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DEVELOPMENT AND IMPLEMENTATION OF THE
BODY LOGIC PROGRAM FOR ADOLESCENTS:
A PRIMARY PREVENTION PROGRAM
FOR EATING DISORDERS

A Dissertation

Submitted to the Graduate Faculty of the
Louisiana State University and
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in partial fulfillment of the
requirements for the degree of
Doctor of Philosophy

in
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by
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ABSTRACT

Eating disorder symptoms such as feelings of fatness, restrictive eating and purgative behaviors are observed in many children and adolescents. These feelings and behaviors, may, in some adolescents lead to the development of anorexia nervosa and bulimia nervosa. A recent series of studies has identified risk factors for the development of eating disorder behaviors in children and adolescents. These risk factors include overconcern with physical appearance, negative evaluation of physical appearance, social pressure for thinness, higher weight level, depression, and body dysphoria. It has been hypothesized that targeting adolescents who are at risk for developing an eating disorder may result in more effective prevention efforts. The current study developed and implemented a primary prevention program, called the Body Logic Program, targeting those adolescents most at-risk for the development of an eating disorder. The study examined the immediate effects of the Body Logic Program on the general student body, as well as, those students identified as at-risk for the development of anorexia nervosa and bulimia nervosa. Subjects were 287 sixth and seventh graders from two area private schools. Students were screened to ascertain risk status. Fifty-five were identified as meeting criteria for at-risk status. Students identified as at-risk were primarily female (83.6%). All students received a school education component of the Body Logic Program which targeted body image concerns and nutrition knowledge, and the at-risk students were invited to attend an expanded program. However, efforts to attract the students identified as at-risk for eating disorders for participation in the expanded program proved unsuccessful. The school education component led to decreases in scores on the Fear of Fatness scale for all females, as well as at-risk females from School 1. This effect was not
demonstrated in male participants. The general education was not effective at increasing students nutrition knowledge. Despite the failure to attract at-risk students, the Body Logic Program shows promise as a prevention program for eating disorders.
INTRODUCTION

Anorexia nervosa and bulimia nervosa are psychiatric disorders characterized by an intense overconcern with weight and body shape that leads to extreme methods such as starvation or purging to control weight gain. Anorexia nervosa has the following symptom profile: (a) refusal to maintain body weight at or above a minimally normal weight for age and height, (b) an intense fear of weight gain, (c) a disturbance in the way the body is experienced, undue influence of body weight or shape on self-evaluation, or denial of the seriousness of the current low body weight, and (d) amenorrhea (American Psychiatric Association, 1994). There are two subtypes of anorexia nervosa. Restricting type indicates that during the current episode, the person has not engaged in purgative or binge eating behavior and uses restrictive eating and exercise to maintain a low body weight. Binge-eating/Purging type indicates the presence of these behaviors usually in addition to restrictive eating and exercise (American Psychiatric Association, 1994). Bulimia nervosa is characterized by recurrent binge eating and the use of purgative behaviors to compensate for potential weight gain (American Psychiatric Association, 1994). Binge eating is defined as consuming a large amount of food in a discrete period of time, and having a sense of loss of control during the episode. The binge eating and purging must occur at least twice a week for three months to warrant a diagnosis. The final criteria for bulimia nervosa are that self-evaluation is unduly influenced by body shape and weight (American Psychiatric Association, 1994).

Eating disorders have increased dramatically over the past two decades, resulting in prevalence rates exceeding most other high-incidence handicapping conditions treated in the educational systems (Phelps & Bajorek, 1991). It is well
established that adolescents and college-age women are "at-risk" for the development of eating disorders (Crisp, 1988). Also, participants in certain sports and artistic activities which promote thinness are another "at-risk" group (Williamson, Netemeyer, Jackman, Anderson, Funsch, & Rabalais, 1995). Less well-known is the possibility that the seeds of problems related to body size/shape may be present prior to adolescence. For example, Feldman, Feldman, and Goodman (1988), in their review of the literature, concluded that children acquire prevailing cultural values of physical appearance prior to adolescence and that thinness is deemed desirable by girls before the onset of puberty. Thus, girls as young as nine to 10 years old may be at risk for the development of eating disorders. Because of the incidence of eating disorders and maladaptive eating practices in children and adolescents, the physical and emotional consequences, the increasing costs of health care, and the suffering of patients and their families, it is very desirable to develop prevention programs for these problems (Shisslak, Crago, Neal, & Swain, 1987).

A review of the literature shows that there has been very little progress in developing and testing the effectiveness of prevention programs for eating disorders. Of the few studies that have been reported, none have reported findings of effective prevention. Most of these programs have emphasized educational interventions, as opposed to attempting to directly modify psychosocial factors which place some students at greater risk than others. There is great need to test more aggressive prevention programs and the current research is designed to address this need.

**Eating Disorder Behaviors in Children and Adolescents**

There is a substantial body of research demonstrating the presence of eating disorder behaviors in children and adolescents. Age of onset for anorexia and bulimia nervosa is typically reported to be prior to age 18 (Mitchell & Pyle, 1983). Surveys of
eating disorder behaviors in children and adolescents have typically identified a much larger percentage of students who display eating disorder symptoms than the percentage of students that meet full criteria for an eating disorder. The prevalence of eating disorders appears to be increasing and may range from 1%-4% of adolescent and young adult women in predominantly white upper-middle and middle-class student groups (American Psychiatric Association, 1993). In a survey of sixth and seventh graders, 4.3% of the females displayed symptoms associated with an eating disorder while only one of the 839 participants met criteria for bulimia nervosa (Killen et al., 1994). Similar results were obtained in a survey of 15 to 19 year olds in which a larger percentage of the sample displayed significant eating problems (14.4%) than met criteria for anorexia nervosa (1%) (Monck, Graham, Richman, & Dobbs, 1990). In a survey of high school students in urban (mean age = 16.0) and suburban (mean age = 16.2) areas, clinically significant scores on a measure of eating attitudes were achieved by 17.5% of suburban females, 15.0% of urban females, and 6.0% of urban males (Fisher, Pastore, Schneider, Pegler, & Napolitano, 1994). Self-report methodology found that 4.0% of a sample of adolescent females ages 13 to 19 years old and .8% of males would meet strict DSM-III criteria for bulimia (Greenfeld, Quinlan, Harding, Glass, & Bliss, 1987). In a study of third through sixth graders, 12.1% reported scores above clinical cutoffs on a measure of eating attitudes, dieting behaviors, and food preoccupation (Veron-Guidry, Williamson, Netemeyer, in press). Atypical eating disorders have been identified in children from five to eleven years old (Jaffe & Singer, 1989). These children displayed a large number of eating disorder behaviors, however
no child expressed a fear of fatness and only one displayed body image distortion (Jaffe & Singer, 1989).

Several studies have indicated that dieting, feeling fat, and restrictive eating practices are common in female children and adolescents (e.g., Maloney, McGuire, Daniels, & Specker. 1989; Patton, 1988; Rosen, & Gross, 1987; Serdula, Collins, Williamson, Anda, Pamuk, & Byers, 1993; Wardle & Beales, 1986). Dissatisfaction with body shape has been shown in children as young as nine years old (Maloney, McGuire, Daniels, & Specker, 1989; ), and many adolescents with high dietary restraint or who perceive themselves to be overweight are within a normal weight range (Davies & Furnham, 1986; Eisle, Hertsgaard, & Light, 1986; Field et al., 1993; Hill, Oliver, & Rogers, 1992; Rosen, Gross, & Vara, 1987; Wardle & Marsland, 1990). In a survey of high school students, 44% of the females and 15% of males reported that they wanted to lose weight (Serdula et al., 1993). Similar results were found in a survey of 13 - 19 year olds which found a high frequency of concerns with weight, body image, and dieting especially among women (Greenfeld, Quinlan, Harding, Glass, & Bliss, 1989). In a sample of fifth through twelfth grade girls, 39% reported that they had dieted in an effort to lose weight and 56.1% indicated that they were terrified of gaining weight (Fields et al., 1993). Females are more likely to believe that thinness will increase their likability (Oliver & Thelen, 1995). Perception of body shape, rather than actual weight has been shown to be a significant predictor of dieting motivation (Fields et al., 1993; Hill et al., 1992). Atypical eating behaviors in males and females were more highly related to perception of weight than actual degree over or under weight (Greenfeld et al., 1989). Recent research has indicated that extreme maladaptive eating behaviors and extreme drive for thinness are common among minority adolescents (Emmons, 1992; Story, French, Resnick, & Blum, 1995; Striegel-Moore, Schrieber, Pike, Wiltsey, &
Rodin, 1995). In a study examining sex and race differences in dieting behavior, 41% black and 42% white males and 61% black and 77% white females had dieted where dieting was defined as losing at least 5 lbs. (Emmons, 1992).

A number of studies have demonstrated the impact of dieting and other extreme behaviors on adolescents. Increased dieting has been associated with lowered body self-esteem (Hill et al., 1992). Female adolescents attempting to lose weight report levels of body image dissatisfaction approaching clinical levels reported by subjects diagnosed with bulimia nervosa (Rosen et al., 1987). Female weight reducers also exhibit lower self-esteem and symptoms of depression (Rosen et al., 1987).

The use of extreme measures such as fasting or purging to control weight has been found to be relatively common among adolescents. The use of purging as a weight control method occurs more frequently in females than males (Emmons, 1992; Killen et al., 1986). Females were twice as likely as males to feel that they were fat and used such extreme behaviors as fasting (49%), diet pills (4%), and self-induced vomiting (14%) to control their weight (Serdula et al., 1993). Fasting for at least 24 hours was reported by 25% of the males and 30% of the females in a high school sample (Emmons, 1992). Killen et al (1986) found that adolescents use such methods as self-induced vomiting (10.6%), laxatives (6.8%), diuretics (3.6%), and diet pills (8.3%). Similar results were reported in a study examining bulimic symptoms in high school females (Crowther, Post, & Zaynor, 1985) with adolescents reporting occasional binge eating (46%), self-induced vomiting (11.2%), the use of laxatives (4.7%), and fasting (36.4%) to control weight.

Children also report concerns about being overweight and display a preference to be thinner (Thelen, Powell, Lawrence, & Kuhnert, 1992) with fourth and sixth graders reporting more concerns with being overweight and a preference for being thinner than
second grade girls. In a survey of third through sixth grade boys and girls (Maloney, McGuire, Daniels, & Specker, 1989) it was reported that 45% of the children wanted to be thinner, 37% had tried to lose weight, and 6.9% scored in the anorexic range on a measure of dietary restraint, the Children's Eating Attitudes Test (ChEAT; Maloney et al., 1989). Lower grade level, feeling fat, and the belief that friends would like them if thinner predicted higher ChEAT scores in this study. Similar results were obtained in a recent investigation of third through seventh graders (Veron-Guidry et al., in press). In this sample, 40.5% reported a desire to be thinner and 41.8% reported attempting to lose weight. Binge eating was found in 14.1% of the students and 1.3% described wanting to vomit after eating (Veron-Guidry et al., in press). In a study of first through fifth graders, fifth graders rated body shape as significantly more important in determining attractiveness than younger students (Smolak & Levine, 1994). In addition, 40% of the females, as compared to 25% of the males reported trying to lose weight. Dieters in this study had a higher BMI and were unhappier with their bodies than nondieters (Smolak & Levine, 1994). Wardle and Marsland (1990) identified a trend for more weight concerns in girls in higher social status schools, but no differences were noted for age and dieting. Thus, 18 year olds were not dieting significantly more intensely or frequently than 11 year olds.

**Adverse Effects of Eating Disorders**

Eating disorders are associated with a number of severe physical consequences. These physical symptoms include: 1) decreased thyroid function; 2) calcium loss and bone fractures; 3) atrophy (shrinking) of the heart muscle; 4) hair loss; 5) caries and gum disease; 6) protein deficiency; 7) dehydration; and 8) decreased metabolism. Prepubertal patients with anorexia nervosa may have arrested sexual maturation, general physical development, and growth, and may not grow to anticipated

Eating disorders are also associated with a variety of social, psychological, emotional, and family problems. Depression, interpersonal sensitivity, various personality disorders, and anxiety are but a few of the additional problems that frequently accompany these eating disorders (Williamson, et al., 1990). Families of children and adolescents with eating disorders are characterized by a lack of cohesion (Attie &-Brooks-Gunn, 1989). Adolescents who engage in extreme behavior to control their weight report greater psychological distress and less perceived emotional bonding with their families (Wertheim et al., 1992).

Treatment Outcome for Eating Disorders

In a review of the literature, it was concluded that treatment for anorexia and bulimia nervosa has not been shown to be effective in all cases. Reviews of carefully done follow-up studies conducted on hospitalized or tertiary referral populations meeting criteria for anorexia nervosa at least four years after onset of illness show that about 44% of patients had an overall good outcome (American Psychiatric Association, 1993). However, about 24% had a poor outcome (weight never approached 15% under recommended weight for height and menstruation was absent or sporadic) and 28% had an intermediate outcome (American Psychiatric Association, 1993). Mortality for anorexia nervosa increased with length of follow-up and reached about 20% among
patients followed for more than 20 years (Theander, 1985). Death primarily resulted
from cardiac arrest or suicide. In an outcome study of early onset anorexia nervosa, no
deaths were reported after a mean follow-up of eight years (Hawley, 1985). The overall
measure of psychological outcome placed 50% in the good outcome category, 33% in
the intermediate outcome category, and 17% in the poor outcome category, however,
many of the patients had multiple psychiatric admissions (Hawley, 1985). Slightly
better long term outcome was reported in a study of anorexics with an average of 11.7
year follow-up (Remschmidt, Wienand, & Wewetzer, 1990). The participants of this
study had an average age of onset of 13.3 years old. Younger age of onset in this
sample was associated with a good or intermediate outcome. A good prognosis was
indicated by 69% of the sample, and 17% reported an unfavorable outcome, i.e. weight
less than 85% recommended for age and height, and amenorrhea (Remschmidt et al.,
1990).

In an intensive review of the literature, it was concluded that little is known about
the natural history or long-term outcome of bulimia nervosa (American Psychiatric
Association, 1993). Reviews of cognitive behavior therapy have concluded that the
average reduction in purging via self-induced vomiting at the end of treatment was 70%
(Rosen, 1987). Agras (1991) concluded that purging can be reduced by 90% and
between 50 to 60% of patients will cease binging and purging by the end of cognitive-
behavioral treatment. Patients treated for bulimia nervosa as outpatients seem to
maintain improvement over follow-up periods of up to 6 years; however symptoms often
persist (American Psychiatric Association, 1993). Contrasting results were indicated in
a study which found that 27% of patients hospitalized with bulimia nervosa have a good
outcome (binge eating and purging less than once per month), 40% have an
intermediate outcome, and 33% have a poor outcome (Swift, Ritholz, Kalin, & Kaslow, 1987).

Long-term follow-up studies of the treatment of anorexia nervosa and bulimia nervosa indicate that 40-69% of patients treated for anorexia nervosa, and 50-60% of patients treated with bulimia nervosa report a good outcome. However, these reviews indicate that symptoms of the disorders often persist despite treatment gains. Eating disorders result in a number of physiological consequences, some of which may not be reversible. A successful primary prevention program for eating disorders could alleviate the long term physical and emotional consequences associated with anorexia nervosa and bulimia nervosa.

Risk Factors for the Development of Eating Disorder Symptoms

A very important question is: "Why do some young women (and few men) develop eating disorders?" Research on this question has been initiated in the last few years (e.g. Attie & Brooks-Gunn, 1989). This line of research may point the way to the development of more effective prevention programs for eating disorders. It has long been established that postpubertal females are most at risk for the development of eating disorders (Crisp, 1988). Patton (1988) proposed an eating disorder spectrum where dieting, although usually unproblematic, is in some instances a precursor to eating disorder behaviors. Recent research has identified several additional risk factors for the development of eating disorder symptoms in children and adolescents (Netemeyer, Williamson, Barker, Veron-Guidry, Burton, & Lichtenstein, 1995; Veron-Guidry et al., in press; Williamson et al., 1995). These and other studies have identified a variety of potential risk factors, such as body dysphoria, depression, overconcern with
physical appearance, low self-esteem, increased body mass, and social pressure for thinness.

**Body dysphoria.** Body image disturbances have been consistently identified as a risk factor for the development of eating disorder symptoms (Attie & Brooks-Gunn, 1989; Killen et al., 1994; Patton, 1988; Thompson, Coovert, Richards, Johnson, & Cattrain, 1995). It has been proposed that body image disturbance may predate restrictive eating practices which may in turn lead to binge eating (Thompson et al., 1995). In a longitudinal examination of the development of eating disorder symptoms, girls who early in adolescence felt most negatively about their bodies were significantly more likely to develop eating problems (Attie & Brooks-Gunn, 1989). Body image was associated with an increase in restrictive eating in a model of the development of eating disturbance in adolescents (Thompson et al., 1995). High levels of weight concern were significantly associated with the development of a partial eating disorder syndrome in a four-year prospective study of adolescent females (Killen et al., 1996). Girls scoring in the highest quartile on a measure of weight concerns had the highest incidence of partial syndrome development by age 17, whereas no girls in the lowest quartile developed a partial eating disorder syndrome by age 17 (Killen et al., 1996). In a three-year prospective study, high levels of weight concerns placed adolescents (sixth, seventh, and eighth graders) at risk for the development of eating disorder symptoms (Levine, Smolak, Moodey, Shuman, & Hessen, 1994). Higher levels of fear of weight gain were associated with eating disorder symptoms in sixth and seventh grade girls (Killen et al., 1994). Higher levels of body dissatisfaction and an increased desire to achieve thinness were associated with eating disorder symptoms in sixth and seventh grade girls (Killen et al., 1994). In a study examining the relationship of media exposure to eating disorder symptoms, structural equation modeling indicated a
significant relationship between body dissatisfaction and eating pathology (Stice, Schupak-Neuberg, Shaw, & Stein, 1994).

Overconcern with body size, overestimation of body size, and body dissatisfaction in normal weight persons has recently been termed "body dysphoria" (Williamson et al., 1995). Several statistical models examining risk factors for the development of eating disorder symptoms in children, adolescents, and college age women have consistently implicated body dysphoria as a risk factor for the development of an eating disorder (Barker, Williamson, Netemeyer, & Womble, 1996; Veron-Guidry, Williamson, & Netemeyer, in press; Williamson et al., 1995). Social pressure for thinness, low self-esteem, and negative affect were found to be significantly associated with body dysphoria in children (Veron-Guidry et al., in press). As body dysphoria increased, eating disorder symptoms increased (Veron-Guidry et al., in press). A similar model was investigated in female high school students (Barker, Williamson, Netemeyer, Womble, 1996). In this study, body image dysphoria was again a significant determinant of eating disorder symptoms. Body image dysphoria mediated the relationship between eating disturbance and other risk factors such as social pressure for thinness, increased body mass, and negative evaluation of self. Similar results were found in an investigation of risk factors for the development of disordered eating patterns in female college athletes (Williamson et al., 1995). Using structural equation modeling, this study found that social pressure for thinness, athletic performance anxiety, and negative self-appraisal of athletic performance influenced eating disorder symptoms. These effects were again mediated by body dysphoria (Williamson et al., 1995).

