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A Quantitative Analysis of an Eating Disorder Prevention Program

Jennalee Murray

A thesis submitted to the faculty of  
Brigham Young University  
in partial fulfillment of the requirements for the degree of  
Education Specialist

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## ABSTRACT

### A Quantitative Analysis of an Eating Disorder Prevention Program

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Eating disorders affect millions of people in the United States alone. This study aimed to test the effectiveness of a preventative curriculum for eating disorders called *Eating Disorders: Physical, Social, and Emotional Consequences, A High School Curriculum about Anorexia, Bulimia, and Compulsive Eating* (EDPSEC). Participants included an experimental group of 27 students in their ninth grade health class and a control group of 21 students. The research examined the integrity of the curriculum administration and changes in participating students' attitudes and behaviors. The outcome measures used were students' scores on the Eating Attitudes Test (EAT-26) and the Eating Survey (ES). Results indicate high treatment integrity (85%) and significant change on students' EAT-26 scores, but not students' ES scores. Students' EAT-26 and ES scores correlated highly. Although a more robust sample and wider testing of the curriculum is needed, this study indicates that a school-based preventative program can yield positive results in changing some students' attitudes toward disordered eating.

Keywords: Eating Disorders, School curriculum, Prevention

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## Introduction

Rough estimates show that approximately 11 million people in the United States suffer from an eating disorder (National Eating Disorders Association [NEDA], 2008). Damages for those with eating disorders are often severe and irreversible. These damages can range from compromised immune systems, organ failure, bone density problems, memory difficulty, interpersonal relationship problems, and school deficits (Ahn, Chang, Kim, & Kim, 2007; Becker et al., 1999; Bradley, Taylor, Rovet, & Goldberg, 1997; Eldridge, Locke, & Horowitz, 1998; Fisher et al., 1995; Saito et al., 2008). Many risk factors can affect the onset of an eating disorder, the most common being the developmental and physical changes that accompany puberty.

Research indicates that the rise and climax of incidence rates for eating disorders occur between the ages of 14 and 19. This rise in incidence is marked by several risk factors including the onset of puberty, pubertal timing, adolescent impulsivity, and the transition to junior high (Duncan, 2005; Reijonen, Pratt, Patel, & Gredanus, 2003). Multiple studies conducted on eating disorder prevention agree with this longitudinal course. Abascal, Brown, Winzelberg, Dev, & Taylor (2004), Carter, Stewart, Dunn, & Fairburn (1997), Grave, De Luca, & Campello (2001), Mussell et al. (2000), Tilgner, Wertheim, & Paxton (2004), and Varnado-Sullivan & Horton (2006) have all completed studies in this age bracket. Implementing a prevention program at the beginning of this rise in risk, namely the ninth grade year, should prove most effective.

Although it may seem that many studies have been done on eating disorders, few have seriously looked at prevention efforts targeted at adolescents in the most vulnerable age for developing eating disorders. Therefore, the purpose of this study is to test the

effectiveness of the prevention curriculum created by the Center for Change, *Eating Disorders: Physical, Social, and Emotional Consequences, A High School Curriculum about Anorexia, Bulimia, and Compulsive Eating* (EDPSEC).

## **Review of literature**

Mental disorders have affected many people throughout society. More specifically, eating disorders in young women have been a continual cause for concern. A variety of factors contributes both to the onset of an eating disorder and to the effects that an eating disorder has on the individual. Eating disorder prevention should be a chief concern for professionals who work with young women. To understand why prevention efforts are so important for this particular disorder, an understanding of the epidemiology and severity of the disorder must first be considered. This information is then followed by a discussion on the best time to implement a prevention curriculum so that prevention efforts can prove more effective.

### **Base Rate and Epidemiology**

It is estimated that in the United States nearly one in four adults will suffer from a diagnosable mental disorder in any particular year. According to the 2004 Census, an estimated 26.2 percent of Americans age 18 and older, or nearly 57.7 million people suffer from a mental disorder (National Institute of Mental Health, 2008). Of these, eating disorders are becoming increasingly common among adolescent girls and young women.

The *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR)* specifies three eating disorder diagnoses which are (a) Anorexia Nervosa (AN), (b) Bulimia Nervosa (BN), and (c) Eating Disorders Not Otherwise Specified (EDNOS). The diagnostic criteria for AN include a refusal to maintain body weight at or above a minimally normal weight for age and height, intense fear of gaining

weight, denial of the seriousness of the current low body weight, and amenorrhea or the absence of at least three consecutive menstrual cycles.

