., MacPherson, K., & Langille, D. B. (2007). Far from ideal: Weight perception, weight control, and associated risky behaviour of adolescent girls in Nova Scotia. *Canadian Family Physician*, 53, 678-684.
- Cook-Cottone, C., & Phelps, L. (2003). Body dissatisfaction in college women: Identification of risk and protective factors to guide college counseling practices. *Journal of College Counseling*, 6(1), 80-89.
- Cooley, E., & Toray, T. (2001). Body image and personality predictors of eating disorder symptoms during the college years. *International Journal of Eating Disorders*, 30(1), 28-36.
- Cooper, P. J., & Goodyer, I. (1997). Prevalence and significance of weight and shape concerns in girls aged 11-16 years. *British Journal of Psychiatry*, 171, 542-544.
- Currie, C. E., Elton, R. A., Todd, J., & Platt, S. (1997). Indicators of socioeconomic status for adolescents: the WHO Health Behaviour in School-Aged Children Survey. *Health Education Research*, 12(3), 385-397.

- Davies, E., & Furnham, A. (1986a). Body satisfaction in adolescent girls. *British Journal of Medical Psychology*, 59(3), 279-287.
- Davies, E., & Furnham, A. (1986b). The dieting and body shape concerns of adolescent females. *Journal of Child Psychology and Psychiatry*, 27(3), 417-428.
- Davis, C. (1997). Normal and neurotic perfectionism in eating disorders: An interactive model. *International Journal of Eating Disorders*, 22(4), 421-426.
- Delugach, R. R., Bracken, B. A., Bracken, M. J., & Schicke, M. C. (1992). Self concept: Multidimensional construct exploration. *Psychology in the Schools*, 29, 213-223.
- Dittmar, H., & Howard, S. (2004). Thin-ideal internalization and social comparison tendency as moderators of media models' impact on women's body-focused anxiety. *Journal of Social & Clinical Psychology*, 23(6), 768-791.
- Dokken, B. B., & Tsu-Shuen, T. (2007). The physiology of body weight regulation: Are we too efficient for our own good? *Diabetes Spectrum*, 20(3), 166-170.
- Durkin, S. J., Paxton, S. J., & Wertheim, E. H. (2005). How do adolescent girls evaluate body dissatisfaction prevention messages? *Journal of Adolescent Health*, 37, 381-390.
- Eisele, J., Hertsgaard, D., & Light, H. K. (1986). Factors related to eating disorders in young adolescent girls. *Adolescence*, 21(82), 283-290.
- Elgar, F.J., Roberts, C., Tudor-Smith, C., Moore, L. (2005). Validity of self-reported height and weight and predictors of bias in adolescents. *Journal of Adolescent Health*, 37(5), 371-375.
- Elliot, A., & Woodward, W. (2007). *Statistical analysis quick reference guidebook with SPSS examples*. Thousand Oaks, California: Sage Publications, Inc.

- Evans, E., Bowes, H., & Drewett, R. F. (2008). How does perfectionism relate to body dissatisfaction in late childhood? *Appetite*, 50(2-3), 557.
- Evans, C., Margison, F., & Barkham, M. (1998). The contribution of reliable and clinically significant change methods to evidence-based mental health. *Evidence Based Mental Health*, 1(70-72).
- Fabian, L. J., & Thompson, J. (1989). Body image and eating disturbance in young females. *International Journal of Eating Disorders*, 8(1), 63-74.
- Faia, M. A. (1981). Selection by certification: A neglected variable in stratification research. *American Journal of Sociology*, 86, 1093-1111.
- Fairburn, C. G., Cooper, Z., Doll, H. A., Norman, P., & O'Connor, M. (2000). The natural course of bulimia nervosa and binge eating disorder in young women. *Archives of General Psychiatry*, 57(7), 659-665.
- Field, A. E., Austin, S. B., Taylor, C. B., Malspeis, S., Rosner, B., Rockett, H. R., et al. (2003). Relation between dieting and weight change among preadolescents and adolescents. *Pediatrics*, 112(4), 900-906.
- Field, A. E., Camargo, C. A., Jr., Taylor, C. B., Berkey, C. S., Roberts, S. B., & Colditz, G. A. (2001). Peer, parent, and media influences on the development of weight concerns and frequent dieting among preadolescent and adolescent girls and boys. *Pediatrics* 107(1), 54-60.
- Fingeret, M. C., & Gleaves, D. H. (2004). Sociocultural, feminist, and psychological influences on women's body satisfaction: A structural modeling analysis. *Psychology of Women Quarterly*, 28(4), 370-380.

- Fisher, M., Schneider, M., Pegler, C., & Napolitano, B. (1991). Eating attitudes, health-risk behaviors, self-esteem, and anxiety among adolescent females in a suburban high school. *Journal of Adolescent Health* 12(5), 377-384.
- Flett, G. L., & Hewitt, P. L. (1990). The Child-Adolescent Perfectionism Scale: Development and association with measures of adjustment. In R. Frost (Chair), *Perfectionism: Meaning, measurement, and relation to psychopathology*. Symposium conducted at the meeting of the Association for the Advancement of Behavior Therapy, San Francisco.
- Frost, J., & McKelvie, S. (2004). Self-esteem and body satisfaction in male and female elementary school, high school, and university students. *Sex Roles*, 51(1-2), 45-54.
- Furnham, A., Badmin, N., & Sneade, I. (2002). Body image dissatisfaction: Gender differences in eating attitudes, self-esteem, and reasons for exercise. *Journal of Psychology: Interdisciplinary and Applied*, 136(6), 581-596.
- Gardner, R. M., Friedman, B. N., & Jackson, N. A. (1999). Body size estimations, body dissatisfaction, and ideal size preferences in children six through thirteen. *Journal of Youth and Adolescence*, 28(5), 603-618.
- Gardner, R. M., Stark, K., Friedman, B. N., & Jackson, N. A. (2000). Predictors of eating disorder scores in children ages 6-14; a longitudinal study. *Journal of Psychosomatic Research*, 49, 199-205.
- Garner, D. M., Garfinkel, P. E., Schwartz, D., & Thompson, M. (1980). Cultural expectations of thinness in women. *Psychological Reports*, 47(2), 483-491.

- Garrow, J. S., & Webster, J. (1985). Quetelet's index (W/H^2) as a measure of fatness. *International Journal of Obesity* 9(2), 147-153.
- Glasgow, R., Green, L., Klesges, L., Abrams, D., Fisher, E., Goldstein, M., et al. (2006). External validity: We need to do more. *Annals of Behavioral Medicine*, 31(2), 105-108.
- Goodman, E. (1999). The role of socioeconomic status gradients in explaining differences in US adolescents' health. *American Journal of Public Health*, 89, 649-653.
- Gowers, S., & Shore, A. (2001). Development of weight and shape concerns in the aetiology of eating disorders. *British Journal of Psychiatry*, 179, 236-242.
- Graber, J. A., Brooks-Gunn, J., Paikoff, R. L., & Warren, M. P. (1994). Prediction of eating problems: An 8-year study of adolescent girls. *Developmental Psychology*, 30(6), 823-834.
- Graham, M. A., Eich, C., Kephart, B., & Peterson, D. (2000). Relationship among body image, sex, and popularity of high school students. *Perceptual and Motor Skills*, 90, 1187-1193.
- Grigg, M., Bowman, J., & Redman, S. (1996). Disordered eating and unhealthy weight reduction practices among adolescent females. *Preventive Medicine: An International Journal Devoted to Practice and Theory*, 25(6), 748-756.
- Gurney, P. (1986). Self-esteem in the classroom: Theoretical perspectives and assessment issues. *School Psychology International*, 7, 199-209.
- Haines, J., & Neumark-Sztainer, D. (2006). Prevention of obesity and eating disorders: A consideration of shared risk factors. *Health Education Research*, 21, 770-782.

- Haines, J., Neumark-Sztainer, D., Eisenberg, M. E., & Hannan, P. (2006). Weight teasing and disordered eating behaviors in adolescents: Longitudinal findings from Project Eat (Eating Among Teens). *Pediatrics, 117*, e209-e215.
- Hayes, S. D., Crocker, P. R., & Kowalski, K. C. (1999). Gender differences in physical self-perceptions, global self-esteem and physical activity: Evaluation of the physical self-perception profile model. *Journal of Sport Behavior, 22*(1), 1-14.
- Health Canada. (1999). *Healthy development of children and youth: The role of the determinants of health*. Ottawa: Author.
- 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*(1), 81-89.
- Heinberg, L. J., & Thompson, J. K. (1995). Body image and televised images of thinness and attractiveness: A controlled laboratory investigation. *Journal of Social & Clinical Psychology, 14*(4), 325-338.
- Henriques, G. R., & Calhoun, L. G. (1999). Gender and ethnic differences in the relationship between body esteem and self-esteem. *Journal of Psychology: Interdisciplinary and Applied, 133*(4), 357-368.
- Henry, B., Moffitt, T. E., Caspi, A., Langle, J., & Silva, P. (1994). On the 'remembrance of things past': a longitudinal evaluation of the retrospective method. *Psychological Assessment, 6*, 92-101.
- Hewitt, P. L., & Flett, G. L. (1991). Perfectionism in the self and social contexts: Conceptualization, assessment, and association with psychopathology. *Journal of Personality and Social Psychology, 60*(3), 456-470.

- Hewitt, P. L., Flett, G. L., & Ediger, E. (1995). Perfectionism traits and perfectionistic self-presentation in eating disorder attitudes, characteristics, and symptoms. *International Journal of Eating Disorders*, 18(4), 317-326.
- Hohlstein, L. A., Smith, G. T., & Atlas, J. G. (1998). An application of expectancy theory to eating disorders: Development and validation of measures of eating and dieting expectancies. *Psychological Assessment*, 10(1), 49-58.
- Howell, D. C. (1999). *Fundamental Statistics for the Behavioural Sciences* (4th ed.). New York: Brooks/Cole Publishing Company.
- Hsu, L. (1996). Epidemiology of the eating disorders. *Psychiatric Clinics of North America*, 19(4), 681-700.
- Huon, G. F. (1994). Dieting, binge eating, and some of their correlates among secondary school girls. *International Journal of Eating Disorders*, 15(2), 159-164.
- Irving, L., & Neumark-Sztainer, D. (2002). Integrating primary prevention of eating disorders and obesity: Feasible or futile? *Preventive Medicine*, 34, 299-309.
- Jacobi, C., Hayward, C., de Zwaan, M., Kraemer, H. C., & Agras, W. S. (2004). Coming to terms with risk factors for eating disorders: Application of risk terminology and suggestions for a general taxonomy. *Psychological Bulletin*, 130(1), 19-65.
- Jacobson, N., & Truax, P. (1991). Clinical significance: a statistical approach to defining meaningful change in psychotherapy research. *Journal of Consulting and Clinical Psychology*, 59(1), 12-19.
- Jones, C. D. (2004). Body image among adolescent girls and boys: A longitudinal study. *Developmental Psychology*, 40(5), 823-835.

- Jones, J. M., Bennett, S., Olmsted, M. P., Lawson, M. L., & Rodin, G. (2001).
Disordered eating attitudes and behaviors in teenaged girls: A school-based study.
Canadian Medical Association Journal, 165(5), 547-551.
- Kamphuis, J. H., & Finn, S. E. (2002). Incorporating base rate information in daily
clinical decision making. In J. N. Butcher (Ed.), *Clinical Personality Assessment:
Practical Approaches* (pp. 257-268). New York: Oxford University Press.
- Kazdin, A. E. (2002). *Research design in clinical psychology* (4th ed.). Boston: Allyn &
Bacon.
- Kazdin, A. E., Kraemer, H. C., Kessler, R. C., Kupfer, D., & Offord, D. (1997).
Contributions of risk factor research to developmental psychopathology. *Clinical
Psychology Review*, 17(375-406).
- Keery, H., Boutelle, K., van den Berg, P., & Thompson, J. (2005). The impact of
appearance-related teasing by family members. *Journal of Adolescent Health*,
37(2), 120-127.
- Killen, J. D., Taylor, C., Hayward, C., Haydel, K. F., Wilson, D. M., Hammer, L. D., et
al. (1996). Weight concerns influence the development of eating disorders: A 4-
year prospective study. *Journal of Consulting and Clinical Psychology*, 64(5),
936-940.
- Killen, J. D., Taylor, C. B., Hammer, L. D., Litt, I., Wilson, D. M., Rich, T., et al. (1993).
An attempt to modify unhealthful eating attitudes and weight regulation practices
of young adolescent girls. *International Journal of Eating Disorders*, 13(4), 369-
384.

