University of Alberta

Assessment of the Effectiveness of a Wellness-based Program for Eating Disorder Prevention on Eating Attitudes and Disordered Eating Behaviors in Elementary and Junior High Students

By

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Abstract

Anecdotal reports of eating disorders in children seem to be on the rise, and the reported age for eating disorders in children is dropping. These recognitions have stimulated an increasing interest in eating disorder prevention, a relatively new area of study. The purpose of the current study was to evaluate the effects of a wellness-based psychoeducational prevention program on eating attitudes and disordered eating behaviors in girls and boys in grades 5 and 7. The *Making the Most of ME* program was delivered to 697 9-12 year old children who completed evaluation tools at pre, post and five months post-program delivery. *Making the Most of ME* resulted in a statistically significant reduction in problematic eating attitudes at 5 months post intervention; however, there was no change in disordered eating behaviors. While there were no differences in program effects for sex, the program had a greater effect with grade 5 students.

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Chapter One: Introduction

1.1 Rationale

It has been suggested that in our society negative body image is becoming the norm. Excessive weight preoccupation (associated with negative body image) is a public health concern associated with a number of harmful physiological and psychological consequences, including the development of eating disorders (ED) (Neumark-Sztainer, 1995). Initial signs of ED usually display in early adolescence (Neumark-Sztainer), partly explained because puberty is a high-risk time for body image disturbance (O'Dea & Abraham, 1999). While ED are more prevalent in females (American Psychiatric Association, 2000), both girls and boys manifest with negative body image, both living in an environment which produces near universal body dissatisfaction, preoccupation with eating and weight, and clinical cases of obesity and eating disorders (Battle & Brownell, 1996). It seems therefore advisable that investigations into ED risk and prevention should begin in pre- and early adolescence, and include both girls and boys.

Over the past 10 years there has been an increasing interest in the prevention of ED; however, there continues to be controversy regarding the best approach (Austin, 2000; Carter, Stewart, Dunn, & Fairburn, 1997). Most previous prevention studies used an illness education model and were marginally

successful. In general the illness approach focused on imparting knowledge about the adverse effects of dieting and on developing skills to combat social pressures to diet. Although these studies demonstrated increased knowledge of participants, they were unsuccessful in demonstrating a change in eating behaviors (Gresko & Rosenvinge, 1998; Killen, Taylor, Hammer, Litt, Wilson, Rich, et al., 1993; Paxton, 1993; Smolak, Levine, & Schermer, 1998; Stewart, Carter, Drinkwater, Hainsworth, & Fairburn, 2001). As well, there is concern that this approach may actually have a negative impact by providing participants with knowledge about how to develop an ED (O'Dea & Maloney, 2000).

A newer approach uses a wellness model targeting the establishment of health enhancing activities (Dalle Grave, 2003). Advocates of this approach suggest that future education programs need to be aimed at improving self-esteem, body image and health practices (O'Dea & Abraham, 2000; Steiner-Adair, Sjostrom, Franko, Pai, Tucker, Becker, et al., 2002), while leaving out information about ED (O'Dea & Abraham). Using a wellness model, O'Dea & Abraham, were able to demonstrate an improvement in body satisfaction, self-esteem, and social acceptance for middle school girls and boys, all which were maintained one year later. Kater, Rohwer, & Levine (2000) and Phelps, Sapia, Nathanson, & Nelson (2000) both found that a wellness pilot program for eating disorder prevention had positive short-term results for developing positive body image and reducing ED behaviors. Other long-term effects of wellness programs on improving body image and reducing ED behaviors have been documented by Piran (1999), Smolak & Levine (2001), and Steiner-Adair, et al. More longitudinal

studies are needed in primary prevention that both emphasize wellness and examine long-term effects.

1.2 Purpose

The purpose of the present study was to determine the effectiveness of a wellness-based school education program for the primary prevention of ED, evaluating students in elementary school (grade 5) and junior high school (grade 7). The education program developed for this study, Making the Most of ME (MMME) consisted of eight hours of interactive classroom instruction (approximately 1 hour/week), which focused on skill building and self-advocacy. The intent of this study was threefold: (1) to determine prevalence information about eating attitudes and disordered eating behaviors (restricting, purging and bingeing), (2) to compare eating attitudes and disordered eating behaviors between groups (comparing students that received the education program to students who did not receive the education program), and (3) to compare eating attitudes and disordered eating behaviors between groups (comparing sex and grade in the group which received the education).

This study evaluated eating attitudes and disordered eating behavior (restricting, purging and bingeing). This was in contrast to usual measures of overt anorexia nervosa, bulimia nervosa and binge eating disorder. By definition ED must be sustained for a period of time before a clinical diagnosis can be

made. With adolescents, disordered eating behavior, or partial syndrome ED, are more common than actual diagnosed ED. There is evidence that partial syndrome ED in adolescents continues and develops into full-syndrome adult ED (Patton, Coffey & Sawyer, 2003).

This study addressed the need expressed by educators, public health officials, and community members for more ED prevention programs (Alberta Mental Health Board, 1999). Study results will be shared with those who allocate funding and support the development of programs. The timing is important, as the Alberta Education physical education (Alberta Learning, 2001) and health curricula (Alberta Learning, 2002) both have expanded sections addressing body image. The outcomes of this study may provide evidence that will help with future curriculum developments. Additionally, the study complements other Alberta initiatives in eating disorder prevention. It will assist in providing information for the development of strategies for effective ED prevention in schools, and for the development of a model for teaching body image and self-esteem. It will act as a catalyst for the continuing development of effective body image education by providing evidence on the effectiveness of the wellness approach.

1.3 Objectives

The purpose of this study was to assess the effectiveness of an education program for the prevention of ED. This was done through the following objectives:

1. To measure and compare eating attitudes of students (girls and boys) in grades five and seven before the education program, immediately after, and 5 months following the education program, using the Eating Attitudes Test (EAT-26) (total scores; and low risk <20; high risk $\geq$20).

2. To measure and compare disordered eating behaviors (restricting, purging and bingeing) of students (girls and boys) in grades five and seven before the education program, immediately after, and 5 months following the education program, using the Risk of Eating Disorder Inventory (REDI) (no risk, low risk, moderate risk and high risk in restricting, purging and bingeing sub-scales).

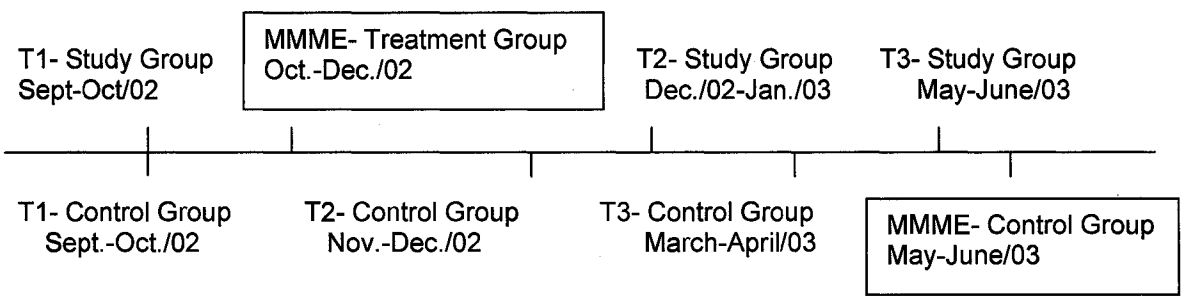
To achieve these objectives, the differences in eating attitudes and disordered eating behaviors were compared between the study group and the control group.

1.4 Understanding this Study In Context of a Larger Research Project

Reporting on the eating attitudes and disordered eating behaviors of students in the study is only one aspect of the full study conducted. The entire study "Evaluation of Eating Disorder Prevention in Schools – A Wellness Approach" was a two year project funded by a grant from the Alberta Heritage Foundation for Medical Research (AHFMR). In addition to eating attitudes and disordered eating behaviors, self-esteem, body image, perfectionism, stress, health behaviors, and effects of teasing were all assessed. Height and weight were measured at all test-times. The tools reported in this paper to measure eating attitudes and disordered eating behaviors were the Eating Attitudes Test (EAT-26) (Garner & Garfinkel, 1979) and the Risk of Eating Disorder Inventory (REDI) (Drummond & Hare, 1999). Additional tools used, but not reported in this paper included the Rosenberg Self-esteem Scale (Rosenberg, 1965), Schematic Figures (Collins, 1991), Almost Perfect Scale (McGarvey, 1996), Inventory of Peer Influence in Eating Concerns (Oliver & Thelen, 1996), Perceived Stress Scale (Cohen & Williamson, 1994), and a health behaviors questionnaire. Students completed 19 pages of questions three times (at pre-test, two months post, and again at five months post). Input from the Capital Health Ethics, as well as that from the Edmonton Public School Board (Ethics), Caritas Research Steering Committee, and a Professional Advisory Committee were all instrumental in final selection of all tools for the study.

This two year project consisted of one year of planning and preparation, followed by one year of data collection and analysis. During year one, in addition to selection of the evaluation tools, the education program was created and pilot tested. Working within the school year, year two consisted of the full study. Students completed pre-test tools in September-October, 2002. Following this, the study group received eight weeks of education (Making the Most of ME; MMME). Post testing occurred immediately after the study group education program was completed and again five months later. Students in the control group were tested at approximately the same time as students in the study group. After the final post-test, students in the control group received the education program (see Figure 1.1).

Figure 1.1 Timelines for Research Project: Evaluation of Eating Disorder Prevention in Schools – A Wellness Approach



1.5 Hypotheses

The hypotheses of the current study were:

1. Students in grade seven will have more negative eating attitudes and disordered eating behaviors than students in grade five.

2. Girls will have more negative eating attitudes and disordered eating behaviors than boys.

3. The education program will result in a significantly greater improvement in eating attitudes in the intervention group:
   a. immediately after program delivery when compared to the control group.
   b. five months post-program delivery when compared to the control group.
   c. grade seven students compared to grade five students.
   b. girls compared to boys.

4. The education program will result in a significantly greater reduction in disordered eating behaviors (restricting, purging and bingeing) in the intervention group:
   a. immediately post-program delivery when compared to the control group.
   b. five months after program delivery when compared to the control group.
   c. grade seven students compared to grade five students.
   d. girls compared to boys.

1.6 List of Terms

The following is a list of terms that are found throughout this paper and definitions that explain the context in which they are used.

Binge	"eating in a discrete period of time an amount of food that is definitely larger than most individuals would eat under similar circumstances" (American Psychiatric Association, DSM IV, 1994, pp.589).
Body Dissatisfaction	"discontentment; displeasure" (Avis, Gregg, & Scarhill, 1974, pp.337). For the purpose of this study, dissatisfaction is used in the discussion of how one feels about their appearance, i.e., body dissatisfaction.
Body Image	"a person's inner conception of his or her own physical appearance (may or may not correlate with objective reality); includes cognitive and emotional aspects as well as sensory input" (Weinshenker, 2002, pp.13).
Body Image Distortion	A body image problem where an individual is unable to accurately judge the size of his/her body (Hare & Drummond, 2002).
Body Mass Index (BMI)	Tool used to relate body weight to health; calculated by dividing weight in kg by height in meters squared. A healthy BMI for adults is 18.5-24.9 (Health Canada, 2006). However, when using BMI to assess healthy weight for children, a BMI percentile is used. The BMI percentile plots weight against normal growth curves for children, indicating the relative position of the child's BMI number among children of the same sex and age. A healthy weight percentile for children is between the 5^{th} - 85^{th} percentiles (Centres for Disease Control and Prevention, 2006).

Comprehensive School Health	"an approach to health promotion in the school setting; a 'whole' school approach where students, teachers, parents, school staff, community groups, agencies, and institutions work together on key priorities for improving health and education attainment; an approach where priority health issues are addressed through integration, coordination and enhancement to curriculum, environments and home, school and community partnerships and services" (Baugh Littlejohns, 2004, pp.11).
Construct	"a psychological entity that does not exist in physical reality, but is created in the mind; tendency of individuals to develop certain unique interpretations of events; describes differences between individual behavior; attempts to explain behaviors" (Corsini, 2003, pp.212).
Dieting	"restricting calories (food choices) for the purpose of losing weight and/or controlling weight" (Hare & Drummond, 2002).
Disordered Eating Behavior	"when a person's attitudes about food, weight and body size lead to very rigid eating habits that jeopardize one's health, happiness and safety. Disordered eating may begin as a way to lose a few pounds or get in shape, but these behaviors can quickly get out of control, become obsessions, and may even turn into an eating disorder. Eating disorders are the extreme category of disordered eating" (National Eating Disorders Association, 2006). For the purpose of this study, disordered eating behavior is used to describe dieting, overt eating disorder behavior (restricting, purging and bingeing), and partial syndrome eating disorders.

Eating Attitude	"one's way of thinking, acting or feeling" (Avis, et al., 1974, pp.72). For the purpose of this study, attitudes are used to discuss a way of thinking or feeling that affects a person's ability to make healthy choices, i.e., eating attitude.
Eating Disorder	Mental illnesses which are characterized by severe disturbances in eating behavior (clinically diagnosed as anorexia nervosa and bulimia nervosa) (American Psychiatric Association, DSM IV, 1994).
Eating Disorder Prevention	Efforts targeting individuals to prevent eating disorders (or their worsening) and maintain good health. Eating disorder prevention is categorized into primary, secondary and tertiary (Neumark-Sztainer, 1995).
Eating Disorder Risk	Several factors put an individual at risk of developing an eating disorder. While there is no simple equation to predict who will develop an eating disorder, eating disorder risk factors are categorized as biological, psychological and sociocultural (Muris, Meesters, van de Blom, & Mayer, 2003).
Health Promotion	"the process of enabling individuals and communities to increase control over the determinants of health and therefore improve their health" (Stachtchencko & Jenicek, 1990, pp.54).
Illness Approach	Illness is an unhealthy condition of body & mind (Beare & Myers, 1990). For the purpose of this study illness is used to describe an educational approach which includes the didactic teaching about the illness targeted to prevent, i.e., the illness approach.

Partial Syndrome Eating Disorders	Milder forms of eating disorders that do not fit formal DSM IV criteria for the full classification of an eating disorder. Partial syndrome eating disorders are sometimes also called Eating Disorders Not Otherwise Specified or Sub-Syndrome Eating Disorders (Nicholls, Chater, & Lask, 2000).
Primary Prevention	Prevention which targets individuals who do not yet demonstrate signs of the illness. Primary prevention addresses risk factors for the development of the illness (Neumark-Sztainer, 1995).
Purge	The use of compensatory behaviors to prevent weight gain. The most common compensatory techniques are the induction of vomiting; others include misuse of laxatives and diuretics, and excessive exercising (American Psychiatric Association, DSM IV, 1994).
Secondary Prevention	Targets individuals who may already experience signs or symptoms of the illness, but may not yet have the full-blown disease. Secondary prevention is also known as early intervention (Neumark-Sztainer, 1995).
Self-efficacy	The belief in one's capabilities to organize and execute the courses of action required to produce given attainments; the focal point of the Social Cognitive Theory (Bandura, 1989).
Self-esteem	The individual's perception of his worth (Beare & Myers, 1990).
Social Cognitive Theory	Social Cognitive Theory (SCT) describes learning in terms of a model of "causation including behavior, cognition and other personal factors, and environmental influences, which all operate as interacting determinants that influence each other bidirectionally" (Bandura, 1989, pp.2).

Tertiary Prevention	Refers to treatment, and comments on efforts to improve the course of the disease or minimize harmful effects once the illness has been diagnosed (Neumark-Sztainer, 1995).
Wellness Approach	Wellness is the integration of the five different subgroups of health, including mental health, physical health, social health, spiritual health, and emotional health, in a balanced way (Beare & Myers, 1990). For the purpose of this study wellness is used to describe an educational approach which promotes health without talking about the disease targeted to prevent, i.e., the wellness approach.

Chapter Two: Review of the Literature

2.1 Introduction

Over the past 20 years there has been an increase in disordered eating in our society (Irving & Neumark-Sztainer, 2002). Precursors to disordered eating are a variety of attitudes that support such behaviors as unhealthy dieting, severe caloric restriction, the use of meal supplements, over-consumption of high fat foods, skipping meals; and anorexic and bulimic behaviors such as laxative and diet pill use, cycles of binge eating and dieting, and self-induced vomiting (Littleton & Ollendick, 2003; Neumark-Sztainer, 1995). Respectively, eating attitudes are the building blocks for eating behavior. Eating attitudes can range from healthy to problematic (or unhealthy) (Russell & Ryder, 2001). Typically, as eating attitudes become less healthy, so do eating behaviors; the extreme result of unhealthy problematic eating attitudes is eating disorders (Russell & Ryder).

An underlying belief is that the sociocultural emphasis on the thin-ideal, with the subsequent escalation of dieting, has made dieting become a "normative" behavior that it is a fundamental contributor to the problem (Neumark-Sztainer, 1995). Brownell (1991) describes a “toxic” environment which produces nearly universal body dissatisfaction, preoccupation with eating and weight, and clinical cases of ED and obesity. The following quote is becoming a gold standard in describing the pathological environment we

live in: "dysfunctional eating practices have occurred within the context of an environment that is becoming increasingly "toxic" relative to food and weight; an environment that exults thinness, stigmatizes fatness, encourages unregulated food consumption of energy-dense foods, and promotes "quick-fix" approaches to weight loss" (Irving & Neumark-Sztainer, 2002, pp. 299). This profound statement sets the stage for a discussion about eating attitudes and disordered eating behaviors in children and adolescents.

Many researchers have examined the prevalence of problematic eating attitudes and disordered eating behaviors in adolescents. Amongst 12-18 year old girls and boys, prevalence of binge eating with associated loss of control has been reported to be 15%, using excessive exercise for weight control 14%, fasting 6%, use of diet pills 2.4%, self-induced vomiting 2-2.4%, and use of laxatives and diuretics for weight control 1%; furthermore, 9% of adolescents report that their eating problems caused them distress (Jones, Bennett, Olmsted, Lawson, & Rodin ,2001; Baranowski, Jorga, Djordjevic, Markinovic, & Heatherington, 2003). Other studies have studied attitudes and behaviors in younger children. Halvarsson & Sjoden (1998), Rolland, Farnill, & Griffiths (1997), and McVey, Tweed, & Blackmore (2004) reported that 4.7-14% of young girls and boys age 7-11 had a score >20 on the Children's Eating Attitudes Test (ChEAT), which is indicative of eating disturbance. They also found that 20-55.6% of girls and boys were dieting to lose weight; and 43.5% of girls were exercising to lose weight. As well, 6.5-14.2% of girls and boys were binge eating; and 0.7-1.8% were using self-induced vomiting to

lose weight. The concern is that these disordered eating behaviors increase the risk of developing an eating disorder. Reinforcing this concern, Patton, Selzer, Coffey, Carlin, & Wolfe (1999) reported that female teenagers who diet frequently are 18 times more likely, and girls who diet moderately are five times more likely, to develop an eating disorder than are non-dieters.

Problematic eating attitudes and disordered eating behaviors are not without serious consequence. Symptoms represent an entire spectrum of disordered eating with eating disorders being the extreme outcome. Common physical and psychological aspects of disordered eating include fatigue, anxiety, depression, and anxiety associated with meals (American Psychiatric Association, 2000). Additionally, poor nutritional intake is associated with nutrient deficiencies, low body temperature, constipation, amenorrhea, sluggishness, impaired school performance, decreased zest and interest in life and a failure to grow (Golden, Katzman, Kreipe, Stevens, Sawyer, Rees, et al., 2003). Further associations include problematic future weight management and weight cycling, and increased binge eating following restrained eating (Austin, 2000; Neumark-Sztainer, 1995). Early dieting and related behaviors are risk factors for chronic body image problems, weight cycling, obesity, and eating disorders (Ricciardelli & McCabe, 2001). Unhealthy disordered eating behaviors contribute to a preoccupation with weight and subsequent escalation of body dissatisfaction. In fact, body dissatisfaction may be a precursor to a societal epidemic in disordered eating

Ohring, Graber, & Brooks-Gunn, 2002; Ricciardelli & McCabe; Stice & Shaw, 2002).

While body dissatisfaction is perceived as a female issue, males are also affected. Both girls and boys as young as age 7-11 have negative stereotypes against obese children (Ricciardelli & McCabe, 2001). In a study by Ricciardelli, McCabe, Holt, & Finemore (2003), girls and boys aged eight to 11 had more similarities than differences in body dissatisfaction, beliefs about the importance of losing weight, and perceived pressure to lose weight. Other studies have reported that while both girls and boys have body dissatisfaction, generally girls want to lose weight, and boys want to gain weight (Baranowski, et al., 2003; Ricciardelli & McCabe). Borrenson & Blair (2003) suggest that body dissatisfaction should be recognized as equally important among boys and girls.

Traditionally unhealthy eating attitudes and disordered eating behaviors have been associated with adult (college-aged) females. The literature is now being permeated with data to support similar attributes in adolescents (Baranowski, et al. 2003; Borrenson & Blair, 2003; Boschi, Siervo, D'Orsi, Margiotta, Trapanese, Basile, et al., 2003; Nowark, Crawford & Buttner, 2001; Ohring, et al., 2002). In children, the prevalence of eating disorders is difficult to assess, but it is believed that eating disorders are likely more common than previously believed (Ricciardelli & McCabe, 2001). Children as young as 10 have been reported to have body dissatisfaction (Halvarsson, Lunner, Westerberg, Antesen, & Sjoden, 2002; Littleton &

Ollendick, 2003; McVey, Tweed, & Blackmore, 2004; Ricciardelli, et al., 2003; Ricciardelli & McCabe, 2001; Schur, Sanders, & Steiner, 2000), leading to the conclusion that unhealthy eating attitudes and behaviors are no longer a concern for adults only.

Coincidental to recognition that the environment is becoming more "toxic" and disordered eating is becoming a pervasive normal behavior, there is an increasing interest in eating disorder prevention. Eating disorder prevention incorporates strategies addressing risk for the development of eating disorders. Steiner, Kwan, Shaffer, Walker, Miller, Sagar, et al. (2003) classify eating disorder risk factors into three major types: biological, psychological, and sociocultural. The biological category includes family history of eating disorders and overweight, dieting behavior, and sex. Psychological risk factors include negative self-evaluation, perfectionism, adolescence as a high risk period, maladaptive parental behaviors, and high exposure in Western cultures to health and weight consciousness, poor body image, body dissatisfaction, body distortions and low self-esteem. Finally, sociocultural factors include peer pressure (and teasing) regarding weight and eating, media influence, and at-risk sports activities.

Eating disorder prevention research is relatively new, having only been discussed in the literature for the past 25 years. Initial research was largely unsuccessful in changing behaviors. The "first and second generation" of prevention programs delivered didactic psycho-educational material and demonstrated improved knowledge, but not behavior change (Stice & Shaw,

2004). The most recent "third generation" of eating disorder prevention studies has built on accomplishments, recommending a wellness model which improves body image and self-esteem without talking about ED (the illness) and a more interactive approach to learning to facilitate sustained behavior change (O'Dea & Maloney, 2000; Russell & Ryder, 2001). These newer studies are demonstrating more success in sustaining changed behaviors over longer periods. With current concerns about unhealthy eating attitudes and disordered eating behavior in children and adolescents, it is imperative to develop effective prevention programs.

2.2 Eating Attitudes

2.2.1 *General Concerns with Body Dissatisfaction*

Reports of children and adolescents displaying problematic attitudes about size and shape seem to be increasing. Two Canadian studies have looked at similar populations 15 years apart, and reported an increase in problematic eating attitudes. Both studied high school girls and boys, and both used the EAT-26 for measurement. In 1987, Chandarana, Helmes, & Benson found an overall prevalence of disordered eating attitudes as measured by EAT-26 scores $\geq$20 to be 7.5%. A recent study by Jonat & Birmingham (2004) found the prevalence of disordered eating attitudes in a

similar population, and using the same measurement, to be 15.2%. This increase highlights the rising concern.

Adolescents are particularly sensitive to other's evaluation of their appearance, body shape and weight. This may be in part because of the onset of puberty, which makes the process of individualization and the formation of social bonds a personal control issue (Calam & Waller, 1998). The subsequent outcome is a vulnerability to messages about weight control. Resulting body dissatisfaction manifests itself as a variety of behaviors such as unhealthy dieting, severe caloric restriction, use of meal supplements, over-consumption of high fat foods, skipping meals, and anorexic or bulimic behaviors (laxative and diet pill use, cycles of binge eating and dieting, and self-induced vomiting) (Littleton & Ollendick, 2003).

Body Image

Body image is the subjective concept of one's physical appearance based on self-observations and reactions of others. The psychological construct of body image is complex, including cognitive and emotional aspects as well as sensory input (Weinshenker, 2002). In a study by Kelly, Ricciardelli, & Clarke (1999), poor body image in girls and boys in grades 2 and 4 (mean age 7.41 years) predicted dieting behavior. A number of factors influence body image, including gender, age, weight, race, sociocultural pressures, and self-concept (Ricciardelli & McCabe, 2001). Negative body image is synonymous with body dissatisfaction, a common theme associated

with negative eating attitudes and disordered eating behaviors (Littleton & Ollendick, 2003). Measuring body image in children is challenging, as the concepts being measured are vague and difficult for children to understand. Figure preferences are the most common tool to measure body image with children, and have had high test-retest reliability with children as young as eight years (Ricciardelli & McCabe).

Stereotypes about Weight and Shape

Stereotypes about weight and body shape are formed early in childhood and affect attitudes about size and shape. Young girls and boys between age 7-11 rate obese children as having fewer friends, being lazier, being less happy and being less attractive than average thinner-sized children (Tiggermann & Wilson-Barrett,1998). Studies with pre-school children have demonstrated similar findings. Musher-Eizenman, Holub, Barnhart Miller, Goldstein, & Edwards-Leeper (2004) studied 4-6 year old children and found that even young children see obese figures as more negative. These opinions are constant over the years, with 10% of females and 18% of males in high school expressing that slim people have more friends, and 35% of females and 55% of males believing that slim people are more attractive. These beliefs affect how individuals feel about themselves (Nowark, et al., 2001) ultimately affecting their eating attitudes and behaviors.