Depression. Depression has also been associated with eating disorder symptoms in numerous studies (Attie & Brooks-Gunn, 1989; Killen et al., 1994; Patton,
Sixth and seventh grade girls who displayed eating disorder symptoms also exhibited higher levels of depression (Killen et al., 1994). In a longitudinal study examining the development of eating problems in adolescence, dysfunctional eating behavior was associated with symptoms of depression (Attie & Brooks-Gunn, 1989). Level of depression in post-menarcheal adolescents has also been associated with overestimation of body size (Fabian & Thompson, 1989). In an examination of a model of the development of body image and eating disturbance, global psychological functioning (self-esteem, anxiety, and depression) and eating disturbance were significantly associated (Thompson et al., 1995). The presence of neurotic and depressive symptoms most effectively distinguished between normal dieters and eating disorder cases (Patton, 1988).

In an examination of a model for the development of eating disorder symptoms in third through seventh grade females, negative affect was significantly associated with body dysphoria, sociocultural pressure for thinness, and self-esteem (Veron-Guidry et al., in press). In this study, as negative affect increased, sociocultural pressure for thinness increased, and self-esteem decreased. The effect of negative affect on eating disorder symptoms was mediated by body dysphoria (Veron-Guidry et al., in press). In an examination of a similar model with high school females, negative affect was a significantly associated with eating disorder symptoms (Barker et al., 1996). Negative affect also mediated the effect of negative evaluation of self on eating disorder symptoms. Thus, as negative affect increased, eating disorder symptoms increased (Barker et al., 1996).

Increased body mass. Higher body weight than peers has been associated with the development of eating disorder symptoms. It has been proposed that women who are genetically prone to be heavier than the svelte ideal are at a greater risk for the
development of eating disorders (Striegel-Moore et al., 1986). Patton (1988) found that higher weight and the presence of depressive symptoms discriminated between students with problematic and non-problematic dieting. Higher body weight was found to be associated with eating disorder symptoms in adolescents (Whitaker et al., 1989). Young girls exhibiting disturbed eating and weight control practices were significantly heavier than peers in a study of sixth and seventh grade females (Killen et al., 1994). In a longitudinal study of late adolescents, Time 1 levels of obesity and teasing predicted Time 2 levels of weight and appearance dissatisfaction (Thompson et al., 1995). In a study of high school females, increased body mass index (BMI) was associated with the development of eating disorder symptoms, and this effect was mediated by body dysphoria (Barker et al., 1996).

Preoccupation with physical appearance. Netemeyer, Burton, and Lichtenstein (1995) have identified two aspects of physical preoccupation: a) an excessive concern for one's physical appearance; and b) perception of physical appearance. It has been proposed that the more a girl or woman defines herself based on her physical appearance and relationships with others, the more vulnerable she will be to develop binge eating (Striegel-Moore, 1993). Increased concern with physical appearance has been associated with increased body dysphoria. Overconcern with physical appearance is associated with increased body dysphoria because self-evaluation is unduly influenced by the perception of minor changes in body size (Williamson et al., 1993). Degree of disturbed eating was strongly correlated with overconcern with weight and physical appearance and interference of weight and appearance concerns with other life domains in undergraduate females (Mintz & Betz, 1988).

Perception of physical appearance assesses the degree to which individuals feel that they are physically attractive (Netemeyer et al., 1995). It has been suggested
that females who perceive themselves to be physically attractive are less likely to be dissatisfied with their bodies and have a lower likelihood of engaging in eating disorder behaviors (Brown, Cash, & Lewis, 1989). Overall body esteem has been shown to be higher in adolescents exhibiting high dietary restraint (Hill, Oliver, & Rogers, 1992).

Body esteem, defined as satisfaction with bodily changes, feelings of strength and health, and feelings of attractiveness, was predictive of maladaptive dieting across ages in a study examining the differences in dieting between early and middle adolescence (Gralen, Levine, Smolak, & Murmen, 1990). In a longitudinal examination of college females, an increase in disordered eating was associated with decreased ratings of attractiveness (Striegel-Moore, Silberstein, Frensch, & Rodin, 1989). Body esteem was shown to be significantly correlated with depression, eating disturbance, and teasing frequency regardless of menarcheal status (Fabian & Thompson, 1990).

The development of eating disorder symptoms was examined in 15 to 18 year olds. The results of this study indicated that the less attractive a female adolescent perceived herself, the higher the tendency toward development of an eating disorder.

Preoccupation with physical appearance and negative evaluation of physical appearance was identified as an additional risk factor for adolescents (Netemeyer et al., 1995).

Low self-esteem. Negative evaluation of self, or low self-esteem, has also been implicated in the development of eating disorder symptoms. Low self-esteem was implicated in the development of eating disorder symptoms in a sample of 15 to 18 year old females (Grant & Fodor, 1986). Self-esteem emerged as the most important predictor of tendencies toward anorexia nervosa and bulimia nervosa (Grant & Fodor, 1986). Similar results were obtained in a study of 13-19 year old eating disorder patients, athletes, and students which found that the eating disorder patients exhibited
significantly poorer self-images than the other groups (Mallick, Whipple, & Huerta, 1987). Negative evaluation of self was also implicated in the development of eating disorder symptoms in female children (Veron-Guidry et al., in press). In this study, children who evidenced low self-esteem displayed higher levels of body dysphoria, which was associated with increased eating disorder symptoms. Similar results were found in a study of high school students which also indicated that low self-esteem was associated with eating disorder symptoms (Barker et al., 1996). In this study, the effect of low self-esteem on eating disorder symptoms was mediated by negative affect.

**Social pressure for thinness.** Social pressure for thinness has also been examined as a potential risk factor for the development of an eating disorder (Barker et al., 1996; Levine et al., 1994; Shisslak, Crago, Neal, & Swain, 1987). The sociocultural pressures on women to achieve a thinner body shape and the subsequent influence that this pressure has on dieting can account for a portion of the increasing prevalence of eating disorders in young women (Mason, & Chaney, 1996). Because thinness is associated with accomplishment and success and tends to be the standard for women in American society, women who are raised in achieving, conforming families; who demonstrate a conforming personality style; and who are members of groups that focus on appearance, consensus, and achievement are considered more likely than others to adopt this ideal (Mason & Chaney, 1996). In an examination of middle-school girls, perceived parental pressure to be slender and peer investment in dieting was significantly associated with disturbed eating (Levine et al., 1994). Social influences which promote thinness as an ideal value, as is often depicted in the popular media, has also been validated as a risk factor of eating disorder symptoms (Stice et al., 1994). This study found that media exposure was directly and indirectly (through ideal body-type internalization) related to eating disorder symptoms. Social pressure for thinness
was significantly associated with body dysphoria in studies of children (Veron-Guidry et al, in press), adolescents (Barker et al., 1996), and female college athletes (Williamson et al., 1995). In each of these studies, as body dysphoria increased, eating disorder symptoms increased. In addition, parental pressure for thinness, which was mediated by body dysphoria, was also associated with eating disorder symptoms in the high school sample (Barker et al., 1996).

These converging lines of research have led to the development of a risk factor model for the development of eating disorders which is illustrated in Figure 1. If females have low self-esteem, become preoccupied with body shape and appearance, have elevated BMI, and perceive social pressure for thinness, they are at risk for developing symptoms of body dysphoria and depression. If body dysphoria and depression develop, in the context of these other risk factors, the individual will be at risk for developing symptoms of anorexia and/or bulimia nervosa (Barker et al., 1996; Veron-Guidry et al., in press; Netemeyer et al., 1995; Williamson et al., 1995). If social pressure for thinness, negative affect, and/or negative evaluation of self can be modified, then the likelihood that a young girl will evidence body dysphoria and subsequent development of eating disorder symptoms may be reduced (Veron-Guidry et al., in press).

**General Review of the Prevention Literature**

Prevention has been classified into three types: primary, secondary, and tertiary. Primary prevention is aimed at reducing the incidence of a disorder (Kessler & Albee, 1975). Secondary prevention targets the early detection of a disease with the main goal to enhance the positive effects of treatment (Schoemaker, 1995). Primary prevention, on the other hand, strives to modify the risk factors associated with the disease. High-quality, competence promotion programs that focus on children and their
Figure 1. Model of risk factors for the development of eating disorders.
socializing environments represent the state of the art in prevention (Weissberg, Caplan, & Harwood, 1991). Numerous primary prevention programs have been developed for substance abuse, and suicide, while relatively few studies have been conducted for the prevention of eating disorders. In general, these programs have utilized an information giving approach to prevention. The following is a review of these programs.

Lessons from substance abuse prevention. Several reviews have been conducted in the area of prevention of substance and alcohol abuse (Hochheimer, 1981; Moskowitz, 1989; Suski, 1992). Most alcohol abuse prevention programs utilize an educational approach and focus on changing the attitudes of adolescents toward alcohol (Moskowitz, 1989). It has been found that recent programs which focus on substance abuse prevention through the teaching of decision-making and problem-solving skills, as well as the development of healthy coping skills, result in improved knowledge and improved attitudes (Suski, 1992). Some observers argue that the mere conveyance of information about drugs may be irrelevant and even counterproductive to the prevention of substance abuse, resulting in no behavior change, or even more frequent drug use (Bangert-Drowns, 1988).

A recent review of the literature concluded that one of the most disappointing aspects of the substance abuse prevention field is the large number of health education and counseling programs which can only demonstrate that knowledge was enhanced or attitudes changed as a result of the intervention (Dryfoos, 1990). In a meta-analysis of substance abuse prevention programs, the programs reviewed most readily demonstrated an increase in knowledge about drugs, but the effect size associated with behavior change was half the effect size of knowledge changes (Tobler, 1986). Similar result were found in another meta analysis of substance abuse prevention programs.
(Bangert-Drowns, 1988). It was concluded that educational approaches have generally been unsuccessful in the prevention of alcohol abuse (Moskowitz, 1989; Suski, 1992).

Recent reviews have recommended the use of multi-component prevention programs which encompass more than factual information about drug and alcohol abuse (Suski, 1992). Appropriate prevention should incorporate honest education, promote the development of lasting self-esteem, and contribute to the formation of and involvement in activities that stand as healthy alternatives to alcohol and other drugs (Suski, 1992). A meta-analysis of controlled prevention programs for substance abuse indicated that the use of group discussion was indicative of significantly higher effects on attitude towards drug usage (Bangert-Drowns, 1988). Students who volunteered for substance abuse education reported lower drug usage after treatment than those required to attend (Bangert-Drowns, 1988).

Lessons from suicide prevention. Shaffer, Garland, Gould, Fisher, and Trautman (1988), in a review of suicide prevention literature, concluded that there was little support for the value of school education programs in suicide prevention. Further, the authors concluded that most students do not benefit from the programs and those who do need such a program would most likely benefit from a more individualized approach. Curriculum based programs usually include the following main goals: (a) raise awareness of the problem of suicide, (b) train participants to identify students at risk, and (c) to educate the participants about resources and referral (Garland & Ziegler, 1993). Few evaluations of such programs have been conducted, however, and the authors concluded that there is little evidence that the programs have the desired effect on knowledge and attitudes and may have a deleterious effect on some students (Garland & Ziegler, 1993). Essential elements for a successful suicide prevention program include: 1. focus on delivering specific skills at appropriate developmental
points, 2. teaching specific skills for resisting negative social influences, 3. include both promotion of life skills and specific skills for prevention of the particular problem, 4. ensure active student participation through learning methods such as modeling, role plays, performance feedback, and positive reinforcement (Kalafat & Elias, 1995).

Multi-component programs which increase self-esteem, social skills, and communication skills have been recommended in the development of future suicide prevention programs (Garland & Ziegler, 1993; Silverman & Felner, 1995).

**Review of eating disorder prevention.** The prevention of eating disorders is a relatively new area of study. Crisp (1988) advocated the primary prevention of eating disorders by providing information about eating disorders and their consequences, providing information about the development of eating disorders, and by teaching relevant behavior skills. In general, the studies of prevention to date have followed this design. This approach is similar to the strategies employed by substance and suicide prevention programs that have been developed. The general model of this type of strategy is that providing knowledge will change attitudes which in turn will alter behavior. Numerous authors have developed curricula for the prevention of eating disorders (e.g. Levine & Hill, 1991). However, few of the programs have been evaluated. In addition, colleges often invite recovering patients to speak on the dangers of eating disorders (Sesan, 1989). It has been suggested that this type of program may lead to inadvertent effects such as teaching about various dieting and purgative behaviors (Garner, 1985). Most of the evaluations of the prevention of eating disorders have been conducted with adolescent females.

Porter, Morrell, and Moriarty (1986) utilized an inoculation strategy in a multi-component prevention program which provided education about eating disorders, as well as art, dance and music workshops. A small number of children and adolescents...
aged nine to 16 years old were targeted. The program included a film and discussion of sociocultural influences on thinness. The dance component included a discussion of perfectionism, moderation, expression of feeling and dichotomous thinking. The music component was also designed to encourage expression of feelings and relaxation. Significant differences were noted on participants' drive for thinness, perfectionist tendencies, and degree of interpersonal distrust. The differences were immediate and no follow-up information was provided.

An eight session program was developed for use with boys and girls (Rosen, 1989). This program consisted of sessions on physical development, body image, weight modification, and decision making. The program utilized lecture and classroom discussion, as well as a student workbook which included homework assignments. The program led to an increase in knowledge about weight reduction behavior, but no changes in eating disorder behaviors (Rosen, 1989).

A large scale program developed by the Bulimia Anorexia Nervosa Association - Canadian American (BANA) was instituted with Canadian school children (Moriarty, Shore & Maxim, 1990). The BANA program consisted of four components. "Dieting and Eating Disorders" consisted of five lessons for females in grades 9 through 11. For males, the "Male Concerns with Eating Disorders" component was developed which consisted of one lesson for grades 9 thorough 11. These programs were implemented within physical education or family studies classes. "The Sociocultural Background of Anorexia Nervosa and Bulimia in North America" component contained five lessons units to be implemented within sociology courses in grades 9 through 11. Younger grades (seventh and eighth) were targeted with a 5 lesson unit entitled "Sociocultural Influences Which Promote Eating Disorders - and How to Forestall Them". The program was implemented by teachers within the school system. The researchers
reported difficulties controlling the implementation of the study. For example, in at least one school a teacher not trained in the research protocol obtained copies of the curriculum and implemented the curriculum within classes. Results indicated that the “Dieting and Eating Disorders” component increased participants knowledge of eating disorders as compared to the control group. However, no attitude change was reported. The “Sociocultural Influences which Promote Eating Disorders - and How to Forestall Them” component also increased participants knowledge of eating disorders, but resulted in more favorable attitudes toward eating disorders than the control group which demonstrated a worsening of attitudes about eating disorders from pre to post testing (Moriarty et al., 1990). Overall, feedback obtained from students and teachers was positive.

The use of videotape vignettes has also been examined with junior high age females (Moreno & Thelen, 1993). Short (6.5 minutes) vignettes were developed providing information about eating disorders and suggestions for resisting peer pressure and for weight management. The program resulted in increased knowledge about eating disorders, more positive attitudes, and “healthier” behavioral intentions about dieting.

Shisslak, Crago, and Neal (1990) examined a pilot program for the prevention of eating disorders in tenth grade students (n=50). The program targeted students (eight sessions), as well as, faculty and staff (four presentations) at the target school. Components included educational information about eating disorders and referral information. The educational component about eating disorders included information about symptoms and prevalence, psychological characteristics, medical complications, family characteristics, risk factors, and treatment and referral information. A consultation service was also provided by the research team, however only one student
attended for more than one session. The program was concluded to be effective in increasing knowledge about eating disorders, but attitudes and behavior change was not assessed.

Paxton (1993) developed a program for the prevention of eating disorders which focussed on eating and dieting behaviors and negative body image. The Body Image and Eating Behavior Intervention Program (BIEBIP) included the following content areas: 1. "ideal" female body shape - sociocultural influences; 2. determinants of body size and shape; 3. nutrition and weight reducing behaviors; 4. successful and unsuccessful dieting; and 5. awareness of physical needs and emotional eating. This program was implemented with ninth grade girls (n=136) over five sessions. No changes were found in dieting behavior, or body image dissatisfaction. Given the ineffectiveness of changing participants' attitudes toward eating disorders, it was concluded that prevention efforts should target younger adolescents. In addition, a large proportion of the participants were overweight, leading the author to conclude that information should also be offered about safe, long term weight loss strategies.

The effect of group discussion on the prevention of dieting and body image disturbance was examined in a small number of college age female subjects (Huon, 1994). Discussion of what might be helpful for other young women of approximately the same age to develop a more positive body image when focussed on strategies of change increased positive body affect and decreased negative feelings about the body for participants.

A large scale prevention program was developed for sixth and seventh grade girls (Killen et al., 1993). The program targeted the following components: 1. instruction on the harmful effects of unhealthful eating attitudes and weight regulation practices, 2. promotion of healthful weight regulation through the practice of sound nutrition and
regular aerobic activity; and 3. development of coping skills for resisting the diverse sociocultural influences that appear linked to the current popular obsessions with thinness and weight. Participants were provided with a treatment manual and lessons were covered in 18 sessions. Significant effects were found for knowledge, but no effects were found for eating attitudes and unhealthful weight regulation practices. It was concluded that prevention efforts should target those students most at risk for the development of an eating disorder rather than the entire student body many of whom would not benefit from the intervention.

A primary program for the prevention of eating disorders was evaluated in a group of tenth grade girls (Neumark-Sztainer, Butler, & Palti, 1995). This 10 session program was conducted during class hours by a nutrition/health educator and was presented to both males and females. The goals of the program were to change attitudes, knowledge and behavior about nutrition and weight control, improve body and self-image, and promote greater self-efficacy in dealing with social pressures regarding excessive exercise and dieting. The program also included an educational component about anorexia nervosa and bulimia nervosa. At six-month follow-up, girls in the intervention group displayed significantly greater nutrition knowledge, more regular meal patterns, and exercised more frequently. There was no effect on body dissatisfaction, self-esteem, attitudes towards weight loss methods, or food preferences. At two year follow-up, the significant variables at six month follow-up showed similar, but nonsignificant trends. The program led to significantly less binge eating, purgative behaviors, and recent dieting in overweight girls.

The studies to date on the prevention of eating disorders have typically yielded results of improved knowledge about eating disorders, but none has indicated a reduction in eating disorder behaviors. The negative results of early attempts to
prevent eating disorders should not discourage researchers from future efforts to
develop prevention programs for these disorders (Shisslak & Crago, 1994). The
authors concluded that it is critical to provide opportunities for young women to examine
and challenge the attitudes and behaviors that lead to eating disorders, and that this
can be done most effectively through school-based programs (Shisslak & Crago, 1994).

Numerous reviews have been written on the prevention of eating disorders.

Suggestions from Reviews of Prevention Efforts

Recent reviews of the literature on prevention of eating disorders have made a
number of recommendations for the development of future programs. Smolak and
Levine (1994) described recommendations for prevention programs targeting
elementary school children: (1) place an emphasis on the acceptance of diverse body
shapes; (2) emphasis that body shape is not infinitely mutable; (3) provision of
information on proper nutrition and exercise; (4) discussion of the negative effects of
dieting; and (5) the development of strategies to deal with teasing, and pressure to diet.