- Killen, J. D., Taylor, C. B., Hayward, C., Wilson, D. M., Haydel, K., Hammer, L. D., et al. (1994). Pursuit of thinness and onset of eating disorder symptoms in a community sample of adolescent girls: A three-year prospective analysis. *International Journal of Eating Disorders*, 16.
- Koff, E., Rierdan, J., & Stubbs, M. L. (1990). Gender, body image, and self-concept in early adolescence. *Journal of Early Adolescence*(10), 56-68.
- Kraemer, H. C. (1992). Reporting the size of effects in the research studies to facilitate assessment of practical or clinical significance. *Psychoneuroendocrinology*, 17, 527-536.
- Kraemer, H. C. (2003). Current concepts of risk in psychiatric disorders. *Current Opinion in Psychiatry*, (16), 421-430.
- Kraemer, H. C., Berkowitz, R. I., & Hammer, L. D. (1990). Methodological difficulties in studies in obesity: I. Measurement issues. *Annals of Behavioral Medicine*, 12(3), 112-118.
- Kraemer, H. C., Kazdin, A. E., Offord, D., Kessler, R. C., Jensen, P. S., & Kupfer, D. J. (1999). Measuring the potency of risk factors for clinical or policy significance. *Psychological Methods*, 4(3), 257-271.
- Kraemer, H. C., Kazdin, A. E., Offord, D. R., Kessler, R. C., & et al. (1997). Coming to terms with the terms of risk. *Archives of General Psychiatry*, 54(4), 337-343.
- Kraemer, H. C., Morgan, G. A., Leech, N. L., Gliner, J. A., Vaske, J. J., & Harmon, R. J. (2003). Measures of clinical significance. *Journal of the American Academy of Child & Adolescent Psychiatry*, 42(12), 1524-1529.

- Kraemer, H. C., Stice, E., Kazdin, A., Offord, D., & Kupfer, D. (2001). How do risk factors work together? Mediators, moderators, and independent, overlapping, and proxy risk factors. *American Journal of Psychiatry*, 158(6), 848-856.
- Lamb, C. S., Jackson, L. A., Cassiday, P. B., & Preist, D. J. (1993). Body figure preferences of men and women: A comparison of two generations. *Sex Roles* (28), 345-358.
- Levine, M., & Ensom, M.H. (2001). Post hoc power analysis: An idea whose time has passed? *Pharmacotherapy*, 21(4), 405-409.
- Levine, T.R., Weber, R., Park, H.S., & Hullett, C.R. (2008). A communication reseachers' guide to null hypothesis significance testing and alternatives. *Human Communication Research*, 34, 188-209.
- Lewinsohn, P. M., Striegel-Moore, R. H., & Seeley, J. H. (2000). Epidemiology and natural course of eating disorders in young women from adolescence to young adulthood. *Journal of the American Academy of Child & Adolescent Psychiatry*, 39(10), 1284-1292.
- Liberatos, P., Link, B. G., & Kelsey, J. L. (1988). The measurement of social class in epidemiology. *Epidemiologic Reviews*, 10, 87-121.
- Lien, N., Friestad, C., & Klepp, K. I. (2001). Adolescents' proxy reports of parents' socioeconomic status: How valid are they? *Journal of Epidemiology and Community Health*, 55, 731-737.
- Loss, R., & Rankinen, T. (2005). Gene-diet interactions on body weight changes. *Journal of American Dietetic Association*, 105, S29-S34.

- Lunner, K., Werthem, E. H., Thompson, J. K., Paxton, S. J., McDonald, F., & Halvaarson, K. S. (2000). A cross-cultural examination of weight-related teasing, body image, and eating disturbance in Swedish and Australian samples. *International Journal of Eating Disorders*, 28(4), 430-435.
- Manson, J., Skerrett, P., & Willet, W. (2002). Epidemiology of health risks associated with obesity. In C. G. Fairburn & K. D. Brownell (Eds.), *Eating disorders and obesity: A comprehensive handbook* (2nd ed., pp. 422-428). New York: Guilford Press.
- Martin, S., Housley, K., McCoy, H., & Greenhouse, P. (1988). Self-esteem of adolescent girls as related to weight. *Perceptual and Motor Skills*, 67(3), 879-884.
- Matusek, J. A., Wendt, S. J., & Wiseman, C. V. (2004a). Dissonance thin-ideal and didactic healthy behavior eating disorder prevention programs: Results from a controlled trial. *International Journal of Eating Disorders*, 36(4), 376-388.
- Matusek, J. A., Wendt, S. J., & Wiseman, C. V. (2004b). Dissonance thin-ideal and didactic healthy behavior eating disorders prevention programs: Results from a controlled trial. *International Journal of Eating Disorders*, 36(376-388).
- McCabe, M. P., & Ricciardelli, L. A. (2001). Parent, peer, and media influences on body image and strategies to both increase and decrease body size among adolescent boys and girls. *Adolescence*, 36(142), 225-240.
- McLaren, L., Gauvin, L., & White, D. (2001). The role of perfectionism and excessive commitment to exercise in explaining dietary restraint: Replication and extension. *International Journal of Eating Disorders*, 29(3), 307-313.

- McVey, G., & Davis, R. (2002). A program to promote positive body image: A 1-year follow-up evaluation. *Journal of Early Adolescence*, 22(1), 96-108.
- McVey, G., Davis, R., Tweed, S., & Shaw, B. F. (2004). Evaluation of a school-based program designed to improve body image satisfaction, global self-esteem, and eating attitudes and behaviors: A replication study. *International Journal of Eating Disorders*, 36, 1-11.
- Meland, E., Haugland, S., & Breidablik, H. (2007). Body image and perceived health in adolescence. *Health Education Research*(22), 342-350.
- Mendelson, B. K., & White, D. R. (1985). Development of self-body-esteem in overweight youngsters. *Developmental Psychology*, 21(1), 90-96.
- Mendelson, B. K., White, D. R., & Mendelson, M. J. (1996). Self-esteem and body esteem: Effects of gender, age, and weight. *Journal of Applied Developmental Psychology*, 17(3), 321-346.
- Meyer, C., & Waller, G. (2001). Social convergence of disturbed eating attitudes in young adult women. *Journal of Nervous and Mental Disease*, 189(2), 114-119.
- Mintz, L. B., & Betz, N. E. (1988). Prevalence and correlates of eating disordered behaviors among undergraduate women. *Journal of Counseling Psychology*, 35(4), 463-471.
- Morris, A., Cooper, T., & Cooper, P. J. (1989). The changing shape of female fashion models. *International Journal of Eating Disorders*, 8, 593-596.
- Neumark-Sztainer, D. (2005). Can we simultaneously work toward the prevention of obesity and eating disorders in children and adolescents? *International Journal of Eating Disorders*, 38, 220-227.

- Neumark-Sztainer, D. (2007). Addressing the spectrum of adolescent weight-related problems: Engaging parents and communities. *The Prevention Researcher*, 14(3), 11-14.
- Neumark-Sztainer, D., Paxton, S. J., Hannan, P., Haines, J., & Story, M. (2006). Does body satisfaction matter? Five-year longitudinal associations between body satisfaction and health behaviors in adolescent females and males. *Journal of Adolescent Health*, 39, 244-251.
- Neumark-Sztainer, D., Story, M., Hannan, P., Perry, C., & Irving, L. (2002). Weight-related concerns and behaviours among overweight and non-overweight adolescents: Implications for preventing weight-related disorders. *Archives of Pediatrics and Adolescent Medicine*, 156, 171-178.
- Newman, D. L., Moffitt, T. E., Caspi, A., Magdol, L., Silva, P. A., & Stanton, W. R. (1996). Psychiatric disorder in a birth cohort of young adults: Prevalence, comorbidity, clinical significance, and new case incidence from ages 11-21. *Journal of Consulting and Clinical Psychology*, 64(3), 552-562.
- Newman, D. L., Sontag, L. M., & Salvato, R. (2005). Psychosocial aspects of body mass and body image among rural American Indian adolescents. *Journal of Youth and Adolescence*, 35, 281-291.
- O'Dea, J. A., & Abraham, S. (2000). Improving the body image, eating attitudes, and behaviours of young male and female adolescents: A new educational approach that focuses on self-esteem. *International Journal of Eating Disorders*, 28, 43-45.

- Ohring, R., Graber, J. A., & Brooks-Gunn, J. (2002). Girls' recurrent and concurrent body dissatisfaction: Correlates and consequences over 8 years. *International Journal of Eating Disorders*, 31(4), 404-415.
- Owen, P. R., & Laurel-Seller, E. (2000a). Weight and shape ideals: Thin is dangerously in. *Journal of Applied Sociology*, 30, 979-990.
- Owen, P. R., & Laurel-Seller, E. (2000b). Weight and shape ideals: Thin is dangerously in. *Journal of Applied Social Psychology*, 30(5), 979-990.
- Pallant, J. (2005). *SPSS survival manual* (2nd ed.). New York: Open University Press.
- Patton, G., Johnson-Sabine, E., Wood, K., Mann, A., & Wakeling, A. (1990). Abnormal eating attitudes in London schoolgirls: A prospective epidemiological study: Outcome at twelve month follow-up. *Psychological Medicine*, 20(2), 383-394.
- Paxton, S.J., Eisenberg, M.E., & Neumark-Sztainer, D. (2006). Prospective predictors of body dissatisfaction in adolescent girls and boys: A five-year longitudinal study. *Developmental Psychology*, 42(5), 888-899.
- Paxton, S. J., Schutz, H. K., Wertheim, E. H., & Muir, S. L. (1999). Friendship clique and peer influences on body image concerns, dietary restraint, extreme weight-loss behaviors, and binge eating in adolescent girls. *Journal of Abnormal Psychology*, 108(2), 255-266.
- Paxton, S. J., Wertheim, E. H., Gibbons, K., Szmukler, G., Hillier, L., & Petrovich, J. (1991). Body image satisfaction, dieting beliefs, and weight loss behaviors in adolescent girls and boys. *Journal of Youth and Adolescence*, 20(3), 361-379.
- Plotnikoff, R., Bercovitz, K., & Loucaides, C. (2004). Physical activity, smoking, and obesity among Canadian youth. *Canadian Journal of Public Health*, 95, 413-418.

- Presnell, K., Bearman, S. K., & Stice, E. (2004). Risk factors for body dissatisfaction in adolescent boys and girls: A prospective study. *International Journal of Eating Disorders*, 36(4), 389-401.
- Pritchard, M. E., King, S. L., & Czajka-Narins, D. M. (1997). Adolescent body mass indices and self-perception. *Adolescence*, 32(128), 863-880.
- Rierdan, J., & Koff, E. (1991). Depressive symptomatology among very early maturing girls. *Journal of Youth and Adolescence*, 20(4), 415-425.
- Robson, P. (1989). Development of a new self-report questionnaire to measure self esteem. *Psychological Medicine*, 19(2), 513-518.
- Roehrig, M., Thompson, D. A., Brannick, M., & van den Berg, P. (2006). Dissonance-based eating disorder prevention program: A preliminary dismantling investigation. *International Journal of Eating Disorders*, 39, 1-10.
- Rosenbaum, M., & Leibel, R. L. (1998). The physiology of body weight regulation: relevance to the etiology of obesity in children. *Pediatrics*, 101, 525-539.
- Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press.
- Ross, D., Scott, K., & Kelly, M. (1996). Overview: Children in Canada in the 1990s. In *Growing up in Canada: National longitudinal survey of children and youth* (pp. 15-45). Ottawa: Human Resources Development Canada and Statistics Canada.
- Rothenberg, A. (1990). Adolescence and eating disorder: The obsessive-compulsive syndrome. *Psychiatric Clinics of North America*, 13, 469-488.
- Rubinstein, S., & Caballero, B. (2000). Is Miss America an undernourished role model? *Journal of the American Medical Association*, 283, 1569.