Relationship to Body Mass Index (BMI)

Body Mass Index (BMI) is a tool used to relate body weight to health. It is calculated by dividing weight in kilograms by height in meters squared. A healthy BMI for adults is 18.5-24.9 (Health Canada, 2006). When using BMI to assess healthy weight for children, a BMI percentile is used. This tool plots weight against normal growth curves for children, indicating the relative position of the child's BMI number among children of the same sex and age (Centres for Disease Control and Prevention, 2006).

Evidence suggests that to a large degree body dissatisfaction and dieting are mediated by BMI. In a study of grade 3-6 students by Schur, et al. (2000), high BMI was consistently associated with higher levels of body dissatisfaction and eating concerns. Other researchers have reinforced that BMI is a good indicator of girls' and boys' body dissatisfaction, with higher BMI being a strong predictor for body dissatisfaction (Ricciardelli, et al., 2003). With rates of overweight and obesity dramatically increasing in the past two decades (Tremblay & Willms, 2000), there is increased concern regarding the effect this might have on increasing body dissatisfaction in youth, with the subsequent result being an increasing incidence in disordered eating and eating disorders.

Body Image Distortion

Dieting and dissatisfaction with weight extend far beyond those that are overweight (Austin, 2001). In a large study of 10-14 year old Canadian

girls, McVey, Tweed, & Blackmore (2004) found that while only 7.2% of girls were above the normal weight range, 31.3% felt that they were too fat. In another large study of 10-14 year old girls, 33% of the underweight group perceived themselves as normal weight and 10.8% thought they were overweight (Wong, Bennink, Wang, & Yamamato, 2000). In this same study, 33.6% in the acceptable weight range thought they were overweight. It was also reported in this study that 12.5% in the underweight group had intentionally tried to lose weight. This body distortion, or perception of being overweight when not actually overweight, creates body dissatisfaction and often initiates dieting behavior (Austin, 2001). While dieting behavior is usually prompted by being overweight or obese, in the case of body distortion, one may engage in dieting and disordered eating behaviors in the absence of overweight (Austin).

Summary: Consequences of Body Dissatisfaction

Body dissatisfaction and negative eating attitudes have serious consequences to both physical and psychological health. Low calorie diets are associated with irritability, nervousness, depression and anxiety (Austin, 2000). Additionally, poor nutritional intake is associated with nutritional deficiencies, low body temperature, constipation, amenorrhea, sluggishness, impaired school performance, decreased zest and interest in life and a failure to grow. Also affected is weight cycling and future weight management, problematic effects which are partially explained by increased binge eating

following periods of restrained eating (Austin; Neumark-Sztainer, 1995). Early dieting and related behaviors are risk factors for chronic body image problems, weight cycling, obesity, and eating disorders (Ricciardelli & McCabe, 2001). Interestingly, Ohring, et al. (2002) found that eating symptomatology and depressive symptoms declined from mid-adolescence to young adulthood. However, Calam, & Waller (1998) found that eating attitudes and behaviors in teenage years are self-maintaining characteristics which predicted eating attitudes and behaviors in adulthood. Their conclusion is that eating attitudes and behaviors established during childhood have lasting effects during the entire life span. The strength of the tracking of these attitudes and behaviors is not clearly demonstrated at this point.

2.2.2 *Differences in Gender: Girls versus Boys*

Traditionally, body dissatisfaction has been associated with a desire to be thinner and was seen as a greater problem in females than males (Barry, Grilo & Masheb, 2002; Baranowski, et al., 2003; Lam, Stewart, Leung, Ho, Fan, & Mah, 2002). A recent study by Beato-Fernandez, Rodriguez-Cano, Belmonte-Llario, & Martinez-Delgado (2004) found that girls were seven times more at risk for pathological body dissatisfaction (than boys). Wood, Becker, & Thompson (1996) reported that 55% of girls compared to 35% of boys were dissatisfied with their size. Shapiro, Newcomb, & Loeb (1997) found that 23% of girls and only 18% of boys said they always wished they were thinner. Another study by Thomas, Ricciardelli, & Williams (2000) reported 46% of

girls versus 26% of boys frequently thought about being thinner. However, body dissatisfaction in males is a relatively new area of study, and it is now recognized that males also experience body dissatisfaction. Many recent studies have reported that males experience body dissatisfaction to an extent relatively equal to females (Furnham, Badmin & Sneade, 2002; McCabe & Ricciardelli, 2003; Ricciardelli, et al., 2003; Thomas, James, & Bachmann, 2002; Wiseman, Peltzman, Halmi, & Sunday, 2004).

The nature of male body image dissatisfaction is different from that of females. Specifically, females express body dissatisfaction with respect to weight, while males primarily express body dissatisfaction with respect to shape and muscles (Furnham, et al., 2002; McCabe & Ricciardelli, 2001; McCabe & Ricciardelli, 2003; Ricciardelli, et al., 2003). In many past studies the focus on body dissatisfaction has been on measuring satisfaction with weight, thus presenting the conclusions that females had greater body dissatisfaction.

Another interesting dilemma in interpreting data collected from males and females is that commonly an equal number of males want to lose weight as gain weight (Furnham, et al., 2002; McCabe & Ricciardelli, 2001; McCabe & Ricciardelli, 2002), effectively canceling each variable out in the total scores. This is not the case for females where routinely more want to lose weight than gain. These factors may explain why in the past body dissatisfaction was traditionally felt to be more of a female problem.

Mood also plays an important part in body dissatisfaction and differences between females and males have been observed. Girls tend to have more depressed moods than boys, and this is positively correlated to negative body image (Marcotte, Fortin, Potvin, & Papillon, 2002). Phares, Steinberg, & Thompson (2004) found that girls' reports of body dissatisfaction were related to higher levels of depression and lower levels of global self-worth. In another study by Siegel, Yancey, Aneshensel, & Schuler (1999), girls scored higher on depressed mood, lower on self-esteem, and lower on body image. Self-esteem, body image and mood may be correlated.

Another difference between females and males is how socio-cultural influences affect body satisfaction. Toro, Gila, Castro, Pombo, & Guete (2005) found that girls were significantly more vulnerable than boys to the influence of advertising and media messages. They reported that 40% of girls and only 15% of boys reported feeling tempted to diet after seeing advertisements for slimming products. Phares, et al. (2004) found that with girls there was more support for the connections between parental influences and body image disturbance. They also suggested that mothers have more effect on their daughter's weight and body image concerns than do fathers. McCabe & Ricciardelli (2002) reinforced that girls are likely more influenced by parental messages to lose weight than boys. This exerts a cautionary message on the role of families in influencing a daughter's body dissatisfaction. McCabe & Ricciardelli also suggest that while there are few

studies addressing socio-cultural influence on body image in boys, parents have less influence than peers.

Females and males display different stereotypical beliefs about size and weight. In a study by O'Dea & Abraham (1999) of grade 7 and 8 students, 67% of females and 82% of males indicated that appearance affected romantic appeal; as well, 72% of females and 68% of males believed that it affected happiness. In another study by Nowark, et al. (2001) in grade 8 students, 58% of females and 50% of males felt that being thin was more important for a female than a male, 22% of females and 46% of males felt that overweight females were not attractive to males, and 20% of females and 44% of males felt that overweight people had only themselves to blame. In this same study 10% of females and 18% of males felt that slim people had more friends, and 35% of females and 55% of males felt that slim people looked the most attractive. From these observations, it is apparent that both females and males have stereotypes about size and weight; however, males seem to have more negative stereotypes of fat people than females.

Body dissatisfaction in girls and boys is complex, manifesting differently in weight loss and exercising behaviors, disordered eating, interaction with mood, sociocultural influences, and stereotypical beliefs about size and shape. While it was traditionally believed that boys had less body dissatisfaction than girls, new information points to the fact that this may not be true. Rather, boys may simply express their body dissatisfaction differently than girls.

2.2.3 *Differences in Age: Elementary School versus Junior High School*

Much has been written about age and body dissatisfaction, but few studies have actually compared elementary and junior high school students. Wong, et al. (2000) studied a large sample of girls age 10-14 and found that discrepancies between actual and perceived body weight were smallest for girls at age 10, and greatest for girls at age 14. McCabe & Ricciardelli (2001) studied a small group of boys age 12-14 and found that younger boys were more satisfied with their current weight than were older boys. Another study by Marcotte, et al. (2002) addressed body image and self-esteem in boys and girls age 11-18. They found that the youngest age group had more positive body image and higher self-esteem. Another large study by Borrenson & Blair (2003) reported that 22% of children at age 11 reported body dissatisfaction, whereas 30% reported body dissatisfaction at age 13. They also found that self-perception of being overweight increased with age and being on a diet was reported by more 13 year olds than 11 year olds. Lastly, in a study of 8-17 year olds, Packard & Krongstrand (2002) observed that greater than 50% of the group reported weight concerns and dieting behavior; however, when examined by age group, the 11-14 year olds had significantly less body dissatisfaction than the 15-17 year olds. From these results, it appears that younger children are more satisfied with their bodies and weight than older children.

Interestingly, however, there are differences between girls and boys as they get older. Sweeting & West (2002) found that as males got older they

were less worried about putting on weight, and girls were the opposite. They found that at age 11, 30% of overweight males were dieting, but by age 15 only 15% (of these still overweight males) were dieting. They reported rates of dieting for 11 year old girls to be 30% and 48% at age 15. Borrenson & Blair (2003) also replicated these findings with 36.2% of boys dieting at the age of 11, and only 22% of 15 year old boys dieting. Reinforcing this, Siegel, et al. (1999) reported that generally, male body satisfaction, but not female, increases with age. This phenomenon may be explained because of boys' and girls' changing divergence from societal ideals; that is, generally, young boys who are not yet developed desire a larger body and as they grow seem to be more content with their size, whereas girls move more away from their societal ideal body as they get older and gain weight. These gender differences seem to emerge somewhere between age 8-10 (Ricciardelli & McCabe, 2001). This occurrence adds to the complexity of the discussion about body dissatisfaction in girls and boys.

Many authors feel that puberty plays a large part in the development of body dissatisfaction in children (Ackard & Peterson, 2001; Hayward & Sanborn, 2002; Hermes & Keel, 2003; McCabe & Ricciardelli, 2001; McCabe, Ricciardelli, & Finemore, 2002; O'Dea & Abraham, 1999). Clearly, puberty is a developmental period during which many changes in body shape and size occur. Pubertal growth is associated with weight gain in both boys and girls (Ge, Elder, Regnerus, & Cox, 2001). Girls tend to react to this weight gain in a negative way because it moves them away from the female "thin" societal

ideal body; conversely, boys embrace this growth as it moves them towards the male "muscular" ideal body. O'Dea & Abraham (1999) suggest that girls who have attained menarche are more likely than their premenarcheal peers to engage in disordered eating. Some authors have studied the relationship between the age of onset of puberty on body dissatisfaction and disordered eating, and they have found mixed results. Ackard & Peterson (2001) found that the age of puberty onset in females was not significantly associated with body dissatisfaction, self-esteem, depression, or body dissatisfaction. Conversely, McCabe & Ricciardelli (2004) found that girls who matured early were more at risk to engage in health risk behaviors such as weight loss strategies. However, they also admitted that the results for pubertal timing were not consistent, with both early and late maturing boys and girls susceptible to engaging in health risk behaviors, as they attempted to achieve the body shape endorsed by the broader society. Thus, while it seems that puberty itself does affect body satisfaction in children, it is not clear whether the timing of puberty has any influence.

Overall, it appears that age is a factor in predicting eating attitudes and disordered eating behavior in children and adolescents. Generally, younger children have fewer body image problems, with body dissatisfaction and disordered eating emerging as they age. Factors that influence this are gender, and perhaps timing of puberty. Age of pubertal development is different for every child, so it is not possible to predict when exactly a child will go through puberty. It is clear however that because of age, more children in

junior high school, compared to elementary school, will be postpubertal, thus displaying more body image problems and disordered eating than their younger peers.

2.3 Disordered Eating Behavior in Children and Adolescents

2.3.1 Dieting

Body image dissatisfaction has a large impact on dieting behavior. As already discussed, body dissatisfaction is prevalent in children and adolescents. In a study by Borrenson & Blair (2003), approximately 50% of boys and girls expressing body dissatisfaction were on a diet. Ricciardelli, et al. (2003) found that half of girls and boys age 8-11 experienced some body dissatisfaction and one third reported frequent behaviors and cognitions associated with weight loss, including dieting. Shapiro, et al. (1997) found that 18-23% of girls and boys said they always wished they were thinner, suggesting that this attitude is a precursor to dieting behavior in this age group. This high prevalence of body dissatisfaction in children and adolescents raises concern regarding consequences of dieting behavior in this population, putting many at risk for the development of an eating disorder.

Prevalence

Many researchers have written about dieting behavior in children and adolescents. Reported rates of dieting in this population consistently range

from 13-29%. Specifically, the rates of dieting found in studies of children were: 13-21% (O'Dea & Abraham, 1999), 17.4% (Schur, et al., 2000), 13% (Baranowski, et al., 2003), and 29.3% (McVey, Tweed, & Blackmore, 2004). Ricciardelli and McCabe (2001) reported that a significantly larger number of girls, than boys, were dieting and exercising to lose weight. In a study by Borrenson & Blair (2003), 15% of girls were on a diet, while only 7% of boys were. O'Dea & Abraham found 21% of pre-pubertal girls aged 12-13 compared to 13% of pre-pubertal boys of the same age reported currently dieting to lose weight. These same researchers studied a similar population (expanded age range 11-14 years) in 2000 and found similar rates of dieting in that group (27% of girls versus 13% of boys age 11-14). The pathway implicated in these studies is that body dissatisfaction gives rise to dieting, which in turn increases risk for eating pathology.

Consequences Specific to Children and Adolescents

Early dieting and related behaviors are risk factors for chronic body image problems, weight cycling, obesity, and eating disorders (Ricciardelli & McCabe, 2001). Restricted calorie diets are especially problematic for children and adolescents who are experiencing the highest caloric needs of their lifespan, with their bodies physiologically demanding energy required for growth and development. Unless medically supervised, restricted calorie diets should not be imposed on children. In addition to compromising growth and development, dieting behavior can lead to binge behavior (Austin, 2001). A

natural consequence of the self-imposed hunger of dieting is bingeing. This has two logical consequences, one being the development of erratic eating behaviors which may lead to problems with weight gain and obesity, the other being the development of bulimia nervosa or binge eating disorder, both serious eating disorders (Austin). Dieting in children and adolescents can also lead to the development of anorexia nervosa, characterized by restriction of food. Dieting can be viewed as a major pathway to the development of an eating disorder (Neumark-Sztainer, 1995).

Problems with Self-report of Dieting and Binge Eating Behavior

Fundamental to the discussion about body dissatisfaction and negative eating attitudes and behaviors in children and adolescents is a description of dieting and binge eating behavior. However, dieting and binge eating are concepts poorly understood by this age group. Neumark-Sztainer & Story (1998) found that adolescents do not all define dieting and binge eating behavior in the same way. As determined by focus groups of junior and senior high school adolescents, they found that definitions of dieting ranged from healthy eating behavior, to unhealthy eating behavior, eating to lose weight, dieting to gain weight, and anti-dieting views. Similarly, they found that the definition of binge eating was poorly understood, especially with younger participants. Definitions of binge eating ranged from over-eating a large amount of food at one sitting, to over-consuming a certain type of food, over eating for reasons other than hunger, over eating cycled with periods of semi-

starvation, and over eating simultaneously occurring with self-induced vomiting. All studies reported in the literature assess dieting behavior via self-report measures. These discrepancies in self-report definitions of dieting and binge eating may negatively affect the credibility of interpreting epidemiological data.

2.3.2 Anorexia Nervosa, Bulimia Nervosa and Binge Eating Disorder

Prevalence

Eating disorders represent the extreme consequence of disordered eating attitudes. The three ED commonly recognized are anorexia nervosa (AN), bulimia nervosa (BN), and binge eating disorder (BED). They typically develop during adolescence. The peak age of onset for both AN and BN is age 15-18 (Dalle Grave, 2003). While less is known about BED, it is believed that binge eating starts even earlier than BN, most commonly in the mid-teen years (Bulik, 2002). In three prospective studies researchers have investigated the relationship between ED in adolescents and the prevalence of ED in adulthood. Kotler, Cohen, Davies, Pine, & Walsh (2001) found that while AN was difficult to detect in adolescents, early adolescent BN was associated with a 20-fold increase in risk for adult BN. Lewinsohn, Striegel-Moore and Seeley (2000) found similar results, with BN before age 19 being strongly associated with adulthood bulimia. Patton, et al. (2003) found that 11% of those with ED as teens had persisting ED at follow-up into adulthood.

Even more profound was that 50% of those with ED during their teens had high levels of depression, anxiety and heavy alcohol use. Thus, it is implied that ED in children and adolescents has a profound impact on the prevalence of ED in later years.

Estimates of the prevalence and incidence of ED vary according to the sampling and assessment methods. The lifetime prevalence of AN in females is .5-3.7%, and BN among females is estimated at 1.1-4.2% (American Psychiatric Association, 2000). Because most ED start during adolescence, these values are consistent for adolescents as well as adults; however, prepubertal AN and BN are rare (Bulik, 2002). Researchers have found rates that support these estimates. Kjelsas, Bjornstrom, & Gotestam (2004) reported the prevalence of AN among girls aged 14-15 to be 0.7%, BN at 1.7%, and BED at 1.5%. Rojo, Livianos, Conesa, Garcia, Dominguez, Rodrigo, et al. (2002) found AN in .45% of girls aged 12-18, and BN in .41% of the same sample. Older studies estimate the prevalence of AN in 15-19 year old girls to be .48%, and BN to be 1-5% (Fisher, Golden, Katzman, Kreipe, Rees, Schebendach, et al., 1995). While these numbers are relatively small, they present a special problem during a period of growth and development in the teen years that is marked by enormous biologic and social change.

Little has been reported in the literature on actual incidence rates in children and adolescents. While the incidence of AN has remained relatively constant from the mid-fifties for adults, the incidence rates for anorexia have

increased steadily for age 10-19 year olds (Fisher, et al., 1995; Steiner & Lock, 1998). Bulimia nervosa, having first been described in the '70s by Gerald Russell, steadily increased across all age groups in the '80s and '90s, but recently is decreasing (Currin, Schmidt, Treasure, & Jick, 2005). Binge eating disorder is relatively new to the discussion, thus little is known about changing incidence rates.

Consequences Specific to Children and Adolescents

Eating disorders in children and adolescents present special considerations because of the unique developmental processes in this age group. Adolescents with ED are at increased risk for developing additional psychological disorders and medical conditions, and have a higher risk of mortality (Pratt, Phillips, Greydanus, & Patel, 2003). Consequences are related to significant dietary deficiencies of energy, protein, calcium, vitamin D, folate, and vitamin B12. Medical complications include growth retardation, loss of dental enamel with chronic vomiting, structural brain changes which may not be reversible, and impaired acquisition of peak bone mass, predisposing individuals to osteoporosis and increased fracture risk (Golden, et al., 2003). Psychological complications are highlighted because of interference with adjustment to pubertal development and mastery of skills necessary to become a healthy, functioning adult. Issues arise related to self-concept, self-esteem, autonomy, and capacity for intimacy. These contribute to social isolation and family conflicts.

Early intervention is important with children and adolescents because of the potentially irreversible effects on physical, psychological and emotional growth and development. Encouraging however, is the fact that because youth have a shorter history of symptoms and maladaptive behaviors, they are more likely to respond to intervention and show greater treatment effects than adults who have had the illness longer (Pratt, et al., 2003). Golden, et al (2003) report that 76% of adolescents meet the criteria for full recovery. This is compared to treatment outcomes for adults at 44% having good outcomes, 28% having intermediate outcomes, and 24% having poor outcomes (including 5% who die) (American Psychiatric Association, 2000).

Problems with Diagnosis

Several authors have recognized the difficulties in diagnosing ED in children and adolescents (Fisher, et al., 1995; Golden, et al., 2003; Nicholls, et al., 2000; Nielsen, 2001). Traditionally, diagnosis of ED has been established by following criteria defined in the Diagnosic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV). However, DSM-IV criteria are not entirely applicable to children and adolescents for a variety of reasons (Golden, et al.). In children and adolescents, the wide variability in the rate, timing and magnitude of both height and weight gain during normal puberty makes assessment of normal weight change challenging. In addition, the absence of menstrual periods in early puberty, and the unpredictability of menses soon after menarche, limit the application of those formal diagnostic

criteria to adolescents. Many children and adolescents, because of their stage of cognitive development, lack the psychological capacity to express abstract concepts such as self-awareness, motivation to lose weight, or feelings of depression (Golden, et al.). In addition, clinical features such as pubertal delay, growth retardation, or impaired bone acquisition, may occur at subclinical levels of ED. Younger patients may present with significant difficulties related to eating, body image, and weight control behaviors without necessarily meeting formal diagnostic criteria for an ED. By DSM-IV criteria, these ED that do not meet formalized criteria are often described as Eating Disorders Not Otherwise Specified (EDNOS). In children and adolescents, these cases are often called syndromes. This requires discussion about partial syndrome ED in children and adolescents.

2.3.3 Partial Syndrome Eating Disorders

Steiner & Lock (1998) suggest that teenagers may develop a milder form of ED in response to cultural pressures that do not meet strict DSM-IV criteria. Whether such ED are milder forms, or whether they are severe childhood ED that cannot be classified using current diagnostic criteria, is controversial. As already explained, all eating disturbances in children and adolescents have potentially serious consequences because of developmental considerations in this population. Experts agree that it is essential to diagnose ED in children and adolescents in the context of multiple and varied aspects of normal pubertal growth, and adolescent

development, rather than merely applying formalized criteria (Golden, et al., 2003).

Many authors have discussed the prevalence of these partial syndrome ED in children and adolescents (also sometimes called EDNOS, sub-clinical conditions, sub-threshold ED, or disordered eating). Golden, et al. (2003) suggest that partial syndromes constitute the majority of patients seen in referral centres treating adolescents. Rates of these partial syndrome ED in adolescents range from 6.94-18.43% (Boschi, et al., 2003; Cotrufo, Gnisci, & Caputo, 2004; Kjelsas, et al., 2004; Rojo, et al., 2002). These numbers are much higher than the previously discussed prevalence of reported (strict) ED in this population. Nicholls, et al. (2000) found that more than 50% of children age 7-16 who had serious eating concerns did not meet strict DSM-IV criteria. They suggest that there may be a category of ED about which we know little.

Partial syndrome ED in adolescents are not insignificant. Partial syndrome and clinical ED may exist on a continuum. Lewinsohn, Seeley, Moerk, & Striegel-Moore (2000) reported that there was a significant association between partial syndrome BN before age 19 and full syndrome BN later in adult years. They suggest that screening for partial syndrome ED should be a routine part of medical assessment for adolescent girls.

Complicating the discussion about partial syndrome ED is their lack of clear definition. This raises a critical question in epidemiologic studies: how are cases defined? Some studies define partial syndrome ED as meeting two (of the many) DSM-IV criteria for either AN or BN (Patton, et al., 2003). Other

researchers have not defined the criteria in their research papers. This diversity of definitions for partial syndrome ED makes it very difficult to compare studies that provide prevalence rates of partial syndromes.

2.3.4 Differences in Gender: Girls versus Boys

Generally speaking, females tend to display more disordered eating symptoms than males (Baranowski, et al., 2003; Croll, Neumark-Sztainer, Story, & Ireland, 2002; Furnham, et al., 2002; Thomas, et al., 2002). Traditionally, the prevalence of ED in males is approximated at 10% of that of females (American Psychiatric Association, 2000). Disordered eating is positively correlated with dieting, negative body image, low self-esteem, and depression (Austin, 2001; Neumark-Sztainer, 1995; Ricciardelli & McCabe, 2001). These problems have already been discussed as being more prevalent within the female population. Binge eating is the exception. Both Barry, et al. (2002) and Lewinsohn, et al. (2002) found that men and women did not differ significantly regarding the frequency of binge eating. Of importance, however, is that women are more likely (than men) to report that: overeating was associated with a sense of loss of control, they feel bad about these episodes, and they consider their eating habits abnormal (Lewinsohn, et al.). While binge eating is inherent in the cycle of restrictive eating, it is not clearly understood why females and males display equal prevalence in this behavior. Perhaps it is not the behavior itself that is of primary importance,

but the feelings associated with it, which like other disordered eating concerns, are largely more of a problem for females (Croll, et al., 2002).

Another interesting difference between females and males was reported by Lewinsohn, et al. (2002), who found that while females scored higher than males on inappropriate compensatory exercise, males scored higher on excessive exercise. They explain that males were using exercise to develop muscles rather than lose weight. McCabe & Ricciardelli (2001) reinforce that generally speaking, boys do not change their eating habits to alter shape and size; rather, they increase their level of exercise to change body dimensions. Reinforcing this, Phares, et al. (2004) found that boys were more likely than girls to utilize muscle gain strategies, and they perceive greater pressure to increase muscle mass. Additionally, Furnham, et al. (2002) found that girls tended to exercise more for weight loss, while boys' reasons were for fitness. It seems that the motivating factors for exercise are different for females and males.

Females tend to score higher on restrained eating and dieting than males (Baranowski, et al., 2003; Borrenson & Blair, 2003; Lam, et al., 2002; Lewinsohn, et al., 2002; McCabe, et al., 2002; Phares, et al., 2004; Ricciardelli & McCabe, 2001). This female preoccupation with weight also seems to manifest itself as body distortion, with more females than males tending to judge themselves as overweight, when in fact they are not when compared to objective standards (Furnham, et al., 2002). Conversely, males score higher on importance of muscle development and perceived pressure

to increase muscles (Ricciardelli, et al., 2003). In the study by Furnham, et al., males were more likely to perceive themselves as underweight, when compared to objective standards. This reinforces that males generally see underweight as bad, while females see it as desirable.