The involvement of parents in the prevention of eating disorders has been stressed by
several research groups (Smolak & Levine, 1994; Striegel-Moore, 1992; Thompson,
1996). The importance of targeting attitudes of fathers of adolescents has also been
stressed (Levine, 1994). Sociocultural influences such as an emphasis on thinness in
the media and the changing roles of women are also necessary components of a
prevention program for eating disorders (Shisslak & Crago, 1994). Interventions aimed
at discouraging weight loss efforts may also be effective in preventing binge eating and
in reducing body image dissatisfaction (Striegel-Moore, 1992). Prevention efforts must
take great care not to stigmatize the subjects targeted, and to not over react to often
normal dieting (Striegel-Moore & Silberstein, 1989).
Summary of the Research Literature

Eating disorders exceed most other high-incidence handicapping conditions treated in the educational systems (Phelps & Bajorek, 1991). Surveys of eating disorder behaviors in children and adolescents have indicated a larger percentage of students who display eating disorder symptoms than meet full criteria for an eating disorder. Studies have indicated that as many as 77% of white, female adolescents have dieted (Emmons, 1992). Female adolescent dieters report levels of body image dissatisfaction approaching clinical levels and exhibit lower self-esteem and symptoms of depression (Rosen et al., 1987). An eating disorder spectrum has been proposed where dieting, although usually unproblematic, is in some instances a precursor to eating disorder behaviors (Patton, 1988). Eating disorders lead to numerous medical problems and may be especially dangerous for children and adolescents. Adolescents with pre-pubertal onset of anorexia nervosa display arrested physical development, and prolonged amenorrhea has been associated with potentially irreversible osteopenia (American Psychiatric Association, 1993). Further, treatment outcome studies of anorexia nervosa and bulimia nervosa indicate that symptoms of the disorders often persist despite treatment gains.

Dieting and feelings of fatness do not, in most cases, lead to the development of an eating disorder. Numerous studies have examined biopsychosocial risk factors, such as gender, body dysphoria, depression, and body size, in an attempt to identify why some persons develop eating disorders and others do not. Recent series of studies have been conducted to examine risk factor models for eating disorder symptoms (Barker et al., 1996; Netemeyer et al., 1995; Stice et al., 1994; Veron-Guidry et al., in press). These studies have found that several risk factors interact to place some adolescents at-risk for the development of an eating disorder. In general, these
models indicate that if a preadolescent or adolescent girl has low self-esteem, perceives herself to be unattractive, perceives social pressure to be thin, or becomes preoccupied with body shape and appearance, then she is at risk for developing body dysphoria and negative affect. If body dysphoria or negative affect develops, in the context of these other risk factors, then the individual is at-risk for developing symptoms of anorexia nervosa and/or bulimia nervosa.

Primary prevention of substance abuse and suicide has received substantial attention in the scientific literature. Calls for eating disorder prevention are relatively recent, however, (Crisp, 1988). Reviews of studies of substance abuse and suicide prevention have found that providing knowledge about the dangers associated with a target behavior has little effect on behavior change. Similar results have been found in studies of the prevention of eating disorders to date.

Programs for the prevention of eating disorders have ranged from 1 to 18 sessions conducted during school hours and offered to the student body at large. In addition, the prevention programs for eating disorders to date have typically included an educational component which contained information about eating disorders and physiological effects of extreme behaviors. A consistent finding from the studies is an increase in knowledge about eating disorders and their consequences, but no decrease in actual eating disorder symptoms. Some researchers have concluded that providing information about eating disorders may teach participants how to engage in the maladaptive behaviors (Gamer, 1985). An alternative approach would be to target the risk factors for the development of an eating disorder rather than providing education about the dangers associated with the disorders. The prevention literature has indicated the need for multi-component programs which increase self-esteem, social skills, and improve communication skills (Weissberg et al, 1991). The current program
for the prevention of eating disorders has been designed to target the risk factors for
the development of an eating disorder, such as body dysphoria and negative affect,
rather than providing information about the target behaviors. The impact of
sociocultural influences on the development of eating disorders has been stressed. In
previous prevention efforts, however, this has primarily been targeted by including a
discussion on these influences in the curriculum. The current program targeted
sociocultural influences by incorporating this as a treatment component as well as, by
including interested parents and teachers in the program. In addition, male students
attended the sessions.

In addition to targeting the risk factors associated with the development of
anorexia nervosa and bulimia nervosa, the current program included an expanded
program for those students identified as at-risk for the development of an eating
disorder. Killen et al. (1993) concluded that prevention programs should be offered to
only those students "at-risk" for the development of anorexia or bulimia nervosa. In
addition, targeting at-risk students would maximize the benefits of such a program,
while minimizing the costs (Schoemaker, 1995).

The purpose of the current study was to develop and implement the Body Logic
program for the prevention of eating disorders within schools and determine its
immediate effects on the participating students, parents, and teachers. This study was
designed to evaluate the immediate effects of the Body Logic Program, thus cannot be
construed as a true evaluation of prevention. Long-term follow-up of the participating
students will occur after the completion of the current study in the next school year.
This will be evaluated in a separate study. Figure 2 outlines the experimental phases of

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Figure 2. Experimental phases of the current study.
the current study. It has also been concluded from previous prevention efforts that targeting high school or college age students may be too late to allow for an effective prevention effort (Paxton, 1993). Therefore, the current study targeted junior high level students (6th, and 7th grade). This age group is also undergoing synchronous developmental changes, such as the onset of puberty and dating, that, in conjunction with weight concerns, have been proposed to be an additional risk factor for the development of eating disorder symptoms (Levine, Smolak, Moodey, Shuman, & Hessen, 1994). Planning stage 1 was conducted over the previous school year. Focus groups comprised of educators and administrators were held at various area public and private schools. In addition, focus groups for parents were also held and a parental advisory board was developed. Planning stage 2 included announcements sent to teachers and parents within each school explaining the upcoming program. Through these announcements, interested teachers were invited to the teacher component of the Body Logic program. During this planning stage, information packets and informed consent were sent to the parents and children.

Baseline assessment occurred during experimental phase 1 of the study. The current program offered a school education component to the general student body, as well as a voluntary intensive program for those students identified as "at-risk". The school education component was held during experimental phase 2 of the study. The school education program included interactive homework assignments to encourage parental involvement. Due to the concerns about iatrogenic effects of educating students about eating disorders (Schoemaker, 1995), information about behaviors associated with an eating disorder was limited. The use of a treatment manual has been recommended to increase treatment integrity (Waltz, Addis, Koerner, & Jacobson, 1993). A treatment manual was developed for the therapists to follow, and checklists
were developed for each of the intervention sessions. The checklists included the main goals of each session and ratings to be made by the co-therapists. The importance of educating teachers and school counselors about eating disorders has been stressed (Shisslak et al., 1987). During experimental phase 2, a teacher component was offered to interested teachers. Experimental phase 3 of the study consisted of the expanded component for students identified as at-risk for the development of an eating disorder. The parents of these children were also invited to this program. Feedback about the Body Logic Program components was obtained at the completion of each phase from participating students, parents, and teachers. Because of the intensive nature of the current prevention program, the acceptability of this program was assessed for parents, teachers, and students. A ratings scale to assess acceptability has been developed for the current study. This scale is based on a measure previously developed to assess treatment acceptability (Treatment Evaluation Inventory - short form; TEI-SF; Kelley, Heffer, Gresham, & Elliot, 1989).

**Major Aims of the Current Study**

The primary goal of the current study was to examine the immediate effects of the components of the Body Logic program on participating students. The program was designed to target the risk factors for the development of an eating disorder (see Figure 1). Specifically, the components attempted to decrease overconcern with body and body dissatisfaction in persons of normal body weight, a condition which has been called "body dysphoria" (Williamson, Barker, Bertman, & Gleaves, 1995). It was hoped that by targeting this risk factor, eating disorder symptoms would decrease. The sessions were also designed to provide information about nutrition and unhealthy dieting. The teacher workshop provided an overview of the Body Logic Program and information about the development of eating disorders.
The study was implemented in two area schools. Baseline assessment was conducted to ascertain levels of the risk factors for the development of an eating disorder, as well as treatment outcome assessment. Interventions were time lagged across schools. This experimental design (see Figure 3) allowed for comparison between the school education component offered to the entire student body and the expanded program which targeted the at-risk students. By randomizing schools, rather than class or grade, group contamination by sharing of information about the program between groups was deterred. In addition, to avoid potential stigmatization of those students identified as at-risk, all interested students and parents were invited to attend the expanded program. It was predicted that the school education component of the current program would lead to a decrease in fears of fatness and an increase in nutritional knowledge. Further, the expanded program for students at risk for the development of an eating disorder would lead to decreases in reported eating disordered behaviors such as restrictive eating, binge eating, purgative behaviors, and avoidance of feared foods. It was hoped that the expanded program would also lead to decreases in fear of fatness, and depression. It was expected that teachers would demonstrate similar decreases in social attitudes towards thinness and increases in knowledge about eating disorders and referral information.
<table>
<thead>
<tr>
<th></th>
<th>Baseline (1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
<th>(5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>School 1</td>
<td>Screening</td>
<td>General Education</td>
<td>*</td>
<td>Intensive Intervention</td>
<td>*</td>
</tr>
<tr>
<td>School 2</td>
<td>Screening</td>
<td>Wait</td>
<td>*</td>
<td>Wait</td>
<td>General Education</td>
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<tr>
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<td>Intensive Intervention</td>
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*Note: Testing = *

Figure 3. Design of the student component of the Body Logic Program.
METHOD

Subjects

Subjects were 287 sixth and seventh grade students recruited from two private schools. One hundred twenty-two students volunteered to participate from School 1, and 165 students volunteered to participate from School 2. This age group was selected based upon recent research showing that the earliest symptoms of eating disorders are observed in grades three through seven (Veron-Guidry et al., in press). Informed consent was obtained from both the parents and the children. Copies of the consent forms can be found in Appendix A. Students whose parents did not give permission for their children to participate in the study were not assessed. In school 1, 63 (34%) of the students refused to participate in the study, while 20 (11%) of the students from school 2 chose not to participate. Seven students decided to discontinue the study after the initial assessment session.

All interested teachers, coaches, guidance counselors, and principals were invited to attend a workshop on the prevention of eating disorders. This program was also time lagged across schools see Figure 4. Informed consent was attained from the educators prior to attending the program. Sixteen teachers from school 1 opted to participate in the initial session of the workshop. Parents of the at-risk students were invited to attend the expanded component of the Body Logic program. At least one parent was required to attend sessions with their child.

Measures

Baseline assessment involved screening of students at participating schools. Assessment measures were administered before the implementation of the prevention
<table>
<thead>
<tr>
<th>School 1</th>
<th>*</th>
<th>Intervention</th>
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<tr>
<td>School 2</td>
<td>wait</td>
<td>wait</td>
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*Note: Testing = *

Figure 4. Design of the teacher component of the Body Logic Program.
program to identify those students at a high risk for the development of an eating disorder, and to obtain pre-treatment data for evaluating outcome of the prevention program. Table 1 presents the measures used in the study.

**Body Image Assessment for Children and Adolescents (BIA).** The BIA procedure for children (Veron-Guidry & Williamson, 1996) is a modification of the Body Image Assessment (BIA) procedure developed by Williamson, Davis, Bennett, Goreczny, and Gleaves (1989). This procedure involves two sets of body image cards that correspond to male and female children and pre-adolescents. Each set includes nine cards and on each card there is a silhouette of a figure whose body size ranges from very thin to obese.

The BIA procedure involves the placement of the nine body image cards in random order in front of the child. The participant is then given the following instructions: "I want you to look at all of the cards and point to the one that most looks like you do right now. You can only pick one card." After the child picks a card, the cards are reshuffled and again placed in front of the subject in random order. The child is then given the following instructions: "I want you to look at all of these cards and point to the one that you would most want to look like if you could look like any of these. You can only pick one card." This procedure yields an estimate for current body size (CBS) and ideal body size (IBS). A body size dissatisfaction score is derived from the difference between CBS and IBS. This measure assessed body image dysphoria in the current study. Test-retest reliability for the BIA was estimated at .79 for CBS, and .67 for IBS. Concurrent validity established has also been established (Veron-Guidry & Williamson, 1996). Scores were converted to t-scores and a discrepancy score one standard deviation above the mean was used to determine risk status.
### Table 1

#### Summary of Measures for the Current Study

<table>
<thead>
<tr>
<th>Measures</th>
<th>Purpose</th>
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<tbody>
<tr>
<td>Eating Attitudes Test for Children (CHEAT)</td>
<td>Assess eating disorder symptoms; identify at-risk students</td>
</tr>
<tr>
<td>Body Image Assessment for Adolescents (BIA-A)</td>
<td>Assess body image disturbance; identify at-risk students</td>
</tr>
<tr>
<td>Children’s Depression Inventory (CDI)</td>
<td>Assess depression; identify at-risk students</td>
</tr>
<tr>
<td>Rosenberg Self-Esteem Scale</td>
<td>Assess negative self-evaluation; identify at-risk students</td>
</tr>
<tr>
<td>Physical Perception Scale</td>
<td>Assess physical preoccupation; identify at-risk students</td>
</tr>
<tr>
<td>Physical Concern Scale</td>
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<tr>
<td>Perception of Social Pressure Scale</td>
<td>Assess perceived pressure for thinness; identify at-risk students</td>
</tr>
<tr>
<td>Additional Items</td>
<td></td>
</tr>
<tr>
<td>BMI</td>
<td>Assess body mass</td>
</tr>
<tr>
<td>Multi-axial Assessment of Eating Disorder Scale (MAEDS)</td>
<td>Evaluate the impact of the prevention program (DV)</td>
</tr>
</tbody>
</table>
The Children's Depression Inventory (CDI). The Children's Depression Inventory (Kovacs & Beck, 1977) is a modification of the Beck Depression Inventory commonly used to assess depression with adults (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961). This 27 item, self-report measure assess a child's mood and feelings during the two weeks prior to administration. Satisfactory reliability and validity have been demonstrated (Saylor, Finch, Spirito, & Bennett, 1984).

Children's Version of the Eating Attitudes Test (ChEAT). This measure was adapted from the Eating Attitudes Test (EAT; Garner & Garfinkel, 1979) which is a measure of eating attitudes commonly used with adults (Maloney, McGuire, & Daniels, 1988). This is a 26 item self-report measure that assesses eating attitudes, dieting behaviors, and food preoccupation in children. A score of 20 or above is indicative of anorexic attitudes towards eating. Satisfactory test-retest (.81) and internal reliability (Chronbach's alpha=.76) of the ChEAT has been reported (Maloney et al., 1988). A recent study examined the factor structure and concurrent validity of the ChEAT. Four factors were identified: 1. dieting; 2. overconcern with eating; 3. social pressures to increase body weight; and 4. extreme weight control habits. Moderate correlations were found for the dieting, social concern with eating/body, and purging factors. Dieting was found to be negatively correlated with body mass. Social pressure to increase body weight was found to be positively correlated with adiposity (Bentz, Williamson, DeLaney, Bray, & Womble, 1996).

Multi axial Assessment of Eating Disorders Symptoms (MAEDS). The MAEDS (Anderson, Williamson, Duchmann, Gleaves, & Barbin, 1996) was developed as a brief self-report inventory which could be used to evaluate treatment outcome for anorexia and bulimia nervosa. It was constructed to measure six symptom clusters which have been found to be central to eating disorders: 1. depression; 2. binge eating; 3. purgative
behavior; 4. fear of fatness; 5. restrictive eating; and 6. avoidance of forbidden foods. The MAEDS was found to have a stable factor structure, and to have satisfactory reliability and validity (Anderson et al., 1996). Coefficient alphas for each of the scales ranged from 0.80 (purging behavior) to 0.92 (binge eating) indicating strong internal consistency for each of the scales. Coefficient alphas for test-retest reliability ranged from 0.89 (binge eating) to 0.99 (purging behavior). Preliminary results also indicate that the measure is sensitive to changes in eating disorder symptoms over the course of treatment. The MAEDS was used as a treatment outcome measure to assess eating disorder symptoms in the students. The MAEDS requires a third grade reading level. Some of the items were reworded to provide suitable explanation of eating disorder behaviors for a sixth and seventh grade reader. Coefficient alpha was calculated for the present sample.

Rosenberg Self-Esteem Scale (RSE). The Rosenberg Self-Esteem Scale (Rosenberg, 1965) is a general measure of self-esteem designed for use with adolescents. The scale contains 10 items which are summed to create a global self-esteem score. Lower scores indicate higher self-esteem. The scale has high internal consistency (Cronbach's alpha coefficient = .87) and test-retest reliability (.85; Wylie, 1989). This measure was used to assess negative evaluation of self in the participating students.

Preoccupation with physical appearance, negative evaluation of physical appearance, and social influence on thinness scales. Three scales adapted from a measure of how physical appearance relates to marketing and consumer behavior (Netemeyer, Burton, & Lichtenstein, 1995) were used to measure preoccupation and negative evaluation of physical appearance, and social influences on thinness. The physical concern scale is composed of four items. Test-retest reliability estimates were
The perception of physical appearance scale contains five items, and test-retest was .90. Perceived social/media influence on thinness consists of four items with a test-retest reliability of .85. Total Scale test-retest was .80. Item total correlation indicated alphas of .89 for Time 1 testing and .92 for Time 2 (Womble, Williamson, & Netemeyer, 1996). The items were previously adjusted for a third grade reading level (Veron-Guidry et al., in press). This measure has primarily been used with females, therefore male versions of certain items were created for this study. Age appropriate versions of the measure were used with the student and adult participants.

**Diet and Health Knowledge Survey Questionnaire.** This is a measure currently being developed (Geiselman, Anderson, Champagne, & Funsch, 1996). This is a 42 item measure which assesses general knowledge about nutrition. Age appropriate versions were used to assess nutrition knowledge for students, parents and teachers (see Appendices O and P). The adult participants of the current study completed the full 42 item questionnaire. The students completed a shortened version of the measure which includes 11 questions from the original measure and three additional age appropriate questions developed for the current study. Psychometric information for adult samples was gathered in a separate study. Psychometric analyses were conducted on the children's version of the measure using information gathered in the current study.

**Additional Items.** In addition to completing the above questionnaires, subjects were asked to respond to questions related to perceived parental pressure for thinness (Barker, Williamson, Netemeyer, & Womble, 1996). The questions were two Likert scale questions regarding how much pressure the participants perceive from each of their parents to be thin.
Eating disorder knowledge. The faculty that participate in the teacher workshop received a measure of eating disorder knowledge. This measure was developed for the current study. It is based on a measure utilized by a previous prevention program (Shisslak et al., 1990.) The questions have been designed to assess teachers knowledge about eating disorders as well as appropriate referral information.

Procedure

Planning Stage 1. Planning stage 1 of the current study was devoted to the development of the prevention program. Focus groups consisting of educators and graduate students and psychologists working with eating disorders were held to aid in the development of the program. Several area junior and senior high schools were contacted to participate in the focus groups. The focus groups were attended by coaches, teachers, guidance counselors and administrators. All of the educators surveyed felt that the program was a useful endeavor and would like to see the program in their schools. A separate focus group was held for parents from a variety of schools. The parents provided information about the components of the program, as well as feedback on how to contact parents of children identified as “at-risk”. The parents also choose the name Body Logic for the program from a list of possible alternatives. The parents also felt that the Body Logic program was a useful endeavor. From the initial focus group of parents, a parent advisory board for the project was established.

Planning stage 2. During planning stage 2 of the current study, the Body Logic program was presented to the faculty and parents at each of the target schools. The design of the interventions was presented to faculty of the schools prior to the baseline assessment. Announcements about the Body Logic Program were made by the faculty of each school and through school newsletters. Through the memos and
announcements, interested teachers, coaches, guidance counselors, and administrators working with the sixth and seventh grade students were encouraged to attend the teacher component of the Body Logic program. Parents received an overview of the study through a parents packet that was sent home with the children (see Appendix A). This packet encouraged discussion of the program between parents and children. An overview of the intervention was also provided to the student along with the informed consent forms. Students and parents were provided several phone numbers staffed by members of the research team to answer any questions about the program. In addition, school personnel were instructed to refer any questions about the program to the author of this study.