- Ruderman, A. J. (1986). Bulimia and irrational beliefs. *Behaviour Research & Therapy* 24(2), 193-197.
- Shaw, H.E., Ng, J., & Stice, E. (2007). Integrating eating disorder and obesity prevention programs for adolescents. *The Prevention Researcher*, 14(3), 18-20.
- Shaw, H.E., Stice, E., & Springer, D. W. (2004). Perfectionism, body dissatisfaction, and self-esteem in predicting bulimic symptomatology: Lack of replication. *International Journal of Eating Disorders*, 36(1), 41-47.
- Shea, M.E., & Pritchard, M.E. (2007). Is self-esteem the primary predictor of disordered eating? *Personality and Individual Differences*, 42, 1527-1537.
- Sherry, B., Jefferds, M. E., & Grummer-Strawn, L. M. (2007). Accuracy of adolescent self-report of height and weight in assessing overweight status: A literature review. *Archives of Pediatrics and Adolescent Medicine*, 12(161), 1154-1161.
- Shields, M. (2004). Overweight Canadian children and adolescents [Electronic Version]. *Canadian Community Health Survey: Nutrition*. Retrieved September 21, 2008 from <http://www.statcan.ca/>.
- Shirk, S. R. (1988). What is child psychotherapy? In S. R. Shirk (Ed.), *Cognitive development and child psychotherapy* (pp. 1-16). New York: Plenum.
- Silverstein, B., Peterson, B., & Perdue, L. (1986). Some correlates of the thin standard of bodily attractiveness for women. *International Journal of Eating Disorders*, 5(5), 895-905.
- Smith, G. T., McCarthy, D. M., & Anderson, K. G. (2000). On the sins of short-form development. *Psychological Assessment*, 12(1), 102-111.

- Smithson, M. (2001). Correct confidence intervals for various regression effect sizes and parameters: The importance of noncentral distributions in computing intervals. *Educational and Psychological Measurement*, 61(4), 605-632.
- Statistics Canada. (2008). Census 2006 [Electronic Version]. Retrieved September 21, 2008 from <http://www.statcan.ca/>.
- Stice, E. (2001a). A prospective test of the dual-pathway model of bulimic pathology: Mediating effects of dieting and negative affect. *Journal of Abnormal Psychology*, 110(1), 124-135.
- Stice, E. (2002). Risk and maintenance factors for eating pathology: A meta-analytic review. *Psychological Bulletin*, 128(5), 825-848.
- Stice, E. (Ed.). (2001b). *Risk factors for eating pathology: Recent advances and future directions*. Washington, DC: American Psychological Association.
- 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(5), 597-607.
- Stice, E., Cameron, R. P., Killen, J. D., Hayward, C., & Taylor, C. (1999). Naturalistic weight-reduction efforts prospectively predict growth in relative weight and onset of obesity among female adolescents. *Journal of Consulting and Clinical Psychology*, 67(6), 967-974.
- Stice, E., Chase, A., Stormer, S., & Appel, A. (2001). A randomized trial of a dissonance-based eating disorder prevention program. *International Journal of Eating Disorders*, 29(3), 247-262.

- Stice, E., Hayward, C., Cameron, R. P., Killen, J. D., & Taylor, C. (2000). Body-image and eating disturbances predict onset of depression among female adolescents: A longitudinal study. *Journal of Abnormal Psychology, 109*(3), 438-444.
- Stice, E., Marti, N., Spoor, S. T., Presnell, K., & Shaw, H. (2008). Dissonance and healthy weight eating disorder prevention programs: Long-term effects from a randomized efficacy trial. *Journal of Consulting and Clinical Psychology, 76*(2), 329-340.
- Stice, E., Mazotti, L., Krebs, M., & Martin, S. (1998). Predictors of adolescent dieting behaviors: A longitudinal study. *Psychology of Addictive Behaviors, 12*(3), 195-205.
- Stice, E., Mazotti, L., Weibel, D., & Agras, W. (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*(2), 206-217.
- Stice, E., Orjada, K., & Tristan, J. (2006). Trial of a psychoeducational eating disturbance intervention for college women: A replication and extension. *International Journal of Eating Disorders, 39*(3), 233-239.
- Stice, E., Presnell, K., & Bearman, S. K. (2001). Relation of early menarche to depression, eating disorders, substance abuse, and comorbid psychopathology among adolescent girls. *Developmental Psychology, 37*(5), 608-619.
- Stice, E., Presnell, K., Gau, J., & Shaw, H.E. (2007). Testing mediators of intervention effects in randomized controlled trials: An evaluation of two eating disorder

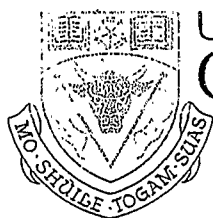
- prevention programs. *Journal of Consulting and Clinical Psychology*, 75(1), 20-32.
- Stice, E., & Ragan, J. (2002). A controlled evaluation of an eating disturbance psychoeducational intervention. *International Journal of Eating Disorders*, 31, 159-171.
- Stice, E., Schupak-Neuberg, E., Shaw, H. E., & Stein, R. I. (1994). Relation of media exposure to eating disorder symptomatology: An examination of mediating mechanisms. *Journal of Abnormal Psychology*, 103(4), 836-840.
- Stice, E., & Shaw, H.E. (2004). Eating disorder prevention programs: A meta-analytic review. *Psychological Bulletin*, 130(2), 206-227.
- Stice, E., Shaw, H.E., Burton, E., & Wade, E. (2006). Dissonance and healthy weight eating disorder prevention programs: A randomized efficacy trial. *Journal of Consulting and Clinical Psychology*, 74(2), 263-275.
- Stice, E., Shaw, H.E., & Marti, C. N. (2006). A meta-analytic review of obesity prevention programs for children and adolescents: The skinny on interventions that work. *Psychological Bulletin*, 132, 667-691.
- Stice, E., Shaw, H.E., & Marti, C. N. (2007). A Meta-analytic review of eating disorder prevention programs: Encouraging findings. *Annual Review of Clinical Psychology*, 3, 207-231.
- 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(5), 985-993.

- Stice, E., Trost, A., & Chase, A. (2003). Healthy weight control and dissonance-based eating disorder prevention programs: Results from a controlled trial. *International Journal of Eating Disorders*, 33(1), 10-21.
- Stice, E., & Whitenton, K. (2002). Risk factors for body dissatisfaction in adolescent girls: A longitudinal investigation. *Developmental Psychology*, 38(5), 669-678.
- Stormer, S. M., & Thompson, J. K. (1996). Explanations of body image disturbance: A test of maturational status, negative verbal commentary, social comparison, and sociocultural hypotheses. *International Journal of Eating Disorders*, 19(2), 193-202.
- Striegel-Moore, R. H., Silberstein, L. R., & Rodin, J. (1986). Toward an understanding of risk factors for bulimia. *American Psychologist*, 41(3), 246-263.
- Tabachnick, B. G., & Fidell, L. S. (2001). *Using multivariate statistics* (4th ed.). New York: HarperCollins.
- The McCreary Centre Society. (1999). *Mirror images: Weight issues among BC youth*. Vancouver, BC: Author.
- Thompson, D. A., Berg, K. M., & Shatford, L. A. (1987). The heterogeneity of bulimia symptomatology: Cognitive and behavioral dimensions. *International Journal of Eating Disorders*, 6(2), 215-234.
- Thompson, J. K. (1991). Body shape preferences: Effects of instructional protocol and level of eating disturbance. *International Journal of Eating Disorders*, 10(2), 193-198.
- Thompson, J. K., Covert, M. D., Richards, K. J., Johnson, S., & Cattarin, J. A. (1995). Development of body image, eating disturbance, and general psychological

- functioning in female adolescents: Covariance structural modeling and longitudinal investigation. *International Journal of Eating Disorders*, 18(3), 221-236.
- Thompson, J. K., Heinberg, L. J., Altabe, M., & Tantleff-Dunn, S. (1999). *Exacting beauty: Theory, assessment, and treatment of body image disturbance*. Washington, DC: American Psychological Association.
- Thompson, J. K., & Psaltis, K. (1988). Multiple aspects and correlates of body figure ratings: A replication and extension of Fallon and Rozin. *International Journal of Eating Disorders*, 7(6), 813-817.
- Tiggemann, M. (2005). Body dissatisfaction and adolescent self-esteem: Prospective findings. *Body Image*, 2, 129-135.
- Tiggemann, M. (2002). Media influences on body image development. In T. F. Cash & T. Pruzinsky (Eds.), *Body image: A handbook of theory, research, and clinical practice* (pp. 91-99). New York: Guilford Press.
- Tiggemann, M., & Pennington, B. (1990). The development of gender differences in body-size dissatisfaction. *Australian Psychologist*, 25(3), 306-313.
- Tiggemann, M., & Pickering, A. S. (1996). Role of television in adolescent women's body dissatisfaction and drive for thinness. *International Journal of Eating Disorders*, 20(2), 199-203.
- Tremblay, M., & Willms, J. (2000). Secular trends in the body mass index of Canadian children. *Canadian Medical Association Journal*, 163(11), 1429-1433.

- Tuinstra, J., Groothoff, J. W., van den Heuvel, W. J., & Post, D. (1998). Socio-economic differences in health risk behavior in adolescence: Do they exist? *Social Science and Medicine*, 47, 67-74.
- van den Berg, P., Wertheim, E. H., Thompson, J. K., & Paxton, S. J. (2002). Development of body image, eating disturbance, and general psychological functioning in adolescent females: A replication using covariance structure modeling in an Australian sample. *International Journal of Eating Disorders*, 32(1), 46-51.
- Vohs, K. D., Bardone, A. M., Joiner, T. E., & Abramson, L. Y. (1999). Perfectionism, perceived weight status, and self-esteem interact to predict bulimic symptoms: A model of bulimic symptom development. *Journal of Abnormal Psychology*, 108(4), 695-700.
- Vohs, K. D., Voelz, Z. R., Pettit, J. W., Bardone, A. M., Katz, J., Abramson, L. Y., et al. (2001). Perfectionism, body dissatisfaction, and self-esteem: An interactive model of bulimic symptom development. *Journal of Social & Clinical Psychology*, 20(4), 476-497.
- von Ranson, K., Klump, K., Iacono, W., & McGue, M. (2005). The Minnesota Eating Behavior Survey: A brief measure of disordered eating attitudes and behaviors. *Eating Behaviors*, 6, 373-392.
- Wadden, T. A. (1993). Treatment of obesity by moderate and severe caloric restrictions: results of clinical research trials. *Annals of Internal Medicine*(119), 688-693.
- Wade, T. D., & Lowes, J. (2002). Variables associated with disturbed eating habits and overvalued ideas about the personal implications of body shape and weight in a

- female adolescent population. *International Journal of Eating Disorders*, 32(1), 39-42.
- Wakeling, A. (1996). Epidemiology of anorexia nervosa. *Psychiatry Research*, 62, 3-9.
- Webster, J., & Tiggemann, M. (2003). The relationship between women's body satisfaction and self-image across the life span: The role of cognitive control. *Journal of Genetic Psychology*, 164(2), 241-252.
- Wertheim, E. H., Paxton, S. J., & Blaney, S. (2004). Risk factors for the development of body image disturbances. In J. K. Thompson (Ed.), *Handbook of Eating Disorders and Obesity* (pp. 463-494). New Jersey: John Wiley & Sons, Inc.
- Williams, J. M., & Currie, C. (2000). Self-esteem and physical development in early adolescence: Pubertal timing and body image. *Journal of Early Adolescence*, 20(2), 129-149.
- Wiseman, C. V., Gray, J. J., Mosimann, J. E., & Ahrens, A. H. (1992). Cultural expectations of thinness in women: An update. *International Journal of Eating Disorders*, 11(1), 85-89.
- Woodside, B., Bulik, C. M., Halmi, K. A., Fichter, M. M., Kaplan, A., Berrettini, W. H., et al. (2002). Personality, perfectionism, and attitudes towards eating in parents of individuals with eating disorders. *International Journal of Eating Disorders*, 31(3), 290-299.