2.3.5 Differences in Age: Elementary School versus Junior High School

In the available literature, the age of onset of ED is stated to be approximately 15-18 years (Dalle Grave, 2003). However, the age of onset of ED in children seems to be dropping, with children as young as age 7 seen with ED (Ricciardelli & McCabe, 2001).

At what age does disordered eating emerge? As already highlighted, disordered eating and ED are very difficult to assess in preadolescent children. However, Ricciardelli & McCabe (2001) suggest that disordered eating in preadolescent children is likely more common than previously believed. They report that in this age group, 8.8-14% of girls and 4.7-8% of boys have scores $\geq$ 20 on the ChEAT, indicative of disordered eating; 6.5% of girls and 14.2% of boys are binge eating; and 1.8% of girls and 0.7% of boys are displaying self-induced vomiting.

More is known about ED in older children and adolescents. Traditionally, lifetime prevalence information is used in calculating the prevalence of ED in adolescents, recognizing that most ED start during this developmental period. The lifetime prevalence of ED in females continues to be estimated at 1-3% for AN, and 3-5% for BN (American Psychiatric

Association, 2000). Less is known about BED, but lifetime prevalence of this ED is estimated at 1-3% (for both genders) (Pull, 2004; Striegel-Moore & Franko, 2003). Kjelsas, et al. (2004) report the prevalence of AN among girls age 14-15 to be 0.7%; BN to be 1.7% and BED to be 1.5%. However, partial syndrome ED are much more prevalent, with estimates of the prevalence of partial syndrome ED in adolescents as high as 18% (Rojo, et al., 2002). It is generally believed that preadolescent children have less body dissatisfaction than older children, with the prevalence of body dissatisfaction, disordered eating and ED increasing as children get older (Borrenson & Blair, 2003; Packard & Krogstrand, 2002; Ricciardelli & McCabe, 2001).

2.4 Eating Disorder Prevention

2.4.1 Model Of Eating Disorder Prevention (Primary, Secondary, Tertiary)

Traditionally, prevention can be classified into three types: primary, secondary, and tertiary (Neumark-Sztainer, 1995). Primary prevention targets individuals who do not yet show signs of illness (Austin, 2000). Secondary prevention targets individuals who may already experience signs or symptoms of the problem but may not already have the full-blown disease i.e., early intervention. Tertiary prevention actually refers to treatment, and comments on efforts to improve the course of the disease or minimize harmful effects once the illness has been diagnosed (Austin). Breton (1999) suggests that this model of prevention may work well for physical diseases, but

presents confusion for mental health because mental health conditions present a much more complex network of biological, psychological and environmental influences. Irregardless, in most of the professional literature on ED, primary prevention is recommended as the preferred target for reducing ED (Neumark-Sztainer). Primary prevention usually targets adolescents, and school is by far the most commonly recommended site for efforts. Because eating pathology is commonly seen as a female problem, efforts are commonly aimed at females, but others suggest that boys should also be included in interventions (Neumark-Sztainer). Typically, primary prevention of ED involves a variety of educational topics on nutrition and psychological issues. A review of primary prevention studies will be provided later in this section.

A newer look at ED prevention classifies it somewhat differently. Levine & Piran (2003) continue to discuss prevention as being either primary or secondary, but divide primary prevention into two types: "universal" and "selective". Universal prevention focuses on changing public policies, communities, and significant institutions; in other words, adding an ecological perspective to ED prevention. Selective prevention focuses on people who do not yet have the targeted problems, including negative body image, but who are at high risk due to biological, psychological, and/or sociocultural factors. While this is new language in the field of ED prevention, it is not a new concept. Their message highlights the need for addressing both aspects of primary prevention when attempting to prevent ED.

Primary Prevention

Eating disorder prevention has been rife with controversy over the years. Carter, et al. (1997) were the first to suggest that ED prevention may in fact lead to an increase in the very behaviors targeted for prevention. Pratt & Woolfender (2005) and Littleton & Ollendick (2003) found that few primary prevention programs to date had demonstrated much measurable success. However, Stice & Shaw (2004), in a comprehensive review of 38 ED prevention programs, concluded that 53% of interventions resulted in significant improvement of at least one risk factor, and that 25% resulted in significant reduction of eating pathology. They concurred that a number of promising programs had been developed, with some effects lasting as long as two years. Austin (2000) highlighted the difficulties in comparing prevention programs, summarizing that in the early years ED prevention research had many pitfalls, and few studies use similar methodology, so it is difficult to compare them.

Over the years, ED prevention initiatives have developed from earlier work. Initial ED prevention studies met with only limited success. These "first generation" of prevention programs delivered didactic psychoeducational material about ED in universal interventions involving all available adolescents (Stice & Shaw, 2004). The "second generation" of prevention studies demonstrated improved knowledge, but were not able to change behavior. They were also universal in focus and didactic in format, but included components on resistance of sociocultural pressures for thinness

and healthy weight-control behaviors (Stice & Shaw). The most recent "third generation" of ED prevention studies have shown more success in sustaining changed behaviors over longer periods. These interventions commonly include selective programs that target high-risk individuals with interactive exercises that focus on risk factors that have been shown to precipitate eating pathology (Stice & Shaw). Eating disorder prevention programs continue to evolve and demonstrate increasing success in preventing ED (Austin, 2000; Dalle Grave, 2003; Stice & Shaw).

2.4.2 Target Age for Eating Disorder Prevention

The heightened concern about ED in children and adolescents has prompted an interest in ED prevention. Most past prevention programs have been designed to target high risk groups, such as older teen females or college students; however, in recognition that ED are affecting younger and younger children, ED prevention programs targeting younger children are being developed. This presents a dilemma, as programs for younger children are more broad-based, targeting both girls and boys who do not yet have ED symptomatology. Furthermore, it is a challenge to measure change in a group that by nature is not yet presenting with problematic features.

Little has been written on the most effective age for ED prevention to be provided. School is the recommended site for delivery of programs because it presents students as a captive audience in a learning environment (Neumark-Sztainer, 1995; Rosen & Neumark-Sztainer, 1998). Older

adolescents are characterized by greater receptiveness to themes such as psychological and physical identity (Rosen & Neumark-Sztainer); however they tend to have concrete, less adaptive schemas about their self-image. Young children are perhaps more open to learning new ideas and may have fewer issues and pre-conceived barriers to learning about body image. Attempting to reach the younger, more malleable children should reap added benefits and better results (Kater, et al., 2000; Smolak & Levine, 1994). Additionally, since changes as a result of puberty are often a risk factor for eating disturbances (Kater, et al.), reaching pre-pubescent children offers a truly preventative approach.

One final feature in addressing the intended age for ED prevention programs is embedded in the definition of primary prevention. Primary prevention targets individuals who do not yet show signs of illness (Austin, 2000). As already explained, adolescents tend to have more problems with ED and disordered eating than do younger children. In this sense, providing programs to younger children may have more of a true impact at the primary prevention level. Conversely, education programs for adolescents may have more impact at the secondary prevention level, by heightening awareness and facilitating help for those displaying early symptoms. All of these factors complicate the discussion about what age ED prevention programs should be delivered.

2.4.3 *Wellness Versus Illness Model*

A fundamental development in primary prevention of ED is a shift in thinking from an illness to a wellness model for all education with children and adolescents. By definition, an illness model involves talking about ED (the illness). Until recently, it was thought that knowledge about the health risks of ED would prevent their development. Now, there is general agreement that prevention programs purely focused on this didactic teaching of signs, symptoms and causes of ED may actually increase the very behaviors targeted for prevention (Cohn & Maine, 1998; O'Dea & Maloney, 2000; Russell & Ryder, 2001). This implies that ED prevention programs should not focus on ED; rather, preventative strategies should enhance self-esteem and facilitate healthier social and relational contexts within the family and school communities. Recommended topics for inclusion in this wellness model for ED prevention are: (1) understanding physical attributes, including acceptance and appreciation of all body sizes and shapes, and how puberty, genetics and metabolism affect our bodies, (2) understanding and accepting internal characteristics, recognizing that an individual is much more than their appearance, (3) development of strategies for improving body image, including emphasis on the importance of active lifestyles and healthy eating, (4) discussion regarding the myths and dangers of dieting, (5) development of critical thinking skills about the relationship between attitudes and behaviors which affect our physical health, i.e., recognizing the impact of messages given by parents, teachers, and/or peers, effective communication, (6)

discussion about the influence of the media and how it creates a cultural obsession with appearance; learning how to critique these media messages and differentiate them from our own reality, (7) recognition that jokes and put-downs about bodies are a form of harassment; developing strategies to deal with teasing and bullying about size and appearance, (8) it's not only about having a healthy body, but also about having a healthy attitude and being accepting of oneself; importance of positive self-talk and effective stress management. This list is a compilation of topics from 34 published ED prevention studies (see Section 2.6 for a summary of these studies, and Section 2.7 at end of this chapter for references).

2.4.4 Summary of Past Prevention Studies

Eating disorder prevention has been studied since the late eighties. Prevention initiatives have been tested with individuals from elementary school to college age. Over the past two decades 34 ED prevention studies have been published regarding children and adolescents in elementary and junior/senior high school. These studies have been summarized in a Section 2.6 at the end of this chapter.

Three authors have highlighted the limitations of past ED prevention studies (Austin, 2000; Battle & Brownell, 1996; & Stice & Shaw 2004). Stice & Shaw reviewed 38 ED prevention studies (including all age groups), highlighting many limitations of past work in this area. In their review, they found that 25% of studies did not involve a control group, and many studies did not randomly assign participants to groups. They found that 30% of

studies did not assess eating pathology to test their assumptions, a fundamental requirement of assessing outcomes of ED prevention. Littleton & Ollendick (2003) criticize that the vast majority of programs have been low dose interventions. Austin (2000) in a review of 20 empirical prevention studies, reinforced that all studies reviewed had short duration, implying that longer studies would have been more meaningful. He also summarized that half of the studies involved only females, suggesting this to be a flaw in the research. Austin highlighted that most education was didactic, with few studies using a participatory technique. He also commented that only half of studies reviewed used standardized measurement tools and most were designed to measure individual responses, not to assess the settings where people live and learn. Battle & Brownell also discussed the common theme in ED prevention being a focus on the individual at fault for the disorder, with remedies often focusing on individual responsibility. They raise questions about environmental impact and public policy on preventing ED. These problems with past ED prevention research reinforce the controversy around this area of study.

Conversely, several studies have demonstrated success in ED prevention (Stice & Shaw, 2004). In their comprehensive review of ED prevention studies, Stice & Shaw found that 53% of interventions resulted in significant reductions of at least one risk factor. They also found that 25% of studies resulted in significant reductions in eating pathology, with certain interventions both reducing extant eating pathology and preventing increases

in eating pathology. Finally, they praised that they found a number of promising newer prevention programs demonstrating effects that lasted as long as two years. While ED prevention is still in its infancy, clearly researchers are learning from their predecessors and developing more effective programs.

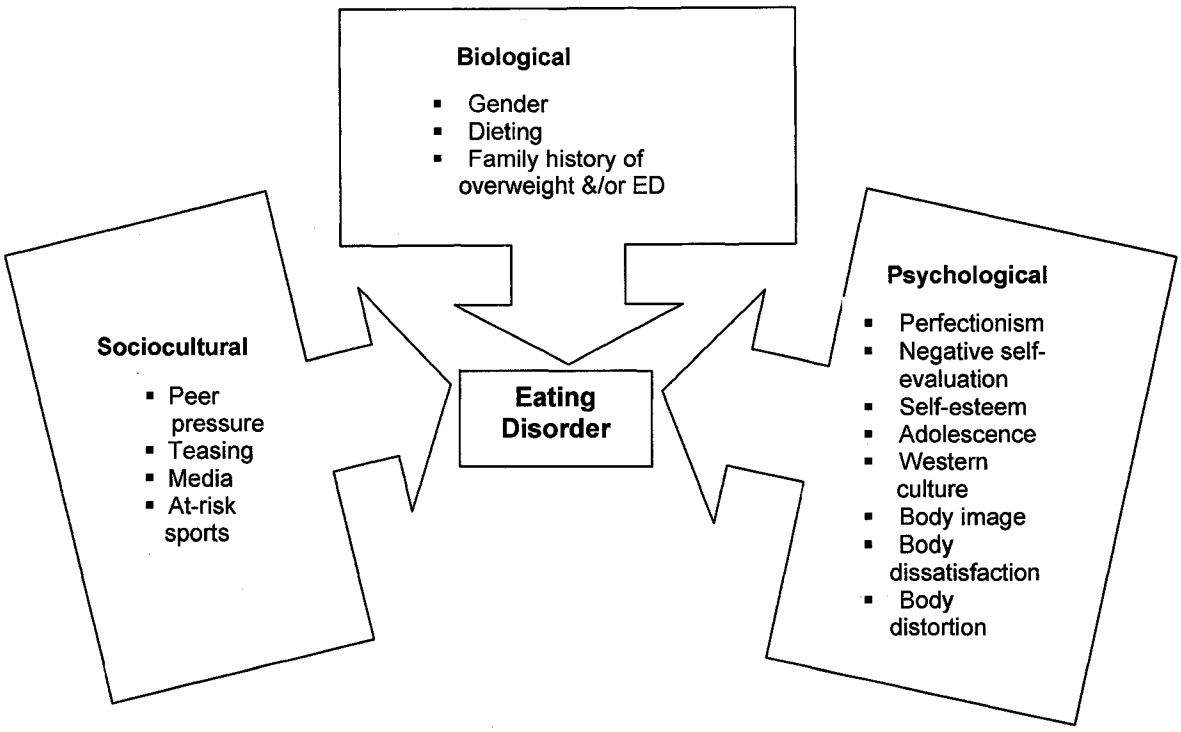
2.4.5 *Eating Disorder Risk*

Eating disorder prevention concepts and initiatives have largely grown from the medical model, which has influenced medicine throughout the twentieth century. Developments in psychiatry have required a paradigm shift in thinking about mental health prevention to one which has multiple causes and manifestations in a complex network of biological, psychological and environmental influences (Breton, 1999). Theoretically, primary prevention aims at reducing the incidence of a disorder through the reduction or elimination of those risk factors that cause or contribute to its occurrence (Neumark-Sztainer, 1995). Several risk factors have been associated with eating pathology. They will be discussed in detail in the following section.

Steiner, et al. (2003) classify ED risk factors into three major types: biological, psychological, and sociocultural. Within the biological category, factors include family history of ED and overweight. White (2000) also includes dieting behavior in this risk category. Additionally, Pratt, et al. (2003) include gender as a risk factor for the development of ED, with girls having a greater predisposition than boys. Psychological risk factors include negative

self-evaluation, poor body image, body dissatisfaction, body distortions, low self-esteem, perfectionism, adolescence as a high risk period, maladaptive parental behaviors, and high exposure in Western cultures to health and weight consciousness (Fairburn & Harrison, 2003; Steiner, et al., 2003; White). As well, in the psychological category, Stice & Shaw (2002) suggest that elevated thin-ideal internalization increases risk, concluding that elevated perceived pressure to be thin predicts subsequent increases in body dissatisfaction. Finally, sociocultural factors include peer pressure (and teasing) regarding weight and eating, media influence, and at-risk sports activities (Gowers & Shore, 2001; Stice & Shaw; Steiner, et al.; White). Risk factors for the development of an ED are summarized in Figure 2.1.

Figure 2.1 Risk of Developing Eating Disorders



Biological Risk Factors

Biological risk factors include gender, dieting behaviors to lose weight, and a family history of overweight and/or ED. **Gender** is seen as a risk factor because more females than males suffer from ED (American Psychiatric Association, 2000). Many authors mention **dieting behavior** as a risk for the development of ED (Bulik, 2002; Gowers & Shore, 2001; Neumark-Sztainer, 1995; Patton, et al. 1999; Pratt, et al., 2003; Rojo, et al., 2002; White, 2000). Patton, et al. found that female subjects who dieted at a severe level were 18 times more likely to develop an ED than those who did not diet. They concluded that dieting is the most important predictor of new ED. Neumark-

Sztainer suggested that unhealthy dieting has harmful physical and psychological consequences, and may ultimately lead to the development of an ED. She concluded that excessive weight preoccupation is a public health concern. Clearly, all ED begin with dieting behavior (Neumark-Sztainer), but the mechanism which determines when the diet develops into ED pathology is not always clear. A **family history of overweight and/or ED** is a biological risk factor which may affect risk through the dieting pathway or via genetic predisposition to illness.

Psychological Risk Factors

Perfectionism is a personality attribute that has been associated with ED. Wade & Lowes (2002) mention perfectionism as a risk factor for the development of an ED. Bulik (2002) reinforces that perfectionism is often seen in those who have ED. McVey, Pepler, Davis, Flett, & Abdolell (2002) explore this concept further in explaining that high self-oriented perfectionism is associated with disordered eating, while socially prescribed perfectionism is not. While it is recognized that perfectionism is associated with ED, studying the relationship between personality traits and ED is a relatively new area and more research is warranted before the exact relationship between these two variables is understood.

Low self-esteem is a predictor of the development of an ED (Fairburn & Harrison, 2003; Littleton & Ollendick, 2003; Wade & Lowes, 2002; White, 2000). Reinforcing this, Beato-Fernandez, et al. (2004) found that positive

self-esteem was a protective factor for ED in adolescents. Additionally, there is a strong positive correlation between low self-esteem, **body dissatisfaction,** negative **self-evaluation**, negative **body image,** and **body distortion**. Ohring, et al. (2002) suggest that body dissatisfaction may be a precursor to disordered eating. A study by Stice & Whitenton (2002) found that girls who reported at least moderate pressure to be thin were four times more at risk for early body dissatisfaction. They also found that the perceived pressure to be thin was a more powerful predictor of body dissatisfaction than was actual body weight. Littleton & Ollendick conclude that low self-esteem leads to feelings of ineffectiveness, and restrictive dieting is initiated to enhance feelings of control.

Other psychological risk factors include emotional repercussions linked with living in a **Westernized culture** and **adolescence** as a developmental growth period. Briefly, consequences of exposure to Westernized ideals of the "thin body", and changes in body shape (associated with puberty) are seen as risk factors for ED, impacting the psychological well-being of girls especially (White, 2000).

Sociocultural Risk Factors

Sociocultural factors are commonly blamed for the increasing incidence of ED in Westernized cultures. A recent study by Muris, et al. (2005) found sociocultural influences to be a significant predictor of eating problems in adolescent girls and boys. Over the past century, the standards

of female beauty have changed, with thinness becoming the ideal (Weinshenker, 2002). Males are also bombarded with an ideal body look; however, rather than the emaciated "look", the male ideal is trim and muscular (McCabe & Ricciardelli, 2002). **Media**, for its part in promoting society's ideals, has been criticized for instilling body dissatisfaction (Gowers & Shore, 2001; Muris, et al., 2005). Images of "ideal" body shapes are used to sell products. The images presented by this billion dollar marketing industry have replaced reality for many who do not question the validity of what they are seeing.

Another aspect of sociocultural influences is **peer pressure**, one of the most influential factors of adolescent behavior (Muris, et al., 2005). Peer pressure can be as innocuous as striving to "fit in" by achieving a certain "look", or being exposed to weight-related teasing and harassment. Certainly in Westernized societies, adolescents take extreme measures to look like their friends. Austin (2000) lists both media promotion of thinness and weight-related teasing as risk factors in the development of ED. Steiner & Lock (1998) reinforce that in the developmental phase, **teasing** by peers is an ED risk factor. Bulik (2002) suggests that although all individuals are exposed to the societal emphasis on thinness, individuals with greater genetic risk are more adversely affected. Others suggest that individuals with low self-esteem are especially vulnerable to these pervasive messages, internalizing them as their own ideals, and leading to dieting behavior (Littleton & Ollendick, 2003).

A final sociocultural risk factor is the participation in at-risk **sports** which target a specific body shape for success. Specific sports, in which a slender physique is important, such as gymnastics and long-distance running, are thought to be influential in the development of an ED in vulnerable individuals (White, 2000).

In order to prevent ED, one must attempt to understand what causes them. However, with the complexity of human nature and numerous risk factors, it can be challenging to determine the most effective mechanism for prevention. The field of ED prevention is still in its infancy. Recent researchers are building on the outcomes of pioneer work, but much has yet to be learned regarding successful strategies.

2.5 Evaluation Tools

Evaluation tools for studies in ED prevention are rife with controversy. Traditionally, standardized interviews are the gold standard for diagnosing individuals with ED; however, self-report measures have also been shown to be effective. As well, questions arise about the appropriateness of using traditional tools to measure ED symptomatology when targeting ED risk. And, a final area for discussion is the controversy which exists about appropriate tools to measure eating attitudes and disordered eating behavior in children. The following section reviews these controversies, ending with a discussion of

some tools which can be used in to measure ED prevention outcomes with children.

2.5.1 Self-Report Measures

Inventories to measure outcomes can be classified into two types: investigator-based interview and self-report. Kjelsas, et al. (2004) present a review of the advantages of each, suggesting that in using self-report measures for the assessment of eating pathology, the concepts of binge eating, loss of control, eating a large amount of food, and over concern with weight and shape are difficult concepts to assess accurately and answers may present challenges in interpretation. This concern is reinforced by Fairburn & Beglin (1994) in a study comparing results of interview and self-report questionnaire formats. They found that when assessing features that did not pose problems of definition (i.e., self-induced vomiting, laxative abuse, and dietary restraint), self-report measures and interviews obtained similar results; however, there was less agreement with respect to more complex and ill-defined features, such as binge eating. Tanofsky-Kraff, Morgan, Yanovski, Marmarosh, Wilfley, & Yanovski (2003) suggest that interpretation challenges are even more remarkable for children and adolescents than for adults because of the complexity of understanding concepts in eating pathology. They conclude that self-report measures do not accurately reflect the results of a structured interview in studying children and adolescents. Recommendations to overcome these differences made by Passi, Bryson, &

Lock (2003) include providing information about eating pathology to participants before they complete the self-report measure.

Some authors have found that self-report measures detect higher concerns for eating pathology than do investigator-based interviews (Fairburn & Beglin, 1994; Field, Taylor, Celio, & Colditz, 2003). It is not clear whether this is due to problems in interpreting complex questions in self-report format, or because questions are sensitive and embarrassing, and thus not answered accurately in an interview format. Kjelsas, et al. (2004) suggest that self-report measures may yield more accurate data on sensitive and embarrassing topics. Another explanation for discrepancy in interview format evaluation is that results are open to interpretation of the interviewer. Passi, et al. (2003) recommend that interviewers must be trained extensively before administration of interview evaluation in order to reduce the potential for error. Clearly both types of assessment have certain limitations.

Conversely, self-report questionnaires have advantages, in that they are economical and take less time to administer, in comparison to investigator-based interview format. Several authors recommend that self-report measures to assess eating pathology in children can be used successfully to gather general information (Field, et al., 2003; Passi, et al. 2003; Tanofsky-Kraff, et al., 2003). While investigator-based interviews continue to be the gold standard for detecting ED in children, the pros and cons must be considered when making the final decision about whether to use investigator-based interviews or self-report questionnaires to gather data.

2.5.2 Tools to Measure Prevention Outcomes

Controversy exists regarding how best to measure outcome variables in ED prevention initiatives in children and adolescents. There is general concern that using ED tools with children and adolescents who do not have eating pathology may be risky and dangerous. Two authors have studied this area. A study by Celio, Bryson, Killen, & Taylor (2003) found that there was no evidence to suggest negative effects in asking grade six girls questions about weight control behaviors and attitudes. Another study by Halvarsson, et al. (2002) found that using specific ED inventories in their study to measure outcomes in the development of dieting among Swedish girls did not impact results. Still, attention does need to be given to potential placebo effects of ED measures. Littleton & Ollendick (2003) suggest that a flaw in many prevention studies is the avoidance of standardized ED inventories to measure change. They found that many tools measured body image satisfaction and subclinical eating behavior, not actual ED pathology, rendering results less useful. At the present time, using standardized ED tools, such as the Eating Attitudes Test, to assess changes in measurable eating behavior is believed to be the best measure of outcomes of ED prevention (Stice & Shaw, 2004).

2.5.3 Measuring Eating Pathology in Children

Many inventories are available to measure ED pathology in adults; however, few are available for use with children. The primary difference between tools used with adults and children is the need to make questions as simple to understand as possible when working with children. Riccardelli & McCabe (2001) highlight the need for measurement instruments for use with children to be simple for ease of comprehension. They also suggest that instruments should not be intrusive or suggestive, but should be sensitive enough to detect problems.

The Children's Eating Attitudes Test (ChEAT) is an ED inventory developed specifically for children age 8-13 (Maloney, McGuire, & Daniels, 1988). The ChEAT is a modification of the Eating Attitudes Test (EAT-26), an inventory developed with adult females as the sample population (Garner, Olmsted, Bohr, & Garfinkel, 1982). There are few differences in questionnaire format between the ChEAT and EAT-26, with the same number of identical questions asked in the same order. Some words were simplified, e.g., "terrified" was changed to "scared", and "preoccupied with" was changed to "think a lot about". These changes did not affect the meaning of the questions (Maloney, et al.). While using the ChEAT for younger children is advantageous, the EAT-26 has recently been used successfully with children as young as age 11 (Castro, Gila, Puig, Rodriguez, & Toro, 2004; Thomas,et al., 2002). Accuracy of responses using EAT-26 with children can be

enhanced by reading the questionnaire to them, and taking the time to explain difficult concepts.