In each school there were four phases: 1) baseline measurement, 2) administration of the school education program, 3) administration of the intensive treatment program for at-risk children and their parents, or a control condition, and 4) follow-up. Schools were randomly assigned to one of two treatment conditions. Active interventions were time lagged across schools in order to establish control conditions to evaluate the immediate impact of the prevention program. The design of the study was similar to a multiple baseline design across settings design used in applied behavioral analysis. Thus, while School 1 entered experimental phase 2 of the study, School 2 served as a wait-list control condition. School 2 began experimental phase 2 after School 1 had completed phase 2. A research team was established for the Body Logic program. The members of the team included the author of the current study, a clinical psychologist, a registered dietitian, and three additional graduate students in clinical psychology at Louisiana State University. The research team was supervised by D. Williamson, Ph.D. The school education sessions were led by two member research teams with one team member serving as the group leader. These sessions
were directed by the graduate students in clinical psychology. All team members have experience in the treatment of eating disorders. The graduate student team members have each completed at least one year of practicum training under the supervision of D. Williamson, Ph.D. All research team members have attended meetings throughout the development of the Body Logic program. All research team members attended training sessions to review the goals for each session and associated exercises. These were supervised by the author of the current study and D. Williamson, Ph.D. Training materials included the therapist checklists for each session, the workbook to be utilized with the students, and the slides to be used in sessions related to body image. The identified group leaders participated in the school education component of the Body Logic Program in each of the schools, and through each of the experimental phases. These research team members also conducted the treatment outcome assessments.

Experimental phase 1. Baseline assessment occurred for the students at each of the school during experimental phase 1. The baseline assessment was conducted by members of the research team. Experimental phase 1 took place over a two week period. Baseline assessment consisted of screening for risk factors for the development of an eating disorder, as well as, treatment outcome assessment. The 287 students who participated were administered the MAEDS, nutrition knowledge, CDI, ChEAT, RSE, Physical Perception, Physical Concern, Perception of Social Pressure, and parental pressure questions at baseline assessment. The instructions were read to the children aloud, and at least one member of the research team remained in the classroom while students completed the questionnaires. The BIA assessment procedure, height and weight were measured privately, however 12 students opted to self-report their weight. Children were asked to remove their shoes, but not allowed to remove other articles of clothing while being weighed. Height and
weight information was converted to body mass index (BMI). The formula for BMI is computed by dividing the subject's weight in kilograms by the square of his/her height in meters.

Using measures described, students at Schools 1 and 2 at a high risk for the development of an eating disorder were identified. A decision hierarchy based on the models for the development of eating disorders was used to determine risk status. A student was identified as at-risk for the development of an eating disorder if one of the following conditions was met (see Table 2). Condition 1 was defined as elevated levels of eating disorder symptoms as indicated by scores one standard deviation above the mean for sample on the ChEAT. Condition 2 was defined as the presence of elevated levels of body dysphoria and negative affect as indicated by scores one standard deviation above the mean for the sample on the BIA discrepancy score and the CDI. Condition 3 was specified as scores one standard deviation above the mean for sample on three out of the following: (a) negative evaluation of self; (b) physical preoccupation; (c) perceived pressure for thinness; or (d) increased body mass.

The MAEDS and nutrition knowledge measures were re-administered to the children as close to 4 week intervals as possible. The mean time between testings was 38 days. The testing sessions were scheduled after the completion of each experimental phase. In school 1, outcome assessment was conducted during homeroom time, and was monitored by members of the research team as well as faculty from the school. Sixth and seventh grade participants were tested on the same day. Outcome assessment was conducted during classroom guidance times at School 2. Sixth and seventh graders were tested on separate days for this school. These
<table>
<thead>
<tr>
<th>Condition</th>
<th>Definition</th>
<th>Measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Condition 1</td>
<td>elevated levels of eating disorder symptoms</td>
<td>ChEAT</td>
</tr>
<tr>
<td>Condition 2</td>
<td>elevated levels of body dysphoria and depression</td>
<td>BIA (discrepancy score)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>CDI</td>
</tr>
<tr>
<td>Condition 3</td>
<td>3 of the following:</td>
<td>RSE</td>
</tr>
<tr>
<td></td>
<td>(a) negative evaluation of self</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(b) negative perception of physical appearance</td>
<td>Physical Perception</td>
</tr>
<tr>
<td></td>
<td>(c) perceived pressure for thinness</td>
<td>Physical Concern</td>
</tr>
<tr>
<td></td>
<td>(d) higher weight level</td>
<td>Perception of Social</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pressure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>parental pressure questions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>BMI</td>
</tr>
</tbody>
</table>
testing sessions were monitored by the research team members and the school counselor.

**Experimental phase 2.** Following the baseline assessment, the school education component of the Body Logic program was implemented in School 1. School 2 served as wait-list control. Following the completion of experimental phase 3, School 2 began experimental phase 2. The school education component consisted of three sessions. School 1 opted to hold the sessions once per week for three weeks. Students from School 1 were divided into ten class sections (five per grade), thus there was a mean of 12.2 students in each class. School 2 opted to hold classes over a three day period of one week. The class size was larger (mean = 27.5) students per class than School 1 as students were divided into six class sections (three per grade).

In both schools, teachers of various curricula allowed the program to be implemented within their classrooms. A treatment manual was used by the research team to provide a method of treatment integrity. Research team members attended training sessions outlining the main points of each module. Checklists were developed for completion by the research team at the completion of each session. Four of the research team members served as facilitators for these sessions with at least two to three of the school education group leaders present at each session. In addition, the students completed brief checklists to assess retention of the material presented.

The school educational component implemented in experimental phase 3 was based on previously proposed programs (e.g., Shisslak et al., 1987), suggestions from recent reviews of eating disorder prevention studies, and the information gathered during the focus groups. This component included a variety of exercises to increase students’ knowledge of basic nutrition, and realistic weight requirements for height and age. Didactic material describing natural changes in the body and resulting weight gain
associated with puberty was provided through didactic and interactive exercise. For example, a slide presentation provided an overview of historical changes in sociocultural ideals (Stormer & Thompson, 1996) followed by a discussion of the material. Information was presented on the development of a negative body image and included a discussion if the impact of teasing. Students also received information about the impact of a negative body image on self-esteem. The class also participated in the "Great Debate" in which the class debated the acceptance of current sociocultural ideals. A review of nutrition guidelines and the basic nutrition was also presented.

Assignments were developed to encourage interaction between the child and parents. Following the completion of the school education program in school 1, measures of eating disorder symptoms and nutrition knowledge were administered to both schools at time 2.

The teacher workshop was also presented during experimental phase 2. Information gathered from the focus groups indicated the need for a teacher component of the Body Logic program. This workshop was led by the one of the clinical psychologists of the research team and co-led by the author of the current study. The teachers received a description of the Body Logic program. The teacher workshop also included information on normative discontent of body image, risk factors for the development of an eating disorder, basic information about eating disorders, and information about referral. Teachers were also encouraged to avoid overreacting to "normal" dieting, since dieting is so common in our society. Faculty were also provided information on the warning signs of eating disorders and appropriate referral information. It was stressed that teachers should not attempt treatment of perceived difficulties on their own. It was also stressed that the student participants in the expanded component of the Body Logic program would remain confidential. The

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workshop was held over two sessions for School 1. Sixteen teachers attended the first session, however only seven attended the second session. Measures were administered one week prior to the scheduled workshop, and again upon completion. Feedback was obtained to assess acceptability of the workshop and for further refinement of the program. Of the, teachers who attended both sessions, six teachers completed the outcome measures. School 2 did not have regularly scheduled in service times in which to present the teacher workshop. Three teachers from School 2 were interested in attending the teacher workshop after school hours. However, these teachers reported that they would be unable to attend when the research team attempted to schedule a time that was convenient to them.

**Experimental phase 3.** A more intensive program for "at risk" students was developed based on information gathered from previous prevention efforts and the focus groups. This program was open to all interested students and parents, but students identified as "at-risk" for the development of an eating disorder were encouraged to attend. After the completion of the school education component (experimental phase 2), the students who had been identified as "at-risk" and other interested students were invited to attend the expanded component of the Body Logic program (experimental phase 3). This program was designed to provide more in depth information on the topics covered in the school education component as well as information on how to change a negative body image. Exercises were designed to include both the student and the parents through a combination of didactic and interactive presentations. The expanded program included four sessions covering the following content areas. The body image component consisted of two sessions targeting the development of negative body image and how to improve a negative body image. The "Development of Negative Body Image" component included information
and exercises reviewing the developmental influences of body image, body changes associated with puberty, biological limitations of body shape, as well as affective and situation specific components of body image. This session was planned to introduce the concept of self-monitoring negative self-talk. "How to Improve a Negative Body Image" included information about appearance assumptions, and altering negative self-talk. One session included more detailed information about nutrition. This session provided exercises on the recognition of fad diets, resisting peer pressure to diet, and the basics of healthy eating and exercise. This session also allowed the parents and children to meal plan and discuss potential problems with meal times. A final session included an overview of communication training and problem solving.

The parent component of the Body Logic Program was scheduled to be held concurrently with the expanded intervention for the children in each treatment condition. The research design of the parent program is presented in Figure 5. All parents of the participating students were invited to attend the Body Logic Program through the initial parent packet sent home with the children and a flyer sent home with the children. Parents of children identified as at-risk for the development of an eating disorder were contacted and encouraged to participate in the expanded component of the Body Logic Program. All phone calls were handled by the principal investigator (Paula Varnado, M.A.). The children were informed that their parents might be contacted via informed consent as well as during the overview of the study. Although both parents were encouraged to attend the expanded program with their child, at least one parent was instructed to attend each of the sessions. The same parent was instructed to attend the first and final session of the program. Parent sessions were designed to be held separately from the sessions for their children. Content of the parent component focussed on the information presented to the children, and ways to support changes
<table>
<thead>
<tr>
<th>School 1</th>
<th>*</th>
<th>Intervention</th>
<th>*</th>
</tr>
</thead>
<tbody>
<tr>
<td>School 2</td>
<td>wait</td>
<td>wait</td>
<td>*</td>
</tr>
</tbody>
</table>

**Note:** Testing = *

Figure 5: **Design of the parent component of the Body Logic Program.**
that their children were making. The parents were invited to attend sessions on body image, nutrition, and basic communication and problem-solving skills. The body image component took part in two sessions “Normative Discontent of Body Dissatisfaction” and “How to Improve a Negative Body Image”. The “Normative Discontent of Body Dissatisfaction” session included exercises and information about the development of negative body image, and the sociocultural impact on body image. In addition, the parents were encouraged to examine their own body image dissatisfaction and the ways in which bias about body shape is communicated. Basic nutrition and exercise information was presented, as well as information on the dangers of extreme dieting. Parents received an overview of cognitive therapy, self-esteem building, communication training and problem solving.

Parents of the children identified as at-risk from School 1 received a phone call inviting them to the expanded component of the Body Logic Program. Of these, only one parent and student were interested in this part of the program. This parent and child opted to wait until another group could be organized rather than attend the program individually. Seven of the parents did not return phone calls made by the author of the study. Four of the parents stated that they would be unable to attend the program as scheduled due to other commitments (e.g. volleyball, business trips). Two parents stated that they did not feel that the assessment was an accurate representation of their children and therefore were not interested in the program. Due to the response of parents from School 1, increased efforts were made to contact the parents of children identified as at-risk in School 2. Letters outlining the results of the initial assessment were sent to the parents of children identified as at-risk in School 2 (see Appendix B). The letters were followed by a phone call to the parents. Of the thirty-nine parents contacted, nineteen returned phone calls by the author of the
present study. Of these, seven stated that they were not interested in the expanded program. These parents primarily reported that they did not feel that the assessment was an accurate presentation of their child and did not feel the expanded program would be useful. One parent stated that although the results were valid, the parents felt that they could deal with this without assistance. Two parents expressed an interest in the program, but were unable to attend due to scheduling conflicts (e.g. business trip, and moving). Three parents stated that they were interested, but would call back after talking with their children. Six parents confirmed to attend the expanded program. Of these, only one parent and child attended the initial session. This family opted to participate in the program individually.

**Experimental phase 4.** After School 1 had completed experimental phase 2, the participants from that school entered the follow-up phase. This provided a 10 week follow-up for School 1. School 2 had a much shorter follow-up due to conflicts with scheduling at the end of the school year. These students will complete follow-up assessment at the beginning of the next school year in a separate study.

**Methods to increase compliance.** Drawings for prizes were utilized to increase participation. Parents, children, and teachers were given the opportunity to have their names put into a drawing for participation in each phase of the study. Age appropriate prizes were offered at the completion of each experimental phase. At the completion of the study, two grand prizes were awarded at each school.

**Statistical Analysis**

To examine the primary hypothesis regarding the effectiveness of the Body Logic components, the following analyses were conducted. All females and males were examined separately. The primary dependent variable, the total MAEDS score, was entered into a univariate analysis of variance to determine if there were significant
group differences between schools on the total score of the MAEDS and nutritional knowledge measure at baseline. If a significant school main effect was indicated, baseline assessment was covaried for the subsequent analyses. Following this analysis, the total MAEDS score was entered into a repeated measures univariate analysis of variance for each sample. Initially, analysis was conducted for all females. If a significant effect was indicated for the total MAEDS score, then univariate analyses were conducted for each of the MAEDS scales. The primary effect required to test the experimental hypothesis was a significant school by time interaction. When an interaction was indicated, the following post-hoc analyses were conducted. To compare between subject effects of schools at each point in time, t-tests were examined. For within subjects changes across time, Newman-Keuls tests were calculated. If significant differences were indicated for all females, a separate analysis was then conducted for those females identified as at-risk for the development of eating and weight difficulties. If significant school by time interactions were indicated on MAEDS scales, post-hoc analysis was conducted in the same manner as for the total MAEDS score. If significant differences were indicated for at-risk subjects, the students identified as not at-risk were examined to determine differences between these students and those identified as at-risk. Analysis was conducted in the same manner for the Nutrition Knowledge scales, then for the males.
RESULTS

Demographic Data

Participants in this study ranged in age from 10 to 13 years old. The total number of participants at each age were as follows: 10 years (n=2, 0.7 percent); 11 years (n=90; 31.36 percent); 12 years (n=140; 48.78 percent) and 13 years (n=55; 19.16 percent). Sixth grade participants from School 1 consisted of twenty-seven males and thirty-seven females. Seventh grade participants from School 1 consisted of twenty-one males and thirty-seven females. School 2 participants included thirty-five males and forty-five females from the sixth grade and forty-seven males and thirty-eight females from the seventh grade. Most of the subjects were Caucasian (90.8%). In addition, 3.2% of the subjects were African-American, 1.4% were Asian, and 4.6% indicated that they were of some other ethnicity. Of all participants, 55 students were identified as at-risk for the development of an eating disorder. A substantial majority of those identified as at-risk for the development of eating and weight difficulties were female (83.6%).

Sample means and standard deviations for weight, height, and BMI according to age and gender are presented in Tables 3 and 4. In Table 5, these data are compared to body mass index norms presented by Must, Dallal, and Dietz (1991), based on a large, nationally representative sample for people ages 6 to 74 years old. Body mass index values are somewhat higher than the 50th percentile normative values presented by Must et al. (1991). However, body mass indices, with the exception of 11 year old males, were below the 85th percentile norms for 10-13 year olds (20.19 to 23.08 females; 20.19 to 21.93 males) and did not approach obesity.
Table 3

Means and Standard Deviations of Height, Weight, and Body Mass Index of Females

<table>
<thead>
<tr>
<th>Age</th>
<th>n</th>
<th>Mean Height (inches)</th>
<th>Mean Weight (pounds)</th>
<th>BMI</th>
</tr>
</thead>
<tbody>
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<td>10</td>
<td>2</td>
<td>57.5</td>
<td>76.5</td>
<td>16.21</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(7.07)</td>
<td>(16.26)</td>
<td>(.52)</td>
</tr>
<tr>
<td>11</td>
<td>54</td>
<td>58.57</td>
<td>89.21</td>
<td>18.09</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(3.13)</td>
<td>(23.63)</td>
<td>(3.39)</td>
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<tr>
<td>12</td>
<td>73</td>
<td>61.96</td>
<td>104.32</td>
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<tr>
<td></td>
<td></td>
<td>(3.11)</td>
<td>(22.50)</td>
<td>(3.25)</td>
</tr>
<tr>
<td>13</td>
<td>28</td>
<td>62.81</td>
<td>110.26</td>
<td>19.52</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(3.01)</td>
<td>(23.93)</td>
<td>(3.21)</td>
</tr>
</tbody>
</table>

Note: Standard deviations are in parentheses; BMI = Body Mass Index.

Table 4

Means and Standard Deviations of Height, Weight, and Body Mass Index of Males

<table>
<thead>
<tr>
<th>Age</th>
<th>n</th>
<th>Mean Height (inches)</th>
<th>Mean Weight (pounds)</th>
<th>BMI</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>36</td>
<td>59.69</td>
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<td>13</td>
<td>27</td>
<td>64.11</td>
<td>113.96</td>
<td>19.41</td>
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<tr>
<td></td>
<td></td>
<td>(3.29)</td>
<td>(19.69)</td>
<td>(2.50)</td>
</tr>
</tbody>
</table>

Note: Standard deviations are in parentheses; BMI = Body Mass Index.
Table 5

**Comparison of Body Mass Index (BMI) Data to Reference Data (Must, Dallal, & Dietz, 1991)**

<table>
<thead>
<tr>
<th>Age</th>
<th>n</th>
<th>Subjects' BMI</th>
<th>Reference BMI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Females</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>2</td>
<td>16.21</td>
<td>17.00</td>
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<tr>
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<td>54</td>
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<tr>
<td>13</td>
<td>28</td>
<td>19.52</td>
<td>18.95</td>
</tr>
<tr>
<td>Males</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>36</td>
<td>20.28</td>
<td>17.28</td>
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</tr>
<tr>
<td>13</td>
<td>27</td>
<td>19.41</td>
<td>18.53</td>
</tr>
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</table>

*Note:* Reference body mass index values correspond to 50th percentile normative values.
levels. The BMI of 11 year old males was slightly above the 85th percentile for the normative population.

**Questionnaire Data**

Baseline assessment measures were entered into a multivariate analysis of variance with baseline measures as dependent variables and gender and grade as independent variables to ascertain potential pre-treatment differences. Wilk's lambda indicated a significant effect for gender, $F(13, 189) = 3.562, p < .0001$. Post-hoc analysis indicated females scored significantly higher on most of the baseline measures. Means and standard deviations of student's scores on the assessment measures are presented in Table 6.