Appendix A

CERTIFICATION OF INSTITUTIONAL ETHICS REVIEW

This is to certify that the Conjoint Faculties Research Ethics Board at the University of Calgary has examined the following research proposal and found the proposed research involving human subjects to be in accordance with University of Calgary Guidelines and the Tri-Council Policy Statement on *"Ethical Conduct in Research Using Human Subjects"*. This form and accompanying letter constitute the Certification of Institutional Ethics Review.

File no: 4474
Applicant(s): Amy Baxter
Department: Psychology
Project Title: Girls' Self-Image Over Time
Sponsor (if applicable):

Restrictions:

This Certification is subject to the following conditions:

1. Approval is granted only for the project and purposes described in the application.
2. Any modifications to the authorized protocol must be submitted to the Chair, Conjoint Faculties Research Ethics Board for approval.
3. A progress report must be submitted 12 months from the date of this Certification, and should provide the expected completion date for the project.
4. Written notification must be sent to the Board when the project is complete or terminated.

Janice Dickin, Ph.D, LLB,
Chair

Conjoint Faculties Research Ethics Board

10 August 2005
Date:

Distribution: (1) Applicant, (2) Supervisor (if applicable), (3) Chair, Department/Faculty Research Ethics Committee, (4) Sponsor, (5) Conjoint Faculties Research Ethics Board (6) Research Services.

Appendix B

Sample Recruitment Letter

To: *[Insert principal's name]*
 Address: *[Insert school's address]*
 From: Amy E. Wojtowicz
 Department of Psychology
 University of Calgary

Re: Proposed Research Project: Girls' Self-image over Time

I am a doctoral student at the University of Calgary, working under the supervision of Dr. Kristin von Ranson (Assistant Professor, Department of Psychology). I am contacting you to inquire about the availability of students in your school for participation in a project. The project was approved by the University of Calgary Conjoint Faculties Research Ethics Board and the *[insert the name of the school board]*. A brief description of the project is below:

Purpose

Body dissatisfaction, or negative self-evaluation of one's body shape and weight, has become a common and troubling concern among adolescent girls. By the time they reach high school, girls are three times more likely than boys to perceive themselves as overweight, even if they are underweight or average weight. In a large sample of Canadian youth, 52% of high school girls not only expressed a desire to change their bodies, but were actively dieting in an attempt to lose weight.

Body dissatisfaction is worrisome because it is associated with a variety of psychological problems, including low self-esteem, appearance rumination, unnecessary cosmetic surgery, depression, and social isolation. In addition, body dissatisfaction is a primary risk factor for the development of eating disorders among adolescent girls. Despite evidence of the serious consequences of body dissatisfaction, risk factors associated with its development are not well understood. Consequently, the purpose of the proposed study is to test the degree to which a set of postulated risk factors predict changes in body dissatisfaction among adolescent girls over time.

Although a host of putative risk factors have been theorized, the current study will focus on five variables: weight-related teasing, body mass index (i.e., a measure of body fat calculated by height and weight measurements), low self-esteem, perfectionism, and thin-ideal internalization (i.e., the extent to which an individual accepts socially defined ideals of attractiveness and overvalues the importance of appearance).

Method

I plan to recruit four hundred and eighty 10th- and 11th- grade adolescent girls from public and private high schools in Calgary. I propose to test girls in the Fall 2005 ("Time 1") and again one year later ("Time 2"). Prior to data collection, a letter describing the study will be sent home with all eligible students in order to obtain consent from parents (please see the attached

copy). Parents will be asked to provide their daughter's phone number and e-mail address so I may contact them to ask them to participate again one year later. Parents will also be asked to provide contact information of someone who they do not live with, who is likely to know where their daughter is in one year's time so we can contact them if we are unable to contact the student. If we were to call the other person, we would let them know that the student volunteered for a study at the University of Calgary and we wish to locate them. No other information would be given to protect the student's privacy.

At Time 1, data collection will be conducted on school grounds both individually and in groups, during the school day at times convenient for teachers and students. Only girls who return a signed parental consent form will be eligible to participate. Participating girls will be read the informed consent script verbatim before starting the study (please see the attached copy). Students will be told that the purpose of the study is to examine changes in self-image over time. At first we will intentionally describe the study vaguely to participants so that we do not give away our study's hypotheses, although later we will make sure to explain fully the purpose of the study. Participants will then be asked to complete a series of questionnaires and have their height and weight measured. Questions will pertain to demographics, weight-related teasing, self-esteem, perfectionism, body image, and thin-ideal internalization. I will guide participants through the questionnaires and answer questions while a trained research assistant takes height and weight measurements individually in a private, preferably enclosed area. Participation at Time 1 is expected to take < 50 minutes. Students who are ineligible to participate, as well as students who decline participation, will be given an alternative body image activity to work on individually. At Time 2, participants will complete a brief questionnaire either on-line or by phone, depending on the availability and preference of participants. Thus data collection at Time 2 will not involve any school time or resources.

At Time 1 all participants will receive a one-page handout following completion of data collection describing ways to improve body image. If data collection takes place in a classroom, all girls (regardless of whether or not they participated in my study) will receive the handout. The handout is intended to help counteract any possible negative impact the body image questions might have had and leave things on a positive note. Also, if the school and teacher agree, as part of the debriefing I will lead a brief discussion (10-15 minutes) reviewing the handout to provide an educational opportunity for students. At Time 2 the handout will be appended to the debriefing script that automatically pops up once students have completed the on-line survey. If data is collected over the phone at Time 2, the handout will be read verbatim to students following the debriefing script.

Girls' participation in the study is strictly voluntary; if they wish to skip a question, or to terminate their participation for any reason, they may do so at any time. All information that is collected will remain confidential and will only be accessible to the researcher and research assistants who are working directly on the study. No information will be made available to teachers or school personnel. Results from this study will be released in anonymous form as aggregate data only, and care will be taken when presenting data to ensure no individual participant is identifiable.

Completed consent forms and questionnaires will be stored in a secure cabinet in a locked research laboratory at the University of Calgary. Participants' e-mail addresses and first names will be stored on a secure on-line survey database, which can only be accessed by a username and password that only the primary researcher (Amy Wojtowicz) and the supervisor (Dr. Kristin von Ranson) will know. E-mails inviting participants to complete the questionnaire at Time 2 will be sent through the secure on-line survey website rather than through the researcher's personal e-mail account. Once Time 2 data collection has been completed, participants' first names and e-mail addresses will be deleted from the on-line survey database. The on-line survey data will be saved on a floppy disk or CD, which will be stored in a secure file cabinet in a locked research

laboratory at the University of Calgary. All data will be retained in a secure location for a period of five years, after which it will be destroyed.

Refining our understanding of predictors of body dissatisfaction is important because learning how to better identify those who might be at particular risk for developing body dissatisfaction will assist in the development and improvement of targeted prevention strategies. In addition, this project may assist in the development of successful treatment programs to counteract body dissatisfaction after it occurs.

If you have any questions or concerns about this study, please feel free to contact me or Dr. von Ranson at the following numbers.

Amy E. Wojtowicz, M.Sc.

Office: 210-9438

Home: 210-2926

Kristin von Ranson, Ph.D.

Office: 220-7085

I will be contacting you in the near future to discuss this project, and look forward to speaking with you. Thank you in advance for your time.

Sincerely,

[Insert Signature]

Amy Wojtowicz

Clinical Psychology Doctoral Student

Appendix C

Sample Parental Consent Form

AN INVITATION FOR YOUR DAUGHTER TO PARTICIPATE IN RESEARCH**Name of Researcher, Faculty, Department, Telephone, & E-mail:**

Amy Wojtowicz, M.Sc., Department of Psychology, 210-9438, amy.wojtowicz@ucalgary.ca

Supervisor:

Kristin von Ranson, Ph.D., Department of Psychology, 220-7085, kvonrans@ucalgary.ca

Title of Project:

Girls' Self-image over Time

Dear Parent/Guardian,

I am a doctoral student at the University of Calgary, working under the supervision of Dr. Kristin von Ranson (Assistant Professor, Department of Psychology). I am writing to give you information about a research study in which I would like to request your daughter's participation. This project was approved by the University of Calgary Conjoint Faculties Research Ethics Board, the *[insert the name of the school board]*, and the principal of your daughter's school.

Purpose:

This study aims to examine self-image among adolescent girls. Your daughter has been contacted because she is a girl in grade 10 or 11 at *[insert school name]*. Refining our understanding of self-image is important because it will assist in the development and improvement of prevention and treatment strategies to counteract poor self-image.

Method:

This project has two phases. In the first phase, all participants will be asked to complete a series of questionnaires that ask questions about demographics, body image, weight-related teasing, self-esteem, perfectionism, and the extent to which she values the importance of appearance. In addition, participants will be asked to have their height and weight measured, which will be measured individually in a private location. Data collection will be conducted on school grounds both individually and in groups, during the school day at times convenient for teachers and students. Participation in the first phase of the study will take < 50 minutes.

If you agree to have your daughter participate in the first phase of the study, I would like to ask you to provide her e-mail address (if she has access to e-mail) and phone number so I may contact her in about one year to ask a few more questions to see if things have changed for the second phase of the study. I would also like to ask you to provide contact information of someone who she does not live with, who is likely to know where she is in one year's time so we can contact them if we are unable to contact your daughter. If we were to call the other person, we would let them know that your daughter volunteered for a study at the University of Calgary and we wish to locate them. No other information will be given to protect your daughter's privacy. Please note that the contact information that you provide will be used only for the purposes of collecting Time 2 data. Under no circumstances will the contact information be used for any other purpose. Your daughter will be asked to answer 9 brief questions on a secure website or over the phone, depending on her availability and preference. Participation in the second phase of the study will take approximately 5 minutes to complete.

While we do not anticipate that participating in this study will cause distress, participants could potentially become temporarily upset by certain items on the questionnaires, such as those inquiring about body satisfaction, weight-related teasing, perfectionism, and self-esteem. In addition, participants will be asked to have their height and weight measured by a research assistant, which may cause some individuals to become temporarily embarrassed. We expect that any concerns raised would be temporary and would diminish rapidly.

In the first phase of the study, all participants will receive a one-page handout following completion of data collection describing ways to improve body image. If data collection takes place in a classroom, all girls (regardless of whether or not they participated in my study) will receive the handout. The handout is intended to help counteract any possible negative impact the body image questions might have had and leave things on a positive note and provide an educational opportunity for students. In the second phase of the study, the handout will automatically pop up once students have completed the on-line survey. If data is collected over the phone during the second phase, the handout will be read verbatim to students.

Girls' participation in the study is strictly voluntary and will have no effect on your daughter's grades. If your daughter wishes to skip a question, or to terminate her participation for any reason, she may do so at any time. Prior to data collection, girls will be asked to provide their written assent; if your daughter wishes to terminate her participation for any reason, she may do so at any time. All information that is collected will remain confidential and will only be accessible to the researchers working on this study. No information will be made available to teachers or school personnel. Results from this study will be released in anonymous form as aggregate data only, and care will be taken when presenting data to ensure no individual participant is identifiable.

Completed consent forms and questionnaires will be stored in a secure cabinet in a locked research laboratory at the University of Calgary. Participants' e-mail addresses and first names will be stored on a secure on-line survey database, which can only be accessed by a username and password that only the primary researcher (Amy Wojtowicz) and the supervisor (Dr. Kristin von Ranson) will know. E-mails inviting participants to complete the questionnaire at Time 2 will be sent through the secure on-line survey website rather than through the researcher's personal e-mail account. Once Time 2 data collection has been completed, participants' first names and e-mail addresses will be deleted from the on-line survey database. The on-line survey data will be saved on a floppy disk or CD, which will be stored in a secure file cabinet in a locked research laboratory at the University of Calgary. All data will be retained in a secure location for a period of five years, after which it will be destroyed.

Only students who return a signed copy of this form to the school will be eligible to participate. In no way does this waive your legal rights nor release the investigators, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw your daughter from this research project at any time.