Another difference between ChEAT and EAT-26 is interpretation of results. Interpretation of the EAT-26 will be discussed in detail in future paragraphs, but in summary, the cut-point for eating pathology in adults has been identified as a score greater than or equal to 20. While little has been written about any deviations to this standard when using the EAT-26 with children, this same value is used throughout the literature to identify problematic eating attitudes in children (Buddeberg-Fischer, Klaghofer, Gnam, & Buddeberg, 1998; Button, Loan, Davies, & Sonuga-Barke, 1997; Castro, et al., 2004; Jonat & Birmingham, 2004; Jones, et al., 2001; Wlodarczyk-Bisaga & Dolan, 1996).

2.5.4 Eating Attitudes Test (EAT-26)

The Eating Attitudes Test (Garner & Garfinkel, 1979) is an inventory used for detecting anorexia nervosa; however, it has also been used in studies to identify abnormal concerns with eating and weight (Jonat & Birmingham, 2004; Jones, et al., 2001, Mintz & O'Halloran, 2000). The EAT-26 version of the Eating Attitudes Test was condensed from the original EAT-40 version in a controlled study of 300 females including individuals with anorexia nervosa and other university psychology students (Garner, et al., 1982). In this validation study, the 40 items of the EAT were analyzed for the sample of 160 anorexia nervosa patients. Three factors were extracted

accounting for 40.2% of the total variance. The three factors that were identified were: dieting (relating to food avoidance with fattening foods and a preoccupation with being thinner), bulimia and food preoccupation (relating to items reflecting thoughts about food as well as those indicating bulimia), and a third factor called oral control (relating to self-control of eating and perceived pressure from others to gain weight). Fourteen items (from the original 40 questions) did not conclusively identify any factors so were removed, to create the new 26 item scale.

Initial reliability and validity of the EAT-40 was reported to be high by Garner & Garfinkel (1979). Factor analysis between the original EAT-40 and the EAT-26 indicated the EAT-26 was highly correlated with the original tool (r=0.98), with the resulting EAT-26 correctly identifying ED 83.6% of the time (compared to EAT-40 at 84.9%), maintaining a high predictability. In computing the score on the EAT-26, questions are assigned a value ranging from one to three (with three more severe), reflecting the severity of issues described. The standardized reliability coefficients (Cronbach's alpha) determined a cut-off score of 20 for the EAT-26 to classify a significant proportion of subjects with anorexia nervosa according to group membership (Garner, et al., 1982).

In factor analysis, the factor accounting for the largest amount of variance in the total EAT-26 was labeled 'dieting'. This Factor I is extremely reliable (alpha=0.90) and is highly correlated with the total EAT-26 score (r=0.93). Factor II, 'bulimia and food preoccupation', is positively related to

bulimia and a heavier body weight. High scores on Factor II are associated with poor ED treatment outcomes. Factor II demonstrates correlation with the total EAT score (r=0.64). "Oral control', the third factor identified, is related to lower weight and the absence of bulimia. It, as well, demonstrated a statistically significant correlation with total EAT score (r=0.60).

Using a cut-off score of 20, the EAT-26 has been validated in a clinical setting to diagnose patients having anorexia nervosa (Garner, et al., 1982). It has also proven to be useful in identifying eating disturbances in non-clinical samples. In these non-clinical samples, high EAT scores are not diagnostic of anorexia nervosa; however, in non-clinical settings, EAT can be used as a screening instrument to detect disturbed eating patterns (Garner, et al. 1982). In this capacity, EAT-26 is used to screen for generalized eating disturbances. A score of greater than or equal to 20 is assessed as problematic, suggesting ED risk. Total EAT scores can also be categorized into subscales for dieting (avoidance of fattening foods and the preoccupation with being thinner), bulimia and food preoccupation (reflecting thoughts about food, as well as purging), and oral control (self-control of eating and perceived pressure from others to gain weight) (Garner, et al.).

2.5.5 Risk of Eating Disorder Inventory (REDI)

The Risk of Eating Disorder Inventory (REDI) is an inventory that was initially designed to be used by schools to screen entire student populations for students at risk of developing an ED (Drummond & Hare, 1999).

However, it is also suitable for use on an individual basis, to assess eating problems of an individual student. REDI has been validated for use with children and adolescents in grades 5-12 (ages 11-18) (Drummond & Hare). The reading level is grade 4.4. The screening tool classifies individuals according to their degree of risk (none, low, moderate, high), and the disordered eating behavior they are engaging in (restricting, purging, bingeing). REDI is composed of 8 subscales: self esteem, emotional indicators, maladaptive thoughts, body image, dieting, restricting, purging, bingeing. For the purpose of this inventory, dieting and restricting differ in the degree of restrictive behaviour, i.e., restricting is more severe restriction of food than dieting. There is no overall total risk score for REDI; rather, risk is evaluated based on scores in each subscale, and patterns are examined to better understand profiles of at risk students. Individual subscales can be used as stand-alone assessments for individual risk behaviors. For the disordered eating subscales (restricting, purging, bingeing), a score in any of the risk levels of low, moderate or high is assessed as problematic, suggesting already engaging in eating disorder behavior. For the other subscales, a score in the moderate or high risk levels indicates a potential concern and further investigation is recommended.

In the development of REDI, 170 items were considered for the first draft and the questionnaire was reduced to 132 questions, based on feedback from focus groups and health professionals. The second draft was pilot tested with 30 students, and questionnaire responses were compared to results of a

standardized interview and EAT-26 responses. The second draft had a reliability (internal consistency), as measured by coefficient alpha, of 0.96. Factor analysis was used to eliminate questions which generated similar responses. The result was a third draft of 70 questions, which were reviewed again by factor analysis and reduced to 50 questions. One hundred and twenty students pilot tested the final draft of REDI (including a standardized interview and EAT-26). Reliability of the final draft (compared to interview and EAT-26 responses), as measured by coefficient alpha, was 0.95.

Validation of REDI was completed in several ways. Factor analysis results suggested that the items on the REDI cluster in patterns that correspond to the underlying theoretical structure upon which the items were constructed and subscales created. In addition, REDI results were compared to the EAT-26 and interview results using descriptive statistics. In preliminary data analysis, the mean grade of students tested was 7.3 (age 13); 32% were male and 68% were female. The screen detected 21.1% of female students and 18.4% of male students with some risk (low, moderate, high) of developing or having an ED. There was a significant effect for age, but not gender. Students in higher grades were significantly more likely to score higher (i.e., have more risk) than those in younger grades (p=.005). REDI flagged all students classified at risk by the EAT-26; as well, REDI classified additional students at risk (most in the low/moderate range). Individual clinical assessments using a standardized interview in each case deemed all individuals to correctly be identified at risk (Drummond & Hare, 1999).

2.5.6 Summary: Evaluation Tools

Measurement of outcomes of ED prevention studies is challenging. Two gaps are the lack of available tools specifically to measure ED prevention, and few available tools specifically targeting children. While concern has been raised about the risk of using ED tools with children, researchers have shown that this practice does not cause harm. As well, it is desirable to use standardized tools for comparison with other studies, and standardized prevention tools do not yet exist. At the present time, using standardized ED tools to assess measurable changes in eating behavior is believed to be the best measure of outcomes of ED prevention. Regarding the lack of tools specifically targeting children, REDI is a new (unpublished) tool which measures disordered eating behavior in 11-18 year olds. The EAT-26 is an adult tool, which was used in the validation of REDI. While a children's version of EAT-26 exists, the only difference between it and EAT-26 is that ChEAT has been modified to make language appropriate for children age 11-13. The EAT-26 has been used successfully to measure eating attitudes with children in past studies. Accuracy of responses using EAT-26 with young children can be enhanced by reading the questionnaire to them, and taking the time to explain difficult concepts.

2.6 Eating Disorder Prevention Initiatives- Elementary & Junior/Senior High School

Study	Sample	Intervention	Findings
Porter, 1986 (Canada)	School aged girls & boys (age NA)	Participatory technique targeting individual level change (no control group). One single education session.	Improvements in attitudes & concerns regarding weight & shape.
Rosen, 1989 (USA)	School aged girls & boys (age NA)	Didactic- information targeting individual level change (control group). Multiple sessions over a few months.	Improved knowledge at post.
Moriarty, Shore, & Maxim, 1990 (Canada)	Elementary & high school students (grade 6-11) 61% elementary; 39% high school	Didactic & participatory technique targeting individual level change -16 lessons: diet & eating disorders, male concerns, sociocultural issues	Improved knowledge at post.
Outwater, 1990	50 middle school girls & boys (mean age 11.5)	Didactic psychoeducational- focusing on enhancing body satisfaction & self-esteem	No effects at post-test or 1-month post (relative to controls) for body satisfaction or negative affect).
Killen, Taylor, Hammer, Litt, Wilson, Rich, et al., 1993 (USA)	838 middle school girls (mean age 12.4)	Didactic psychoeducational- information on weight control practices & coping skills to resist sociocultural pressures for thinness	Effect at post-test for knowledge; but not at 24 months (relative to controls); no effects on healthy weight control behaviors, perfectionism, body dissatisfaction, dieting, negative affect, eating pathology or body mass at either test-time.
Moreno & Thelen, 1993 (USA)	219 middle school girls (mean age 13.75)	Didactic psychoeducaitonal- information on eating disorders, eating pathology, healthy weight control behaviors, & peer pressure resistance skills.	Effects at post-test and one-month post (relative to controls) for knowledge and behavioral intentions to diet.
Richman, 1993	180 primary school girls & boys (mean age 10.4)	Psychoeducaitonal- information on eating disorders, healthy weight control behaviors; attempted to enhance self-esteem & resist thin ideal	Effects at pot-test (relative to controls) for knowledge & body dissatisfaction; no effects for dieting & eating pathology.
Huon, Roncolato, Ritchie, & Braganza, 1997 (Australia)	100 girls in elementary school (mean age 10 years 9 months)	Didactic & participatory- 6 weekly one hour sessions. Not eating disorder information. Information targeting individual level education	Pre-test, [post test, six-months post -Improvement in attitudes & concerns re weight and shape. -no change in knowledge, drive for thinness or body dissatisfaction -little change in overall body liking
Buddeberg-Fischer, Klaghofer, Gnam, & Buddeberg, 1998 (Switzerland)	314 middle school girls & boys Age 14-19 (mean age 16.1)	Didactic- information about normative physical development, nutrition, healthy weight control, eating disorders, ED risk	No significant intervention effects (relative to controls).

2.6 Eating Disorder Prevention Initiatives- Elementary & Junior/Senior High School

Franko, 1998 (USA)	Girls only	Information targeting individual level education	Improvement in attitudes & concerns regarding weight & shape
Vandereycken & Noordenbos, 1998 (Norway)	All students in grades 7-9	-school-based education package (state wide) -17 chapters of information (didactic): • information about ED & early intervention strategies • information about body weight, shape & not dieting, puberty • sociocultural factors -also included training for school & health care personnel; as well as support groups for students	Outcomes not measured
Richman, 1997	463 primary school girls & boys (mean age 10.9)	Psychoeducaitonal- information on eating disorders, healthy weight control behaviors; attempted to enhance self-esteem & resist thin ideal	Effects at post-test (relative to controls) for knowledge, body dissatisfaction, & dieting; no effects for bulimic pathology.
Smolak, Levine & Schermer, 1998 (study a) (USA)	222 grade school girls & body (mean age 10.0)	Didactic & participatory psychoeducational- information on nutrition, healthy weight control, & diversity of body shapes; promoted media literacy	Effects at post-test (relative to controls) for thin-ideal internalization; no effects for knowledge, healthy weight control behaviors, body dissatisfaction, or dieting.
Smolak, Levine & Schermer, 1998 (study b) (USA)	266 grade school girls & boys (mean age 9.0)	Didactic & participatory psychoeducational- information on nutrition, healthy weight control, & diversity of body shapes; promoted media literacy	No effects at post-test (relative to controls) for thin-ideal internalization, knowledge, healthy weight control behaviors, body dissatisfaction, or dieting.
NB- Smolak & Levine (follow-up) 2002 found compared to control, those adolescents who received the prevention program 2 years earlier were more knowledgeable, used fewer unhealthy weight management techniques, and had higher body esteem			
Kusel, 1999	172 middle school girls (mean age 10.1)	Media literacy program	Effects at post-test for thin-ideal internalization, body dissatisfaction, dieting, & negative affect (relative to controls); no effects at 3 months post.
Piran, 1999 (Canada)	Female & male residential ballet students (age 10-18)	Didactic & participatory; addressing social factors affecting eating disorders.	Nine year follow-up demonstrated improvement in bahavior, and attitudes and concerns regarding weight & shape.

2.6 Eating Disorder Prevention Initiatives- Elementary & Junior/Senior High School

Irving, 2000	152 students in elementary school completed qualitative evaluation of program 45 grade 5 girls completed figure rating scale pre/post	EDAP Puppet Program	-positive response to program evaluation -significant improvement in body image at post-test
Kater, Rohwer, & Levine, 2000	222 grade 4 & 6 girls & boys	Didactic- "Healthy Body Image: Teaching Kids to Eat & Love Their Bodies Too!" Ten separate lessons covering body size/shape, nutrition & sociocultural issues	Pre & immediate post-test times -significant positive changes in knowledge & critical thinking regarding messages; also positive changes in attitudes regarding body shape & size.
Neumark-Sztainer, Sherwood, Coller, & Hannan, 2000	208 girl scouts (mean age 10.6)	Psychoeducatiuonal- information on normative physical development; also self-esteem enhancement exercises & media literacy/critical consumer information	Effects at post-test for knowledge (relative to controls), but not at 3-months post; no effects at post-test for thin-ideal internalization, but effects at 3-monhts post; no effects for body dissatisfaction, dieting or eating pathology.
O'Dea & Abraham, 2000	470 middle school girls & boys (mean age 12.9)	Interactive intervention- promoting positive self-esteem, coping skills & social skills	No effects at post-test (relative to controls) for thin-ideal internalization & dieting, but effects at 12-month post; effects at post for body dissatisfaction, but not at 12-monhts post; no effects for perfectionism, dieting, negative affect, & eating pathology.
Phelps, Sapra, Nathanson, & Nelson, 2000	530 middle school girls (age 11-15 302 high school girls age 13-14 45 college age women	Didactic & interactive- six sessions covering sociocultural influences, physical attributes, physical activity, building personal competence, reducing body dissatisfaction, dieting, & weight management	Middle school- positive changes (not significant) in behavior, body dissatisfaction, drive for thinness; improvement in physical self-concept & competence. High school- significant improvement in attitudes, beliefs & behaviors; also improvement (not significant) in physical self-concept, body dissatisfaction, drive for thinness, & competence scores. College- significant improvement in attitudes & behaviors

2.6 Eating Disorder Prevention Initiatives- Elementary & Junior/Senior High School

Dalle Grave, De Luca & Campello, 2001	106 middle school girls & boys (mean age 11.6)	Interactive- information about eating disorders & ED risk, overvaluation of appearance, promote self-acceptance & healthy weight control	Positive effects for knowledge at post-test and 6 months (relative to control group); no effects for body dissatisfaction, dieting, negative affect or eating pathology.
Stewart, Carter, Drinkwater, Hainsworth & Fairburn, 2001	459 grade school girls (mean age 13.4)	Interactive program- focused on resisting cultural pressures for thinness, determinants of body weight, body acceptance, effects of cognitions on emotions, eating disorders, self-esteem enhancement, stress management, & healthy weight control behaviors.	Effects at post-test & 6-months post (relative to controls) for knowledge, dieting & eating pathology; effects at post-test for body dissatisfaction, but not at 6-months post. No effects for negative effect.
Varnado-Sullivan, Zucker, Williamson, Reas, Thaw, & Netemeyer, 2001	287 grade school girls & boys (mean age 12.0)	Interactive psychoeducational- focused on causes & consequences of body dissatisfaction (particularly cultural influences) & healthy weight control behaviors.	Effects for girls at post-test (relative to controls) for thin-ideal internalization & eating pathology, but not for dieting & negative affect. Effect for boys at post-test (relative to controls) for thin-ideal internalization & negative affects, but not for dieting & eating pathology.
Kater, Rohwer & Londre, 2002	415 grade & middle school girls & boys (mean age 10.0)	Psychoeducational- information on determinants of body shape & healthy weight-control, promoted body acceptance, coping skills & media literacy critical thinking	No effects for knowledge, healthy weight control behaviors, thin-ideal internalization, body satisfaction, or negative affect at post-test (compared to controls)
McVey & Davis, 2002 (Canada)	263 middle school girls (mean age 10.9)	Interactive program- information about determinants of body mass; promoted critical review of media, body acceptance, healthy weight control behaviors & stress management.	No effects at post-test or relative follow-up (relative to controls) for body dissatisfaction or eating pathology.
O'Dea, 2002 (Australia)	Grade 7-10 students (age 13-16)	"Body Basics" program	Qualitative program analysis only- program evaluated highly

2.6 Eating Disorder Prevention Initiatives- Elementary & Junior/Senior High School

Steiner-Adair, Sjostrom, Franko, Pai, Tucker, Becker, et al., 2002	499 grade seven girls (mean age 12.43)	Interactive- 8 sessions- "Full of Ourselves: Advancing Girl Power, Health & Leadership"- media literacy, understanding weightism/dieting/healthy eating, normal healthy growth (puberty), positive thinking, activism.	Effects at post-test & 6-months post (relative to controls) for knowledge, weight satisfaction, internalization & awareness, & dieting behavior. No effect on weightism thinking & behaviors at post-test or 6-months post; however, participants ad more favorable responses than controls at both test-times..
Withers & Wertheim, 2004	242 middle school girls (mean age 12.5)	Psychoeducational video- information on causes & consequences of body image & eating problems, body shape determinants, social pressures for thinness, & healthy eating.	Effects at post-test & 1-month post (relative to controls) for knowledge; no effects for body dissatisfaction or dieting.
Wade, Davidson & O'Dea, 2003	86 middle school girls & boys (mean age 13.42)	Media literacy program- critical evaluation of thin ideal; self-esteem program promoting self-esteem, coping skills & social skills.	No effects at post-test or 6-months post (relative to controls) for body dissatisfaction, dieting, or negative affect.
Tilgner, Wertheim & Paxton, 2004	677 female students in grades 7 & 8 (mean age12.63/13.66)	Interactive- videotape promoting body acceptance and discouraging dieting; followed by group discussion	Pre, post, one month post-tests -no differences in effects between grades -at immediate post-test: significant positive effect (relative to controls) for drive for thinness, intent to diet and increase in knowledge; no significant differences in body dissatisfaction or size discrepancy. -at one month post- significantly greater increase in knowledge, however, effect onn drive for thinness and intent to diet no longer significant -no significant differences found for restrained eating over all test-times
McVey, Davis, Tweed, & Shaw, 2004 (Canada)	258 middle school girls (mean age 11.8)	Interactive program- information about determinants of body mass; promoted critical review of media, body acceptance, healthy weight control behaviors & stress management.	Effects at post-test and follow-up (relative to controls) for body dissatisfaction, dieting and negative affect; effects for bulimic symptoms at post-test but not at follow-up; no effects for perfectionism.

2.6 Eating Disorder Prevention Initiatives- Elementary & Junior/Senior High School

Bruning Brown, Windelberg, Abascal & Barr Taylor, 2004	152 grade 10 females	Internet delivered education "Student Bodies: program: • 8 X 1 hr. sessions • discussion group/bulletin board • Topics: - ED - Weight & shape attitudes - cultural pressures - healthy nutrition & exercise	• Pre, post & 5 months post • Controlled study • Quantitative & qualitative analysis • Significantly reduced restraint & I increased knowledge at post • No significant differences at follow-up
Favaro, Zanetti, Huon, & Santonastaso, 2005	141 girls age 16-18 (mean age 17.0)	3 teachers were trained to teach the program -6 sessions (communication & social interaction, changes during adolescence, dealing with pressures to be thin, eating disorders, prevention of eating disorders, media literacy) -interactive: lecture followed by group discussion	• control group • pre-test & 1 year post-test • more new cases of ED in the control group (vs study) at 1 year post • significant lower rate of importance of weight for self-esteem in study group at 1 year post • significant improvement in study group in EAT Bulimia subscale • no differences in BMI, total EAT scores, & Dieting & Oral Control subscales of EAT

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Chapter Three: Methods

Chapter Two described the rationale for the current research study, outlining the relevance of evaluation of a wellness-based prevention (education) program focusing on personal eating attitudes and behaviors. The basic research questions were developed to investigate group differences in measures of student eating attitudes and behaviors, and to test the overall effectiveness of Making the Most of ME (MMME), the wellness-based prevention (education) program developed for this study. In Chapter Three, first, the purpose of the study is repeated, and a description of the different components of the study is provided. The development of MMME is explained, as well as implementation of the study. Finally, quantitative evaluation approaches used to examine the impact of the program are described.

3.1 Purpose of Current Study

The purpose of the present study was to determine the effectiveness of a wellness-based school education program for the primary prevention of eating disorders (ED). This study evaluated personal eating attitudes and disordered eating behavior (restricting, purging and bingeing) of students in grades 5 and 7. The intent of this study was threefold: (1) to determine

prevalence information about eating attitudes and disordered eating behaviors (restricting, purging and bingeing), (2) to compare eating attitudes and disordered eating behaviors between groups (comparing students that received the education program to students who did not receive the education program), and (3) to compare eating attitudes and disordered eating behaviors between groups (comparing sex and grade in the group which received the education).

3.2 Experimental Design

This research project was an intervention study with two groups (treatment and control) by three time points (pre-test, post-test and five months post-test). The treatment and control groups were randomly selected from the original sample. Grades five and seven were selected to compare differences between elementary and junior high school. Both boys and girls were included in the study to compare differences between sexes. Students answered questionnaires at the three time points: pre-test, post-test, and again at five months post-test. This was a two year study that consisted of one year for planning and preparation, followed by one year of the actual study (see Chapter One for timelines and description of the larger project).

3.3 Ethical Approval

Ethical permission was received from Capital Health Region Ethics Committee, Edmonton, Alberta (Health Research Ethics Board - HREB) (see Appendix 1). Additionally, because the project was directed from the Grey Nuns Community Hospital, Caritas Health Group Research Steering Committee, Edmonton, Alberta, provided approval for the project (see Appendix 2). Subsequently, approval was received from the Edmonton Public School Board (EPSB) (see Appendix 3).

3.4 Development of the Education Program

As with any new program, there were several steps in the development of MMME. Initial fact-finding included a detailed study of current Alberta Education curriculum, to ensure that the proposed program would be compatible with school requirements (see Appendix 4 and Appendix 5). A comprehensive literature review was done to become familiar with other eating disorder prevention programs.

Professional Advisory Committee

In the development of MMME, a Professional Advisory Committee was critical, not only in achieving grant funding, but also in providing valuable input

into program development and operational issues. In addition to consultation at regular planning meetings, individual members advised the process at various stages when their specific area of expertise was critical i.e., ethics application, statistical procedures, and evaluation tool selection. Members of the committee consisted of a psychiatrist, psychologist, statistician, university professor, and dietitian.

Curriculum Development

Recommended topics (Dixey, 1996; O'Dea & Abraham, 2000; Rosen & Neumark-Sztainer, 1998; Smolak & Levine, 1994) for inclusion in ED prevention programs include:

- management of peer pressure,
- building effective communication,
- reducing body dissatisfaction and weight prejudice,
- critical thinking about social and peer norms and perceptions of self and others,
- understanding physical development and appreciation of puberty changes,
- improving knowledge of healthy nutrition and weight control,
- healthy eating and active living,
- relieving stress, and improving self-esteem and self-confidence.

Additionally, the Provincial Eating Disorder Service (Alberta) had recently (2002) established guidelines for eating disorder prevention that

endorsed using a "wellness" approach for eating disorder prevention (See Appendix 6).

The next step involved discussion with the on-site research team (consisting of the two project coordinators (DD and SH), a research assistant, and three project educators) about areas thought to be critical in the primary prevention of ED. Through brainstorming, the research team arrived at five basic concepts. These included: exploring the physical self, identifying and accepting strengths and limitations, media awareness, communication/ teasing/peer influences, and self care. Further group discussion helped to distribute these five concepts over eight hours of instruction, separated into eight lessons, with specific lessons based on common themes. Student focus groups were then used to determine the attitudes and beliefs about eating and weight, and issues relevant to these topics, for children in the target age population (reported elsewhere). In total, there were eight focus groups (60 participants). Input from these student focus groups was incorporated, revealing children's current state of knowledge about body image and the age-appropriateness of the instructional concepts. The titles of the eight lessons are: *ME and My Body, Taking Care of ME, Getting to Know ME, Striving for Excellence, My Feelings Count Too, Developing Media Savvy, Accepting Others, and Putting It Into Practice*. An outline of the education program is in Appendix 7.

The MMME curriculum uses a Social Cognitive Theory approach to learning, reinforcing interactive participatory learning. Social Cognitive Theory

(SCT) describes learning in terms of the interrelationship between behavior, environmental factors, and personal factors. It also provides the theoretical framework for interactive learning (Bandura, 1989). Neumark-Sztainer (1995) advocates the use of SCT for educational programs aimed at behavior change, stressing the importance of including three cognitive components of behavior change (behavioral capability, outcome expectation and self efficacy). To support this practical approach to learning, MMME incorporated not only information targeting behavior change, but a self-care section was included to assist students in developing skills and self-efficacy. It was decided to incorporate this self-care section into six healthy living goals spread over six of the eight lessons.

The next step was developing the lesson plans. In order to accomplish this, available resources were reviewed to determine which activities could be incorporated into the program, and to determine where the gaps were in available resources for teaching. Where existing resources were not available, new ones were developed to meet the need. Resource development included creating a student workbook, teacher manual and parent resource package. The lessons were interactive with a combination of classroom activities, videos and written materials.

Wellness Approach

To reflect the "wellness" approach (see Figure 3.1) and avoid confusion about the focus of the education, most references to ED were

removed from the Consent Form, and Parent Information and Teacher Information sheets.