As can be seen in Table 6, females consistently scored higher than males on the ChEAT. Total ChEAT score across the entire sample was 9.41 (SD=7.41) with a range from 0 to 46. Of the 287 students, 24 (8.36%) reported scores of 20 or above on the ChEAT, which is somewhat higher than reported by Maloney et al. (1989) who found that 6.9% of third through sixth graders reported scores of 20 or above on the ChEAT. Participants in the Maloney et al. (1989) study were students in public schools, while the current sample were students in private schools. Eating disorder symptoms have been shown to be more prevalent in higher SES samples. Guidry et al. (1996) found that 12.1% of third through seventh graders in private schools scored 20 or above on the ChEAT. Smolak and Levine (1994) surveyed sixth, seventh, and eighth grade females and reported a mean ChEAT score of 15.74 (SD=12.42). This mean score is higher than the mean score for females in the current sample. Mean scores on the CDI were compared to normative data presented by Finch, Saylor, and Edwards (1985). Finch et al. (1985) reported data for males and females by grade. These scores were higher than the average reported by males in the.
Table 6

Summary of Assessment Measures at Baseline

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
<th>F value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ChEAT</td>
<td>7.48 (4.23)</td>
<td>11.07* (7.97)</td>
<td>14.54</td>
</tr>
<tr>
<td>CDI</td>
<td>6.75 (6.53)</td>
<td>9.40* (9.48)</td>
<td>4.69</td>
</tr>
<tr>
<td>Dysphoria</td>
<td>8.71 (15.11)</td>
<td>5.95 (13.26)</td>
<td>1.36</td>
</tr>
<tr>
<td>RSE</td>
<td>1.11 (1.39)</td>
<td>1.70* (1.75)</td>
<td>5.90</td>
</tr>
<tr>
<td>Preoccupation</td>
<td>23.20 (3.28)</td>
<td>25.02* (4.05)</td>
<td>11.59</td>
</tr>
<tr>
<td>Social Pressure</td>
<td>13.66 (2.94)</td>
<td>14.95* (3.34)</td>
<td>7.70</td>
</tr>
<tr>
<td>Avoidance of Fear Foods</td>
<td>26.91 (8.74)</td>
<td>31.99* (10.34)</td>
<td>13.03</td>
</tr>
<tr>
<td>Binge Eating</td>
<td>20.08 (6.69)</td>
<td>20.37 (6.78)</td>
<td>.46</td>
</tr>
<tr>
<td>Depression</td>
<td>25.96 (10.60)</td>
<td>28.73 (11.66)</td>
<td>2.67</td>
</tr>
<tr>
<td>Fear of Fatness</td>
<td>33.43 (10.63)</td>
<td>42.04* (16.07)</td>
<td>20.23</td>
</tr>
<tr>
<td>Purgative Behaviors</td>
<td>10.49 (3.23)</td>
<td>10.97 (4.03)</td>
<td>1.02</td>
</tr>
<tr>
<td>Restrictive Eating</td>
<td>18.03 (6.81)</td>
<td>22.22* (9.70)</td>
<td>12.57</td>
</tr>
<tr>
<td>Total MAEDS</td>
<td>134.91 (30.53)</td>
<td>156.31* (45.30)</td>
<td>14.96</td>
</tr>
<tr>
<td>Nutrition Knowledge</td>
<td>7.94 (2.57)</td>
<td>8.03 (2.42)</td>
<td>.24</td>
</tr>
</tbody>
</table>

Note: ChEAT = Children's Eating Attitudes Test; CDI = Children's Depression Inventory; Dysphoria = Discrepancy score (CBS-IBS); RSE = Rosenberg Self-Esteem Inventory; Preoccupation = Physical Concern Scale and Physical Appearance Scale; Social pressure = Social/ Media Influences Scale and parental pressure; Avoidance of Fear Foods, Binge Eating, Depression, Fear of Fatness, Purgative Behaviors, and Restrictive Eating = subscale of the MAEDS; MAEDS = Multi axial Assessment of Eating Disorder Symptoms; Nutrition Knowledge = Diet and Health Knowledge Survey Questionnaire. * indicates that group means differ (p < .05). ** indicates that group means differ (p < .01).
females in the current study reported a mean score of 9.36 (SD=9.58) on the CDI which is slightly higher than that reported by Finch et al (1985; mean=8.36; SD=6.65).

Pearson product-moment correlations for the assessment measures are presented in Table 7. Across the entire sample, ChEAT scores were significantly correlated with the CDI, RSE, Social Pressure, and Preoccupation with Appearance. In addition, the ChEAT was significantly correlated with each of the MAEDS scales (Avoidance of Feared Foods, Binge Eating, Depression, Fear of Fatness, Purgative Behavior and Restrictive Eating). CDI scores were significantly correlated with the RSE, Social Pressure, Preoccupation with Appearance, and with the following MAEDS scales: Binge Eating, Depression, Fear of Fatness, Purgative Behavior, and Restrictive Eating. The discrepancy score of the BIA-A (Dysphoria) was significantly correlated with BMI, RSE, Preoccupation with Appearance and the MAEDS Scales. BMI was significantly correlated with Social Pressure, Preoccupation with Appearance, and the Avoidance of Feared Foods, Binge Eating, and Restrictive Eating scales of the MAEDS. Social Pressure was significantly correlated with the MAEDS scales. Scores on the RSE and Preoccupation with Appearance were significantly correlated with all of the assessment measures with the exception of the Nutrition Knowledge measure. The Nutrition Knowledge measure was not significantly correlated with any of the other assessment measures. The MAEDS scales were significantly intercorrelated.

Reliability analyses were conducted for the Nutrition Knowledge measure as well as the MAEDS scales. Separate analyses were conducted for males and females. Inter-item correlations were calculated for each measure using Cronbach's alpha. Cronbach’s alpha for the Nutrition Knowledge measure was .55 for males and .43 for female participants. Test-retest analysis was conducted on the data from School 2. Retest sessions were 31 days apart for sixth grade students and 22 days apart for
Table 7
Correlation matrix for ChEAT, CDI, Dysphoria, 3MI, RSE, Social Pressure, Preoccupation with Appearance, and MAEDS Scales

<table>
<thead>
<tr>
<th></th>
<th>ChEAT</th>
<th>CDI</th>
<th>Dysphoria</th>
<th>BMI</th>
<th>RSE</th>
<th>Social</th>
<th>Preoccupation</th>
<th>Total MAEDS</th>
<th>Avoid</th>
<th>Binge</th>
<th>Depression</th>
<th>Fear</th>
<th>Purge</th>
<th>Restrict</th>
<th>Nutrition</th>
</tr>
</thead>
<tbody>
<tr>
<td>ChEAT</td>
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<td>.30</td>
<td>.12</td>
<td>.04</td>
<td>.40</td>
<td>.36</td>
<td>.44</td>
<td>.86</td>
<td>.53</td>
<td>.39</td>
<td>.35</td>
<td>.62</td>
<td>.35</td>
<td>.59</td>
<td>-11</td>
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<tr>
<td>CDI</td>
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<td>.12</td>
<td>.05</td>
<td>.67</td>
<td>.41</td>
<td>.40</td>
<td>.55</td>
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<td>.41</td>
<td>.29</td>
<td>.46</td>
<td>.05</td>
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<tr>
<td>Dysphoria</td>
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<td>.37</td>
<td>.19</td>
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<td>.27</td>
<td>.29</td>
<td>.24</td>
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<td>.04</td>
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<td>.13</td>
<td>.18</td>
<td>.09</td>
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<tr>
<td>RSE</td>
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<td>Social</td>
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<td>.54</td>
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<td>.03</td>
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<tr>
<td>Total MAEDs</td>
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<td>.76</td>
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<td>.61</td>
<td>.82</td>
<td>.03</td>
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<td>.35</td>
<td>.52</td>
<td>.08</td>
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<td></td>
<td>.08</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Binge Eating</td>
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<td>.48</td>
<td>.52</td>
<td>.45</td>
<td>.45</td>
<td></td>
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<td></td>
<td>.05</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depression</td>
<td>1.00</td>
<td>.50</td>
<td>.45</td>
<td>.58</td>
<td>.58</td>
<td>.58</td>
<td></td>
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<td></td>
<td>.05</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fear</td>
<td>1.00</td>
<td>.37</td>
<td>.62</td>
<td>.03</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td>.03</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purge</td>
<td>1.00</td>
<td>.43</td>
<td>.11</td>
<td>.08</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td>.08</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restrict</td>
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<td>.00</td>
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<td></td>
<td></td>
<td></td>
<td>.00</td>
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<td></td>
</tr>
</tbody>
</table>

Note: ChEAT = Children's Eating Attitudes Test; CDI = Children's Depression Inventory; Dysphoria = Discrepancy score (CBS-IBS); RSE = Rosenberg Self-Esteem Inventory; Preoccupation = Physical Concern Scale and Physical Appearance Scale; Social pressure = Social/ Media Influences Scale and parental pressure; Avoid = Avoidance of Fear Foods scale; Fear = Fear of Fatness scale; Purge = Purgative Behaviors scale; Restrict = Restrictive Eating scale; MAEDS = Multi axial Assessment of Eating Disorder Symptoms; Nutrition Knowledge = Diet and Health Knowledge Survey Questionnaire. Significant correlations (p < .01) are denoted by an asterick.
seventh grade students. The coefficient of stability Pearson product-moment correlation coefficient was .64 for males and .50 for females. Table 8 presents reliability estimates for the MAEDS scales for males. Cronbach's alpha was calculated for each of the MAEDS scales for male participants and ranged from .31 (purgative behaviors) to .86 (depression). Table 9 presents reliability estimates for females. Cronbach's alpha for female participants ranged from .68 (purgative behaviors) to .89 (fear of fatness). Test-retest reliability was conducted on the MAEDS scales from school 2. Pearson product-moment correlation coefficients for males ranged from .58 (restrictive eating) to .79 (avoidance of feared foods). Test-retest analysis for female participants yielded Pearson-product moment correlations ranging from .56 (purgative behaviors) to .88 (avoidance of feared foods).

Identification of Students At-Risk for the Development of Eating and Weight Related Difficulties

As described in the procedure section, students were identified as at-risk for the development of an eating disorder if one of three conditions was met. Condition 1 was defined as elevated levels of eating disorder symptoms as indicated by scores one standard deviation above the mean for sample on the ChEAT (ChEAT > 16.55). Condition 2 was defined as the presence of elevated levels of body dysphoria and negative affect as indicated by scores one standard deviation above the mean for the sample on the BIA discrepancy score (dysphoria > 19.79) and the CDI (CDI > 16.53). Condition 3 was specified as scores one standard deviation above the mean for sample on at least three of the following: (a) negative evaluation of self (RSE > 2.89); (b) physical preoccupation (physical concern and physical perception scales > 27.9); (c) perceived pressure for thinness (social/media influences scale and parental pressure
Table 8

Reliability of MAEDS for Males

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Coefficient α</th>
<th>Test-retest Pearson correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depression</td>
<td>.86</td>
<td>.77</td>
</tr>
<tr>
<td>Binge eating</td>
<td>.73</td>
<td>.73</td>
</tr>
<tr>
<td>Purgative behavior</td>
<td>.31</td>
<td>.70</td>
</tr>
<tr>
<td>Fear of fatness</td>
<td>.81</td>
<td>.74</td>
</tr>
<tr>
<td>Restrictive eating</td>
<td>.77</td>
<td>.58</td>
</tr>
<tr>
<td>Avoidance of fear foods</td>
<td>.81</td>
<td>.79</td>
</tr>
</tbody>
</table>

Note: Table presents subscales of the Multi axial Assessment of Eating Disorder Symptoms subscales.

Table 9

Reliability of MAEDS for Females

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Coefficient α</th>
<th>Test-retest Pearson correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depression</td>
<td>.87</td>
<td>.82</td>
</tr>
<tr>
<td>Binge eating</td>
<td>.73</td>
<td>.73</td>
</tr>
<tr>
<td>Purgative behavior</td>
<td>.68</td>
<td>.56</td>
</tr>
<tr>
<td>Fear of fatness</td>
<td>.89</td>
<td>.79</td>
</tr>
<tr>
<td>Restrictive eating</td>
<td>.86</td>
<td>.78</td>
</tr>
<tr>
<td>Avoidance of fear foods</td>
<td>.85</td>
<td>.88</td>
</tr>
</tbody>
</table>

Note: Table presents subscales of the Multi axial Assessment of Eating Disorder Symptoms subscales.
questions \( > 17.61 \); or (d) increased body mass \( (\text{BMI} > 22.72) \). Using these criteria, fifteen students from School 1 were identified as at-risk for the development of an eating disorder and forty from School 2 were identified as at-risk. One child in School 2 identified as at-risk opted to be removed from the study after the initial assessment session. Forty-four of the students were identified as at-risk based on condition 1. Ten of the students meeting criteria for condition 1 also met criteria for other conditions. Four met criteria for condition 2 and six met criteria for condition 3 in addition to condition 1. Ten students were identified as at-risk for condition 2. Of these, seven met criteria for other conditions as well (four for condition 1, and three for condition 3). Thirteen students met criteria for condition 3 with nine meeting criteria for other conditions as well.

Baseline data for each of the assessment measures was examined in the following manner to determine differences between at-risk subjects and those not identified as at-risk. A series of univariate analyses of variance were conducted. The Nutrition Knowledge measure, BMI, and the total MAEDS score was entered into a 2 (gender) by 2 (school) by 2 (risk) univariate analysis of variance to determine baseline differences. This was followed by a univariate analysis of variance of each of the MAEDS scales.

Analysis of the Nutrition Knowledge Measure and BMI indicated no significant main effects for gender, school, or risk status and no interaction effects. Analysis of the MAEDS total score indicated a significant main effect for risk, \( F (1, 233) = 46.67, p < .001 \) and a gender by risk interaction \( F (1, 233) = 4.998, p < .03 \). Post-hoc analysis indicated that male and female students identified as at-risk scored significantly higher than students not identified as at-risk. In addition, significant differences were indicated between male and female students identified as at-risk on the total score of the MAEDS.
with females scoring significantly higher than at-risk males. Post-hoc analysis yielded no significant gender differences between male and female students not identified as at-risk on the MAEDS total score. Due to the gender differences noted between the male and female at-risk students, additional analyses were conducted on males and females separately with risk as a between subjects factor. Table 10 presents the results for female students. Females identified as at-risk scored significantly higher on the MAEDS scales than females not identified as at-risk. A summary of the results for males is presented in Table 11. At-risk males scored significantly higher on the Binge Eating and Purgative Behaviors scales of the MAEDS.

Summary or Results for the School Education Intervention

Males and females were analyzed separately for the MAEDS data and nutrition knowledge measure. A preliminary univariate analysis of variance was conducted with the MAEDS total score to determine differences across schools. This was followed by separate 2 (school) X 5 (time) univariate repeated measures analysis with each of the MAEDS scales as dependent variables and school as the independent variable. Nutrition knowledge was examined in a separate univariate analysis.

Summary of Results for Female Participants. Baseline assessment of the total MAEDS score was submitted as a dependent variable in a one-way univariate analysis of variance with school as the independent variable for all female participants to determine differences at baseline. Results of this analysis indicated a main effect for school, $F(1, 129) = 16.867, p < .0001$ for females. The mean total MAEDS score at baseline was 134.28 (SD = 39.96) for females at School 1 and 163.81 (SD = 41.42) for females at School 2. Due to this difference at baseline, the MAEDS total score data was entered into a 2 (school) X 5 (time) repeated measures analysis with the baseline score as a covariate. Results of this analysis indicated significant effects for time, $F(4,
### Table 10

**Summary of Means and Standard Deviations of MAEDS scales, Females by Risk Status**

<table>
<thead>
<tr>
<th></th>
<th>Females not identified as At-Risk</th>
<th>At-Risk Females</th>
<th>F value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avoidance of Fear Foods</td>
<td>27.37 (8.50)</td>
<td>39.19* (9.06)</td>
<td>46.46</td>
</tr>
<tr>
<td>Binge Eating</td>
<td>17.94 (4.92)</td>
<td>25.43* (6.93)</td>
<td>48.32</td>
</tr>
<tr>
<td>Depression</td>
<td>23.69 (7.65)</td>
<td>36.67* (11.99)</td>
<td>54.35</td>
</tr>
<tr>
<td>Fear of Fatness</td>
<td>34.89 (11.18)</td>
<td>54.52* (12.94)</td>
<td>74.75</td>
</tr>
<tr>
<td>Purgative Behaviors</td>
<td>9.89 (3.16)</td>
<td>12.98* (4.85)</td>
<td>18.33</td>
</tr>
<tr>
<td>Restrictive Eating</td>
<td>17.96 (6.25)</td>
<td>31.00* (10.12)</td>
<td>79.57</td>
</tr>
</tbody>
</table>

*Note:* Avoidance of Fear Foods, Binge Eating, Depression, Fear of Fatness, Purgative Behaviors, and Restrictive Eating = subscale of the MAEDS; MAEDS = Multi axial Assessment of Eating Disorder Symptoms. * indicates that group means differ (p < .05). ** indicates that group means differ (p < .01).
Table 11

Summary of Means and Standard Deviations of MAEDS scales, Males by Risk Status

<table>
<thead>
<tr>
<th></th>
<th>Males not identified as At-Risk</th>
<th>At-Risk Males</th>
<th>F value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avoidance of Fear Foods</td>
<td>26.89 (8.89)</td>
<td>27.43 (9.18)</td>
<td>.024</td>
</tr>
<tr>
<td>Binge Eating</td>
<td>19.68 (6.52)</td>
<td>28.43 (3.78)</td>
<td>12.23</td>
</tr>
<tr>
<td>Depression</td>
<td>25.43 (10.12)</td>
<td>33.14 (14.68)</td>
<td>3.58</td>
</tr>
<tr>
<td>Fear of Fatness</td>
<td>33.53 (10.19)</td>
<td>40.46 (15.51)</td>
<td>2.83</td>
</tr>
<tr>
<td>Purgative Behaviors</td>
<td>10.31 (3.06)</td>
<td>14.00 (3.79)</td>
<td>9.26</td>
</tr>
<tr>
<td>Restrictive Eating</td>
<td>18.65 (7.46)</td>
<td>19.71 (7.20)</td>
<td>.135</td>
</tr>
</tbody>
</table>

Note: Avoidance of Fear Foods, Binge Eating, Depression, Fear of Fatness, Purgative Behaviors, and Restrictive Eating = subscale of the MAEDS; MAEDS = Multi axial Assessment of Eating Disorder Symptoms. * indicates that group means differ (p < .05). ** indicates that group means differ (p < .01).
Figure 6. Female estimated marginal mean total MAEDS score across time by school.
Separate univariate repeated measures analyses of covariance to covary the specific scale score at baseline were conducted for each of the MAEDS scales. As can be seen in Table 12, analysis of the Avoidance of Fear Foods scale indicated significant effects for time, school, and school by time. The primary effect to test the experimental hypothesis was the school by time interaction. Post-hoc analysis of t-tests indicated that females at School 2 scored significantly higher than females at School 1 at times 1, 2, and 3. Post-hoc analysis of within-subject variables using Newman-Keuls indicated significant differences for School 1 post-intervention, which were maintained through follow-up. However, no differences were noted for females at School 2 post-intervention. Group means are presented in Figure 7. Univariate analysis of the Binge scale with the baseline score entered as a covariate indicated significant effects for time and school but no time by school interaction was indicated although this effect approached significance $F (4, 504) = 1.96, p < .1$.

As can be seen in Table 12, significant effects of time and school by time were found for the Depression scale. T-tests did not indicate significant school differences with the exception of time 3 with School 2 females scoring significantly higher than School 1 females. Within-subjects analysis did not indicate significant effects for intervention at either school. The means for both schools by time are presented in Figure 8.