I hope that you will allow your daughter to participate in my study. As a reminder, it will only take 50 minutes of her time at the first session, and another 5 minutes one year later. Thanks for taking the time to read this letter. Please keep a copy of this letter for your records.

Sincerely,

[Insert Signature]

Amy Wojtowicz

Clinical Psychology Doctoral Student

Your Name: (please print clearly) _____

Your Signature _____ Date: _____

Your Daughter's Name: _____

Your Daughter's E-mail Address: _____

OR My daughter does not have an e-mail address: _____ (check here)

Your Daughter's Telephone Number(s): _____ (Home) _____ (Cell)

Contact information for someone who you do not live with who is likely to know where your daughter is one year from now (in case we are unable to contact her with the above information):

Name: _____

Relationship to your daughter: _____

E-mail address (if applicable): _____

Phone Number(s): _____ (Home) _____ (Cell)

If you have any further questions concerning your daughter's participation in this project, either during or after participation, please contact:

Amy Wojtowicz, M.Sc.
Department of Psychology/Faculty of Social Sciences
Phone: 210-9438
E-mail: amy.wojtowicz@ucalgary.ca

Dr. Kristin von Ranson, Ph.D.
Department of Psychology/Faculty of Social Sciences
Phone: 220-7085
E-mail: kvonrans@ucalgary.ca

If you have any concerns about the way your daughter has been treated as a participant, please contact Patricia Evans, Associate Director, Research Services Office, University of Calgary at (403) 220-3782; e-mail plevans@ucalgary.ca.

Appendix D

Sociodemographic Information

Please mark your responses clearly (e.g., ✓ or ✖). All your responses are confidential. We ask you, therefore, to be completely honest and accurate when you answer the questions. This is NOT A TEST, and there are NO RIGHT OR WRONG ANSWERS. Take your time and please be sure to answer questions based on what you really think. If you need help with any of the questions, please ask the survey administrator.

Your help today is VERY IMPORTANT to us. Thank you for taking the time to fill out these questionnaires!

1. TODAY'S DATE: month_____ day_____ year_____

2. DATE OF BIRTH: month_____ day_____ year_____

3. How old are you? _____ years old.

4. What is your current weight? _____ pounds/kg (*circle one*)

5. What is your current height? _____ feet _____ inches or _____ cm (*complete only one*)

6. What is the name of your school? _____.

7. What grade are you in right now?

_____ [1] Grade 10

_____ [2] Grade 11

_____ [3] Grade 12

8. How would you describe your ethnic background?

_____ [1] Aboriginal (Inuit, Métis, North American Indian, etc.)

_____ [2] Arab/West Asian (Armenian, Egyptian, Iranian, Lebanese, Moroccan, etc.)

_____ [3] Black (African, Haitian, Jamaican, Somali, etc.)

_____ [4] Chinese

_____ [5] Filipino

_____ [6] Japanese

_____ [7] Korean

_____ [8] Latin American

_____ [9] South Asian

_____ [10] South East Asian

_____ [11] White (Caucasian)

_____ [77] Other (*specify*): _____.

9. With what adult(s) do you currently live? (*check all that apply*)

_____ [1] Mother

_____ [2] Father

_____ [3] Stepmother

_____ [4] Stepfather

_____ [5] Other legal guardian (*specify*): _____.

10. What is the highest level of education your mother has completed?

Note: If your mother is deceased or you are no longer in contact with her, please check here _____ and skip to question 11.

- _____ [0] No degree, certificate or diploma
 If so, please indicate the last grade she completed: _____.
 _____ [1] Secondary (high) school graduation certificate or equivalent
 _____ [2] Trades certificate or diploma
 _____ [3] Bachelor's degree
 _____ [4] Degree in medicine, dentistry, veterinary medicine or optometry
 _____ [5] Master's degree
 _____ [6] Doctorate/PhD
 _____ [7] Unsure

11. What is the highest level of education your father has completed?

Note: If your father is deceased or you are no longer in contact with him, please check here _____ and skip to question 12.

- _____ [0] No degree, certificate or diploma
 If so, please indicate the last grade he completed: _____.
 _____ [1] Secondary (high) school graduation certificate or equivalent
 _____ [2] Trades certificate or diploma
 _____ [3] Bachelor's degree
 _____ [4] Degree in medicine, dentistry, veterinary medicine or optometry
 _____ [5] Master's degree
 _____ [6] Doctorate/PhD
 _____ [7] Unsure

12. What is the highest level of education your stepmother has completed?

Note: If you do not have a stepmother, please check here _____ and skip to question 13.

- _____ [0] No degree, certificate or diploma
 If so, please indicate the last grade she completed: _____.
 _____ [1] Secondary (high) school graduation certificate or equivalent
 _____ [2] Trades certificate or diploma
 _____ [3] Bachelor's degree
 _____ [4] Degree in medicine, dentistry, veterinary medicine or optometry
 _____ [5] Master's degree
 _____ [6] Doctorate/PhD
 _____ [7] Unsure

13. What is the highest level of education your stepfather has completed?

Note: If you do not have a stepfather please check here _____ and skip to question 14.

- _____ [0] No degree, certificate or diploma
 If so, please indicate the last grade he completed: _____.
 _____ [1] Secondary (high) school graduation certificate or equivalent
 _____ [2] Trades certificate or diploma
 _____ [3] Bachelor's degree
 _____ [4] Degree in medicine, dentistry, veterinary medicine or optometry
 _____ [5] Master's degree
 _____ [6] Doctorate/PhD
 _____ [7] Unsure

14. If you live with another adult who is your legal guardian, what is his or her level of education?

Note: If you do not live with another adult, please check here _____ and skip to the instructions on the bottom of the next page.

- _____ [0] No degree, certificate or diploma
_____ *If so, please indicate the last grade she/he completed: _____.*
_____ [1] Secondary (high) school graduation certificate or equivalent
_____ [2] Trades certificate or diploma
_____ [3] Bachelor's degree
_____ [4] Degree in medicine, dentistry, veterinary medicine or optometry
_____ [5] Master's degree
_____ [6] Doctorate/PhD
_____ [7] Unsure

INSTRUCTIONS: For the remainder of the questionnaires, please read each sentence and pick your answer by circling a number using the scale provided.

Appendix E

Perceived and Desired Weight Items

1) At this time, do you feel that you are:	Very Underweight	Underweight	Just about Right	Overweight	Very Overweight
	1	2	3	4	5
2) Are you <u>currently</u> trying to:	Lose Weight	Stay the Same Weight	Gain Weight	I am not trying to do anything about my weight	
	1	2	3	4	

Appendix F

Weight Teasing-Frequency Subscale of the Perception of Teasing Scale

The following questions ON THIS PAGE should be answered with respect to THE PERIOD OF TIME WHEN YOU WERE GROWING UP (between age 5 and now).

1) People made fun of you because you were heavy.	Never		Sometimes		Very Often
	1	2	3	4	5
2) People made jokes about you being too heavy.	Never		Sometimes		Very Often
	1	2	3	4	5
3) People laughed at you for trying out for sports because you were heavy.	Never		Sometimes		Very Often
	1	2	3	4	5
4) People called you names like "fatso."	Never		Sometimes		Very Often
	1	2	3	4	5
5) People pointed at you because you were overweight.	Never		Sometimes		Very Often
	1	2	3	4	5
6) People snickered about your heaviness when you walked into a room alone.	Never		Sometimes		Very Often
	1	2	3	4	5

Appendix G

Rosenberg Self-Esteem Scale

1) I feel that I'm a person of worth, at least on an equal plane with others.	Strongly Agree	Agree	Disagree	Strongly Disagree
	1	2	3	4
2) I feel that I have a number of good qualities.	Strongly Agree	Agree	Disagree	Strongly Disagree
	1	2	3	4
3) All in all, I am inclined to feel that I am a failure.	Strongly Agree	Agree	Disagree	Strongly Disagree
	1	2	3	4
4) I am able to do things as well as most other people.	Strongly Agree	Agree	Disagree	Strongly Disagree
	1	2	3	4
5) I feel I do not have much to be proud of.	Strongly Agree	Agree	Disagree	Strongly Disagree
	1	2	3	4
6) I take a positive attitude toward myself.	Strongly Agree	Agree	Disagree	Strongly Disagree
	1	2	3	4
7) On the whole, I am satisfied with myself.	Strongly Agree	Agree	Disagree	Strongly Disagree
	1	2	3	4
8) I wish I could have more respect for myself.	Strongly Agree	Agree	Disagree	Strongly Disagree
	1	2	3	4

9) I certainly feel useless at times.

Strongly
Agree

Agree

Disagree

Strongly
Disagree

1

2

3

4

10) At times I think I am no good at all.

Strongly
Agree

Agree

Disagree

Strongly
Disagree

1

2

3

4

Appendix H

Modified Version of the Child and Adolescent Perfectionism Scale

1) I try to be perfect in every thing I do.	False-Not at all true for me 1	Mostly False 2	Neither True nor False 3	Mostly True 4	Very True of me 5
2) I want to be the best at everything I do.	False-Not at all true for me 1	Mostly False 2	Neither True nor False 3	Mostly True 4	Very True of me 5
3) My parents don't always expect me to be perfect in everything I do.	False-Not at all true for me 1	Mostly False 2	Neither True nor False 3	Mostly True 4	Very True of me 5
4) I feel that I have to do my best all the time.	False-Not at all true for me 1	Mostly False 2	Neither True nor False 3	Mostly True 4	Very True of me 5
5) There are people in my life who expect me to be perfect.	False-Not at all true for me 1	Mostly False 2	Neither True nor False 3	Mostly True 4	Very True of me 5
6) I always try for the top score on a test.	False-Not at all true for me 1	Mostly False 2	Neither True nor False 3	Mostly True 4	Very True of me 5
7) It really bothers me if I don't do my best all the time.	False-Not at all true for me 1	Mostly False 2	Neither True nor False 3	Mostly True 4	Very True of me 5
8) My family expects me to be perfect.	False-Not at all true for me 1	Mostly False 2	Neither True nor False 3	Mostly True 4	Very True of me 5
9) I don't always try to be the best.	False-Not at all true for me 1	Mostly False 2	Neither True nor False 3	Mostly True 4	Very True of me 5

10) People expect more from me than I am able to give.	False-Not at all true for me 1	Mostly False 2	Neither True nor False 3	Mostly True 4	Very True of me 5
11) I get mad at myself when I make a mistake.	False-Not at all true for me 1	Mostly False 2	Neither True nor False 3	Mostly True 4	Very True of me 5
12) Other people think that I have failed if I do not do my very best all the time.	False-Not at all true for me 1	Mostly False 2	Neither True nor False 3	Mostly True 4	Very True of me 5
13) Other people always expect me to be perfect.	False-Not at all true for me 1	Mostly False 2	Neither True nor False 3	Mostly True 4	Very True of me 5
14) I get upset if there is even one mistake in my work.	False-Not at all true for me 1	Mostly False 2	Neither True nor False 3	Mostly True 4	Very True of me 5
15) People around me expect me to be great at everything.	False-Not at all true for me 1	Mostly False 2	Neither True nor False 3	Mostly True 4	Very True of me 5
16) When I do something, it has to be perfect.	False-Not at all true for me 1	Mostly False 2	Neither True nor False 3	Mostly True 4	Very True of me 5
17) My teachers expect my work to be perfect.	False-Not at all true for me 1	Mostly False 2	Neither True nor False 3	Mostly True 4	Very True of me 5
18) I do not have to be the best at everything I do.	False-Not at all true for me 1	Mostly False 2	Neither True nor False 3	Mostly True 4	Very True of me 5
19) I am always expected to do better than others.	False-Not at all true for me 1	Mostly False 2	Neither True nor False 3	Mostly True 4	Very True of me 5

20) Even when I pass, I feel that I have failed if I didn't get one of the highest marks in the class.	False-Not at all true for me 1	Mostly False 2	Neither True nor False 3	Mostly True 4	Very True of me 5
21) I feel that people ask too much of me.	False-Not at all true for me 1	Mostly False 2	Neither True nor False 3	Mostly True 4	Very True of me 5