FIGURE 3.1:

Wellness Versus Illness Model for Education

Wellness Approach	**Illness Approach**
Education about body image to promote healthy behaviors	Didactic discussion about the illness (eating disorder)
Develop preventative skill-building strategies, build self efficacy, improve self-esteem, and develop resiliency	Danger of promoting the development of new disordered eating/eating disorder behaviors

Pilot Study

The final step in the development of the education program was a pilot study. Two schools volunteered to participate in the pilot study, representing one class of grade 5 students and one class of grade 7. Each class consisted of approximately 30 students. A trained educator provided the education program. Students were provided the eight hour classroom instruction over eight weeks. In response to formal qualitative evaluation, in general they rated satisfaction with the lessons moderately high. Activities that were most popular were the small group work and role-plays. The least popular activity was the homework. Students tested the evaluation tools both before the

program and two months later on completion. Pilot study results, using EAT-26 and REDI, showed an improvement in attitudes about dieting and showed promising results for a positive change in disordered eating behavior. Based on no increase in disordered eating behavior after the intervention, it was concluded that the education program was not harmful, and a decision to move forward with the full study was made.

Several modifications were made to the project based on feedback received during the pilot study. The sample size for the full study was increased, based on lower than expected recruitment and unanticipated drop out rates. The pilot project provided an opportunity to trial MMME, as well as the Health Behaviors Questionnaire and Satisfaction Questionnaires that were developed for the project (reported elsewhere). Subsequent changes were made.

Participation of parents has been identified in past studies as critical for success (O'Dea & Abraham, 2000). For the pilot study, an attempt was made to engage parents. A creative approach was used to first introduce them to the program by sending a video about it home with their child to explain the program. Updates regarding what was happening in the program were sent home intermittently. In addition, parents were invited to attend the last class, which was a self-directed activity called "putting-it-into-practice". Upon evaluating the success of the introductory video and regular reports, it was determined that most parents did not take the time to watch the video or read the reports. Thus, these were deleted during the full study. Parents were

encouraged to be involved with their student's homework activities and many came to class on the final day to share in their student's presentation.

3.5 Recruitment of Schools

The target sample size was calculated using the following criteria: (1) It was expected that participants in both treatment and control groups would have similar rates of risk. The proportion at risk was expected to decrease significantly in the intervention group but not for the control group. An improvement in one level of risk for any of restricting, purging or bingeing was determined as clinically important. Based on a one-tailed t-test of data from the pilot study (n=120 students) in the development of REDI (1997), at a level of significance of p=.05 and the power of 80%, the required sample size was 168 per group. The purging subscale was used as it required the highest sample size. The remaining subscale requirements ranged from 32 to 120 subjects per group. (2) Collins (1991) used the Schematic Figures (a common tool used with children to assess body image and body dissatisfaction) with 1118 school aged children and found that 42% of girls and 30% of boys picked a thinner ideal than actual body shape. Schematic Figures is a pictorial graph of children with different body shapes, asking participants to select what they think they currently look like, as well as the body that they find attractive for their own sex, and the body they find attractive for the opposite sex. The current study population was believed to

be similar in demographics to the validation study (Collins). With intervention, the percentage of students who picked a thinner ideal at baseline was expected to decrease in the intervention group, but not the control group. Movement towards actual body size by one figure is quantitatively significant. A sample size of 250 per group would have a power of 0.9 to detect a significant (0.05) difference of 10% between the proportions.

(3) A literature review of 10 prevention school-based studies revealed that the average sample size was 165 students (note: some did not have controls), range was 43-400 (Huon, Roncolato, Ritchie, & Braganza, 1997; Kater, et al., 2000; Killen, et al., 1993; Moreno & Thelen, 1993; O'Dea & Abraham, 2000; Smolak, et al., 1998). The average dropout rate was 9.8% (range 4-22). In the present study we included pilot testing, had the support of the schools, teachers and parents, and offered the program as part of the health curriculum. For these reasons, we anticipated that the dropout rate would be <10%. Based on these numbers, recruitment of 275 students per group was estimated. Thus, the total sample size goal was 550.

For the full study, we worked with the Edmonton Public School Board (EPSB) to invite all schools who had indicated an interest in health as a school priority for their yearly goals to participate. This included 27 schools (13% of the total number of 206 schools in the district). Letters were sent to principals of each school selected and follow-up was provided via telephone. Final selection was based on sequential enrollment as schools agreed to participate. When an adequate number of schools were enlisted, recruitment

was closed. More elementary schools were selected than junior high schools, because junior high schools had more classes of students in each grade than elementary schools. The next step was to separate the schools into study and control groups. Half of the schools were randomly separated into control schools and study schools.

3.6 Student Recruitment/Consent

Signed parental consent was required to participate in the study. All teachers in participating classrooms received an information letter about the study (Appendix 8). Additionally every student in selected classes received an information letter for themselves (Appendix 9) and another for their parents (Appendix 10). Students were requested to take the information home, discuss it with their parents, and return the signed consent form (Appendix 11) to their classroom teacher.

3.7 Measurement Tools

Selection of measurement tools was determined in two ways: via input from the Professional Advisory Committee, as well as from the student focus groups. The Professional Advisory Committee provided input into the

requirements for potential inventories to detect eating attitudes and disordered eating behaviors, as well as self-esteem, body image, perfectionism, stress, and the impact of teasing and bullying. Criteria for selection of the evaluation tools were scientific rigor, suitability for the adolescent population, and ease of use. During student focus groups inventories were tested and student feedback was obtained. For this report, only those measuring eating attitudes and disordered eating will be discussed.

Both evaluation tools used are self-report measures. Some authors suggest that in using self-report measures for assessment of eating pathology, the concepts of binge eating, loss of control, eating a large amount of food, and over concern with weight and shape are difficult concepts to assess accurately (Kjelsas, et al., 2004; Fairburn & Beglin,1994). Tanofsky-Kraff, et al. (2003) suggest that interpretation challenges are even more remarkable for children and adolescents than for adults because of the complexity of understanding concepts in eating pathology. Passi, et al. (2003) recommend that these differences can be overcome by providing information about eating pathology to participants before they complete the self-report measure. For the current study, staff were available to answer student questions, providing information and explaining difficult concepts. Conversely, self-report questionnaires have advantages, in that they are economical and relatively rapid to administer, in comparison to investigator-based interviews. Additionally, self-report measures may yield more accurate data on sensitive

and embarrassing topics, such as eating attitudes and disordered eating questions (Kjelsas, et al.). Several authors recommend that self-report measures to assess eating pathology in children can be used successfully to gather general information (Field, et al., 2003.; Passi, et al.; Tanofsky-Kraff, et al.).

Eating Attitudes Test (EAT-26): The Eating Attitudes Test (Garner & Garfinkel, 1979) is a 26 question inventory that is used to diagnose ED (Mintz & Halloran 2000). EAT-26 is primarily a tool to diagnose anorexia nervosa, but has also been used to assess abnormal concerns with eating and weight (ED risk score $\geq$20) (Jonat & Birmingham, 2004; Jones, et al., 2001; Mintz & O'Halloran, 2000). It was initially developed with groups of adult women, but it has also been validated for adolescent girls and boys (Rosen, Silberg & Gross, 1988) and used by researchers to assess children as young as 11 (Button, et al., 1997; Castro, et al., 2004; Jonat & Birmingham, 2004; Jones, et al.; Wlodarczyk-Bisaga & Dolan, 1996).

The EAT-26 was adapted from the original EAT-40 by factor analysis. Initial reliability and validity of the EAT-40 was reported to be high by Garner & Garfinkel (1979). Factor analysis between the original EAT-40 and the EAT-26 indicated the EAT-26 was highly correlated with the original tool (r=0.98), with the resulting EAT-26 correctly identifying ED 83.6% of the time (compared to EAT-40 at 84.9%), maintaining a high predictability. In computing the score on the EAT-26, questions are assigned a value ranging

from one to three (with three more severe), reflecting the severity of issues described. The standardized reliability coefficients (Cronbach's alpha) determined a cut-off score of 20 for the EAT-26 to classify a significant proportion of subjects with anorexia nervosa according to group membership (Garner, et al., 1982). EAT-26 uses a 6-point Likert scale with responses ranging from always to never. Answers have associated scores of 3-2-1-0-0-0. A possible range of scores is 0 to 78. A total score of 20 or above is regarded as suggestive, though not necessarily diagnostic of an ED (Garner, Olmsted, et al., 1982).

The EAT-26 is similar in questionnaire format to a modified version, the Children's Eating Attitudes Test (ChEAT), which has been validated for children age 8-13 (Maloney, et al., 1988).The primary difference between the EAT-26 and ChEAT is simplified language, making ChEAT more valid for younger children. While ChEAT would have been suitable for use in the current research study (based on age of study participants), EAT-26 was selected instead, to maintain consistency in comparative data already obtained for validation purposes for REDI (see following discussion). In our study, children in grade 5 had the tools read to them and difficult concepts were explained, to increase accuracy of responses.

As well as using a total score to assess ED risk, EAT-26 scores can be factored into sub-scales for dieting, bulimia and food preoccupation, and oral control (Garner, et al., 1982; Lane, Lane & Matheson, 2004). Factor one, the dieting sub-scale relates to the avoidance of fattening foods and the

preoccupation with being thinner. Factor two, the bulimia and food preoccupation sub-scale, consists of items reflecting thoughts about food as well as those indicating bulimia. The final factor, oral control, relates to self-control of eating and the perceived pressure from others to gain weight.

The EAT-26 was used as a standard for comparison in the validation of the Risk of Eating Disorder Inventory (see below). See Appendix 12 for a copy of the EAT-26. For the purpose of this study, the EAT-26 was used to measure eating attitudes. Variables of interest were 1) EAT total scores, to describe the eating attitudes of the population; 2) EAT scores $\geq$20, to describe the percentage of the population considered to be at risk for ED.

Risk of Eating Disorder Inventory (REDI): The Risk of Eating Disorder Inventory (REDI) is an unpublished tool (Drummond & Hare, 1999) which has been validated for children age 11-18. The reading level is grade 4.4. REDI consists of 50 questions with responses on a three-point Likert scale (false, somewhat true, true; and in another section of the questionnaire never, sometimes, always). For a copy of REDI see Appendix 13. Measuring ED risk, rather than overt ED symptomatology, this tool has 8 sub-scales: body image, self-esteem, emotional indicators, maladaptive thoughts, dieting, restricting, purging, and bingeing. The sub-scales of restricting, purging, and bingeing are indicative of disordered eating behavior and were used for this report. When questions are answered, responses are calculated into risk categories and plotted onto an individual student profile sheet (see Appendix

14), indicating risk scores for each category. Final scores are divided into four levels of risk: no risk, low risk, moderate risk, and high risk. There is no overall total risk score for REDI; rather, risk is evaluated based on scores in each subscale, and patterns are examined to better understand profiles of at risk students. Individual subscales can be used as stand-alone assessments for individual risk behaviors. For the disordered eating subscales (restricting, purging, bingeing), a score in any of the risk levels of low, moderate or high is assessed as problematic, suggesting already engaging in eating disorder behavior.

Validation of REDI was completed in several ways. Factor analysis results suggested that the items on the REDI cluster in patterns that correspond to the underlying theoretical structure upon which the items were constructed and sub-scales created. In addition, REDI results from 120 students were compared to the EAT-26 and standardized interview results using descriptive statistics. In preliminary data analysis, the mean grade of students tested was 7.3 (age 13); 32% were male and 68% were female. The screen detected 21.1% of female students and 18.4% of male students with moderate/high risk of developing or having an ED. There was a significant effect for age, but not gender. Students in higher grades were significantly more likely to score higher (i.e., have more risk) than those in younger grades ($p=.005$). REDI flagged all students classified at risk by the EAT-26; as well, REDI classified additional students at risk (most in the low/moderate range). Individual clinical assessments using a standardized interview in each case

deemed all individuals to correctly be identified at risk (Drummond & Hare, 1999). Reliability of the final draft, as measured by coefficient alpha, was 0.95. Variables of interest for this study were REDI scores >11 for restricting, >8 for purging, and >9 for bingeing to describe the percentage of the population considered to be at risk for these behaviors.

3.8 Implementation

All students in participating classrooms received the education; however, only those with parental consent completed the evaluation tools. Students in both study and control classrooms completed evaluation tools early in the school year. Subsequently, students in study classrooms received the education program. Then students in both groups again completed evaluation at two months post-test and five months post-test. Students in control classrooms then received the education program after all testing was completed.

Education was provided by trained educators. The large number of students receiving education (approximately 1000) dictated that three educators were required to teach all classes. To control for variance in educators, extensive training was provided before the project began. Training consisted of 40 hours of education about the curriculum for the education program, as well as procedures to be followed to ensure quality control. In

addition, a classroom monitor was present at every class, taking notes and observing the class. These notes were discussed at weekly staff meetings, and changes were made if differences were noted.

3.9 Data Analysis

The evaluation tools generated quantitative data that was evaluated using SPSS for Windows Version 11.5 (SPSS Inc.; Chicago IL. 2002). Descriptive statistics were used to measure frequencies. Independent T-tests were used to compare differences between means for EAT-26 at baseline, and Chi-Square tests were used to compare differences between the proportion of students at baseline who were determined at risk for EAT-26 $\geq$20 and REDI subscales (restricting, purging, and bingeing). Repeated Measures Analysis of Variance (RMANOVA) was used to compare change between treatment and control over the three test times, and paired comparison t-tests were used for post hoc analysis of significant EAT-26 means scores to determine one-way comparison over time. RMANOVA was also used to compare change within the treatment group between sexes and grades over three test-times.

The Bonferroni correction was used to modify the value for significance because more than one test was performed on the same data throughout the analyses (e.g., grade, gender, status, test-time), affecting the chance of

finding significant results when none exist. Using the Bonferroni correction ($p=.05 \div 4$), significance was determined to be $p \leq 0.01$.

Chapter Four: Results

This study focused on the effectiveness of a wellness-based prevention program for eating attitudes and behaviors. The study was also concerned with investigating differences in program effects for girls versus boys, and grade 5 (elementary school) versus grade 7 (junior high school). Additionally, baseline information was used to determine prevalence information about all students in the study. The results of the quantitative investigations are described herein in Chapter Four.

4.1 Demographic Information

Fifteen elementary schools and four junior high schools participated in the study. Nine hundred and eighty-one consent forms were distributed with a return rate of 71.5%. Seven hundred and one students consented to be in the study. Four students results were removed from final data entry because they demonstrated severe comprehension problems felt to compromise the accuracy of their responses, leaving 697 students (99.4% of students with initial consent). After 2 months post-test, 17 students withdrew during the study, for a drop-out rate of 2.4%:15 moved from their school (grade 5: 4 girls and 9 boys; grade 7: 1 girl and 1 boy), and 2 others withdrew themselves (1 grade 5 girl and 1 grade 7 girl). Their data were included in the study for baseline prevalence discussion (see Table 4.1), but removed for analysis of

change over time, leaving a final sample of 680 (see Table 4.2).

Table 4.1

Demographic Information of Study Participants at Pre-test [a]

GROUP			School Grade		Sub-totals
			5	7	
Treatment		girls	91	72	163
		boys	114	98	212
	Sub-total		205	170	375
Control		girls	84	80	164
		boys	73	85	158
	Sub-total		157	165	322
	Total		362	335	697

[a] n values here represent data for baseline

Table 4.2

Demographic Information of Study Participants at Post-test [a]

GROUP		School Grade		Sub-totals
		5	7	
Treatment	girls	89	72	161
	boys	109	97	206
Sub-total		198	169	367
Control	girls	81	78	159
	boys	69	85	154
Sub-total		150	163	313
Total		348	332	680

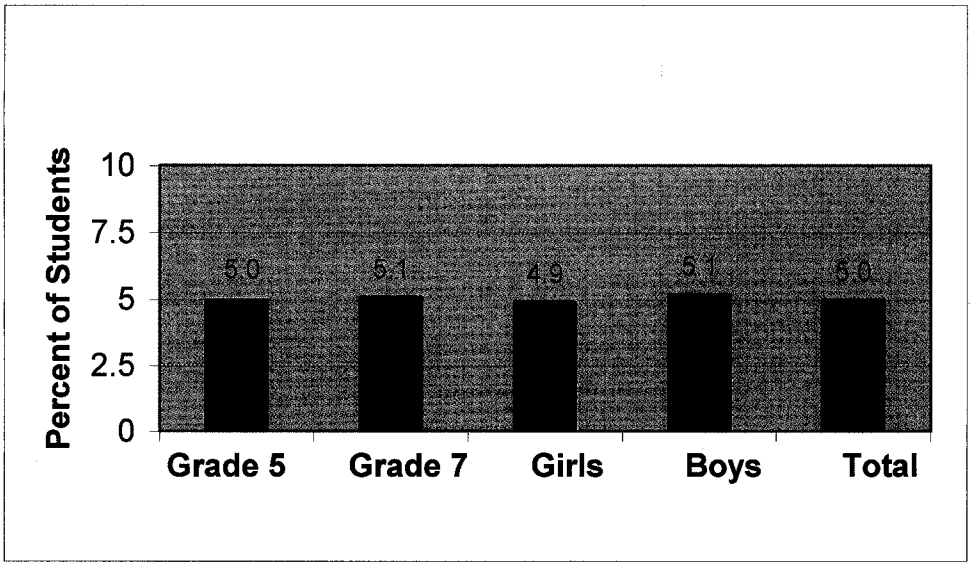
[a] n values here consider students who withdrew from the study and represent data for 5 month post-test (n=680)

4.2 Prevalence of Problematic Eating Attitudes and Disordered Eating Behaviors

The prevalence of problematic eating attitudes and disordered eating behaviors was determined at baseline from the EAT-26 and REDI. The results from the EAT-26 risk scores $\geq$20 are shown in Figure 4.1; results from REDI are shown in Figures 4.2, 4.3, and 4.4.

For EAT-26, using Chi-Square tests, there was no difference at baseline between treatment and control (p=.555). As well, there was no significant difference in prevalence of problematic eating attitudes between grades (p=.543) or between sexes (p=.506) at baseline.

Figure 4.1: Prevalence of Problematic Eating Attitudes [a] at Baseline [b]

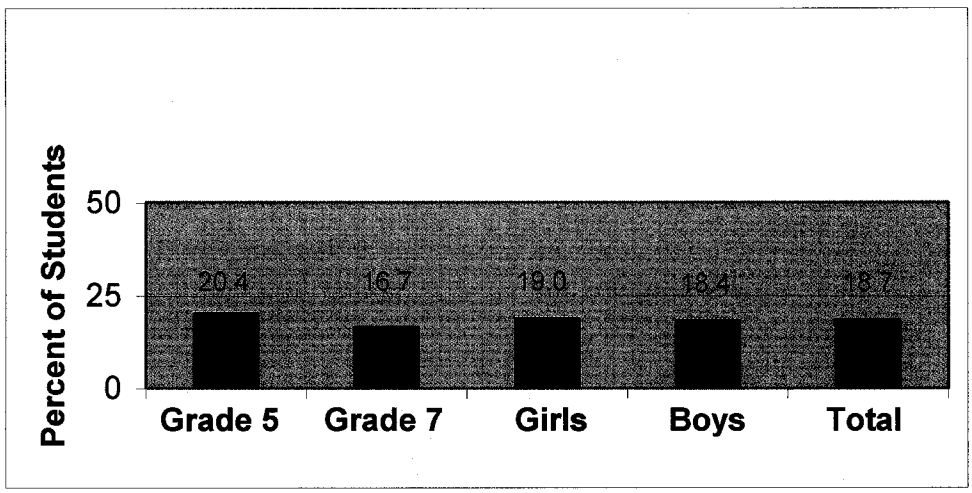


[a] Problematic eating attitudes were defined as EAT-26 scores ≥20 indicating risk.

[b] No significant differences were noted between grades or between sexes. (Chi-Square)

Figure 4.2 describes the percent of students reporting restricting behavior at baseline. Using Chi-Square tests, there was no difference between treatment and control (p=.205). As well, there was no significant difference in prevalence of restricting behavior between grades (p=.119) or between sexes (p=.480) at baseline.

Figure 4.2: Prevalence of Disordered Eating (Restricting) [a] at Baseline [b]

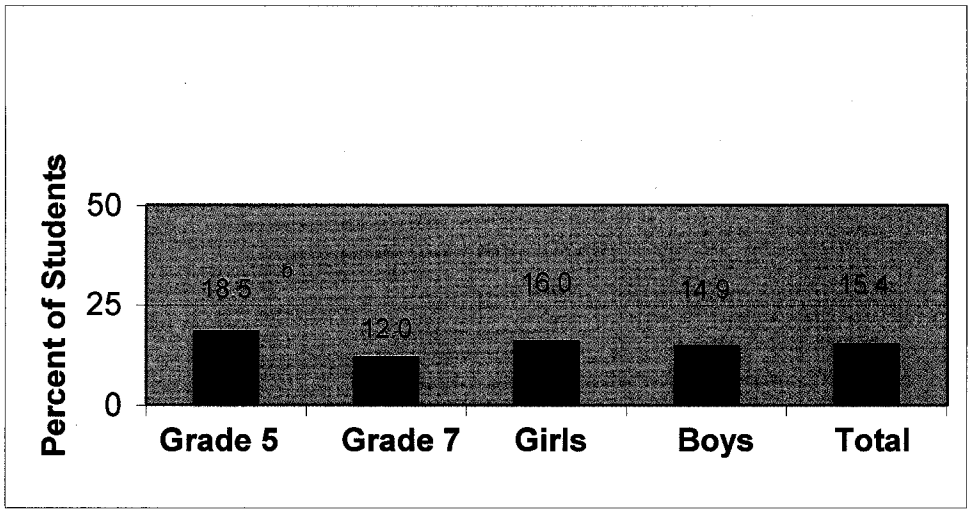


[a] Disordered eating (restricting) was measured by REDI risk score >11.

[b] No significant differences were noted between grades or between sexes. (Chi-Square)

Figure 4.3 describes the percent of students reporting purging behavior at baseline. Using Chi-Square test, there was no difference between the treatment and control groups (p=.633). As well, there was a significant difference in prevalence of purging behavior between grades (p=.010), with more grade 5 students than grade 7 demonstrating risk, but not between sexes (p=.409) at baseline.

Figure 4.3: Prevalence of Disordered Eating (Purging) [a] at Baseline

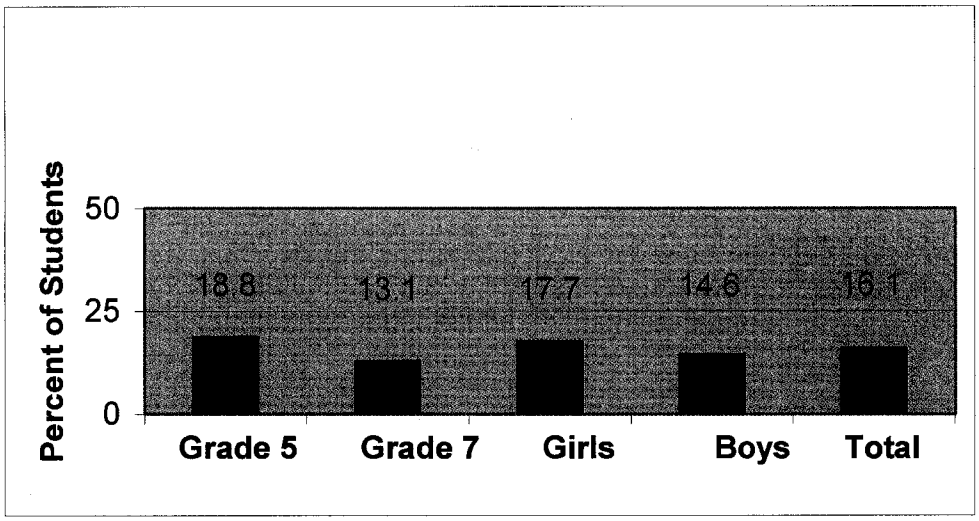


[a] Disordered eating (purging) was measured by REDI risk score >8.

[b] A significant difference was noted between grades (p=.010), but not between sexes. (Chi-Square)

The percent of students reporting bingeing behavior at baseline is indicated in Figure 4.4. Using Chi-Square test, there was no significant difference between treatment and control groups (p=.442). As well, there was no significant difference in the prevalence of bingeing behavior between grades (p=.026) or between sexes (p=.164) at baseline.

Figure 4.4: Prevalence of Disordered Eating (Bingeing) [a] at Baseline [b]



[a] Disordered eating (bingeing) was measured by REDI risk score >9.

[b] No significant differences were noted between sexes or between grades. (Chi-Square)

4.3 Results of Education Program on Problematic Eating Attitudes and Disordered Eating Behaviors

4.3.1 Interaction Effects: Treatment versus Control

Repeated Measures ANOVA was used to determine treatment effects by assessing EAT Mean scores, number of students with EAT Risk ≥20, number of students with risk for REDI Restricting, number of students with risk for REDI Purging, and number of students with risk for REDI Bingeing.

Independent samples T-tests and Chi-Square tests were used to compare differences in the treatment and control groups at baseline. No differences were found. Using an independent sample T-test, there was no difference between the treatment and control groups at baseline for EAT Mean scores (p=.337). Using Chi-Square tests, there was no difference at baseline between the treatment and control groups for EAT Risk ≥20 (p=.555), REDI Risk Restricting (p=.205), REDI Risk Purging (p=.633), or REDI Risk Bingeing (p=.442).

The education program had a significant effect on EAT-26 Mean scores of students in the treatment group compared to controls (p=.005). There were no significant differences at either test-time for any of the risk categories (EAT Risk ≥20, REDI Restricting, REDI Purging, REDI Bingeing). These program effects are reported in Table 4.3. For a summary of change at each test-time within each of the REDI restricting, purging, and bingeing risk levels (no risk, low risk, moderate risk, and high risk) see Appendix 15.