Repeated measures ANCOVA with baseline entered as a covariate for the Fear of Fatness scale of the MAEDS indicated significant effects for time, school, and school by time. Groups means are presented in Figure 9. T-tests indicated significant differences between schools at all times with the exception of time 1 with School 2.
### Table 12

**Summary of F Values for MAEDS Scales with All Females**

<table>
<thead>
<tr>
<th>Scale</th>
<th>Covariate</th>
<th>School Main Effect</th>
<th>Time Main Effect</th>
<th>School by Time Interaction</th>
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<td>Avoidance of Fear Foods</td>
<td>443.91&quot;</td>
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<td>3.84&quot;</td>
<td>5.72&quot;</td>
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<td>Binge Eating</td>
<td>322.76&quot;</td>
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<td>1.96</td>
</tr>
<tr>
<td>Depression</td>
<td>287.83&quot;</td>
<td>1.68</td>
<td>9.47&quot;</td>
<td>2.64&quot;</td>
</tr>
<tr>
<td>Fear of Fatness</td>
<td>245.89&quot;</td>
<td>36.28&quot;</td>
<td>17.18&quot;</td>
<td>9.20&quot;</td>
</tr>
<tr>
<td>Purgative Behaviors</td>
<td>223.46&quot;</td>
<td>17.48&quot;</td>
<td>10.29&quot;</td>
<td>3.92&quot;</td>
</tr>
<tr>
<td>Restrictive Eating</td>
<td>368.27&quot;</td>
<td>2.84</td>
<td>10.80&quot;</td>
<td>3.31&quot;</td>
</tr>
</tbody>
</table>

*Note: Table presents F values for each subscale of the Multi axial Assessment of Eating Disorder Symptoms. " denotes significance at p < .05. " indicates significance at p < .01.*
Avoidance Subscale

Females

Figure 7. Female estimated marginal means of Avoidance Subscale of MAEDS across time by school.
Depression Subscale

All Females

Figure 8 Female estimated marginal means of Depression Subscale of MAEDS across time by school.
Figure 9. Female estimated marginal means of Fear Subscale of MAEDS across time by school.
females scoring significantly higher than females from School 1. School 1 demonstrated a significant effect for the intervention which was maintained through follow-up assessments. School 2, however, demonstrated no significant Fear of Fatness scale score differences post-intervention.

As can be seen in Table 12, significant effects for time, school, and time by school were indicated for the Purgative Behaviors scale. School means by time are presented in Figure 10. School 2 females scored significantly higher at each assessment time following baseline. Post-hoc analysis indicated no differences post-intervention for either school. Differences pre and post-intervention for School 1 approached significance (p < .10)

Significant effects for time and a significant interaction effect for school by time were indicated for the Restrictive Eating Scale of the MAEDS. T-tests indicated no significant differences between schools with the exception of time 2 with School 2 females scoring significantly higher on the Restrictive Eating scale than females at School 1. School 1 females did not demonstrate a significant decrease in Restrictive Eating scale scores after the implementation of the intervention, however there was a significant difference between baseline assessment and testing time 4. For School 2 females, the difference post-intervention approached significance (p < .10). Figure 11 presents the means for the Restrictive Eating scale.

Preliminary analysis of the baseline Nutrition Knowledge total score indicated no significant differences between schools. The total score was then entered into a 2 (school) by 5 (time) repeated measures analysis of variance. This indicated a significant effect for time $F(4, 400) = 3.45$, $p< .01$, but no school by time interaction.
Figure 10. Female estimated marginal means of Purge Subscale of MAEDS across time by school.
Figure 11. Females estimated marginal means of Restrictive Eating subscale of MAEDS across time by school.
Summary of Results for Females Identified as At-Risk for the Development of Eating and Weight Difficulties. Because the students identified as at-risk for the development of eating and weight difficulties were specifically targeted by the intervention, the data from the female students identified as at-risk were analyzed separately in addition to the primary analysis. An initial analysis of the MAEDS total score was conducted with MAEDS total at baseline as the dependent variable and school as the independent variable to determine differences at baseline. No significant differences were indicated for at-risk females between schools. The MAEDS total score was entered into a 2 (school) by 5 (time) repeated measures analysis. Significant effects were indicated for time $F(4, 128) = 10.93, p < .0001$, and time by school $F(4, 128) = 2.67, p < .04$. Figure 12 presents means for the total MAEDS scale. A univariate analysis was then conducted for each of the MAEDS scales for the females identified as at-risk.

As can be seen in Table 13, analysis of the Avoidance of Feared Foods scale yielded significant effects for time and time by school. Figure 13 presents the means for the Avoidance of Fear Foods scale. The only significant difference noted between schools was at time 1 with females at School 2 scoring significantly higher than females at School 1. Within subjects analysis did not indicate significant differences post-intervention although at either school, although these approached significance with School 2 females ($p < .10$).

Univariate analysis of the Fear of Fatness scale was also entered into a repeated measures univariate analysis. As can be seen in Table 13, this analysis yielded significant main effects for time, school, and an interaction effect for school by time. With the exception of baseline assessment, at-risk females scored significantly higher than at-risk females from School 1 at each assessment time. Significant
Figure 12. At-risk female estimated marginal mean total MAEDS score across time by school.
Table 13

Summary of F Values for MAEDS Scales with Females Identified as At-risk

<table>
<thead>
<tr>
<th>Scale</th>
<th>School Main Effect</th>
<th>Time Main Effect</th>
<th>School by Time Interaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avoidance of Fear Foods</td>
<td>2.28</td>
<td>5.29&quot;</td>
<td>2.53'</td>
</tr>
<tr>
<td>Binge Eating</td>
<td>.312</td>
<td>3.19'</td>
<td>.549</td>
</tr>
<tr>
<td>Depression</td>
<td>.006</td>
<td>5.84&quot;</td>
<td>.181</td>
</tr>
<tr>
<td>Fear of Fatness</td>
<td>4.33'</td>
<td>9.04&quot;</td>
<td>4.80&quot;</td>
</tr>
<tr>
<td>Purgative Behaviors</td>
<td>3.08</td>
<td>1.67</td>
<td>2.12</td>
</tr>
<tr>
<td>Restrictive Eating</td>
<td>.96</td>
<td>5.76&quot;</td>
<td>1.89</td>
</tr>
</tbody>
</table>

Note: Table presents F values for each subscale of the Multi axial Assessment of Eating Disorder Symptoms. * denotes significance at p < .05. ** indicates significance at p < .01.
Avoidance Subscale

At-Risk Females

Figure 13. At-risk female estimated marginal means of Avoidance Subscale of MAEDS across time by school.
Figure 14. At-risk female estimated marginal means of Fear Subscale of MAEDS across time by school.
differences were noted for School 1 following intervention, which were maintained through follow-up. No significant differences were indicated for at-risk females from School 2 although they approached statistical significance ($p < .10$). Figure 14 presents the mean scores by time for both schools.

As can be seen in Table 13, univariate analysis of the Depression scale indicated a main effect for time, but no interaction effects. Similar results were indicated for the Binge scale, and the Restrictive Eating scale which found a significant effect for time but no effects for school or the interaction. Analysis of the Purgative Behaviors scale indicated no significant main or interaction effects, however the interaction approached significance, $F(4, 140) = 2.13, p < .08$. Data for the Nutrition Knowledge measure was entered into an initial analysis to determine differences by school for at-risk females at baseline. No significant effects were indicated. The Nutrition Knowledge measure was then entered into a 2 (school) by 5 (time) repeated measures analysis of variance. There were no significant differences for time, school, or the interaction.

**Summary of Results for School Education Intervention for Females Not Identified as At-Risk.** In order to compare results of at-risk students to those not identified as at-risk for the development of eating and weight difficulties, analyses were conducted as for the previous groups. An initial univariate analysis of variance was conducted with baseline total MAEDS score as a dependent variable and school as the independent variable. This analysis indicated a significant main effect for school, $F(1, 92) = 9.24, p < .01$. A univariate repeated measures analysis covarying baseline total MAEDS score was then conducted for the females not identified as at-risk for the development of eating and weight difficulties. This analysis indicated significant main effects for time, $F(4, 344) = 6.15, p < .0001$, school, $F(1, 86) = 13.54, p < .0001$, and a school by
Total MAEDS Score

Non-risk Females

![Graph showing total MAEDS scores for non-risk females across time by school.](image)

Figure 15. Non-Risk female estimated marginal mean total MAEDS score across time by school.
time interaction, $E(4, 344) = 4.94$, $p < .001$. Figure 15 presents the means for the MAEDS total score. Univariate analysis was then conducted for each of the MAEDS scales with baseline score as a covariate.

As can be seen in Table 14, analysis of the Avoidance of Feared Foods scale indicated significant main effects were indicated for school, time, as well as a significant school by interaction effect. Post-hoc analysis indicated that for times 1 and 2, School 2 females scored significantly higher than females at School 1. No differences were noted following the intervention for either school. Figure 16 presents the means for the Avoidance of Fear Foods scale. Similar effects were noted for the Depression scale which indicated a significant main effect for time and a school by time interaction. Post-hoc analysis indicated that at time 3, School 2 females scored significantly higher than School 1 females. No post-intervention differences were indicated for either school. Figure 17 presents means of the Depression scale for females not identified as at-risk. Analysis of the Restrictive Eating scale again indicated significant main effect for time and a school by time interaction (see Figure 18). School 2 females scored significantly higher on this scale at time 2 than School 1 females. No differences were noted following the school education intervention. Analysis of the Purgative Behaviors scale indicated a significant time main effect, but no interaction.

As can be seen in Table 14, significant main effects for school, time, and school by time interaction were indicated for the Fear of Fatness Scale. T-tests indicated significant differences at each assessment session following baseline, with School 2 females identified as not at-risk scoring significantly higher than females in School 1 identified as not at-risk. As can be seen in Figure 19, significant differences following intervention were noted for School 1 which were maintained at follow-up.
Table 14

Summary of F Values for MAEDS Scales with Females Identified as Not At-risk

<table>
<thead>
<tr>
<th>Scale</th>
<th>Covariate</th>
<th>School Main Effect</th>
<th>Time Main Effect</th>
<th>School by Time Interaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avoidance of Fear Foods</td>
<td>246.47**</td>
<td>17.00**</td>
<td>2.76**</td>
<td>3.64**</td>
</tr>
<tr>
<td>Binge Eating</td>
<td>142.25**</td>
<td>9.01**</td>
<td>8.42**</td>
<td>3.36**</td>
</tr>
<tr>
<td>Depression</td>
<td>153.89**</td>
<td>3.01</td>
<td>4.74**</td>
<td>4.92**</td>
</tr>
<tr>
<td>Fear of Fatness</td>
<td>116.34**</td>
<td>20.28**</td>
<td>13.36**</td>
<td>5.67**</td>
</tr>
<tr>
<td>Purgative Behaviors</td>
<td>95.85**</td>
<td>9.24*</td>
<td>12.29*</td>
<td>1.98</td>
</tr>
<tr>
<td>Restrictive Eating</td>
<td>196.11**</td>
<td>2.24</td>
<td>6.04**</td>
<td>3.39**</td>
</tr>
</tbody>
</table>

Note: Table presents F values for each subscale of the Multi axial Assessment of Eating Disorder Symptoms. '*' denotes significance at p < .05. ** denotes significance at p < .01.
Avoidance Subscale

Non-Risk Females

Figure 16. Non-risk female estimated marginal means of Avoidance Subscale of MAEDS across time by school.
Figure 17. Non-risk female estimated marginal means of Depression Subscale of MAEDS across time by school.
Restrictive Eating Subscale

Non-Risk Females

Figure 18. Non-risk female estimated marginal mean Restrictive Score of MAEDS across time by school.

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Fear Subscale

Non-Risk Females

Figure 19. Non-risk female estimated marginal means of Fear Subscale of MAEDS across time by school.
Analysis of the Binge Scale indicated a significant school, time, and school by time interaction (see Table14). School 2 females scored significantly higher than School 1 females at each of the testing times with the exception of baseline and time 3. Significant differences were noted for females at School 1 not at-risk following the school education intervention and this decrease was maintained through follow-up. No significant difference was noted for School 2 after the intervention. Figure 20 presents the profile plot for the Binge scale with females not identified as at-risk.

The Nutrition Knowledge measure was examined with females not identified as at-risk for the development of eating and weight difficulties. Baseline assessment indicated no school differences. Therefore, the measure was entered into a univariate repeated measures analysis. No significant differences were obtained for the not at-risk females.

**Summary of Results for School Education Intervention for Males.** Analysis of data from males was analyzed in the same manner as the data for females. Initially, a univariate analysis of variance was conducted for the total MAEDS score to ascertain differences at baseline. This analysis indicated no significant main effect for school. A repeated measures univariate analysis of variance was then conducted for the total MAEDS score. This indicated a significant main effect for time $F(4, 372) = 7.12, p < .001$ and a school by time interaction $F(4, 372) = 2.45, p < .05$ (see Figure 21). Univariate repeated measures analysis was then conducted on each of the MAEDS scales. As can be seen in Table 15, significant main effects for time were noted for the Avoidance of Fear Foods, Binge Eating and Restrictive Eating scales of the MAEDS. No school by time interactions were noted. For the Restrictive Eating scale, the school by time interaction approached significance ($p < .10$). The Purgative Behaviors scale indicated effects for time and school by time which were approaching
Figure 20. Non-risk female estimated marginal means of Binge Subscale of MAEDS across time by school.
Figure 21. Male estimated marginal means of total MAEDS scores across time by school.
Table 15

Summary of F Values for MAEDS Scales with All Males

<table>
<thead>
<tr>
<th>Scale</th>
<th>School Main Effect</th>
<th>Time Main Effect</th>
<th>School by Time Interaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avoidance of Fear Foods</td>
<td>1.14</td>
<td>8.12~</td>
<td>1.14</td>
</tr>
<tr>
<td>Binge Eating</td>
<td>.76</td>
<td>5.78~</td>
<td>.91</td>
</tr>
<tr>
<td>Depression</td>
<td>.09</td>
<td>3.70~</td>
<td>4.74~</td>
</tr>
<tr>
<td>Fear of Fatness</td>
<td>3.08</td>
<td>5.51~</td>
<td>2.64*</td>
</tr>
<tr>
<td>Purgative Behaviors</td>
<td>1.19</td>
<td>2.26</td>
<td>2.69</td>
</tr>
<tr>
<td>Restrictive Eating</td>
<td>.39</td>
<td>2.76*</td>
<td>2.04</td>
</tr>
</tbody>
</table>

Note: Table presents F values for each subscale of the Multi axial Assessment of Eating Disorder Symptoms. "denotes significance at p < .05. "~indicates significance at p < .01.
significance (p < .10). A significant main effect for time and a school by time interaction was indicated for the Depression scale. No significant differences were indicated between schools at testing times. No significant difference following intervention for either school was found. The means for all males on the Depression scale are presented in Figure 22. Similar results were indicated for the Fear of Fatness scale which indicated significant effects for time and school by time. Examination of t-tests indicated that at times 2 and 3, School 2 boys scored significantly higher on the Fear of Fatness scale than males from School 1 (see Figure 23). No significant differences were found following the school education intervention.

A univariate analysis of variance was conducted for baseline scores on the Nutrition Knowledge measure. No significant main effects were found for school. This measure was then entered into a 2 (school) by 5 (time) univariate repeated measures analysis of variance. No significant main effects or interaction effects were indicated for males on this measure.

Summary of Results of School Intervention with At-Risk Males. The total MAEDS scale was entered into a univariate analysis of variance to determine differences at baseline for at-risk males at each school. No significant differences were indicated at baseline. The total MAEDS scale was then entered into a 2 (school) by 5 (time) repeated measures analysis of variance to determine effects of the intervention on males identified as at-risk. No significant main effects or interaction effects were noted. Analysis of the Nutrition Knowledge measure also yielded no significant main or interaction effects for the at-risk males. Due to this finding, males not identified as at-risk for the development of eating and weight difficulties were not analyzed.

Therapist Checklists. Therapist checklists were completed by the session leader and the co-leader at the end of each session of the school education component of the
Figure 22. Male estimated marginal means of Depression subscale of MAEDS across time by school.
Figure 23. Estimated marginal means of Fear Subscale of MAEDS across time by school.
<table>
<thead>
<tr>
<th>Item</th>
<th>Module 1</th>
<th>Module 2</th>
<th>Module 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>How well did the researcher open the session?</td>
<td>5.89</td>
<td>5.93</td>
<td>5.88</td>
</tr>
<tr>
<td></td>
<td>(1.24)</td>
<td>(.70)</td>
<td>(1.31)</td>
</tr>
<tr>
<td>How well did the researcher establish rapport?</td>
<td>8.11</td>
<td>5.75</td>
<td>6.19</td>
</tr>
<tr>
<td></td>
<td>(.88)</td>
<td>(.86)</td>
<td>(1.16)</td>
</tr>
<tr>
<td>How well did the researcher review the homework?</td>
<td>NA</td>
<td>NA</td>
<td>6.31</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(.87)</td>
</tr>
<tr>
<td>How well did the researcher structure the session?</td>
<td>6.21</td>
<td>6.25</td>
<td>5.87</td>
</tr>
<tr>
<td></td>
<td>(.92)</td>
<td>(.68)</td>
<td>(.88)</td>
</tr>
<tr>
<td>How well was the information presented?</td>
<td>6.21</td>
<td>6.12</td>
<td>5.86</td>
</tr>
<tr>
<td></td>
<td>(.98)</td>
<td>(.72)</td>
<td>(.81)</td>
</tr>
<tr>
<td>Were the goals of the session met?</td>
<td>6.36</td>
<td>6.25</td>
<td>6.06</td>
</tr>
<tr>
<td></td>
<td>(.78)</td>
<td>(.86)</td>
<td>(1.23)</td>
</tr>
<tr>
<td>How well was the homework assigned?</td>
<td>6.11</td>
<td>5.81</td>
<td>6.38</td>
</tr>
<tr>
<td></td>
<td>(1.10)</td>
<td>(1.33)</td>
<td>(1.02)</td>
</tr>
<tr>
<td>Rate the closing of the session.</td>
<td>6.05</td>
<td>6.00</td>
<td>6.00</td>
</tr>
<tr>
<td></td>
<td>(1.13)</td>
<td>(1.03)</td>
<td>(1.03)</td>
</tr>
</tbody>
</table>

**Note:** Standard deviations are in parentheses. Items were rated on a seven point Likert scale (1=very poorly; 7=very well).
Body Logic Program. Checklists consisted of eight items rated on a 7 point Likert scale. Table 16 presents the means and standard deviations for each of the items for each module. This data was analyzed using paired t-tests by module and school. As can be seen in Table 16, the ratings for each module were fairly high on each of the items with module three (nutrition) receiving the highest overall ratings. No significant differences were noted between schools or modules.

Retention of Information. Checklists were completed by the students following each of the school education sessions to determine retention of information presented in the sessions. These checklists were completed by 100 subjects from School 1 and 116 subjects from School 2 for module 1, 105 subjects from School 1 and 125 of the subjects from School 2 for module 2, and 90 of the participants from School 1 and 108 of the subjects for module 3. As can be seen in Table 17, correct responses ranged from 17.3% to 100% correct on the checklists. However, only item 7 yielded a correct responses percentage below 70%. Paired sample t-tests were utilized to determine significant differences between schools for each of the items. This analysis indicated a significant difference for Item 1 (p < .04). No significant differences were indicated for the other items.