Appendix I

Modified Version of the Thinness and Restricting Expectancy Inventory

1) I would feel like I could conquer things more easily if I were thin.	Strongly Disagree	Disagree	Agree	Strongly Agree
	1	2	3	4
2) I would feel more capable and confident if I were thin.	Strongly Disagree	Disagree	Agree	Strongly Agree
	1	2	3	4
3) I would be more self-reliant and independent if I felt thin.	Strongly Disagree	Disagree	Agree	Strongly Agree
	1	2	3	4
4) I would cope better with failures at work or school if I were thin.	Strongly Disagree	Disagree	Agree	Strongly Agree
	1	2	3	4
5) It increases my self-esteem to limit what I eat.	Strongly Disagree	Disagree	Agree	Strongly Agree
	1	2	3	4
6) I would be more attractive if I were thin.	Strongly Disagree	Disagree	Agree	Strongly Agree
	1	2	3	4
7) I would feel better about myself if I were thin.	Strongly Disagree	Disagree	Agree	Strongly Agree
	1	2	3	4
8) When I limit what I eat, others respect me.	Strongly Disagree	Disagree	Agree	Strongly Agree
	1	2	3	4

Appendix J

Modified Version of the Satisfaction and Dissatisfaction with Body Parts Scale

How satisfied are you with your:

1. Weight	Extremely dissatisfied 1	Moderately dissatisfied 2	Neutral 3	Moderately satisfied 4	Extremely satisfied 5
2. Figure.	Extremely dissatisfied 1	Moderately dissatisfied 2	Neutral 3	Moderately satisfied 4	Extremely satisfied 5
3. Body build.	Extremely dissatisfied 1	Moderately dissatisfied 2	Neutral 3	Moderately satisfied 4	Extremely satisfied 5
4. Stomach.	Extremely dissatisfied 1	Moderately dissatisfied 2	Neutral 3	Moderately satisfied 4	Extremely satisfied 5
5. Waist	Extremely dissatisfied 1	Moderately dissatisfied 2	Neutral 3	Moderately satisfied 4	Extremely satisfied 5
6. Thighs	Extremely dissatisfied 1	Moderately dissatisfied 2	Neutral 3	Moderately satisfied 4	Extremely satisfied 5
7. Buttocks (Behind).....	Extremely dissatisfied 1	Moderately dissatisfied 2	Neutral 3	Moderately satisfied 4	Extremely satisfied 5

How satisfied are you with your:

	Extremely dissatisfied	Moderately dissatisfied	Neutral	Moderately satisfied	Extremely satisfied
8. Hips.	1	2	3	4	5
9. Legs.	1	2	3	4	5

Appendix K

Informed Consent Script

My name is Amy Wojtowicz, and I am conducting research at the University of Calgary. The purpose of my study is to investigate girls' self-image over time. I am interested in learning more about girls your age; what you think about, how you feel about yourself, and what your family is like. I would like to give you information about my study and see if you would like to participate in my study. Everyone who returned a signed parental consent form is eligible to participate.

My study has two parts. In the first part, which will take place today, you will be asked to complete a package of short questionnaires that ask questions about body image, weight-related teasing, self-esteem, perfectionism, and your beliefs about thinness. You will also be asked to provide your age, ethnicity, and some background information about your family. In addition, you will be asked to have your height and weight measured. We will be taking height and weight measurements individually in a private area. Participation in the first part of the study will take approximately 50 minutes to complete.

For the second part of the study, I will get in touch with you through e-mail or by phone in about one year to ask you some more questions to see if things have changed. Participation in the second part of the study will take approximately 5 minutes to complete.

I do not anticipate that participation in this study will cause you distress, however it is possible that you might become temporarily upset by certain questions, such as those inquiring about body satisfaction, teasing, perfectionism, and self-esteem. In addition, you will be asked to have your height and weight measured by a research assistant, which may cause some temporary embarrassment.

Your participation in both parts of the study is strictly voluntary; you may refuse to answer specific questions and if you choose to participate you can withdraw from the study at any time. Whether or not you participate in my study will have no effect on your school grades. Your responses will remain strictly confidential and no one except the researchers working directly on this project will be allowed access to the information you give us. That means your answers will not be given or discussed with your parents or teachers. Results from this study will be released in anonymous form, and care will be taken when presenting data to ensure no individual participant is identifiable.

Completed consent forms and questionnaires will be stored in a secure cabinet in a locked research laboratory at the University of Calgary. Participants' e-mail addresses and first names will be stored on a secure on-line survey database, which can only be accessed by a username and password that only the primary researcher (Amy Wojtowicz) and the

supervisor (Dr. Kristin von Ranson) will know. E-mails inviting participants to complete the questionnaire at Time 2 will be sent through the secure on-line survey website rather than through the researcher's personal e-mail account. Once Time 2 data collection has been completed, participants' first names and e-mail addresses will be deleted from the on-line survey database. The on-line survey data will be saved on a floppy disk or CD, which will be stored in a secure file cabinet in a locked research laboratory at the University of Calgary. All data will be retained in a secure location for a period of five years, after which it will be destroyed.

Please do not hesitate to ask me questions at any time. I hope that you will help me out in my study. Remember, it will only take 50 minutes of your time now, and another 5 minutes one year later. Thanks!

Appendix L

Partial Debriefing Script

Thank you for taking part in my study. I would now like to provide you with some more information about my study. Please do not discuss the study with other students at your school, as it may influence the way that participants respond to the follow-up questionnaire and interfere with our results.

As I mentioned to you earlier, the purpose of my study was to investigate adolescent girls' self-image over time. More specifically, the purpose was to determine what causes some adolescent girls to develop body dissatisfaction over time while other girls do not.

Body dissatisfaction is a common concern among adolescent girls. By the time girls reach high school, they are three times more likely than boys to view themselves as overweight, even if they are underweight or average weight. Body dissatisfaction is a serious concern because it is linked to a number of psychological problems, including low self-esteem, social isolation, and eating disorders.

This study is important because learning how to identify girls who might be at risk for developing body dissatisfaction will help researchers develop prevention and treatment programs.

I appreciate the time and effort you contributed to this research project. If you have any questions about this study, please contact Amy Wojtowicz, at 210-9438 (phone) or amy.wojtowicz@ucalgary.ca (e-mail).

Appendix M

Sample Body Image Handout

Ways to Improve the Way You Feel About Your Body

- Keep a top-10 list of things you like about yourself -- things that aren't related to how much you weigh or what you look like. Read your list often. Add to it as you become aware of more things that you like.
- Surround yourself with positive people. It is easier to feel good about yourself and your body when you are around others who are supportive and who recognize the importance of liking yourself just as you naturally are.
- Learn to dress in ways that are comfortable for you rather than wearing fashions, which don't fit with who you are. Wear clothes that are comfortable and that make you feel good about your body.
- Do something nice for yourself -- something that lets your body know you appreciate it. Take a bubble bath, go to a movie, read a good book, go shopping with friends, etc.
- When you look in a mirror, don't just look for problems in how you look. Notice and remind yourself of what you like about your appearance.
- Break the habit of comparing yourself to others in terms of appearance.
- Don't criticize or comment on other people's appearance.
- Learn to value **all** aspects of yourself. Your accomplishments, skills, values, relationships, and interests are equally important to your appearance.
- Try to limit the number of negative messages you receive about your body. This means keeping away from many fashion magazines and advertisements.
- Stay away from the scale. Instead of weighing yourself, focus on how you feel—strong, healthy, energized, etc.
- Surround yourself with positive images of women that reflect the different sizes and shapes women are. It's important to have images that reflect reality and that show beauty comes in many different shapes and sizes.

This information was adapted from the following websites:

<http://www.ucalgary.ca/EAT/bodyimage3.html>

<http://www.something-fishy.org/reach/bodyimage.php>

http://www.nationaleatingdisorders.org/p.asp?WebPage_ID=286&Profile_ID=41158

Appendix N

Sample Follow-up E-mail Message

[Subject Title: University of Calgary Research Follow-up]

Dear *[First Name]*,

Hi! Thanks again for having participated in my research study one year ago at your school. You indicated then that you would be interested in participating a second time.

Participation in the second part of my study involves answering 9 brief questions. Your responses will remain confidential and will not be shared with anyone who is not involved in this study (including your parents and teachers). This questionnaire will take approximately 5 minutes to complete. Participation in my study is VOLUNTARY. Whether or not you participate in my study will have no effect on your school grades. You can skip any questions that you prefer to not answer and you can withdraw from the study at any time.

If you are interested in participating, please click the link below:

[SurveyLink].

Thanks in advance for your time!

--Amy Wojtowicz

Please note: If you do not respond to this e-mail, you will be contacted again by *[Insert "e-mail" or "phone" depending on whether it is the first or second time this message has been sent]* in approximately one week's time. If you do not wish to participate in this study and do not wish to be contacted again, please click the link below, and you will automatically be removed from my contact list.

[RemoveLink]

If you are interested in learning more about my study or if you have any questions, please contact me by phone at 210-9438 or by e-mail at amy.wojtowicz@ucalgary.ca. Thanks again!

Appendix O

Telephone Follow-up Script

Date of Phone Call: _____
Initials of Researcher / Research Assistant: _____

Hi! I am calling you because you participated in our research study one year ago at your school and you indicated at that time that you would be interested in participating a second time. Do you have a few minutes for me to tell you more about our study? [If no, determine a better time for us to call them back].

Participation in the second part of my study involves answering 9 brief questions. Your responses will remain confidential and will not be shared with anyone who is not involved in this study (including your parents and teachers). This questionnaire will take approximately 5 minutes to complete. Participation in this study is voluntary. Whether or not you participate in this study will have no effect on your school grades. You can skip any questions that you prefer to not answer and you can withdraw from the study at any time.

Would you be interested in participating in this study? I am happy to answer any questions you might have before you decide.

[If declines participation]

If this is not a good time, would you like to participate later?

[If participant still declines participation]

I completely understand. We will not be contacting you in the future.

[Debrief participant and thank them for their time].

[If agrees to participate, administer the Body Dissatisfaction measure orally, debrief participant and thank them for their time].

Appendix P

Complete Debriefing Script

Thank you for taking part in my study. I would now like to provide you with some more information about my study. Please do not discuss the study with other students at your school, as it may influence the way that participants respond to the follow-up questionnaire and interfere with our results.

As I mentioned to you earlier, the purpose of my study was to investigate adolescent girls' self-image over time. More specifically, the purpose was to determine what causes some adolescent girls to develop body dissatisfaction over time while other girls do not.

Body dissatisfaction is a common concern among adolescent girls. By the time girls reach high school, they are three times more likely than boys to view themselves as overweight, even if they are underweight or average weight. Body dissatisfaction is a serious concern because it is linked to a number of psychological problems, including low self-esteem, social isolation, and eating disorders.

My study investigated five factors that I predicted would increase an adolescent girl's likelihood of developing body dissatisfaction over time both alone and in combination with the other risk factors: weight-related teasing, increased body fat, low self-esteem, perfectionism, and thin-ideal internalization (i.e., the extent to which girls overvalue the importance of appearance). These five factors were measured at Time 1 to see if they were associated with increases in body dissatisfaction at Time 2.

This study is important because learning how to identify girls who might be at risk for developing body dissatisfaction will help researchers develop prevention and treatment programs.

I appreciate the time and effort you contributed to this research project. If you have any questions about this study, please contact Amy Wojtowicz, at 210-9438 (phone) or amy.wojtowicz@ucalgary.ca (e-mail).

Appendix Q

Details of Missing Data for the Self-Reported Measures

Table Q-1

Number of Participants Missing Data from Baseline Self-Reported Postulated Risk Factors and Baseline and Follow-Up Body Dissatisfaction Measures (N = 393)

Variable	< 10% of total items	> 10% of total items
Weight-related teasing	1	4
Self-esteem	9	6
Perfectionism	4	3
Thin-ideal internalization	5	2
Baseline body dissatisfaction	2	4
Follow-up body dissatisfaction	5	0

Note. Weight-related teasing was measured using the Weight Teasing-Frequency subscale of the Perception of Teasing Scale; perfectionism was measured using a modified version of the Child and Adolescent Perfectionism Scale; thin-ideal internalization was measured using a modified version of the Thinness and Restricting Expectancy Inventory; self-esteem was measured using the Rosenberg Self-Esteem Scale; baseline and follow-up body dissatisfaction were measured using a modified version of the Satisfaction and Dissatisfaction with Body Parts Scale.