Table 4.3

Results of Education Program: Eating Attitudes and Behaviors

Comparison between Treatment (n=367) and Control (n=313)

	Pre-Test		2 months Post-test		5 Months Post-test	
	T	C	T	C	T	C
EAT-26 Mean Scores [a]	6.41 (SD) ± 6.51	5.92 ± 6.90	5.22 ± 6.17	5.38 ± 5.21	4.54 ± 5.15	5.41 ± 5.49
Eat-26 Risk Scores ≥20 [b]	(n) 19 (%) 5.1%	16 5.0%	15 4.0%	9 2.8%	7 1.9%	9 2.8%
REDI Risk for Restricting [c]	(n) 76 (%) 20.2%	54 16.8%	54 14.4%	44 13.7%	29 7.7%	32 9.9%
REDI Risk for Purging [d]	(n) 62 (%) 16.5%	45 14.0%	42 11.2%	48 14.9%	31 8.3%	26 8.1%
REDI Risk for Bingeing [e]	(n) 59 (%)15.7%	53 16.5%	45 12.0%	46 14.3%	31 8.3%	33 10.2%

Abbreviations: T (treatment), C (control), SD (Standard Deviation)

[a] There was a significant difference between treatment and control (p=.005). (RMANOVA)

[b] EAT-26 Risk scores ≥20 (number of students (n) and percentage (%) in each group) suggest problematic eating attitudes. No significant differences were noted between treatment and control.

[c] REDI Risk for Restricting scores >11 (number of students (n) and percentage (%) in each group). No significant differences were noted between treatment and control.

[d] REDI Risk for Purging scores >8 (number of students (n) and percentage (%) in

each group). No significant differences were noted between treatment and control.

[e] REDI Risk for Bingeing scores >9 (number of students (n) and percentage (%) in each group). No significant differences were noted between treatment and control.

Paired T-tests were used for a final post-hoc analysis of significant effects observed for EAT-26 Mean scores to determine whether program effects were greater for the treatment group or the control group. Program effects were compared within the treatment and control groups at 2 months post-test and 5 months post-test. These results are summarized in Table 4.4. This overall difference between groups was due to differences at 5 months.

Table 4.4

Summary of Significant Effects for Treatment (versus Control) within Group Comparison for EAT-26 Mean Scores over Time [a] (Paired Comparisons T-Test)

	Comparative Test-time					
	Pre-test to 2 month Post-test		2 Months Post-test to 5 Months Post-test		Pre-test to 5 Months Post-test	
Test	T	C	T	C	T	C
EAT-26 Means	p=.001	p=.096	p=.083	p=.655	p=.000	p=.491

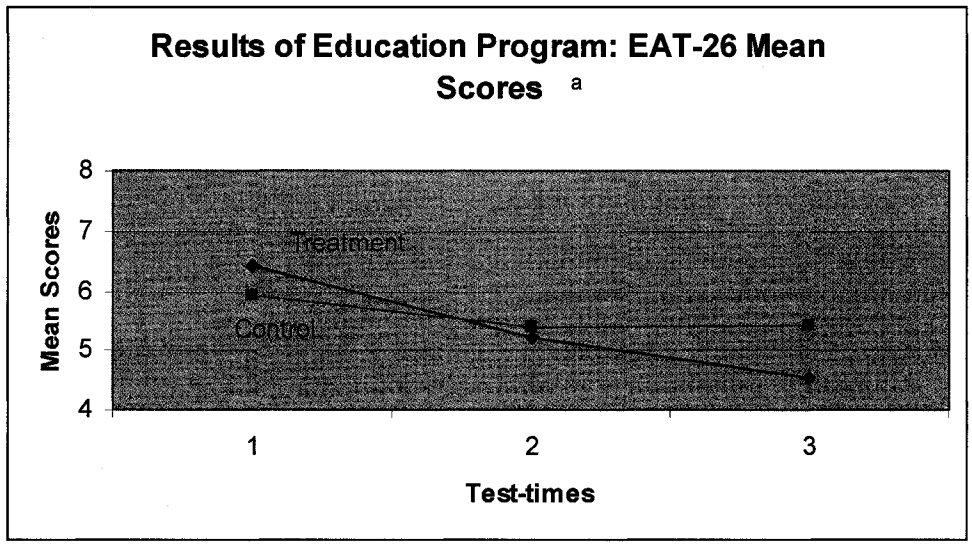
Abbreviations: T (treatment), C (control)

[a] The overall difference between groups was due to differences at 5 months.

4.3.2 Summary of Program Effects: Treatment versus Control

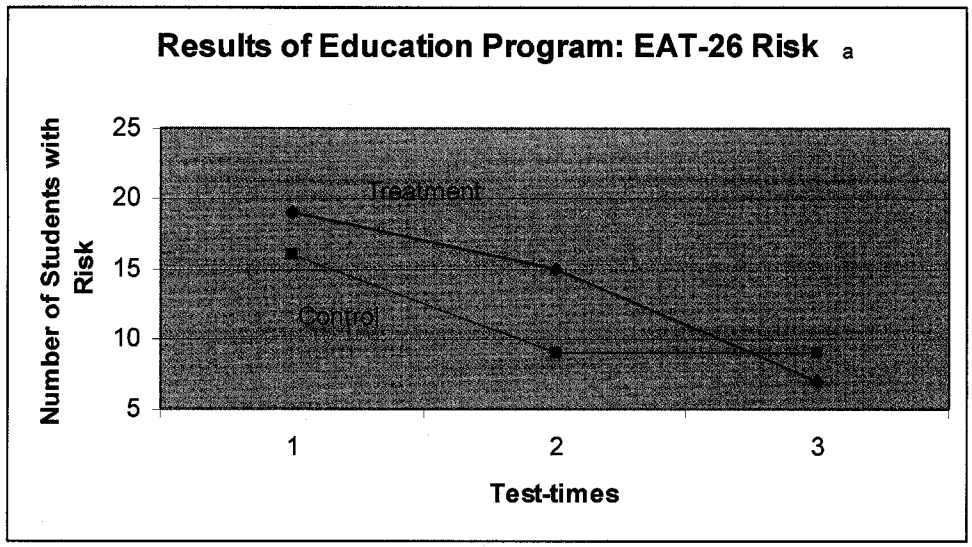
The following figures (Figures 4.5, 4.6, 4.7, 4.8, 4.9) represent results of the education program comparing treatment versus control for all of eating attitudes (EAT-26 Mean scores and risk ≥20) and disordered eating behaviors (restricting, purging and bingeing).

Figure 4.5



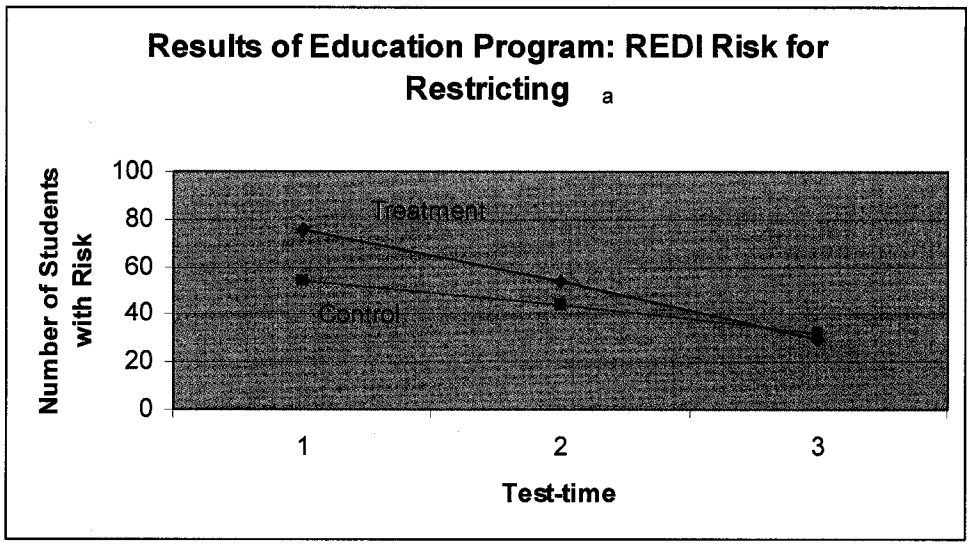
[a] There was a significant difference between treatment and control (p=.005). (RMANOVA)

Figure 4.6



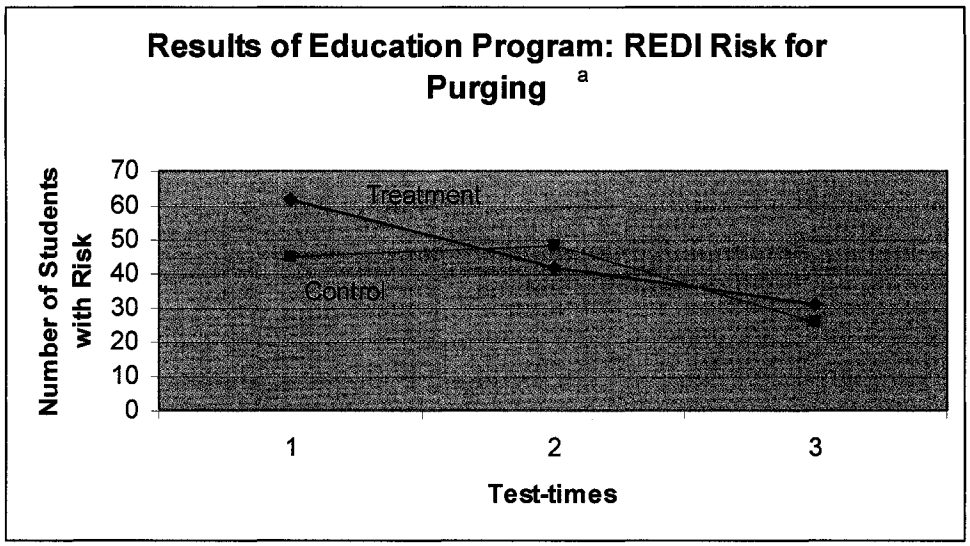
[a] EAT-26 Risk scores ≥20 (number of students (n) in each group) suggest problematic eating attitudes. No significant differences were noted between treatment and control at either test-time.

Figure 4.7



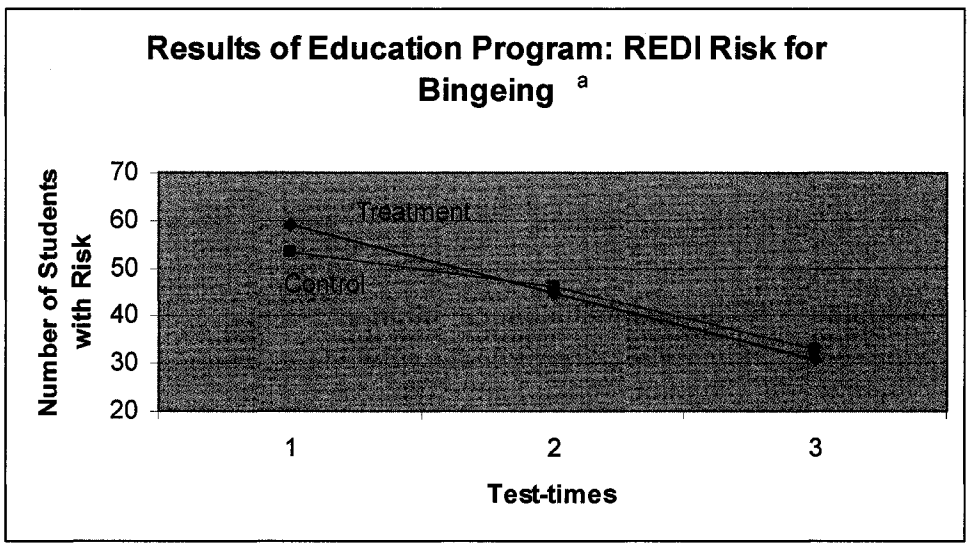
[a] REDI Risk for Restricting scores >11 (number of students (n) in each group). No significant differences were noted between treatment and control at either test-time.

Figure 4.8



[a] REDI Risk for Purging scores >8 (number of students (n) in each group). No significant differences were noted between treatment and control at either test-time.

Figure 4.9



[a] REDI Risk for Bingeing scores >9 (number of students (n) in each group). No significant differences were noted between treatment and control at either test-time.

4.3.3 Comparison between Sex and Grade in the Treatment Group

To measure program effects on sex and grade, Repeated Measures ANOVA was used for sub-group comparisons (girls versus boys and grade 5 versus grade 7) in the treatment group for all measures. For both EAT-26 variables and all REDI variables there were no differences noted at either test-time for sex; however, several differences were noted for grade, with grade 5 demonstrating greater improvement after the education program than grade 7. These results are discussed in detail in the following paragraphs.

EAT Mean Scores

For EAT-26 Mean scores, there was a significant overall difference for grade (p=.000). Grade 5 children improved more than children in grade seven. There were no significant differences at either test-time between girls and boys in the EAT-26 Mean scores. These results are represented in Table 4.5.

Table 4.5

Results of Education Program: Eating Attitudes for Sex and Grade

Student EAT-26 Mean Scores [a] in Treatment Group [b]

	Pre-Test	2 months Post-test	5 Months Post-test
Grade 5 [c]	6.51 ± 6.68	5.19 ± 6.34	3.84 ± 4.14
Grade 7	6.29 ± 6.30	5.26 ± 5.99	5.40 ± 6.06
Girls [d]	6.47 ± 6.86	5.58 ± 6.75	4.65 ± 6.19
Boys	6.36 ± 6.24	4.94 ± 5.69	4.47 ± 4.22

[a] EAT-26 Mean scores ≥20 suggest problematic eating attitudes.

[b] Results expressed as means ± standard deviation.

[c] There was a significant greater improvement in grade 5 compared to grade 7 (p=.000) (RMANOVA); due to differences at 5 months. (paired T-test)

[d] No significant differences were noted between sexes at either test-time.

EAT-26 Risk ≥20

Table 4.6 reports the results of subgroup comparison between sex and grade in the treatment group of students scoring ≥20 on EAT-26. There were no significant differences noted between either sexes or grades at either test-time for EAT-26 Risk.

Table 4.6

Results of Education Program: Eating Attitudes for Sex and Grade Students in Treatment Group with EAT-26 Risk Scores ≥20 [a] (number of students (n) and percentage (%) in each group) [b]

		Pre-Test	2 Months Post-Test	5 Months Post-test
Grade 5	(n)	10	7	1
	(%)	4.9%	3.4%	0.5%
Grade 7	(n)	9	8	6
	(%)	5.3%	4.7%	3.5%
Girls	(n)	10	11	6
	(%)	6.1%	6.7%	3.7%
Boys	(n)	9	4	1
	(%)	4.2%	1.9%	0.5%

[a] EAT-26 Risk scores ≥20 suggest problematic eating attitudes.

[b] No significant differences were noted between grades or sexes at either test-time. (RMANOVA)

REDI Risk Restricting

Table 4.7 reports the results of the education program on the number of students at risk of restricting. There was a significant overall difference for grade (p=.001). Grade 5 children improved more than children in grade seven. There were no significant differences at either test-time between girls and boys in REDI Risk Restricting scores.

Table 4.7

Results of Education Program: Disordered Eating for Sex and Grade Students in Treatment Group with REDI Risk Restricting [a] (number of students (n) and percentage (%) in each group)

	Pre-Test	2 Months Post-test	5 Months Post-test
Grade 5 [b]	(n) 44	25	12
	(%) 21.4%	12.2%	5.8%
Grade 7	(n) 32	29	17
	(%) 18.8%	17.1%	10.0%
Girls [c]	(n) 38	25	18
	(%) 23.3%	15.3%	11.0%
Boys	(n) 38	29	11
	(%) 17.9%	13.7%	5.2%

[a] Disordered eating (restricting) was measured by REDI risk score >11.

[b] There was a significant greater improvement in grade 5 compared to grade 7 (p=.001) (RMANOVA); due to differences at 5 months. (paired T-test)

[c] No significant differences were noted between sexes at either test-time. (RMANOVA)

REDI Risk Purging

Table 4.8 reports the results of the education program on the number of students at risk for purging. There was a significant overall difference for grade (p=.014), with grade 5 students demonstrating greater improvement than grade 7. No differences were noted between sexes at either test-time.

Table 4.8

Results of Education Program: Disordered Eating for Sex and Grade Students in Treatment Group with REDI Risk for Purging [a] (number of students (n) and percentage (%) in each group)

	Pre-Test	2 Months Post-test	5 Months Post-test
Grade 5 [b]	(n) 41	21	11
	(%) 20.0%	10.2%	5.4%
Grade 7	(n) 21	21	20
	(%) 12.4%	12.4%	11.8%
Girls [c]	(n) 29	20	12
	(%) 17.8%	12.2%	7.4%
Boys	(n) 33	22	19
	(%) 15.6%	10.4%	9.0%

[a] Disordered eating (purging) was measured by REDI risk score >8.

[b] There was a significant greater improvement in grade 5 compared to grade 7 (p=.014) (RMANOVA); due to differences at 5 months. (paired T-test)

[c] No significant differences were noted between sexes at either test-time.

REDI Risk Bingeing

Table 4.9 reports the results of the education program on the number of students at risk for bingeing. There was a significant overall difference for grade (p=.012), with grade 5 students demonstrating greater improvement than grade 7. No differences were noted between sexes at either test-time.

Table 4.9

Results of Education Program: Disordered Eating for Sex and Grade Students in Treatment Group with REDI Risk for Bingeing [a] (number of students (n) and percentage (%) in each group)

	Pre-Test	2 Months Post-test	5 Months Post-test
Grade 5 [b]	(n) 37	22	12
	(%) 18.0%	10.7%	5.8%
Grade 7	(n) 22	23	19
	(%) 12.9%	13.5%	11.2%
Girls [c]	(n) 32	20	15
	(%) 19.6%	12.2%	9.2%
Boys	(n) 27	25	16
	(%) 12.7%	11.8%	7.5%

[a] Disordered eating (bingeing) was measured by REDI risk score >9.

[b] There was a significantly greater improvement in grade 5 compared to grade 7 (p=.012) (RMANOVA); due to differences at 5 months. (paired T-test)

[c] No significant differences were noted between sexes at either test-time.

Chapter Five: Discussion

The first portion of this chapter contains a brief review of the major findings of the study. This is followed by discussion of these results in relationship to hypotheses stated and findings in the research literature, incorporating implications for practice throughout. A third section addresses the strengths and limitations of the study. The main points are then summarized in the conclusion.

5.1 Main Findings

The objectives of the study were to measure eating attitudes and disordered eating behaviors before the study, and again at 2 months post and 5 months post, to obtain prevalence information, measure overall program effects, and measure differences in program effects between sex and grade. The main findings are summarized in three categories: (1) prevalence findings of problematic eating attitudes and disordered eating behaviors at baseline, (2) effects of the education program on changing eating attitudes and disordered eating behaviors, and (3) differences in program effects between girls and boys, and students in grade 5 (elementary school) versus grade 7 (junior high school).

Before reporting the findings, a comment needs to be made about the evaluation tools used in this study. While the EAT-26 has been used with children and adolescents before, and attempts were made to improve comprehension in this study group, the children's version, ChEAT would have been a better choice for this study. In addition, REDI is a new tool which has not yet been exposed to scientific peer review. Thus, the results of this study should be considered with caution until further investigation using ChEAT and REDI with this population become available.

5.1.1 Prevalence Findings

The overall prevalence findings in our study of problematic eating attitudes at baseline was 5%. The prevalence in our study of disordered eating behavior at baseline was 18.7% for restricting, 15.4% for purging, and 16.1% for bingeing.

5.1.2 Program Effects on Eating Attitudes and Disordered Eating Behaviors

In our sample of girls and boys in grades 5 and 7, the education program MMME resulted in a significant greater improvement in eating attitudes, as measured by EAT-26, 5 months after the education program was provided (compared to the control group which did not receive the education). There were no significant differences in disordered eating behavior, as measured by REDI subscales (restricting, purging and bingeing), between treatment and control after the education program.

5.1.3 Differences in Program Effects between Girls and Boys

The education program MMME did not result in any differences between girls and boys for any of eating attitudes or disordered eating behaviors (restricting, purging and bingeing).

5.1.4 Differences in Program Effects between Grade 5 and Grade 7

The education program MMME resulted in greater improvement for eating attitudes and disordered eating behaviors in grade 5 students (elementary school) compared to grade 7 students (junior high school). Specifically, there was a significantly greater improvement in grade 5 students (versus grade 7) in eating attitudes, as measured by EAT-26, 5 months after the education program, as well as restricting behavior, purging behavior, and bingeing behavior, as measured by REDI subscales.

5.2 Further Comments

5.2.1 Prevalence: Problematic Eating Attitudes

Our study found overall problematic eating attitudes to be 5%. Problematic eating attitudes reflect general concerns with body dissatisfaction, negative body image, stereotypes about weight and shape, and body image distortion. The reported prevalence of problematic eating attitudes in our study is lower than reported by other recent studies. Jones, et

al. (2001) reported that 13% of girls under age 15 had scores above the recommended cut-off of 20 on the EAT-26. Another Canadian study by Jonat & Birmingham (2004) found in a sample of rural males and females age 12-19 that 8.3% of males and 17.3% of females scored 20 or above on the EAT-26. A final Canadian study by McVey, Tweed, & Blackmore (2004) reported that 10.5% of children age 10-14 had scores $\geq$20 on the Eating Attitudes Test. Our study addresses the eating attitudes of children age 9-12, generally younger than all of the studies referenced. Perhaps children in this age group have not yet achieved the extent of problematic eating attitudes that older children have.

5.2.2 Prevalence: Disordered Eating Behaviors

Disordered eating behaviors include extreme dieting/restricting, purging, and binge eating. Our study found prevalence of restricting to be 18.7%, purging 15.4%, and bingeing 16.1%. We determined some differences in prevalence of disordered eating behaviors compared to other studies of disordered eating behaviors. Generally, rates of restricting and bingeing were similar to other studies, but purging was higher in our study. In comparison, Jones, et al. (2001) reported 23% restricting (dieting), 8.2% purging by vomiting, and 15% of girls age 12-18 reporting binge eating. Another study by McVey, Tweed, & Blackmore (2004) found restricting (dieting) in 10-14 year old girls at 29.3% and vomiting at 1.5%. It is difficult to accurately compare prevalence information when measurement tools used by different studies are

not the same. The higher rate of purging behavior found in our study might be explained because REDI not only detects purging by vomiting, but also underlines compensatory exercise as a purge behavior, a problematic behavior not addressed in other tools. In this respect, REDI may more accurately reflect current issues in youth today than other tools used to detect disordered eating behaviors, but more validation work on the tool is required before this conclusion can be drawn. If these findings do in fact represent current issues with youth today, it is remarkable that one in five may be at risk for the development of an eating disorder. This in fact is a profound comment on today's society, and highlights the need for more prevention in this area.

We found higher rates of disordered eating behaviors as measured by REDI (15.4-18.7%) compared to problematic eating attitudes as measured by EAT-26 (5%). Problematic eating attitudes are the building blocks of disordered eating behaviors, thus one would suspect similar values between the two. The higher rate of disordered eating (compared to problematic eating attitudes) is consistent to other findings reported in the literature. McVey, Tweed, & Blackmore (2004) report 10.5% of girls age 10-14 with scores $\geq$20 on ChEAT, whereas 29.3% were restricting their food intake to lose weight. Jones, et al. (2001) found 16% of girls age 12-18 with EAT-26 scores $\geq$20, whereas 23% were dieting to lose weight. One might explain perhaps that problematic eating attitudes have a dramatic and enhanced effect on promoting disordered eating behaviors.

5.2.3 Prevalence: Gender and Grade

We hypothesized that girls would have more problems with problematic eating attitudes and disordered eating than boys; as well, we hypothesized that grade 7 students would have more problematic eating attitudes and disordered eating behaviors than grade 5 students. Our study found that there was little difference at baseline in eating attitudes or disordered eating behavior between girls and boys, or between students in grades 5 and 7. Few past studies have made these comparisons.

The study of eating attitudes and disordered eating behavior in boys is relatively new. Recent studies of boys report rates of problematic eating attitudes and disordered eating behaviors lower for boys than for girls (Baranowski,et al., 2003; Croll, et al., 2002; Furnham, et al., 2002; Thomas, et al., 2002; Thomas, et al., 2000). However, the results of our study reinforce that these concerns are no longer gender specific, but rather a general concern for both girls and boys.

The literature also generally highlights that older students tend to have more problematic eating attitudes and disordered eating behaviors than younger ones (Borrenson & Blair , 2003; Marcotte, et al., 2002; McCabe & Ricciardelli, 2001; Packard & Krogstrand, 2002; Wong, et al., 2000). An explanation for the lack of variation between grade 5 and 7 students in our study may be that there was not enough variance in age. Greater differences might have been found if elementary students in grade 5 had been compared to junior high students in grade 9. However, our study generally evaluated

these concerns in younger children (9-12 year olds), and results may simply be reinforcing that body dissatisfaction and disordered eating are an equal concern for both younger and older children in this age group.

5.2.4 Overall Results of the Program

We hypothesized that MMME would result in improved eating attitudes and disordered eating behaviors at 2 months after the education program, with sustained positive results 5 months after the education program. The education program demonstrated a treatment effect for eating attitudes only at 5 months post-test (not at 2 months after the education program), but there were no significant effects on any disordered eating behaviors (restricting, purging or bingeing) at either test-time. Results of this study replicate work done by past researchers, who found that they were able to affect knowledge, but not change behavior (Stice & Shaw, 2004). Eating attitudes are affected by imparting knowledge, a common theme in all prevention education programs. Affecting behavior change is much more complex. While it is encouraging that eating attitudes were positively affected by MMME, it is discouraging that there was little effect on disordered eating behaviors. These results highlight the current lack of knowledge about what really works in eating disorder prevention, and strengthens the case for continued research in this area.