Treatment Acceptability. A treatment acceptability measure was completed by 233 of the participants from both schools for the school education component of the Body Logic Program. This scale was composed of seven items rated on a five point Likert scale. The means and standard deviations for each of the scale items is presented in Table 18. Paired sample t-tests indicated significant differences between schools with the exception of one item. Overall, participants from School 1 rated the program higher than participants from School 2.
### Table 17

**Summary of Module Retention Scores by School**

<table>
<thead>
<tr>
<th>Item</th>
<th>Module</th>
<th>School 1</th>
<th>School 2</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>What are some factors that contribute to the formation of body image?</td>
<td>Module 1</td>
<td>92 (90%)</td>
<td>96 (80%)*</td>
<td>p &lt; .04</td>
</tr>
<tr>
<td>Fashions have always been the same.</td>
<td>Module 1</td>
<td>102 (100%)</td>
<td>118 (98.3%)</td>
<td>NS</td>
</tr>
<tr>
<td>The bodies of people in the media are sometimes changed to look better than they are in real life.</td>
<td>Module 1</td>
<td>99 (97.1%)</td>
<td>119 (99.2%)</td>
<td>NS</td>
</tr>
<tr>
<td>When we read or see things in the media we should?</td>
<td>Module 1</td>
<td>101 (99%)</td>
<td>118 (98.3%)</td>
<td>NS</td>
</tr>
<tr>
<td>During puberty, boys typically grow faster than girls?</td>
<td>Module 2</td>
<td>88 (83.8%)</td>
<td>92 (72.4%)</td>
<td>NS</td>
</tr>
<tr>
<td>Adolescents need more energy than adults?</td>
<td>Module 2</td>
<td>89 (84.8%)</td>
<td>113 (89%)</td>
<td>NS</td>
</tr>
<tr>
<td>A person who has broad hips and chest and a small waist would be what body type?</td>
<td>Module 2</td>
<td>24 (22.9%)</td>
<td>27 (17.3%)</td>
<td>NS</td>
</tr>
<tr>
<td>How many servings of fruits should you eat per day?</td>
<td>Module 3</td>
<td>86 (95.6%)</td>
<td>101 (91.8%)</td>
<td>NS</td>
</tr>
<tr>
<td>It is important to eat a variety of foods?</td>
<td>Module 3</td>
<td>90 (100%)</td>
<td>108 (98.2%)</td>
<td>NS</td>
</tr>
<tr>
<td>It is important to eat 3 meals per day?</td>
<td>Module 3</td>
<td>90 (100%)</td>
<td>108 (98.2%)</td>
<td>NS</td>
</tr>
</tbody>
</table>

*Note: Percentages correct are in parentheses.*
Table 18

Summary of Treatment Acceptability Data

<table>
<thead>
<tr>
<th>Item</th>
<th>School 1</th>
<th>School 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>I found this program acceptable.</td>
<td>4.51</td>
<td>3.89£</td>
</tr>
<tr>
<td></td>
<td>(.57)</td>
<td>(1.10)</td>
</tr>
<tr>
<td>I like the procedures used in this program.</td>
<td>4.39</td>
<td>3.63£</td>
</tr>
<tr>
<td></td>
<td>(.63)</td>
<td>(.94)</td>
</tr>
<tr>
<td>I believe that the program will work.</td>
<td>4.28</td>
<td>3.70*</td>
</tr>
<tr>
<td></td>
<td>(.80)</td>
<td>(1.01)</td>
</tr>
<tr>
<td>There were parts of the program that made me uncomfortable.</td>
<td>2.28</td>
<td>2.41</td>
</tr>
<tr>
<td></td>
<td>(1.19)</td>
<td>(1.20)</td>
</tr>
<tr>
<td>I believe that this program will help people.</td>
<td>4.33</td>
<td>3.84£</td>
</tr>
<tr>
<td></td>
<td>(.70)</td>
<td>(1.05)</td>
</tr>
<tr>
<td>I enjoyed the program.</td>
<td>4.39</td>
<td>3.78£</td>
</tr>
<tr>
<td></td>
<td>(.67)</td>
<td>(1.12)</td>
</tr>
<tr>
<td>Overall, I had a positive reaction to the program.</td>
<td>4.42</td>
<td>3.77£</td>
</tr>
<tr>
<td></td>
<td>(.64)</td>
<td>(1.06)</td>
</tr>
</tbody>
</table>

Note: Items were rated in a five point Likert scale (1 = strongly disagree; 5 = Strongly agree). * indicates than group means differ (p < .05). £ indicates that group means differ (p < .01).
Teacher Information

Assessment information was obtained from six teachers who attended the teacher workshop at School 1. Analysis of this data was not conducted due to the small sample size. Table 19 presents the means and standard deviations for these teachers. An increased score at post-testing for the Eating Disorder Knowledge indicates increased knowledge about eating disorders and referral information. Higher scores on other scales indicates an increase in concern for physical appearance, negative view of appearance or perception of social/ media influences on thinness. Participating teachers also completed the treatment acceptability measure which consisted of seven items rated on a five point Likert scale. Table 20 presents the means and standard deviations for the six participating teacher at School 1.
Table 19

**Summary of Means and Standard Deviations for Teacher Assessment Measures**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Pre-testing</th>
<th>Post-testing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eating Disorder Knowledge</td>
<td>4.92</td>
<td>5.67</td>
</tr>
<tr>
<td></td>
<td>(1.24)</td>
<td>(1.63)</td>
</tr>
<tr>
<td>View of Appearance</td>
<td>11.56</td>
<td>12.00</td>
</tr>
<tr>
<td></td>
<td>(1.36)</td>
<td>(1.87)</td>
</tr>
<tr>
<td>Concern for Appearance</td>
<td>10.56</td>
<td>10.20</td>
</tr>
<tr>
<td></td>
<td>(1.79)</td>
<td>(1.64)</td>
</tr>
<tr>
<td>Social/Media Pressure</td>
<td>25.00</td>
<td>28.20</td>
</tr>
<tr>
<td></td>
<td>(3.44)</td>
<td>(2.28)</td>
</tr>
</tbody>
</table>

*Note: Standard deviations are in parentheses.*

Table 20

**Summary of Treatment Acceptability Data for Teachers**

<table>
<thead>
<tr>
<th>Item</th>
<th>School 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>I found this program acceptable.</td>
<td>4.41</td>
</tr>
<tr>
<td></td>
<td>(.89)</td>
</tr>
<tr>
<td>I like the procedures used in this program.</td>
<td>4.40</td>
</tr>
<tr>
<td></td>
<td>(.89)</td>
</tr>
<tr>
<td>I believe that the program will work.</td>
<td>4.20</td>
</tr>
<tr>
<td></td>
<td>(.45)</td>
</tr>
<tr>
<td>There were parts of the program that made me uncomfortable.</td>
<td>1.40</td>
</tr>
<tr>
<td></td>
<td>(.55)</td>
</tr>
<tr>
<td>I believe that this program will help people.</td>
<td>3.60</td>
</tr>
<tr>
<td></td>
<td>(.55)</td>
</tr>
<tr>
<td>I enjoyed the program.</td>
<td>4.20</td>
</tr>
<tr>
<td></td>
<td>(1.10)</td>
</tr>
<tr>
<td>Overall, I had a positive reaction to the program.</td>
<td>4.40</td>
</tr>
<tr>
<td></td>
<td>(.89)</td>
</tr>
</tbody>
</table>

*Note: Items were rated in a five point Likert scale (1 = strongly disagree; 5 = Strongly agree).*
DISCUSSION

The primary purpose of the present investigation was to examine the immediate impact of the Body Logic Program for the prevention of eating and weight related difficulties. Before a discussion of the results, it should be recognized that the generalizability of the findings may be limited. Previous studies of the prevention of eating disorders have primarily targeted students within the public school system (Killen et al., 1993; Moreno & Thelen, 1993; Shisslak et al., 1990). Few of the studies have targeted males as well as females (Moriarty et al., 1990; Porter et al., 1986; Shisslak et al., 1990). In addition, only one has implemented a prevention program with students in the same age range as the current study (Killen et al., 1993). The participants of this study were students at two private schools. Both of these require tuition and the students are primarily Caucasian and of middle to high socioeconomic status. However, a comparison of scores of the ChEAT to that of other samples indicated that the results were comparable to that reported by other researchers. In the current sample, 24 (8.36%) of the participants scored above clinical cutoffs. This is somewhat higher than reported by Maloney et al. (1989), but lower than a survey of third through seventh graders in private schools (Guidry et al., 1996). BMI of the participants was comparable to estimates reported in previous prevention programs (Killen et al., 1993) as well as norms presented by Must et al. (1991). Given these limitations, the findings of this study can be generalized to other middle school students from middle to high economic status.

The primary purpose of the present investigation was to develop and implement the Body Logic Program and determine its immediate effects on the participating
students. The study was initially designed to implement a school education component for all participating students offered during regularly scheduled class times. A more intensive intervention for those students identified as at-risk for the development of eating and weight-related difficulties was then offered away from the school setting. The general education component consisted of three class sessions. The goal of this intervention was to impact body image disturbance, e.g., to decrease fears of fatness, and increase nutrition knowledge. This component of the program was implemented with sixth and seventh graders within two area private schools. School 1 opted to hold the sessions once per week for three consecutive weeks. School 2 requested that the classes be taught for three consecutive days. A treatment manual was used by the school education class leaders and ratings were completed at the end of each class to rate each class session. No significant differences in the group leader ratings were indicated between modules or schools. Treatment acceptability assessment and feedback from the students indicated that the school education component was perceived positively by the participating students. There were significant differences between treatment acceptability assessment between schools with School 2 rating treatment acceptability lower than School 1. Assessment of retention of information presented in the modules indicated that, overall, information presented was retained. The mean percent correct for retention items was 87.3% for School 1 and 84.3% for School 2. Somewhat lower retention scores were indicated for Module 2. Assessment of treatment acceptability for teachers from School 1 indicated that the program was also perceived positively by the faculty at each school. School
administrators from both schools have expressed interest in the program returning next school year.

The expanded program for children at-risk for the development of eating difficulties was designed to target the other risk factors for the development of an eating disorder such as depression, and low self-esteem. Fifty-five students (mostly female) were identified as meeting criteria for being at-risk for the development of eating and weight related difficulties. Analysis of female at-risk students baseline data compared to students not identified as at-risk indicated that female at-risk students scored significantly higher on the total MAEDS score as well as each of the subscales of the MAEDS. At-risk males scored significantly higher on the MAEDS total score than males not identified as at-risk. When the scales of the MAEDS were examined separately for at-risk males and males not identified as at-risk, significant differences were noted for the Binge Eating and Purgative Behaviors scales. No significant differences were indicated on the Nutrition Knowledge measure or BMI between students identified as at-risk and students not identified as at-risk. Efforts to have the at-risk students participate in the intensive intervention were not successful. Parents of children identified as at-risk for the development of eating and weight related difficulties from School 1 were telephoned by the principal investigator of this study. Of these, only one parent was interested in attending the program. Increased efforts were made with children identified as at-risk from School 2. The parents of these children were sent a letter outlining the results of the baseline assessment as well as telephoned by the principal investigator. Of these, six parents confirmed to attend the intensive program. However, only one parent and child opted to receive the program individually. This did not allow an examination of the effectiveness of an intervention program designed specifically for at-risk students. An investigation of an at-risk program is warranted to
determine whether targeting the specific risk factors which have been identified to contribute to the development of an eating disorder (e.g. Guidry et al., 1996) would have an added impact on these students.

Models of health behavior such as the Health Belief Model (Becker, 1974) provide a conceptual framework that uses information about individuals as a means of understanding, predicting, and identifying the potential for changing behaviors related to health. The likelihood of an individual taking action when faced with health-related issues is determined by considering the benefits of taking action as opposed to any barriers to action that may exist (Grodner, 1991). In other words, the benefits of a program must outweigh the perceived costs. The failure to attract students identified as at-risk indicated that the perceived costs of this program outweighed the perceived benefits. There are several possible explanations for this reaction by the participating students and parents. These include: (a) a lack of community support and commitment, (b) a lack of sense of urgency to seek help due to at-risk students being pre-symptomatic; (c) the intensive intervention being perceived as stigmatizing; and (d) a lack of perceived susceptibility due to the current sociocultural emphasis on thinness.

Community commitment has been stressed as a necessity for a successful prevention effort. In health promotion, the target group should be an integral part of directing the plans and operation of the intervention (Arbeit, Serpas, Johnson, Forcier, & Berenson, 1991). The present study was the first implementation of the Body Logic Program. Both participating schools reported that there were not active parental advisory boards at either school. In addition, the parental advisory committee which was established for the Body Logic Program was not specifically composed of members representing the two participating schools. Thus, community commitment and ownership of the Body Logic Program has yet to be established. It is possible that
this lack of community commitment may have influenced the parental and teacher participation. Studies of cardiovascular health promotion have been successful in developing community and familial support (Arbeit et al., 1991; Hearn et al., 1992). However, these interventions were home based (Hearn et al., 1992) or established health promotion programs (Arbeit et al., 1991) which had developed community support over time. For example, the Heart Smart program, had been piloted within a school for two years prior to recruiting a committee composed of teachers, administrators, and parents (Arbeit et al., 1991). Johnson, Malone, and Hightower (1997) stressed the importance of developing community ownership and the need to allow sufficient time to root a program. Thus, it is possible that attendance in the parental and teacher components could be augmented after the Body Logic Program has been implemented over time within the community.

Stein, Bauman, and Ireys (1991) outlined three main ways individuals are motivated to participate in interventions: (a) they have specific problems for which they seek remedy; (b) they are experiencing difficulties which are not direct symptoms, but which predispose them to welcome help; or (c) they wish to improve themselves. Primary prevention programs such as the Body Logic Program, however target those who are at-risk for the development of difficulties and may be presymptomatic. For example, 19.16% of the participating students in the present study met criteria for at-risk status. However, 8.36% of the participants scored above clinical cutoffs on the ChEAT, a measure of restrictive eating practices. Being presymptomatic may effect participant’s investment in a program, e.g. acceptability of costs such as inconvenience.
or time expenditure, may be lower than if there is a perceived need for relief of major symptoms (Stein et al., 1991).

Targeting at-risk students may also be perceived as stigmatizing. For example, an attempt to recruit teens for a peer counseling program for adolescents with chronic illness by heightening awareness of a salient risk factor (chronic illness) for mental health risk was unsuccessful (Stein et al., 1991). Rather, the researchers reported that the health concerns did not motivate the adolescents to participate, but instead the teens viewed their conditions as stigmatizing, instead of a factor to increase participation.

Models of health behavior change stress the importance of perceived susceptibility to a disorder and the perceived seriousness of a disorder in determining the likelihood of taking action or the possibility of behavior change (Grodner, 1991). Research has not examined the perceived susceptibility of developing an eating disorder. However, there is some evidence that certain aspects of eating disorders may be admired, e.g. self-control, or viewed as worth the risk to achieve the current sociocultural ideal for thinness (Grodner, 1991; Murray, Touyz, & Beumont, 1990).

Numerous studies have documented the prevalence of dieting and feeling fat among adolescents (Maloney et al., 1989; Patton, 1988; Rosen & Gross, 1987; Serdula et al., 1993; Wardle & Beals, 1986). The current societal preference for a thin physique has spawned a corresponding societal preoccupation with dieting and weight loss (Polivy & Herman, 1987). Thus, it is possible that parents and children who were identified as being at risk for the development of an eating disorder in the present study perceived the risk factors as normal for children in this age range. Further, it has been documented that eating disorder behaviors typically are secretive (Pomeroy, 1996).

The present study was identified as a prevention program for eating disorders.
Therefore, the perceived lack of extreme behaviors in those participants identified as at-risk may have resulted in a lack of immediacy to take action. Categorizing a participant as at-risk may still result in the intervention being perceived as unnecessary, irrelevant, or unimportant (Stein et al., 1991).

The results of the current study indicate that the school education component of the Body Logic Program is promising as a prevention program for eating disorders. The most consistent result for the MAEDS subscales was a decrease in scores on the Fear of Fatness scale in all females, at-risk females, and females not identified as at-risk from School 1. The school education component was designed to target body image concerns and it was hypothesized that this intervention would lead to decreases on this scale. Additionally, significant differences were indicated on the Avoidance of Fear Foods scale for all females and the Binge Eating scale for females not identified as at-risk. The school education component seemed to be effective with females from School 1 regardless of at-risk status, however this component was not able to target each of the specific factors associated with risk status. This program differed from previous prevention programs in that it offered no information about eating disorders or the dangers associated with eating disorders. Recent research has indicated that this approach may be harmful due to teaching at-risk participants about various purgative or dieting techniques (Mann et al., 1997). Initial results of the impact of the school education intervention indicated a significant school by time interaction for the total score of the MAEDS for all males. However, analysis of the subscales of the MAEDS did not indicate a significant difference following the intervention.

There are several possible ways to explain why the intervention was more successful with School 1 females as compared to School 2. School 2 females consistently scored higher on assessment measures than females from School 2. It is
possible that students at this school required a lengthier or more intensive intervention to achieve further decreases in fears of fatness and other eating disorder symptoms. The class size at School 2 was much larger than the class size at School 1. The smaller impact of the Body Logic program in School 2 suggests that the intervention may be more successful when presented to a smaller class size. This hypothesis should be addressed in future examinations of the program. School 2 also had more male participants (n=82) than School 1 (n=48). In addition, the modules were presented in three consecutive class times as compared to over a three week period for School 1. This difference in schedules may have affected the impact of the program on students in School 2. Finally, the school education component was implemented later in the school year than for School 1. The modules were presented to both grades close to the Easter vacation. In addition, the school education component was implemented after three outcome assessment sessions. Feedback obtained from the students indicated that the repeated testings was not perceived positively by the students. Repeated measurement prior to the intervention may have impacted the motivation of the students in School 2.

The impact of the school intervention on nutrition knowledge was not significant. However, the nutrition information was presented in only one class session. Previous prevention efforts have indicated an increase in nutrition knowledge after the intervention (Neumark-Stzainer et al., 1995). However, this program consisted of ten sessions primarily targeting nutrition and was conducted by a nutrition health educator. The results of the present study indicate the need to increase the number of nutrition related sessions to impact the student's knowledge of nutrition.

Killen et al. (1993) stressed the importance of targeting adolescents most at-risk for the development of eating disorders. As previously mentioned, efforts to have
the students identified as at-risk for eating disorders participate in the intensive intervention for at-risk students were not effective. Although a decrease in scores of the Fear of Fatness scale was indicated for the at-risk students following the school education component of the Body Logic Program, efforts to target this population is warranted. Future programs targeting the at-risk students will need to be modified. Additional focus groups with school faculty is warranted to ascertain the feasibility of offering this component within the school setting. Efforts to increase community support and commitment to the program through more active attempts to involve parents within the targeted schools is necessary. For example, developing a parental advisory committee for each targeted school and the development of educational programs for all parents without identifying children at-risk are possibilities for future programs.

Given the results of the present study, several areas of future research can be suggested. First the development of time efficient outcome evaluation is warranted. The students perceived both the number of assessment sessions as well as the length of the outcome measure negatively. A revision of the MAEDS to develop a shorter version for children would be beneficial in future prevention studies as well as eating disorder treatment outcome evaluations for adolescents. In addition, either varying measures administered during assessment sessions or fewer assessment sessions may be perceived more positively by the children. It is possible that since the participants were administered the same measure numerous times, there may have been some carry-over effects.

It may be helpful to further clarify the at-risk model used in this study. Logistic regression is a statistical technique that can predict the occurrence of an event, as well as identify the variables useful in making a prediction. A recent study has used this
technique to determine a measurement model for the risk of developing eating disorders in female college athletes (Zucker, 1996). This study identified overconcern with body shape and size as a risk factor for the development of eating disorder symptoms. Use of this technique could lead to a more precise and less time consuming method for determining at-risk status.

An initial step to improve upon the results of the current study would be to increase the number of school education sessions held within regularly scheduled classes. Initial focus groups indicated the possibility of using up to eight class periods for the program. Additional classes could then be offered on nutrition, as well as additional information on changing a negative body image. The current school education component offered an overview of this information. Additional classes would allow for the development of gender specific components which would allow for the examination of gender related effects on the effectiveness of the program. Classes should also be implemented over several weeks, rather than over one week as was done in School 2. Developing strategies to implement the at-risk intensive intervention within the school setting will be integral to including this component of the program. For example, offering the classes after school with no identification of risk status might increase attendance. As previously mentioned, more active efforts to include parental and faculty involvement to increase investment in the program are warranted.