Appendix R

Details of the Analyses Examining Self-Oriented and Socially Prescribed Perfectionism

Table R-1

Parameter Estimates and Confidence Intervals from the Hierarchical Univariate Multiple Regression Model Examining Longitudinal Associations of Self-Oriented Perfectionism and Socially Prescribed Perfectionism with Subsequent Increases in Body Dissatisfaction Over One Year

Increases in body dissatisfaction from baseline to one year follow-up					
Variable	<i>B</i> (<i>SE</i>)	95% CI for <i>B</i>	β	Contribution to R^2	Partial Correlation
Self-prescribed perfectionism	< 0.01 (< 0.01)	< - 0.01, 0.02	0.07	0.008	0.09
Socially prescribed perfectionism	< 0.01 (0.01)	-0.01, 0.01	< 0.01	< 0.001	< 0.01

Note. *B* = unstandardized coefficients; *SE* = standard error; CI = confidence interval; β = standardized coefficients; self-oriented perfectionism was measured using the modified Self-Oriented Subscale of the Child and Adolescent Perfectionism Scale; socially

prescribed perfectionism was measured using the Socially Prescribed Subscale of the Child and Adolescent Perfectionism Scale; both types of perfectionism were not statistically significant ($p < 0.05$).

Appendix S

Details of the Analyses Examining Age as a Potential Moderator

Table S-1

Parameter Estimates and Confidence Intervals from the Hierarchical Univariate Multiple Regression Model Examining the Longitudinal Association of Age with Subsequent Increases in Body Dissatisfaction Over One Year

Increases in body dissatisfaction from baseline to one year follow-up					
Variable	<i>B</i> (<i>SE</i>)	95% CI	β	Contribution	Partial
		for <i>B</i>		to R^2	Correlation
Age	0.02 (0.05)	-0.09, 0.12	0.02	< 0.001	0.02

Note. *B* = unstandardized coefficients; *SE* = standard error; CI = confidence interval; β = standardized coefficients; age was not statistically significant ($p < 0.05$).

Table S-2

Parameter Estimates and Confidence Intervals from Hierarchical Univariate Multiple Regression Models Examining Age as a Potential Moderator of Longitudinal Associations of Postulated Risk Factors with Subsequent Increases in Body Dissatisfaction Over One Year

Increases in body dissatisfaction from baseline to one year follow-up					
Postulated risk factors	<i>B</i> (<i>SE</i>)	95% CI for <i>B</i>	β	Contribution to R^2	Partial Correlation
Weight-related teasing * Age	0.05(1.35)	-2.61, 2.70	0.06	< 0.001	< 0.01
Body mass index * Age	-0.45 (0.79)	-2.00, 1.10	-0.85	< 0.001	-0.03
Perfectionism * Age	< 0.01 (< 0.01)	-0.01, 0.01	0.18	< 0.001	0.01
Thin-ideal internalization * Age	< 0.01 (0.01)	-0.02, 0.02	0.46	< 0.001	0.02
Self-esteem * Age	< -0.01 (0.01)	-0.02, 0.02	-0.27	< 0.001	-0.01

Note. *B* = unstandardized coefficients; *SE* = standard error; CI = confidence interval; β = standardized coefficients. Weight-related teasing was measured using the Weight Teasing-Frequency subscale of the Perception of Teasing Scale; perfectionism was measured using a modified version of the Child and Adolescent Perfectionism Scale; thin-ideal internalization was measured using a modified

version of the Thinness and Restricting Expectancy Inventory; self-esteem was measured using the Rosenberg Self-Esteem Scale; body dissatisfaction was measured using a modified version of the Satisfaction and Dissatisfaction with Body Parts Scale. None of the conditional relationships between the postulated risk factors and age was statistically significant ($p < 0.05$).

Table 1

Comparison of Baseline Demographic Characteristics Among the Total Sample and as Classified by Completers Versus Non-Completers

	Total sample (<i>N</i> = 393)		Completers (<i>n</i> = 316)		Non-completers (<i>n</i> = 77)	
Variable	<i>M</i> (<i>SD</i>)	<i>N</i> (%)	<i>M</i> (<i>SD</i>)	<i>n</i> (%)	<i>M</i> (<i>SD</i>)	<i>n</i> (%)
Age	15.77 (0.64)		15.76 (0.65)		15.84 (0.61)	
Grade						
10		222 (56.5)		175 (55.4)		47 (61.0)
11		170 (43.3)		140 (44.3)		30 (38.4)
Type of School						
Public		344 (87.5)		280 (88.6)		64 (83.1)
Private		49 (12.5)		36 (11.4)		13 (16.9)
Location of School ^a						
City		307 (78.1)		250 (79.1)		57 (74.0)
Town /		86 (21.9)		66 (20.9)		20 (26.0)

Unincorporated			
Community			
Ethnicity			
Caucasian	295 (75.1)	240 (76.0)	55(71.4)
Asian	23 (5.9)	19 (6.0)	4 (5.2)
Black	10 (2.5)	9 (2.9)	1 (1.3)
South Asian	6 (1.5)	5 (1.6)	1 (1.3)
Aboriginal	4 (1.0)	1 (0.3)	3 (3.9)
Arab	5 (1.3)	4 (1.3)	1 (1.3)
Latina	2 (0.5)	2 (0.6)	0 (0.0)
Mixed	48 (12.2)	36 (11.4)	12 (15.6)
<hr/>			
Lives with:			
Both natural parents	265 (67.4)	217 (68.7)	48 (62.3)
Mother only	59 (15.0)	48 (15.2)	11 (14.3)
Father only	7(1.8)	5 (1.6)	2 (2.6)
Mother and stepfather	2 (0.5)	2 (0.6)	0 (0.0)

			133
Father and stepmother	4 (1.0)	4 (1.3)	0 (0.0)
Other ^b	56 (9.3)	40 (12.7)	16 (21.8)
Highest Level of Parental Educational Attainment in Household			
No degree, certificate, diploma	107 (27.2)	89 (27.5)	18 (26.1)
Secondary high school certificate	37 (9.4)	31 (9.6)	6 (8.7)
Trades certificate or diploma	30 (7.6)	22 (6.8)	8 (11.6)
Bachelor's degree	49 (12.5)	40 (12.4)	9 (13.0)

			134
Degree in medicine	18 (4.6)	16 (4.9)	2 (2.9)
dentistry, veterinary			
or optometry			
Master's degree	34 (8.7)	26 (8.0)	6 (8.7)
Doctorate degree	9 (2.3)	7 (2.2)	2 (2.9)
Unsure	111 (28.2)	93 (28.7)	18 (26.1)

Note. None of the subgroup comparisons was statistically significant ($p < 0.5$). ^aClassification was determined using

“Municipal Profiles,” by Alberta Municipal Affairs, [Electronic Version], retrieved October 30, 2008 from

<http://www.municipalaffairs.gov.ab.ca>. ^bIncluded foster parent(s), guardian(s), grandparent(s), two mothers, two fathers, and

time split between mother/stepfather and father/stepmother.

Table 2

Distribution of Visible Minorities in the Study Sample Compared to 1996 Canadian Council of Social Development Census Data

	Study sample	1996 census data ^a
	<i>N</i> = 393	<i>N</i> = 3,849,025
Ethnicity	%	%
Asian	5.9	5.9
Black	2.5	2.5
South Asian	1.5	2.8
Arab	1.3	1.0
Latin American	0.5	0.8

Note ^aAdapted from "The Progress of Canada's Children-1996," by the Canadian Council on Social Development, 1996, Ottawa: Author. The study sample included girls aged 15-17 whereas the 1996 census data included both sexes aged 15-24. The group comparison was not statistically significant ($p < 0.5$).

Table 3

Highest Level of Parental Education in the Household of the Study Sample Compared to 2006 Statistics Canada Census Data

	Study sample <i>N</i> = 283	2006 census data ^a <i>N</i> = 17,382,115
Highest Level of Educational Attainment**	%	%
No certificate, diploma, or degree	37.8	15.4
Secondary high school certificate	13.1	23.9
Trades certificate or diploma	10.6	37.7
Bachelor's degree or higher	38.2	22.9

Note. ^aAdapted from "Census 2006," by Statistics Canada, 2006, [Electronic Version], retrieved September 21, 2008 from <http://www.statcan.ca/>. The study sample was *N* = 283 because 111 participants did not know what the highest parental educational attainment was in the household, and were therefore excluded. The 2006 census data included individuals aged 25 to 64 of both sexes; ** = $p < .01$.

Table 4

Body Weight Perception and Desired Weight Change of the Study Sample Compared to a Nova Scotia Sample

	Study Sample	Nova Scotia Sample ^a
	<i>N</i> = 391	<i>N</i> = 1,133
	%	%
Body Weight Perception		
Underweight	9.5	14.0
Just about Right	53.7	51.0
Overweight	36.8	35.0
Desired Weight Change		
Trying to Lose Weight	54.5	60.0
Trying to Gain Weight	4.3	4.0
Trying to Stay the Same Weight	20.4	18.0
Not Trying to Do Anything	20.4	18.0
About Weight		

Note.^aAdapted from “Far from Ideal: Weight Perception, Weight Control, and Associated Risky Behaviour of Adolescent Girls in Nova Scotia,” by S.J. Cook, K. MacPherson, and D.B. Langille, 2007, *Canadian Family Physician*, 53, p. 681. The study sample was *N* = 391 because 2 participants did not complete these items. The study

sample included girls in grade 10 and 11, whereas the Nova Scotia sample included girls in grades 10-12. None of the group comparisons was statistically significant ($p < 0.5$).

Table 5

Mean Scores, Standard Deviations, and Alpha Coefficients for the Baseline Postulated Risk Factors and the Baseline and Follow-Up Body Dissatisfaction Measures for the Total Sample and as Classified by Study Completion Versus Non-Completion Status

Variable	Total sample (<i>N</i> = 393)		Completers (<i>n</i> = 316)		Non-completers (<i>n</i> = 77)	
	<i>M</i> (<i>SD</i>)	α	<i>M</i> (<i>SD</i>)	α	<i>M</i> (<i>SD</i>)	α
Weight-related teasing	8.88 (4.67)	0.92	8.84 (4.73)	0.93	9.01 (4.41)	0.91
Body mass index	22.61 (3.84)	—	22.62 (3.90)	—	22.60 (3.63)	—
Self-esteem	29.86 (5.14)	0.88	29.91 (5.20)	0.88	29.68 (4.93)	0.86
Perfectionism	61.89 (13.44)	0.91	62.29 (13.48)	0.90	60.04 (13.16)	0.89
Thin-ideal internalization	17.60 (5.73)	0.92	17.36 (5.86)	0.93	18.60 (5.09)	0.89
Baseline body dissatisfaction	2.91 (0.90)	0.91	2.88 (0.92)	0.92	3.02 (0.79)	0.87
Follow-up body dissatisfaction	2.64 (0.80)	—	2.64 (0.80)	0.91	—	—

Note. None of the group comparisons was statistically significant ($p < 0.5$). Weight-related teasing was measured using the Weight Teasing-Frequency subscale of the Perception of Teasing Scale; perfectionism was measured using a modified version of the Child and Adolescent Perfectionism Scale; thin-ideal internalization was measured using a modified version of the Thinness and Restricting Expectancy Inventory; self-esteem was measured using the Rosenberg Self-Esteem Scale; body dissatisfaction was measured using a modified version of the Satisfaction and Dissatisfaction with Body Parts Scale.