There are other factors which might have impacted the lack of program effects from MMME. These are (1) the use of age appropriate measurement

tools, (2) the use of traditional "illness" tools to measure change in a "wellness" program, (3) difficulties which emerge when tracking (and demonstrating significant change) in small groups of students identified with risk behavior, and (4) changes which simultaneously happened to the control group and affected the comparisons over time between the treatment and control group.

The use of age appropriate measurement tools to measure eating disorder prevention in children is controversial. The Risk of Eating Disorder Inventory (REDI) is a validated tool for students in grades 5-12. Conversely, the EAT-26 is an adult tool which has been used in many past studies with adolescents as young as 11 (Buddeberg-Fischer, et al., 1998; Button, et al., 1997; Castro, et al., 2004; Jonat & Birmingham, 2004; Jones, et al., 2001; Wlodarczyk-Bisaga & Dolan, 1996). The question arises regarding the accuracy of using EAT-26 with children age 9-12. In our study, to address the concern about comprehension, younger children had the questionnaire read to them. Additionally, research project staff were available to answer student questions about the tool. Irregardless, it remains a question whether outcomes would have been different if the children's version of EAT-26 had been used.

There was a different outcome when eating attitudes were assessed using EAT-26 mean scores or EAT-26 risk scores (calculated at $\geq$20). MMME resulted in a significant improvement in EAT-26 mean scores at 5 months post-test. However, no treatment effect was noted at either test-time in the

numbers of students with EAT-26 scores ≥20. As already mentioned, EAT-26 is an adult tool, the cut point of 20 to determine risk (validated for adults) may not be appropriate for children. In light of this, measuring change in means when using the EAT-26 with children may be a more reliable method of monitoring change in this group.

Both REDI and EAT-26 are "illness" tools measuring pathological attitudes and behaviors. Whether or not such "illness" tools should be used to measure prevention outcomes, is another topic for discussion. Some researchers believe that standardized tools are essential to measure a change in the desired behavior (Littleton & Ollendick, 2003). At this point there are no standardized "wellness" tools available to measure prevention.

Program effects were measured by tracking students who were identified with problematic eating attitudes and disordered eating behaviors before the education program was provided (at baseline). While the number of students in the study was large, and lends confidence to the results, the actual number of students being tracked was much smaller. It is difficult to demonstrate significance when you are working with a small group. This may explain why few significant program effects were noted.

Our study found that there was general improvement in the control group across both test times, as well as in the treatment group. Why would eating attitudes and disordered eating behaviors improve over the school year in the control group? One can postulate that initial testing was conducted at the beginning of the school year for all students, a time when there is an

increased demand on students both academically and socially. Students may react to this stressful time of the school year by experiencing more body dissatisfaction, and engaging in disordered eating behaviors. Sassaroli & Ruggiero (2005) investigated the relationship between stress and eating disorders, finding that stress may stimulate eating disorder behaviors in individuals with predisposed personalities. However, little has been written on the relationship between stress and ED at various times of the school year, so one can only postulate that there may be a natural cyclical developmental process in improving eating attitudes and disordered eating behavior over the school year as students adjust to classroom relationships and expectations.

Also one cannot rule out the placebo effect of using the measurement tools over the three test-times. While students in the control group did not receive the education program until after the final test-time, they may have learned information about eating disorder prevention simply by answering the questions over the three test-times.

One other explanation for improved scores in both eating attitudes and disordered eating behaviors for the control group over the duration of the study might be the provision of body image education in other components of the school curriculum. Modifications to the Alberta Education Curricula in 2001 (Alberta Learning, 2001) and 2002 (Alberta Learning, 2002) incorporated body image into both health education and physical education. The health education curriculum has greater concentration of body image content than the physical education curriculum. MMME was delivered in

health classes for both grades 5 and 7, and students in the control group did not receive body image education until after the final test-time; however, they may have received some body image education in physical education. As well, while attempts were made to ensure random selection of schools for this study, schools self-selected to be involved. This means that schools interested in health agreed to participate, and may have provided parallel unofficial education on relevant topics to students in the control group. This would help to explain improved scores in the control group over the school year.

5.2.5 Results of the Program: Gender

We hypothesized that the education program would result in a significantly greater improvement in eating attitudes and disordered eating behaviors (restricting, purging and bingeing) for girls compared to boys. This was partly because we anticipated that girls would have more negative eating attitudes and disordered eating behaviors than boys. However, we did not find any difference in program effects for girls compared to boys. Given that this program utilized a "wellness" approach, perhaps this finding is not surprising. Nonetheless, it does suggest that many of the programs that previously targeted girls only may have missed an opportunity to influence both genders. Societal influences on both girls and boys to achieve the "ideal" look are widepread (Muris, et al., 2005). This influence on boys is a relatively new phenomena, but is becoming as much a factor in affecting body

dissatisfaction as for girls (McCabe & Ricciardelli, 2001). Taking this into consideration, the curriculum for MMME was created for both girls and boys, discussing topics of interest to both. Outcomes of this study strengthen the argument for including boys in ED prevention initiatives. We did not find any difference in program effect for girls and boys, even in EAT-26 means scores where there was a significant improvement in the treatment group over time, reinforcing that the MMME program was beneficial for both sexes, in the limited treatment outcomes observed.

5.2.6 Results of the Program: Grade

We hypothesized that the education program would result in a significantly greater improvement in eating attitudes and disordered eating behaviors (restricting, purging and bingeing) for grade 7 students compared to grade 5 students. This was partly because we anticipated that grade 7 students would have more negative eating attitudes and disordered eating behaviors than grade 5 students; however, this was not the case. For both eating attitudes and disordered eating behaviors, the MMME program had more effect on grade 5 students. It might be postulated that grade 5 students are more open to receiving new information about body image and more easily influenced in their ideas about eating attitudes. Perhaps by grade 7, students who are identified as having problematic eating attitudes are more difficult to affect. From the results obtained in this study, it is apparent that an ED prevention program delivered to grade 5 students is more effective than to

older students. While those who work in ED prevention have anecdotal experiences reinforcing this, it is useful to have scientific data to support these beliefs.

5.3 Strengths and Limitations

The current study had several strengths and limitations. It was a controlled study with a large sample size. These two factors have a positive impact on credibility of results. Additionally, it compared both genders. The education program was an interactive psychoeducational program, the approach strongly recommended by newer researchers in ED prevention. And finally, evaluation included both quantitative and qualitative analysis (reported elsewhere), soliciting feedback from both students and staff about the program. Overall it was found that most students enjoyed the program, while at the same time benefiting from the curriculum. Additionally, the program was found to not cause harm to participants; instead, it resulted in positive effects on reducing problematic eating attitudes.

However, this study also had several limitations including: the education was provided by 3 different educators, challenges in using the school as the site for the education, difficulty in making school selection random, the use of "illness" tools to measure prevention, and concerns that arose with use of the measurement tools. Because of the size of the study, 3

different educators delivered the program. While all educators were trained to deliver the same curriculum, and had an instruction manual to follow, this added an element of variability. To address this, we ensured that educators had comprehensive and consistent training before teaching the program. As well, there was an observer in every class, and observations were taken to weekly staff meetings for discussion. A final point was that educators kept daily journals for discussion at these meetings. These procedures reduced the potential for differences in the content being taught, but there was still opportunity that material was taught slightly differently.

Limitations of the study also apply to the site of the education, that is, the school environment. While school is the logical site for ED prevention programs, doing research in schools is challenging. Tracking students during a full school year (ten months) presents problems in itself. There are several factors that come into play over the school year which might impact student responses. These include age change, motivation to learn at various times of the year (i.e., Christmas, and other special events), maturation, curriculum being taught, and even changing stress levels for students at different times of the school year. Working in the school environment is likely the best place to work with youth; however, it presents challenges that should be considered when discussing results of a study such as ours. These factors could account for differences that were difficult to explain in student responses.

This consideration is important when measuring prevalence of problematic eating attitudes and disordered eating behaviors in schools, a

factor that is seldom discussed in research papers. However, when working within the school year, there are few options if students are to be monitored longitudinally. Following the study into another school year may cause problems with attrition and drop-out.

As already mentioned, although attempts were made to obtain school representation from all quadrants of the city, thus obtaining participants with different socioeconomic backgrounds, schools were self-selected. Thus, those schools which already had a focus on health were involved in the study. This may have impacted study results.

A final limitation of this study that may have affected the outcomes is the measurement tools used. Both REDI and EAT-26 are "illness" tools measuring pathological attitudes and behaviors. Whether or not such "illness" tools can be used effectively to measure prevention outcomes, is another topic for discussion. Some researchers believe that standardized tools are essential to measure change in the desired behavior (Littleton & Ollendick, 2003). Development of "wellness" tools to evaluate the positive concepts and behaviors promoted in prevention studies, as well as targeted qualitative investigations, would enhance the research in this area.

Additionally, while the Risk of Eating Disorder Inventory (REDI) is a tool for children, the EAT-26 is not. The EAT-26 has been successfully used with children over the years, but for improved accuracy, the children's version (ChEAT) may have been more appropriate. The primary reason that EAT-26 was used was for consistency in continued validation of REDI, a new tool.

However, to compensate for comprehension problems with children in the study, younger children had the questionnaire read to them and difficult concepts explained. This could have reduced some of the potential concerns. However, questions remain regarding the accuracy of using EAT-26 with children in this study, as well as the use of REDI, a non-published tool which has not been exposed to extensive peer review.

5.4 Conclusions and Future Investigation

There remain many unanswered questions in the discussion about ED prevention. Controversy exists about whether or not ED prevention really results in long-term success (Favaro, Zanetti, Huon, & Santonastaso, 2005; McVey, Davis, Tweed, & Shaw, 2004; O'Dea & Abraham, 2000; Phelps, et al., 2000, Steiner-Adair, et al., 2002; Tilgner, Wertheim & Paxton, 2004; Varnado-Sullivan, Zucker, Williamson, Reas, Thaw & Netemeyer, 2001). The current study replicated past studies in being able to change attitudes, with little success in changing behaviors. This reinforces the challenge in developing an ED prevention program that will change behaviors long-term.

What population should be targeted in ED prevention? Past ED prevention has been selective in targeting females, as it was felt that ED are predominantly a female issue. Austin (2000), in a review of 20 empirical prevention studies, challenged this practice, suggesting this to be a flaw in the

research. While the prevalence of ED is reported to be lower in the male population, it is becoming more apparent that males suffer increasingly from body dissatisfaction (Furnham, et al., 2002; Ricciardelli & McCabe, 2001; Ricciardelli, et al., 2003; Thomas, et al., 2002; Wiseman, et al., 2004). As well, males are part of an environment that creates and perpetuates norms (Austin, 2000), so inclusion of both genders allows a variety of perspectives and viewpoints to be heard (O'Dea & Abraham, 2000). Our study demonstrated no difference in treatment effect for girls and boys. The curriculum for MMME was created for both girls and boys, discussing topics of interest to both. The outcomes of this study strengthen the argument for including boys in ED prevention initiatives.

A final question addresses the age at which ED prevention is most effective. Even though school is the recommended site for delivery of programs because it presents students as a captive audience in a learning environment (Neumark-Sztainer, 1995; Rosen & Neumark-Sztainer, 1998), little has been written on the most effective age for provision of ED prevention. Our study reported greater effects in younger children. Since older students tend to have concrete, less adaptive schemas about their self-image (Rosen & Neumark-Sztainer), young children are perhaps more open to learning new ideas and may have fewer issues and pre-conceived barriers to learning about body image. Attempting to reach younger, more malleable children should reap added benefits and better results (Kater, et al., 2000; Smolak & Levine, 1994). Additionally, since changes as a result of puberty

are often a risk factor for eating disturbances (Kater, et al.), reaching pre-pubescent children offers a truly preventative approach. While treatment effects of this study had only limited success, the greater effect on eating attitudes of grade 5 students strengthens the argument for providing ED prevention to children in elementary school, rather than to older children.

While several of our hypotheses were challenged in this study, it is encouraging that we were able to observe some positive results and reveal information that will assist in developing more effective prevention programs. We found that an interactive wellness-based psychoeducational program can reduce problematic eating attitudes in children. Additionally, we were able to demonstrate that ED prevention need not cause harm in children, even when using illness tools to measure change. From our results we observed that it was more effective to intervene with grade 5 students, rather than those in grade 7. And finally, we found that girls and boys in this age group had equal issues around size and weight, and that there were no differences in program effects between them. In summary, we postulate that the most effective ED prevention programs have a curriculum which is interactive and provides wellness based psychoeducational material. We recommend that both girls and boys be targeted in these programs, and that initiatives be focused at children in elementary school, not older grades. This study adds to the existing knowledge about possible strategies for ED prevention.

Areas for further investigation in this study include the impact of the stage of puberty on the results. Students did identify pubertal stage in the

collection of demographic data, but this has not yet been analyzed. As well, the question might be asked about whether it is realistic to expect a prevention program to attempt to change eating attitudes and behaviors of children that already have problems. It would be interesting to remove the students identified with high risk disordered eating behaviors to see if their results are skewing the group results negatively. Additionally, the subscales of EAT-26 should be analyzed to determine if there were any differences with students in dieting, bulimia and food preoccupation, and oral control. And finally, it has been mentioned that it is difficult to conduct longitudinal research with children because of the challenges in tracking them from one school year to the next. However, this is a piece of the information that is lacking in many studies. This study monitored students for five months. There are few studies longer than 5 months, but information collected from longer term studies would be beneficial in determining lasting effects of education programs. We did monitor some of the students in our study 18 months post-test. To date, the data collected from this longitudinal testing has not been evaluated. Once completed, this will add additional meaningful information to the puzzle.

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September 11, 2001

Ms. Dianne Drummond & Ms. Suzanne Hare
Grey Nuns Community Hospital
1100 Youville Drive W.
Edmonton, AB
T6L 5X8

Dear Ms. Drummond & Ms. Hare,

Re: Eating Disorder Prevention in Schools: A Wellness Approach.

Please find enclosed your letter of ethical approval for the above study. Please quote file number **B-200401-GNH** in any future correspondence with the ethics board. On behalf of the Health Research Ethics Board (B: Health Research), I wish you every success in your research endeavours.

Sincerely,

Karen Turpin
Administrative Assistant
Health Research Ethics Board (B: Health Research)

CARITAS HEALTH GROUP

16940 - 87 Avenue Edmonton, Alberta T5R 4H5 Tel. (403) 484-8811 Fax. (403) 930-5774

February 1, 2001

Dianne Drummond
Grey Nuns Community Hospital
Edmonton, Alberta

Dear Dianne:

Re: Eating Disorder Prevention in Schools: A wellness approach

Thank you for your presentation to the Caritas Research Steering Committee on January 26, 2001. We are pleased to advise that this project has received administrative and funding approval in the amount of $5,000 from the Caritas Research Steering Committee pending receipt of the Health Ethics Research Board approval.

The Caritas Research Steering Committee requires full financial disclosure of all incomes and expenditures associated with this study. Please contact Ms. Vikki Newman, Coordinator, Treasury and Risk Management, Finance, Caritas Health Group (Ph: 482-8384) regarding financial arrangements. The Committee requests that recognition be given regarding Caritas support in any papers published. We also require a copy of your report on completion of the study.

If you have any questions, please do not hesitate to contact the Caritas Research Office (Diane Robinson @930-5908). Yours sincerely,

G. F. MacDonald, M.D., FRCP(C)
Chair, Caritas Research Steering Committee

c.c. Vikki Newman

53546 (Oct 97)

EDMONTON PUBLIC SCHOOLS

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March 5, 2002

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Eating Disorder Promotion and Prevention Specialist
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Alberta Mental Health Board
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9230, 1100 Youville Drive W.
Edmonton, Alberta
T6L 5X8

Dear Ms. Drummond:

Re: Research Request: Eating Disorder Prevention in Schools: A Wellness Approach (Drummond/Hare)

The aforementioned research request has been approved, subject to the following conditions:

1. Teacher and student participation in the study shall be voluntary;
2. Participants are free to withdraw at any time;
3. Parental permission will be sought for students to participate in the study. **(Absence of written, informed consent must be interpreted as the absence of authorization.)**;
4. Anonymity of the participants and confidentiality of information obtained is assured;
5. Personal information may only be used for the stated purpose for which the information was collected or compiled;
6. The researcher conforms to the requirements of the Freedom of Information and Protection of Privacy Act and Regulation; and
7. The researcher provides a copy of the results to the Associate Dean, Research and Graduate Studies, to be forwarded to Edmonton Public Schools.

Please contact the undernoted principals to obtain approval and to make the necessary arrangements for conducting the study. It is the responsibility of the researcher to provide the principal with a copy of the proposal and all related documents. I wish you success in this endeavour and anticipate reception of the results as they become available. If you require further information, please contact Jane Kinoshita at 429-8232.

Sincerely,

Jane Kinoshita
Research Liaison

JK:sd

We believe. Kids achieve.

Alberta Learning Health and Life Skills Curriculum (2002)- Grade Five Learning Objectives Covered by *Making the Most of ME*

Program covers 54% of curriculum

	Lesson								
	1	2	3	4	5	6	7	8 (review of all concepts)	Practicing Healthy Living
W - 5.1		X (partial)						X	X (Nutr., Phys. Act., Rest)
W - 5.4	X	X	X	X	X	X	X	X	
W - 5.5		X						X	
W - 5.7							X (partial)	X	
W - 5.8							X	X	
R - 5.1					X		X	X	
R - 5.2		X			X			X	
R - 5.3			X					X	X (Stress)
R - 5.4					X			X	
R - 5.7					X			X	
R - 5.9								X	
L - 5.2	X		X					X	X (Pos. Self-talk)
L - 5.4				X				X	
L - 5.5			X					X	
L - 5.6			X					X	

In addition to above learning objectives, information also covered in *Making the Most of ME*:

- Basic body types and genetic influences to body shape
- Excellence and perfection
- Positive self-talk
- Developing media savvy as it affects body image
- Learning how to deal with compliments and constructive criticism

Learning objectives not covered by *Making the Most of ME*:

W - 5.1	(partially covered by program material) remaining not covered: examine the impact of immunization on the immune system.
W - 5.2	assess the importance of regular hygiene practices during adolescence
W - 5.3	identify the basic components of the human reproductive system and describe the basic functions of the various components
W - 5.6	examine and evaluate the impact of caffeine, alcohol, drugs on personal health/wellness
W-5.7	(partially covered by program material) discussed in context of teasing and Bullying - remainder of learning objective needs to be covered.
W - 5.9	determine appropriate safety behaviors for community recreational situations
W - 5.10	describe and demonstrate ways to assist with injuries of others
R - 5.5	identify possible changes in family relationships and explore strategies for dealing with change
R - 5.6	investigate the benefits of fostering a variety of relationships through out the life cycle
R - 5.8	develop strategies to address personal roles and responsibilities in groups
L - 5.1	identify and implement an effective time management plan
L - 5.3	Investigate the effectiveness of various decision-making strategies
L - 5.7	identify, within the school, the volunteer service accomplishment s of staff and students
L - 5.8	develop strategies for showing appreciation for volunteer contributions

Alberta Learning Health and Life Skills Curriculum (2002)- Grade Seven Learning Objectives Covered by *Making the Most of ME*

Program covers 42% of Curriculum

	Lesson								
	1	2	3	4	5	6	7	8 (Review of all concepts)	Practicing Healthy Living
W - 7.1		X						X	X (Nutr., Phys. Act., Rest)
W - 7.4						X		X	
W - 7.5		X				X		X	X (Nutr.)
W - 7.7							X	X	
W - 7.10		X (partial)						X	
W - 7.11	X	X	X	X	X	X	X	X	
R - 7.1				X				X	
R - 7.2					X (partial)			X	
R - 7.3			X					X	X (Stress)
R - 7.4					X			X	
R - 7.9								X	
L - 7.2	X				X			X	X (Pos. Self-talk)
L - 7.4			X					X	
L - 7.5			X					X	

In addition to above learning objectives, information also covered in *Making the Most of ME*:

- Basic body types and genetic influences on body shape

Learning objectives not covered by *Making the Most of ME*:

W - 7.2	examine personal grooming/cleanliness and evaluate the impact of grooming/cosmetic advertisements on personal grooming habits/choices
W - 7.3	examine the human reproductive process, and recognize misunderstandings associated with sexual development
W - 7.6	analyze social factors that may influence avoidance and/or use of particular substances
W - 7.8	analyze and appreciate differing personal perspectives on safety
W - 7.9	identify basic workplace safety procedures
W - 7.10	(partially covered by program material) remaining not covered: identify and examine potential sources of physical support
W - 7.12	identify the effects of social influences on sexuality and gender roles and equity
W - 7.13	examine the influences on personal decision making for responsible sexual behavior
W - 7.14	examine abstinence and decisions to postpone sexual activity as healthy choices
R - 7.2	(partially covered by program material) remaining not covered: professional support.
R - 7.5	examine the characteristics of healthy relationships, and develop strategies to build and enhance them
R - 7.6	explore and evaluate the impact of media violence on relationships
R - 7.7	evaluate and personalize the effectiveness of various styles of conflict resolution
R - 7.8	analyze the potential affects and effects of belonging to a group, team, gang
L - 7.1	develop improved organizational and study strategies/skills by analyzing the different ways individuals learn
L - 7.3	differentiate between choice and coercion in decision making for self and others
L - 7.6	examine factors that may influence future life role/education/career plans
L - 7.7	determine and use knowledge and skills of the class to promote school and community health
L - 7.8	apply effective group skills to design and implement a school-community health enhancement plan

PROVINCIAL GUIDELINES

FOR

EATING DISORDER PREVENTION

Endorsed by:

Alberta Provincial Eating Disorder Service

Modified December 2002

A PHILOSOPHY FOR THE PREVENTION OF EATING DISORDERS IN YOUTH

Prevention of eating disorders requires a shift in thinking, from an illness to a wellness model, for all education with children and adolescents. By definition, an illness model involves talking about eating disorders (the illness). Until recently, it was thought that knowledge about the health risks of eating disorders would prevent their development. Now, there is general agreement that prevention programs purely focused on this didactic teaching of signs, symptoms and causes of eating disorders may actually increase the very behaviors targeted for prevention (Cohn & Maine, 1998; O'Dea & Maloney, 2000). Eating disorder prevention programs should not focus on eating disorders; preventative strategies should enhance self-esteem and facilitate healthier social and relational contexts within the family and school communities.

Education sessions should include:

- Understanding of how puberty changes, body types, genetics and metabolism affect our bodies.
- Emphasis on the importance of active lifestyles and healthy eating; discussion regarding the myths about dieting.
- Development of critical thinking skills about the relationship between attitudes and behaviors which affect our physical health (i.e., recognizing the impact of messages given by parents, teachers, and/or peers).
- Discussion about the influence of the media and how it creates a cultural obsession with appearance; learning how to critique these media messages and differentiate them from our own reality.
- Recognition that jokes and put-downs about bodies are a form of harassment.
- Development of strategies for improving body image.
- Acceptance and appreciation of all body sizes and shapes, recognizing that you are much more than your appearance; it's not only about having a healthy body, but also about having a healthy attitude and accepting who you are; importance of positive self-talk.

Education sessions should *not* include:

- Discussions of eating disorders with students. It is our belief that discussions of eating disorders do not enhance prevention efforts.

THE ROLE OF ADULTS IN EARLY INTERVENTION OF EATING DISORDERS

Early intervention must be handled very cautiously. Disordered eating and eating disorders are serious health concerns. School counselors, public health nurses, teachers, parents and other adults need education about eating disorders to aid in early detection. Adults working with children and adolescents must be well-informed to appropriately identify and handle identified cases. It is not appropriate to provide eating disorder information directly to children and adolescents so that they might counsel each other. Rather, children and adolescents should be encouraged to approach adults for assistance with eating disorder concerns about themselves or their peers.

RATIONALE

Eating disorder prevention has permeated the eating disorder literature for the past 15 years (Piran, Levine, & Steiner-Adair, 1999). Interest in this area is a result of a number of factors including: (a) the large and increasing number of people suffering from eating disorders (Dorian & Garfinkel, 1999), and (b) the even larger number of people discontent with their bodies and preoccupied with their weight (Brown & Jasper, 1993). There have been a multitude of approaches to the prevention of eating disorders, yet successful prevention has been proven both demanding and controversial (Piran et al., 1999). There is still much to be learned about the most effective form and target for eating disorder prevention.

There are legitimate concerns about the possibility that prevention efforts could backfire and inadvertently increase the very behaviors and attitudes they were designed to prevent (Cohn & Maine, 1998; Piran, 1998; O'Dea & Maloney, 2000). Education programs that specifically address eating disorders through didactic teaching of signs and symptoms have been shown to be minimally effective in behavioral change. In fact, they may do more harm than good by causing undue attention to pathology, with limited emphasis on healthy attitudes and behavior change (Mann & Burgard, 1998; Rosen & Neumark-Sztainer, 1998). To design effective programs and prevent inadvertent escalation of the very behaviors and attitudes targeted for prevention, programming must be developmentally appropriate and continuously reinforced. Youth must be consistently exposed to the ideas of self-acceptance and positive body image. The most current literature points to a wellness focus in the prevention of eating disorders (O'Dea & Abraham, 2000). Piran (1998), a noted expert in the field, identifies that prevention programs with the most favorable outcomes tend to rely on participatory, interactive approaches rather than the traditional didactic imparting of information.