Johnson et al. (1997) stressed the importance of allowing sufficient time for a prevention program to "root". Continuing commitment to the targeted schools is necessary to achieve faculty and parental involvement. Offering a second year of the program would demonstrate the commitment of the program to the community. It would also allow for the potential development of peer groups with participating students. In addition, students could be presented additional information about pubertal...
development, dating, and other synchronous developmental changes which, in conjunction with weight concerns, have been proposed to be additional risk factors for the development of eating disorders (Levine et al., 1994).

In conclusion, the current study successfully implemented the general education component of the Body Logic Program within two private middle schools in the East Baton Rouge area. Results indicated that the general education component of the Body Logic Program led to decreases in fears of fatness in all females from School 1. The program was not effective in implementing the intensive intervention for students at-risk for the development of eating disorders. There is a need for continuing research into the prevention of eating disorders specifically targeting those most at-risk.
REFERENCES


APPENDIX A

CONSENT FORMS AND PARENTS PACKET

LOUISIANA STATE UNIVERSITY-BATON ROUGE

Consent Form: Students and Parents

1. **Study Title:** Development and Implementation of the Body Logic Program: A Primary Prevention Program for Eating Disorders

2. **Performance Sites:** Three area Baton Rouge private schools that have agreed to participate in the study.

3. **Investigators:**
   - Donald A. Williamson, Ph.D.  388-1494
   - Paula Varnado, M.A.  388-1494
   - Nancy Zucker, B.A.  388-1494

4. **Purpose of the Study:** To investigate the immediate effectiveness of the Body Logic Program for the prevention of eating disorders implemented to 6th and 7th grade students.

5. **Subject Inclusion:** A 6th or 7th grade student currently attending the schools in the Baton Rouge area that have agreed to participate and whose parents have signed this consent form.

6. **Subject Exclusion:** Students that are not in the 6th or 7th grade and/or whose parents do not agree to allow them to participate.

7. **Description of Study:** Participating students will be asked to complete questionnaires five times during the school year. These questionnaires will ask questions to address the areas of body image, concern with physical appearance, disturbed patterns of eating, mood, self-esteem, nutrition knowledge, and perceived social pressure related to body size and shape.

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Height and weight will also be measured, but this will be done privately. The initial testing session will take approximately an hour. Additional testing will require approximately 30 minutes. These testing sessions will occur during the school hours. All subjects will also attend a general education program about body image and nutrition that will be held during school hours. An expanded program on these topics will be available to any interested parents and students following the general education program. This expanded program will be offered at a site away from the school setting, in the early evening. Some students and their parents will receive a special invitation to attend the expanded program. A research team member will call the parents and students at home to invite them to this program. At least one parent will be required to attend the sessions with their child. The same parent will be asked to attend the first and last sessions of the program. The expanded component will last for four sessions. Participating students will receive information about body image, nutrition, self-esteem, and problem solving. Parents will receive information about the same topics. In addition, parents will receive information about the development of extreme behaviors to control weight. Parents will be asked to complete measures addressing sociocultural influences on thinness, and nutrition knowledge at the beginning and end of the program. The research team members will be available at designated times to discuss the study with you or your child.

8. **Benefit of the Study:** As body image dissatisfaction and healthy eating have become an increasing concern among adolescents, all subjects will benefit from this study by learning ways to increase self-esteem, by learning about healthy eating patterns and the importance of moderate exercise, by learning how to
critically examine media messages regarding weight and body size, by learning how to spot a fad diet, and by learning to develop a positive body image.

Parents will benefit from this study by learning about the sociocultural pressures of adolescents, healthy nutrition, communication skills, and problem solving.

9. **Risks:** There are no apparent risks for participating in this study.

10. **Alternatives:** This study does not evaluate a different treatment, therefore there are no alternatives other than to not participate in the study, which is an option for all students.

11. **Removal:** There are no criteria for removal from the study other than failure to sign this informed consent form.

12. **Right to Refuse:** Subjects may choose NOT to participate or withdraw from the study at any time with no penalty.

13. **Privacy:** The results of the study may be published. The privacy of the participating subjects will be protected and the identity of participants will not be revealed.

14. **Release of Information:** The records of subjects in the study will be reviewed by investigators, but subject identity will be kept secret.

15. **Financial Information:** There will be no cost to the subjects to participate in this study.

16. **Signatures:**

   The study has been discussed with me and all my questions have been answered. I understand that additional questions regarding the study should be directed to investigators listed above. I understand that if I have questions about subject rights, or other concerns, I can contact the
Vice Chancellor of the LSU Office of Research and Economic Development at 388-5833. I agree with the terms above and acknowledge I have been given a copy of the consent form.

__________________________________________________________
Signature of Subject Volunteer  Date

__________________________________________________________
Signature of Subject Volunteer's Parent  Date

__________________________________________________________
Witness  Date

__________________________________________________________
Investigator(s)  Date

The study subject has indicated to me that the subject is unable to read. I certify that I have read this consent form to the subject and explained that by completing the signature line above the subject has agreed to participate.

__________________________________________________________
Signature of Reader  Date

My telephone number is____________________________________

My child and I are interested in attending the expanded program.

YES  NO
LOUISIANA STATE UNIVERSITY-BATON ROUGE

Consent Form

1. **Study Title:** Development and Implementation of the Body Logic Program: A Primary Prevention Program for Eating Disorders

2. **Performance Sites:** Three Baton Rouge schools that have agreed to participate in the study.

3. **Investigators:**
   - Donald A. Williamson, Ph.D. 388-1494
   - Paula Vamado, M.A. 388-1494
   - Nancy Zucker, B.A. 388-1494

4. **Purpose of the Study:** To investigate the immediate effectiveness of the teacher component of the Body Logic Program for the prevention of eating disorders implemented to faculty at the participating schools.

5. **Subject Inclusion:** Faculty currently employed at the schools in the Baton Rouge area that have agreed to participate who have signed the consent form.

6. **Subject Exclusion:** Faculty not employed at the participating schools, or those who do not wish to participate.

7. **Description of Study:** Faculty will be invited to attend the teacher workshop of the Body Logic Program. Interested teachers will be asked to complete several measures which address sociocultural influences on thinness, nutrition knowledge, and eating disorder knowledge one week prior to the workshop, and again upon its completion. The workshop will take place at a time convenient to the faculty, and will last for two hours. The workshop will address the development of body image issues, eating disorder information, and referral information.
8. **Benefit of the Study:** As body image dissatisfaction has become an increasing concern among adolescents, all subjects will benefit from this study by learning about the development of body image concerns, and eating disorder symptoms.

9. **Risks:** There are no apparent risks for participating in this study.

10. **Alternatives:** This study does not evaluate a different treatment, therefore there are no alternatives other than to not participate which is an option for all teachers.

11. **Removal:** There are no criteria for removal from the study other than failure to sign this informed consent form.

12. **Right to Refuse:** Subjects may choose NOT to participate or withdraw from the study at any time with no penalty.

13. **Privacy:** The results of the study may be published. The privacy of the participating subjects will be protected and the identity of participants will not be revealed.

14. **Release of Information:** The records of subjects in the study will be reviewed by investigators, but subject identity will be kept secret.

15. **Financial Information:** There will be no cost to the subjects to participate in this study.

16. **Signatures:**

The study has been discussed with me and all my questions have been answered. I understand that additional questions regarding the study should be directed to investigators listed above. I understand that if I have questions about subject rights, or other concerns, I can contact the Vice Chancellor of the LSU Office of Research and Economic
Development at 388-5833. I agree with the terms above and acknowledge I have been given a copy of the consent form.

__________________________________________________________________________

Signature of Subject Volunteer Date

__________________________________________________________________________

Investigator(s) Date

__________________________________________________________________________

Witness Date

The study subject has indicated to me that the subject is unable to read. I certify that I have read this consent form to the subject and explained that by completing the signature line above the subject has agreed to participate.

__________________________________________________________________________

Signature of Reader Date

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LOUISIANA STATE UNIVERSITY- BATON ROUGE

Assent Form: Students

Study Title: Development and Implementation of the Body Logic Program: A Primary Prevention Program for Eating Disorders.

There are several parts for the Body Logic Program. Each of these is described below:

1. The first part of the Body Logic Program will be answering questions for the research team. You will fill out several questionnaires during a class period. The researchers will also measure your height and weight, but this will not be done in front of the class. You will also fill out some of the questionnaires several more times during the school year.

2. The second part of the Body Logic Program will be three classes led by the research team. These classes will be held during regular class time. These will have information about how to eat and exercise, and how to feel better about the way you look.

3. The third part of the study will be four classes held away from your school. Both you and your parents can attend if you would like to. Some parents may be called by the research team to invite them to the classes.

4. It is very important to remember that you do not have to do this study if you do not want to. Also, you can drop out at any time.

5. The researchers may write a paper about this study, but your name will not be printed in the paper. The researchers will protect your privacy.

I have read the information related to the proposed study. I understand that I will fill out several questionnaires and that my height and weight will be measured. If I agree to be in this study, the researchers will teach classes to me during class time. I also...
understand that my parents may be called and we may be invited to attend some classes after school hours. I understand that I do not have to participate in the study if I do not want to, and I can decide not to participate at any time. All of my questions about the study have been answered. By signing this form, I agree to be in the study.

________________________________________

Signature of Student                        Date

________________________________________

Witness                                     Date

Age: __________
Dear Parent:

Children acquire prevailing cultural values of physical appearance prior to adolescence and thinness is deemed desirable by girls before the onset of puberty. There is a growing concern in our society about the images portrayed in the media and the impact these may have on adolescents. Recent studies have indicated that children as young as nine years old have attempted dieting. Studies have indicated that up to 77% of adolescent females and up to 42% of adolescent males are trying to lose weight. Studies have further indicated that 40% of the adolescents dieting, are within a normal weight range. Thus, adolescent females, in general, report a high level of body image dissatisfaction. Recent studies have indicated that this body image dissatisfaction may potentially lead to an eating disorder in some children.

The Body Logic Program for the improvement of body image in junior high age students is being developed by the clinical psychology department at Louisiana State University. Because a high level of body image dissatisfaction has been implicated in the development of eating disorders, it is hoped that the program may prevent such problems in children who may be vulnerable to their development. It is important for the investigators to caution you as parents that this program is a research project. Principal investigators for the study will be Dr. Donald Williamson, a clinical psychologist and professor at LSU, and Paula Vamado, a doctoral student in clinical psychology at LSU. The first step in the development of effective eating disorder prevention programs is the study that the research team is presenting in this packet of information. The research team would like to implement this study within your school. The study has been described to administrator's from your school. This program is based on previously conducted studies in the area of prevention of eating disorders.
To date, the studies described in the scientific literature have only been successful at increasing knowledge about eating disorders and their adverse consequences. The material presented to your child in all phases of the study will focus on improving body image and healthy nutrition and exercise. Every effort will be made not to teach your child maladaptive eating practices. It is stressed that no child can participate without parental consent. All information gathered in the study will be confidential and your child will not be identified by name in any publication that results from the study.

The program would consist of several phases. In the first, students will be asked to complete a variety of measures to ascertain the levels of body image concerns, and other areas such as self esteem. The measures are described in the attached consent forms. Following the initial completion of these measures, a general education component would be presented to the student body at large. Both boys and girls will receive this information. Although the majority of persons with increased levels of body image concerns are female, males have been found to experience these difficulties. In addition, the information on nutrition and social pressures would also be beneficial to male students. The general education component will consist of three sessions. The students will then be asked to complete one of the measures immediately following completion of the general education component and several times throughout the school year. After the completion of the general education component, an expanded program will be offered. This program is designed for those children who exhibit increased levels of body image dissatisfaction, low self-esteem, and place a high emphasis on physical appearance.
Screening: The following measures will be used to ascertain the level of your child's body image and eating concerns.

**Body image Assessment for Children and Adolescents (BIA)** The BIA procedure for children involves two sets of body image cards that correspond to male and female children and pre-adolescents. Each set included nine cards and on each card there is a silhouette of a figure whose body size ranges from very thin to obese. The BIA procedure involves the placement of the nine body image cards in random order in front of the child. The participant is then given the following instructions: "I want you to look at all of the cards and point to the one that most looks like you do right now. You can only pick one card." After the child picks a card, the cards are reshuffled and again placed in front of the subject in random order. The child is then given the following instructions: "I want you to look at all of these cards and point to the one that you would most want to look like if you could look like any of these. You can only pick one card."

**Children's Version of the Eating Attitudes Test (ChEAT)** This measure is a 26 item self-report measure that assesses eating attitudes, dieting behaviors, and food preoccupation in children. Some examples of questions from this measure include: 1. I am scared of being fat; 2. I try not to eat when I am hungry; 3. I think about food a lot of the time; 4. Sometimes I eat a lot and feel like I cannot stop.

**Multi axial Assessment of Eating Disorders Symptoms (MAEDS)** The MAEDS was developed as a brief self-report inventory which assesses the presence of such behaviors as restrictive eating, feelings of fatness, and avoidance of feared foods. Some of the items were reworded to provide suitable explanation of eating disorder behaviors for a sixth and seventh grade reader.
Rosenberg Self-Esteem Scale (RSE) The Rosenberg Self-Esteem Scale is a general measure of self-esteem designed for use with adolescents. The scale contains 10 items which are summed to create a global self-esteem score.

Concern for Physical Appearance, Negative Evaluation of Physical Appearance, and Social/Media Influences Scales The scale contains four items that measure concern for physical appearance, five items that measure perception of physical appearance, and four items that measure perceived social/media influence on thinness. The items were previously adjusted for a third grade reading level.

Diet and Health Knowledge Survey Questionnaire The students will complete a shortened version of the measure which assesses general nutrition knowledge.

Additional Items The questions will be two Likert scale questions regarding how much pressure the participants perceive from each of their parents to be thin.

All interested parents and students are invited to participate in the expanded program. Students identified as having increased levels of body image concerns, dieting, and associated areas will be encouraged to attend. The parents of these students will receive a telephone call from the research staff. Every effort will be made to protect the confidentiality of the persons attending these groups. The groups will be held away from the school. The groups will be held on a weekday evening, however, if a majority of interested students and parents would prefer a weekend time, the research team will try to accommodate this. It is crucial that both you and your child attend some of the sessions together.

If you have any questions about the study, please contact either Paula Varnado, or Nancy Zucker at the phone numbers on the informed consent form, and one of the research team members will contact you. We can either answer any questions you may have over the phone, or will set up a meeting to discuss
the study with you individually. Thank you very much for taking the time to review this study. Please review the following forms with your child and return in the enclosed envelope by 1-3-97.
March 4, 1997

Mr. and Mrs. Doe
222 Anywhere Lane
Baton Rouge, LA 77777

Dear Mr. and Mrs. Doe:

Your child is currently participating in the Body Logic Program at St. Aloysius. The Body Logic Program for improvement of body image in junior high age students has been developed by the clinical psychology department at Louisiana State University. Principal investigators for the study are Dr. Donald Williamson, a clinical psychologist and professor at LSU, and Paula Varnado, a doctoral student in clinical psychology at LSU. The initial component of this program was for the students to complete several measures ascertaining factors that research has indicated to be potential risk factors for the development of eating and weight difficulties. The risk factors were determined by research that is similar to research on risk factors for cardiovascular disease. This letter is to provide you with feedback about this initial evaluation. It is important for you to know that we did not interview your child in an in-depth manner. These results are based on psychological testing alone. We are hoping that by discussing these results with you, that we will obtain feedback as to whether these results concur with your observations of your child. A member of the research
team will be contacting you by telephone to answer any questions you may have about
this feedback. The following is a summary of Jane's results.

**Body Image Assessment for Children and Adolescents (BIA)** The BIA procedure
for children involves two sets of body image cards that correspond to male and female
children and pre-adolescents. This procedure provides an estimate of the degree of
body image distortion, as well as body image dissatisfaction that an adolescent
experiences. On this measure, your child indicated a level of dissatisfaction with their
current body size greater than the average child their age.

**Children's Version of the Eating Attitudes Test (ChEAT)** This is a measure that
assesses eating attitudes, dieting behaviors, and food preoccupation in children.
Some examples of questions from this measure include: 1. I am scared of being fat; 2.
I try not to eat when I am hungry; 3. I think about food a lot of the time; 4. Sometimes I
eat a lot and feel like I cannot stop. Elevated scores on this measure indicate the
presence of restrictive eating. On this measure, your child received an elevated score
indicating the presence of excessive dieting and food preoccupation.

**Preoccupation with and negative evaluation of physical appearance and social
influence on thinness scales**. Three scales were used to measure preoccupation and
negative evaluation of physical appearance, and social influences on thinness.
Examples of items from this measure include "The way I look is extremely important to
me." and "Thin girls get treated better than girls who are heavy." On this measure, Jane
endorsed items related to concern for her physical appearance and a negative
evaluation of her physical appearance. Jane also indicated that she agrees with the
current social pressure to attain a thin body size, and that attaining this body size would
help her to be more accepted.
Children's Depression Inventory (CDI) This measure evaluates an adolescent's overall mood over the past 2 weeks. Elevated scores on this measure indicate feelings of sadness and depression. On this measure, your child received a score above the average for children her age.

Rosenberg Self-Esteem Scale (RSE) The Rosenberg Self-Esteem Scale is a general measure of self-esteem designed for use with adolescents. The scale contains 10 items which are summed to create a global self-esteem score. On this scale, your child indicated the presence of a low self-esteem.

Based on the above results, it has been determined by the research team that your child may be at-risk for the development of an eating disorder. We would like to caution you that scores in this range do not mean that your child will definitely develop an eating disturbance. However, recent research has indicated that the concerns expressed by Jane tend to be constant across time. A measure of height and weight indicated that Jane is currently at the 90 percentile for children her age. Specifically her height is at the 50th percentile for her age, while her weight is above the 75th percentile. This places Jane in the overweight range. It is probable that this has impacted her results on the psychological testing. In particular, this may have led to her endorsing items related to concern for her physical appearance. However, Jane also endorsed items related to low self-esteem, and depression. For these reasons, the expanded component of the Body Logic Program may be of special interest to her. The research team is offering an expanded component of the Body Logic Program. This program will provide additional information about nutrition, communication, problem solving, and self-esteem. It will also teach techniques to change negative evaluation of physical appearance. We would like to invite you and your child to attend this program. All interested students and parents are invited to attend this program. However, we are
extending a specific invitation to some parents. There is no charge for this service. The classes will be held on the LSU campus, during April 1997. The faculty at School 2 will not be notified who has been invited to attend the program in order to ensure confidentiality.

If you have any questions about the information presented in this letter, please contact Paula Varnado at 388-1494 or 667-4814. A member of the research team will be contacting you by telephone very soon. Thank you very much for your consideration.

Sincerely,

Donald A. Williamson, Ph.D.
VITA

Paula Jonniece Varnado was born on November 7, 1967, in Baton Rouge, Louisiana. She attended Louisiana State University, where she graduated with honors in 1989 with a bachelor of science degree in psychology. Paula earned her master of arts degree in psychology from Louisiana State University in 1993. Presently she is a candidate for the doctor of philosophy degree in psychology which is expected in August, 1997. She currently resides in Denham Springs, Louisiana.
DOCTORAL EXAMINATION AND DISSERTATION REPORT

Candidate: Paula Jonniece Varnado

Major Field: Psychology

Title of Dissertation: Development and Implementation of the Body Logic Program for Adolescents: A Primary Prevention Program for Eating Disorders

Approved:

[Signatures]

Major Professor and Chairman
Dean of the Graduate School

EXAMINING COMMITTEE:

[Signatures]

Date of Examination:

June 25, 1997