Table 6

Correlations among Baseline Postulated Risk Factors and Baseline and Follow-Up Body Dissatisfaction Measures (N = 393)

Variable	1	2	3	4	5	6	7
1. Weight-related teasing	—						
2. Body mass index	0.55**	—					
3. Self-esteem	-0.32**	-0.13*	—				
4. Perfectionism	0.19**	0.07	-0.23**	—			
5. Thin-ideal internalization	0.40**	0.29**	-0.52**	0.23**	—		
6. Baseline body dissatisfaction	0.44**	0.40**	-0.57**	0.19**	0.59**	—	
7. Follow-up body dissatisfaction	0.27**	0.36**	-0.45**	0.15**	0.40**	0.65**	—

Note. * = $p < .05$; ** = $p < .01$. Weight-related teasing was measured using the Weight Teasing-Frequency subscale of the Perception of Teasing Scale; perfectionism was measured using a modified version of the Child and Adolescent Perfectionism Scale; thin-ideal internalization was measured using a modified version of the Thinness and Restricting Expectancy Inventory; self-esteem was measured using the Rosenberg Self-

Esteem Scale; body dissatisfaction was measured using a modified version of the Satisfaction and Dissatisfaction with Body Parts Scale.

Table 7

Comparison of Mean Scores on Postulated Risk Factors for Participants Reporting Body Dissatisfaction and Participants Not Reporting Body Dissatisfaction at Baseline

	Baseline body dissatisfaction (<i>n</i> = 52)		No baseline body dissatisfaction (<i>n</i> = 337)			
Baseline risk factors	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>t</i>	Cohen's <i>d</i>
Weight-related teasing	13.78	6.93	8.15	3.73	-8.18**	1.33
Body mass index	25.46	5.21	22.17	3.38	5.72**	0.90
Perfectionism	65.86	12.24	61.30	13.59	2.24*	0.34
Thin-ideal internalization	23.49	4.65	16.73	5.35	8.54**	1.28
Self-esteem	24.43	5.05	30.68	4.65	-8.84**	1.33

Note. * = $p < .05$; ** = $p < .01$; body dissatisfaction was defined by a mean score ≥ 4 on the baseline body dissatisfaction measure (i.e., a modified version of the Satisfaction and Dissatisfaction with Body Parts Scale); weight-related teasing was measured using the Weight Teasing-Frequency subscale of the Perception of Teasing Scale; perfectionism was measured using a modified version of the Child and Adolescent Perfectionism Scale; thin-ideal internalization was measured using a modified version of the Thinness and

Restricting Expectancy Inventory; self-esteem was measured using the Rosenberg Self-Esteem Scale.

Table 8

Parameter Estimates and Confidence Intervals from a Simultaneous Multivariate Multiple Regression Model Examining Cross-Sectional Associations of Postulated Risk Factors with Baseline Body Dissatisfaction

Baseline body dissatisfaction					
Postulated risk factors	<i>B</i> (<i>SE</i>)	95% CI for <i>B</i>	β	Contribution to R^2	Partial Correlation
Weight-related teasing	-2.48 (1.04)	-4.53, -0.42	-0.11*	0.007	-0.12
Body mass index	2.68 (0.58)	1.54, 3.82	0.20**	0.028	0.17
Perfectionism	< 0.01 (< 0.01)	-0.27, 0.79	-0.01	< 0.001	-0.01
Thin-ideal internalization	0.05 (0.01)	0.03, 0.06	0.29**	0.052	0.23
Self-esteem	-0.06 (0.01)	-0.08, -0.05	-0.36**	0.092	-0.30

Note. * = $p < .05$; ** = $p < .01$; *B* = unstandardized coefficients; *SE* = standard error; CI = confidence interval; β = standardized

coefficients. Weight-related teasing was measured using the Weight Teasing-Frequency subscale of the Perception of Teasing Scale; perfectionism was measured using a modified version of the Child and Adolescent Perfectionism Scale; thin-ideal internalization was

measured using a modified version of the Thinness and Restricting Expectancy Inventory; self-esteem was measured using the Rosenberg Self-Esteem Scale; baseline body dissatisfaction was measured using a modified version of the Satisfaction and Dissatisfaction with Body Parts Scale.

Table 9

Parameter Estimates and Confidence Intervals from Hierarchical Univariate Multiple Regression Models Examining Longitudinal Associations of Postulated Risk Factors with Subsequent Increases in Body Dissatisfaction Over One Year

Increases in body dissatisfaction from baseline to one year follow-up					
Postulated risk factors	<i>B</i> (<i>SE</i>)	95% CI for <i>B</i>	β	Contribution to R^2	Partial Correlation
Weight-related teasing	0.17 (0.96)	2.07, 1.73	0.01	< 0.001	0.01
Body mass index	1.31 (0.54)	0.24, 2.37	0.11*	0.011	0.14
Perfectionism	< 0.01 (< 0.01)	< -0.01, < 0.01	0.04	0.002	0.04
Thin-ideal internalization	< 0.01 (< 0.01)	< -0.01, 0.02	0.02	< 0.001	0.02
Self-esteem	-0.02 (0.01)	-0.04, < 0.01	-0.13*	0.010	-0.13

Note. *B* = unstandardized coefficients; *SE* = standard error; CI = confidence interval; β = standardized coefficients. Weight-related teasing was measured using the Weight Teasing-Frequency subscale of the Perception of Teasing Scale; perfectionism was measured using a modified version of the Child and Adolescent Perfectionism Scale; thin-ideal internalization was measured using a modified

version of the Thinness and Restricting Expectancy Inventory; self-esteem was measured using the Rosenberg Self-Esteem Scale; body dissatisfaction was measured using a modified version of the Satisfaction and Dissatisfaction with Body Parts Scale.

Table 10

Parameter Estimates and Confidence Intervals from Hierarchical Multivariate Multiple Regression Models Examining Longitudinal Associations of Postulated Risk Factors with Subsequent Increases in Body Dissatisfaction Over One Year

Increases in body dissatisfaction from baseline to one year follow-up					
Postulated risk factors	<i>B</i> (<i>SE</i>)	95% CI for <i>B</i>	β	Contribution to R^2	Partial Correlation
Body mass index	1.54 (0.55)	0.46, 2.62	0.13**	0.015	0.16
Self-esteem	-0.02 (0.01)	- 0.04, -0.01	-0.15**	0.014	-0.16

Note. ** = $p < .01$; *B* = unstandardized coefficients; *SE* = standard error; CI = confidence interval; β = standardized coefficients. Self-esteem was measured using the Rosenberg Self-Esteem Scale; body dissatisfaction was measured using a modified version of the Satisfaction and Dissatisfaction with Body Parts Scale.

Table 11

Potency of Baseline High Body Mass Index as a Risk Factor for Follow-Up Body Dissatisfaction

		Outcome		
		(follow-up body dissatisfaction)		
		Yes	No	
Risk factor (high body mass index)	Yes	a <i>n</i> = 10	b <i>n</i> = 71	<i>a</i> + <i>b</i> = 81
	No	c <i>n</i> = 10	d <i>n</i> = 224	<i>c</i> + <i>d</i> = 234

Risk difference = $(a / (a + b)) - (c / (c + d)) = 8.1\%$

Number needed to treat = $1 / 0.081 = 12.35$

Cohen's *d* = 0.69

Note. Body dissatisfaction was defined by a mean score ≥ 4 on the follow-up body dissatisfaction measure (i.e., a modified version of the Satisfaction and Dissatisfaction with Body Parts Scale); individuals were classified as having high BMI if they reached the cut-off points for overweight and obesity for their age (i.e., BMI ≥ 23.9 for 15 year olds, BMI ≥ 24.4 for 16 year olds, BMI ≥ 24.7 for 17 year olds; T.J. Cole et al., 2000).

Table 12

Potency of Baseline Low Self-Esteem as a Risk Factor for Follow-Up Body Dissatisfaction

		Outcome		
		(follow-up body dissatisfaction)		
		Yes	No	
Risk factor (low self-esteem)	Yes	a <i>n</i> = 8	b <i>n</i> = 22	a + b = 30
	No	c <i>n</i> = 12	d <i>n</i> = 268	c + d = 280

Risk difference = $(a / (a + b)) - (c / (c + d)) = 22.38\%$

Number needed to treat = $1/0.2238 = 4.47$

Cohen's *d* = 1.33

Note. Body dissatisfaction was defined by a mean score ≥ 4 on the follow-up body dissatisfaction measure (i.e., a modified version of the Satisfaction and Dissatisfaction with Body Parts Scale); low self-esteem was defined as a mean score ≤ 22.11 on the Rosenberg Self-Esteem Scale.

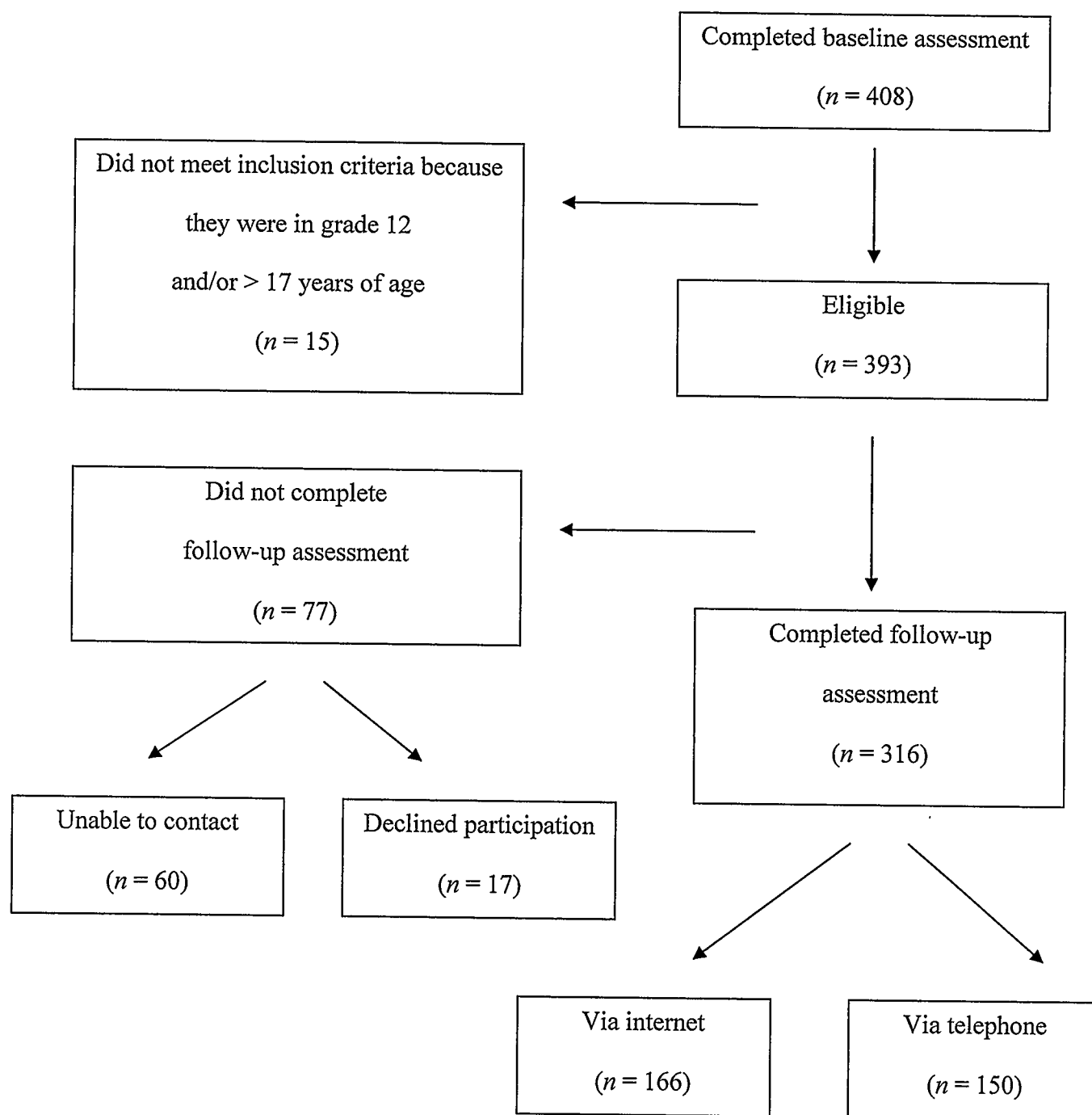


Figure 1. Summary of Participant Flow.