There is limited research regarding the primary prevention of eating disorders. A number of current authors suggest a need for research that targets primary prevention and that recognizes the complexity of multiple factors (Fabrega & Miller, 1995; Nichter, Ritenbaugh, Nichter, Vuchobic, & Aiken, 1995; Noordenbos, 1994; White, 1992). In the past decade, increasing interest has focussed on health promotion and eating disorder prevention programs. Echoing the movement toward mental health promotion in general, discussion in the area of eating disorder prevention has broadened beyond attempts to reduce risk. The result is a movement towards understanding factors that build resilience in youth and protect youth from risk behaviors in general (i.e. developmental assets) (Scale & Leffert, 1999). A health promotion approach to body image recognizes that the issue is more than just the prevention of an illness. Rather, the development of a healthy body image allows people to focus on their lives, not their looks. Body image has been identified as an important component of overall self-esteem (Shisslak, Crago, Renger, & Clark-Wagner, 1998). In turn, self-esteem has been linked as a protective factor against a number of risks, including eating disorders (Shisslak et al., 1998). In fact, one of the only studies to show a positive attitude change in adolescents in terms of body satisfaction focused their entire educational approach on self-esteem (O'Dea & Abraham, 2000). This program placed the entire educational approach in the health promotion framework (O'Dea & Abraham, 2000).

CONCLUSIONS

Eating disorder prevention is at a crossroads. Caution must be exercised when determining the variables involved in successful prevention programming. There is general agreement about what is not best practice. Current literature points to a wellness-based approach to prevention, a movement we fully support.

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Making the Most of ME Curriculum Outline
1) Understanding your physical characteristics ("ME" and My Body) Awareness of physical identity is important in formulating a sense of self. Students are taught that all body types are natural and healthy, and no one type is better, nor should it be more desirable than another. Gaining self-acceptance builds self-esteem, a protective factor against developing weight and shape preoccupation.
2) Identifying and accepting strengths/limitations (Getting to know 'ME') Developing and understanding individual physical and non-physical strengths and limitations helps children form an identity based on interests, competence, and self-acceptance rather than their physical attributes
3) Understanding the difference between excellence and perfection (Striving for Excellence) Children need to understand that while it is important to strive for excellence, perfection is an impossible goal. Developing strategies to apply personal traits towards achieving excellence helps students build a more positive self-esteem.
4) Communication and peer influences (My Feelings Count Too!) Students need to understand that every person experiences feelings and emotions. Teaching this concept helps students explore what to do with feelings and emotions, and helps protect them from misinterpreting messages and communication with others.
5) Media literacy and societal stereotypes (Developing Media Savvy) *Media Awareness:* Media exerts tremendous pressure on children and adolescents to meet the near impossible beauty standards of our culture. Realizing the fallacies brought by media may help children and adolescents become less vulnerable to social pressures to be thin (for females) or muscular (for males).
6) Teasing and bullying (Accepting Others) Students need to learn to appreciate the concept that everyone deserves empathy and respects and has something unique to offer. Teasing has serious negative consequences on self-esteem and can be a critical step in the development of disordered eating and eating disorders.
7) Putting it into Practice -The final lesson is one where students practice the knoledge and skills that they had by making presentations to the class on topics that have been taught (skits, videos, posters).
8) Practicing self-care (Taking Care of 'ME') Developing efficacy is an important part of this program. Because behaviors need to be practiced before they are adopted, the concept of self-care is introduced early in the program and these skills are practiced and nurtured weekly through practice and repetition. The healthy living goals which are targeted are: healthy eating, including overall daily nutrition intake as well as eating breakfast every day, active living, positive self-talk, managing stress, and getting enough sleep.

Caritas Health Group

A Study to Evaluate a New Body Image Program for Grades 5 and 7 - A Wellness Approach

Teacher Information Sheet

Dianne Drummond, RD
Alberta Mental Health Board
Phone: (780) 450–7613

Suzanne Hare, RD
Grey Nuns Community Hospital
Phone: (780) 450–7458

Your school has agreed to be part of this study and has the permission of the School Board to participate. We are looking for students in grades 5 and 7 to help us determine how effective a wellness-based education program is on building self-esteem and body image and reducing disordered eating behaviors. Within your school, your classroom was randomly chosen to be part of the study. Whether your student takes part in the study is up to their family.

Why are we doing this study? The Grey Nuns Community Hospital provides education sessions to schools across the province and has instructed more than 10,000 students over the last five years. Our goal is to build positive self-esteem and promote healthy body images, encourage healthy eating and reduce eating disorders in Alberta's youth. It is our hope that this study will provide valuable information for educators and health professionals to develop strategies for successful programs in the schools.

How is the study conducted? We will be giving 8 hours of interactive, curriculum-based education to grade 5 and 7 students. This program will be in place of the regular health classes. A specially trained health educator will be giving the education sessions. The course content meets the health curriculum. Topics will cover building self-esteem and body image and developing health-promoting behavior.

In order for the study to be scientific, a control group (a group that does not receive education) is needed. Classes who receive the education program will be followed for about 8 or 9 months and asked to complete questionnaires before the education, directly after the education and 6 months later. The control classrooms will receive the questionnaires at the same time as those receiving education. The questionnaires are made up of questions about self-esteem, body image, general health questions, and eating practices.

If your classroom is one of the control classrooms will they be offered the education program? After the study is completed, we will evaluate the program's effectiveness. If results show a positive benefit or children in the control groups will be offered the education sessions later in the school year.

What specifically will I have to do? This program requires approximately 9 hours of class time and should come out of the time allocated for health. Student grading for report card purposes will be the responsibility of the teacher, however we will be assigning a grade to the program we deliver. We will be happy to have the teacher participate in this process. The teacher will continue to be responsible for the parts of the health curriculum not covered by this project. At the end of the education program, you will be asked to complete a short questionnaire evaluating the program from a teacher's perspective.

What specifically will the students have to do? If a student participates (whether in the control classroom or education classroom), they will be asked to answer a series of questionnaires given by a qualified research assistant. The questionnaires will be given three times. This will help us determine both the immediate effects of the education and the longer-term effects. The questionnaires will take about an hour to complete and will be given during regular lunchtime. In addition, we will be taking the student's height and weight.

What are the benefits and risks?
The potential benefits are:

- Students will receive enhanced health education.
- Teachers will receive additional education material and access to additional training.
- In past similar studies, schools reported a reduction in teasing and bullying.
- Students will experience improved self-esteem, more positive body image, healthier eating behavior and improved general health practices.
- There will be access to a health team if needed.

Potential risks: Although it is unlikely, there may a small number of students who experience anxiety because they have to fill out the questionnaires. All the questionnaires have been developed specially for children. There will be a trained research assistant to answer any questions students may have.

Will a student be singled out if they are not participating? Children will not be excluded or made to feel uncomfortable. Our goal is to build self-esteem in all students. Because the education program deals with the curriculum guidelines, it is important that students not miss out on health education. All students will receive the education program at the same time as those participating.

Why then participate? The information we are gathering from the questionnaires will help us determine the effectiveness of planned classroom activities and strategies, beyond just improved knowledge. That is, can we change behavior? This information will be used to help make the health curriculum even more effective.

What about confidentiality? All information will be held private except when professional codes of ethics or legislation, requires reporting. The data gathered will be kept for at least five years in a secure area, after the study is done. Identifying information will not be attached to the information collected. Nobody's name will ever be used in any presentation or publication of the study results. The information gathered for this study may be looked at again in the future to help us answer other study questions. If so, the Ethics Board will first review the study to ensure ethical use of the information.

Can students stop participating? Yes, they are free to withdraw from the study at any time with permission of their parents. In addition, students have the right to refuse to answer any question on the questionnaire or decline the height and weight measurements.

Can I come into the classroom when the education sessions are being held? Teachers are encouraged to be present during the education session and may be asked to be present during the questionnaires.

Please keep this letter for future reference. If you have any concerns about any aspect of the study, please contact the Caritas Research and Ethics Committee at 450-7000.

Caritas Health Group

A New Body Image Program Study

Student Information Sheet

Dianne Drummond, RD
Alberta Mental Health Board, and

Suzanne Hare, RD
Grey Nuns Community Hospital

Your school has agreed to be a part of this study. We are looking for students in grades 5 and 7 to help us determine whether an education program can improve self-esteem and body image and promote healthy eating. **Your participation would be really appreciated**.

Your parents have been given information about this study. Please discuss this project with them.

How does the study work? Students who take part in this study will be split into two groups: those who do not receive the new program and those who do. Half of the students will receive 8 hours of interactive and fun education from a guest teacher. This program will be in place of the regular health classes. All students will answer several questions before we start, right after we finish and again at 6 months. The questions are about eating practices, self-esteem, body image and general health. If our study shows that the extra classes work well, then those students who did not receive the program will have it at the end of the year.

What will I have to do? Like any school class, you will be expected to participate in classroom activities and homework assignments. Each time you do the questions it will take about a half an hour. In addition, we will be taking your height and weight. No one in your class will know your height or weight. All of this happens during regular class time.

In order for a student to participate their parent(s)/guardian(s) must fill out the consent form. There is a place on this form for the student to sign as well. Signing this means you agree to participate and do your best in the program.

What happens if I don't want to participate? We really want students to feel positive about the program so if you have a concern, please discuss it with your parents. Together you can decide if this program is for you.

Please keep this letter for future reference. If you have any concerns about any aspect of the study, please contact the Caritas Research and Ethics Committee at 450-7000.

Caritas Health Group

Body Image Promotion in Schools – A Wellness Approach

Parent Information Sheet

Dianne Drummond, RD
Alberta Mental Health Board
Phone: (780) 450 – 7613

Suzanne Hare, RD
Grey Nuns Community Hospital
Phone: (780) 450 – 7458

Your school has agreed to be part of this study and has the permission of the School Board to participate. We are looking for students in grades 5 and 7 to help us determine how effective a wellness-based education program is on building self-esteem, body image, and health building behaviors, while reducing disordered eating practice. Within your school, your child's classroom was randomly chosen to be part of the study. **His/her participation is strictly voluntary**. Whether your child takes part in the study is up to you.

Please read the information provided below to help you make your decision. If you have any questions, please feel free to contact Dianne or Suzanne at the above numbers. We would be happy to answer any questions, you have that may not be answered below.

Why are we doing this study? We represent Grey Nuns Community Hospital in delivering the present research project. The Grey Nuns Community Hospital is recognized as a leader in eating disorder prevention and body image promotion in Alberta. Currently we provide education sessions to schools in Edmonton and across the province and have instructed more than 10,000 students over the last five years. Our goal is to reduce unhealthy eating practices, build positive self-esteem and promote healthy body images in Alberta's youth. It is our hope that this study will provide valuable information for educators and health professionals to develop strategies and successful programs.

How is the study conducted? We will be giving 8 hours of interactive, curriculum-based education to grade 5 and 7 students. This program will be in place of the regular health classes. A specially trained health educator will be giving the education sessions. Health educators, teachers and health professionals have reviewed the course content to ensure that it follows a safe, wellness-based approach. Topics will cover building self-esteem and body image, while reducing behaviors such as dieting.

In order to scientifically prove that the education program will work, we need to have a control group (a group not receiving education). Students who receive the education program will be followed for about 8 or 9 months and asked to complete three questionnaires before the education, directly after the education and 6 months later. The control classrooms will receive the questionnaires at the same time as those receiving education. The questionnaires are made up of questions about self-esteem, body image, general health, eating attitudes and practices, and feelings and peer relationships..

If my child is placed in the control class will they be offered the education program? After the study is completed, we will evaluate the program's effectiveness. If results show a positive benefit, children in the control groups will be offered the education sessions later in the school year.

What specifically will my child have to do? If your child participates (whether in the control classroom or education classroom), they will be asked to answer a series of questionnaires given by a qualified research assistant. The questionnaires will be given three times. This will help us determine both the immediate effects of the education and the longer-term effects. The questionnaires will take about a half an hour to complete and will be given during regular class time. In addition, we will be taking your child's height and weight. Your child will not be told what their weight is and it will be done privately. If your child is in the intervention classroom, they will be expected to participate in the homework assignments and classroom activities.

What are the benefits and risks? *The potential benefits are*

- Your child will receive enhanced health education;

- Your school's teachers will receive additional education material and access to training on how to deal with body image concerns and build self-esteem;
- In past similar studies, schools reported a reduction in teasing and bullying;
- Student will experience improved self-esteem, more positive body image, reduction of unhealthy eating attitudes and practices behavior and improved health behaviors;
- There will be access to health team if needed.

Potential risks: Although it is unlikely, there may a small number of students who experience anxiety because they have to fill out the questionnaires. All the questionnaires have been developed specially for children. There will be a trained research assistant to answer any questions your child may have during the questionnaire process. Will they develop disordered eating because they are participating? No, but being part of the study may help children who are having concerns come forward and get help faster.

Will my child be singled out if we don't agree to participate? Fear not! Your child will not be excluded or made to feel uncomfortable. Our goal is to build self-esteem in all students. Because the education program deals with the curriculum guidelines, it is important that your child not miss out on health education. Your child will receive the education program at the same time as those participating. In class, while the other students will be filling out questionnaires, your child will receive a worksheet on healthy eating based on the curriculum guidelines. That way your child will receive the education without being singled out for not participating.

Why then participate? The information we are gathering from the questionnaires will help us determine the effectiveness of planned classroom activities and strategies, beyond just improved knowledge. That is, can we change behavior? This information will be used to help make the health curriculum even more effective.

What is a wellness approach? Rather than talking about an illness (like eating disorders), a wellness approach addresses the concern by attempting to build the skills helping to insulate your child from developing these problems. Thus we look at building self-esteem, critically assessing media messages, emphasizing not dieting and so on; rather than talking about what eating disorders are. If fact there will be no information on eating disorders given out during the class time.

What will happen if you find out my child has a health concern or disordered eating problem? First of all it is important for you to know that we cannot diagnose an eating disorder. What we can pick up is if you child is at risk for developing one or shows some of the behaviors associated with an eating disorder. What we do with that information is up to you. If you would like to be notified please complete the section in the consent form. We will not inform anyone else about the results. If you wish, you will be connected with our team of health professionals for a complete assessment.

What about confidentiality? All information will be held private, except when a professional code of ethics or legislation requires reporting. The information you or your child provides will be kept for at least five years after the study is done. Your name, your child's name, or any other identifying information will not be attached to the information your child gives. Your name or your child's name will also never be used in any presentation or publication of the study results. The information gathered for this study may be looked at again in the future to help us answer other study questions. If so, the Ethics Board will first review the study to ensure ethical use of the information.

Can we stop participating? Yes, you are free to withdraw your child from the study at any time. In addition, your child has the right to refuse to answer any question on the questionnaire or decline the height and weight measurement.

Can I come into the classroom when the education sessions are being held? Yes, certainly. Except during the completion of the questionnaires. Your child's teacher will be supervising the process.

Please keep this letter for future reference. If you have any concerns about any aspect of the study, please contact the Caritas Research and Ethics Committee at 450-7000.

Caritas Health Group

Consent Form

Body Image Promotion in Schools – A Wellness Approach

Researcher Contact Information:

Dianne Drummond, RD
Alberta Mental Health Board
Phone: (780) **450 – 7613**

Suzanne Hare, RD
Grey Nuns Community Hospital
Phone: (780) **450 – 7458**

	Yes	No
Do you understand that you have been asked to give permission for your child to be in a research study?		
Have you received and read a copy of the attached information sheet?		
Do you understand the benefits and risks involved in having your child take part in this research study?		
Have you had an opportunity to ask questions and discuss the study if you wished to?		
Do you understand that if your child feels anxious about participating in the study there will be a trained research assistant present to help them with any concerns or questions?		
Do you understand that you are free to withdraw your child from the study at any time?		
Do you understand that if you withdraw your child from the study, the information gathered up to that point, will be still included in the study unless you request otherwise? You may contact 450-7613 to request information not be included.		
Has the issue of confidentiality been explained to you? Do you understand who will have access to the your child's information?		
Do you want the investigator(s) to inform you if your child's survey results indicate that she/he potentially has a health related problem? If so please indicate the phone number and the individual(s) to be contacted: Name:_____ Phone:_____		

I agree to let my child (ward) _____take part in this study.
(Name of Child)

Signature of parent/guardian: _____

Printed Name: _____Date: _____

Witness (if available): _____

Printed Name: _____

I believe that the person signing this form understands what is involved in the study and voluntarily agrees to have their child participate:

Researcher: _____

Printed Name: _____

Eating Attitudes Test –26

	Always	Very True	True	Some -what True	Rarely	Never
1. I am scared about being overweight.	1	2	3	4	5	6
2. I avoid eating when I am hungry.	1	2	3	4	5	6
3. I think about food a lot of the time.	1	2	3	4	5	6
4. I have gone on eating binges where I feel that I might not be able to stop.	1	2	3	4	5	6
5. I cut my food into small pieces.	1	2	3	4	5	6
6. I am aware of the energy (calorie) content in foods I eat.	1	2	3	4	5	6
7. I particularly stay away from foods such as breads, potatoes and rice.	1	2	3	4	5	6
8. I feel that others would like me to eat more.	1	2	3	4	5	6
9. I vomit after I have eaten.	1	2	3	4	5	6
10. I feel extremely guilty after eating.	1	2	3	4	5	6
11. I am preoccupied with a desire to be thinner.	1	2	3	4	5	6
12. I think about burning up energy (calories) when I exercise.	1	2	3	4	5	6
13. Other people think I am too thin.	1	2	3	4	5	6
14. I am preoccupied with the thought of having fat on my body.	1	2	3	4	5	6

	Always	Very True	True	Some -what True	Rarely	Never
16. I avoid foods with sugar in them.	1	2	3	4	5	6
17. I eat diet foods.	1	2	3	4	5	6
18. I feel that food controls my life.	1	2	3	4	5	6
19. I can display self-control around food.	1	2	3	4	5	6
20. I feel that others pressure me to eat.	1	2	3	4	5	6
21. I give too much time and thought to food.	1	2	3	4	5	6
22. I feel uncomfortable after eating sweet things.	1	2	3	4	5	6
23. I have been dieting.	1	2	3	4	5	6
24. I like my stomach to be empty.	1	2	3	4	5	6
25. I enjoy trying new foods.	1	2	3	4	5	6
26. I have the impulse to vomit after eating.	1	2	3	4	5	6

REDI™

	False	Some-what true	True
1. If I were more muscular and less fat, I would have more friends.	1	2	3
2. There have been times when I have taken medicine or pills to lose weight.	1	2	3
3. I am happy with myself.	1	2	3
4. I am often ashamed.	1	2	3
5. I will not be satisfied with my appearance until I have the shape of a model.	1	2	3
6. I have made myself sick (vomited) as a means of controlling my shape and weight.	1	2	3
7. I am happy with the way I look.	1	2	3
8. My life would be better if I could lose some weight.	1	2	3
9. In order to feel good about myself, I have to be something that others expect me to be.	1	2	3
10. My weight or shape affects the way I feel about myself as a person.	1	2	3
11. I worry whether people my age will be attracted to me.	1	2	3
12. No matter how well I do, I don't feel satisfied with my performance.	1	2	3
13. I have learned, from magazines and TV, that men are attracted to women who are very slender and shapely.	1	2	3
14. I wish my body was different.	1	2	3
15. I feel that if I fail someone will not respect me or care for me as much.	1	2	3
16. If I eat something fattening it is converted immediately to fat on my body.	1	2	3
17. In the past a boy/girl has rejected me because I wasn't thin enough.	1	2	3
18. I am often disappointed with myself.	1	2	3
19. My life would be better if I had less fat and more muscle.	1	2	3
20. Being overweight scares me.	1	2	3
21. I am more concerned about my weight than most people my age.	1	2	3
22. Weight and shape are among the main things that affect how I feel about myself.	1	2	3
23. I am committed to losing weight.	1	2	3
24. I have tried to follow a diet to lose weight in the last year.	1	2	3
25. I eat more than I would like to, when I feel anxious, depressed, angry, or lonely.	1	2	3

REDI™

	Never	Some-times	Always
26. I feel depressed after I binge eat (answer never if you don't binge eat).	1	2	3
27. I deliberately eat foods that are low in calories.	1	2	3
28. I feel powerless to change my life.	1	2	3
29. I am preoccupied with being thinner.	1	2	3
30. I have been teased about being too fat.	1	2	3
31. I deliberately eat less so that I won't gain weight.	1	2	3
32. I try to exercise to avoid gaining weight.	1	2	3
33. I am satisfied with the shape and size of my body.	1	2	3
34. I feel best when my stomach is empty.	1	2	3
35. I feel that my life is getting worse and worse.	1	2	3
36. I try not to eat foods that are high in fat.	1	2	3
37. It feels like my best is never good enough.	1	2	3
38. When I have eaten too much, I usually eat less the next day.	1	2	3
39. I throw food away that I am supposed to eat because I am afraid of gaining weight.	1	2	3
40. I intentionally skip a meal to lose weight.	1	2	3
41. I feel guilty when I have eaten foods that I shouldn't, and exercising makes the guilt go away.	1	2	3
42. I don't seem to do anything right.	1	2	3
43. I am satisfied with my current weight.	1	2	3
44. I feel like throwing up after I eat.	1	2	3
45. I'm afraid to start eating because I think I won't be able to stop.	1	2	3
46. I am preoccupied with being more muscular.	1	2	3
47. I eat so much in a short period of time that I would be embarrassed if others saw me.	1	2	3
48. I feel uncomfortable after I eat foods with high sugar or fat content.	1	2	3
49. I stay away from foods with sugar in them.	1	2	3
50. I feel that I could control my life if I could control my eating.	1	2	3

Risk of Eating Disorder Inventory - REDI™

Summary Results Profile

Grey Nuns Community Hospital and Health Centre

Name _____

	Self Esteem	Emotional Indicators	Mal-adaptive Thoughts	Body Image	Dieting	Restricting	Purging	Binging
				Intervention STRONGLY Suggested				
High Risk	21 20 19 18	27 26 23 25 22 24 21	15 14 13	24 23 22 21	30 29 27 28 26	21 20 18 19 17	18 15 17 14 16 13	18 17 15 16 14
		Should be assessed- referral to health professional recommended				Intervention Suggested		
Moderate Risk	17 16	20 19	12 11	20 19	25 24	16 15	12 11 10	13 12
						Should be Assessed & Monitored		
Low Risk	15	18 17	10 9	18 17	23 22 21	14 13 12	9	11 10
		No Risk - No Concern				No Risk - No Concern		
No Risk	14 10 13 9 12 8 11 7	16 12 15 11 14 10 13 9	8 7 6 5	16 15 11 14 10 13 9 12 8	20 19 14 18 13 17 12 16 11 15 10	11 10 9 8 7	8 7 6	9 8 7 6
	Eating Disorder Risk Factors					Eating Disorder Behaviors		

APPENDIX 15. Data Analysis for REDI (Restricting, Purging, Bingeing) Broken Down by Risk Levels (Low, Moderate, High)

When looking at separate levels of risk for REDI (no risk, low risk, moderate risk, high risk), improvement in REDI Risk is defined as an improved change in one risk level (high to moderate, moderate to low, low to no risk) on any of the REDI subscales of Restricting, Purging or Bingeing. As the following tables demonstrate, there was a general improvement in numbers of students with risk (in all subscales) at both 2 months post-test and again at 5 months post-test; however, there was no significant difference between treatment and control when looking at numbers in each risk level at any test-time.

REDI Risk Restricting: Change in Numbers of Students with Risk Within Each Risk Level for Treatment versus Control (number of students (n) and percentage of total (%) in each group) [a]

		No Risk	Low Risk	Moderate Risk	High Risk
Treatment	**T1**	(n) 297	59	12	5
		(%) 79.6%	15.8%	3.2%	1.3%
	T2	(n) 315	43	8	3
		(%) 85.4%	11.7%	2.2%	0.8%
	T3	(n) 334	18	5	6
		(%) 92.0%	5.0%	1.4%	1.7%
Control	**T1**	(n) 267	35	11	8
		(%) 83.2%	10.9%	3.4%	2.5%
	T2	(n) 271	33	8	3
		(%) 86.0%	10.5%	2.5%	1.0%
	T3	(n) 280	20	8	4
		(%) 89.7%	6.4%	2.6%	1.3%

[a] No significant differences between treatment and control were noted at any test-time in the numbers of students in each risk category. (chi-square)

REDI Risk Purging: Change in Numbers of Students with Risk Within Each Risk Level for Treatment versus Control (number of students (n) and percentage of total (%) in each group) [a]

		No Risk	Low Risk	Moderate Risk	High Risk
Treatment	**T1**	(n) 311	32	28	2
		(%) 83.4%	8.6%	7.5%	0.5%
	T2	(n) 327	18	21	3
		(%) 88.6%	4.9%	5.7%	0.1%
	T3	(n) 332	16	14	1
		(%) 91.5%	4.4%	3.9%	0.3%
Control	**T1**	(n) 276	24	18	3
		(%) 86.0%	7.5%	5.6%	0.9%
	T2	(n) 267	32	16	0
		(%) 84.8%	10.2%	5.1%	0.0%
	T3	(n) 266	12	13	1
		(%) 91.7%	3.8%	4.2%	0.3%

[a] No significant differences between treatment and control were noted at any test-time in the numbers of students in each risk category. (chi-square)

REDI Risk Bingeing: Change in Numbers of Students with Risk Within Each Risk Level for Treatment versus Control (number of students (n) and percentage of total (%) in each group) [a]

		No Risk	Low Risk	Moderate Risk	High Risk
Treatment	**T1**	(n) 314	41	12	6
		(%) 84.2%	11.0%	3.2%	1.6%
	T2	(n) 324	27	14	4
		(%) 87.8%	7.3%	3.8%	1.1%
	T3	(n) 331	21	7	3
		(%) 91.4%	5.8%	1.9%	0.8%
Control	**T1**	(n) 268	31	15	7
		(%) 83.5%	9.7%	4.7%	2.2%
	T2	(n) 269	32	11	3
		(%) 85.4%	10.2%	3.5%	1.0%
	T3	(n) 279	24	6	3
		(%) 89.4%	7.7%	1.9%	1.0%

[a] No significant differences between treatment and control were noted at any test-time in the numbers of students in each risk category. (chi-square)