To be diagnosed with BN, the following diagnostic criteria must be present: recurrent episodes of binge eating, recurrent inappropriate compensatory behavior in order to prevent weight gain, binge eating, and inappropriate compensatory behaviors that can include self-induced vomiting, misuse of laxative, diuretics, enemas, etc. Additionally, these behaviors must occur at least twice a week for three months on average. The patients' self-evaluation must also be overly influenced by body shape and weight and the disturbance does not occur exclusively during Anorexia Nervosa episodes.

Eating Disorders Not Otherwise Specified includes a wide range of disordered eating patterns for example all the criteria for AN is met except the female has regular menses, an individual with normal body weight regularly uses inappropriate compensatory behavior after eating only small amounts of food, and the individual repeatedly chews and spits out but does not swallow large amounts of food (American Psychological Association, 2000).

In the United States, an estimated seven to ten million girls and women and nearly one million men struggle with an eating disorder (NEDA, 2008). Similarly in Canada, estimates have shown that nearly 360,513 women and 64,253 men could be at risk for eating disorders (Gadalla & Piran, 2007). Throughout the United States there have been at least eight new incidences of severe AN per 100,000 of the population per year. There have also been at least 12 new cases of BN per 100,000 people per year (Hoek & van Hoeken, 2003).

These demographics, however, most likely underestimate the number of individuals who are suffering from disordered eating. Eating disorders are becoming increasingly common, and it is difficult to obtain a prevalence or incidence rate that adequately estimates the true number of people who are suffering. Calderon, Stoep, Collett, Garrison, and Toth (2007) looked at the Pediatric Health Information System, which is a national database which includes demographic, diagnostic, and treatment data on freestanding, noncompeting children's hospitals in the United States. Only those patients who had an ICD-9, International statistical Classification of Disease and Related Health Problems, diagnosis of AN, BN, or eating disorders not otherwise specified (EDNOS) coded as the primary diagnosis at discharge were included in the study. The researchers found that less than 2,000 teens were admitted as pediatric inpatients with an eating disorder within a three-year span. This seemingly small rate of admittance indicates that many rates underestimate actual eating disorder prevalence because they are based only on severe cases that meet the stringent DSM-IV-TR or ICD-9 criteria.

Additionally, other individuals who may be embarrassed to admit their unhealthy eating patterns do not report and, in turn, are not counted in eating disorder statistics. Therefore, the true incidence rate of those suffering from AN, BN, or EDNOS could be millions more (Becker, Grinspoon, Klibanski, & Herzog, 1999; Crowther, Wolf, & Sherwood, 1992; Fairburn, Hay, & Welch, 1993; Gordon, 1990; Hoek, 1995; Hoek & van Hoeken, 2003; Shisslak, Crago, & Estes, 1995).

### **Consequences of Maintaining an Eating Disorder**

The damages for those with eating disorders are widespread. They range from physical to emotional to social damages, as well as problems in a school setting.

**Physical damages.** Some of the most familiar effects of an eating disorder are physical. One of the most common physical effects found in an eating disorder patient, especially those with anorexia nervosa, is amenorrhea, or the disruption of the menstrual cycle. This physical damage is usually reversible, and, in many women, menstrual periods return with weight gain (Becker et al., 1999; do Carmo et al., 2007). Another common damage associated with eating disorders is a direct effect of nutritional deprivation. Depriving the body of essential nutrients can often cause immunodeficiency, especially when protein-energy levels are low. This immunocompromised condition can lead to severe infections, including those that cause tuberculosis (Ahn, Chang, Kim, & Kim, 2007). Consequently, many people who suffer from an eating disorder become ill.

Eating disorder patients with severe malnutrition can similarly contract many virtually irreversible problems among different organs in the body. Patients with malnutrition and eating disorder problems, including AN, are vulnerable to severe liver damage and multi-organ failure (Di Pascoli, Lion, Milazzo, & Caregaro, 2004; Saito et al., 2008). In addition to this, Yasuhara et al. (2005) found an association between AN, BN, and kidney cysts. For Example, a woman with a long-standing diagnosis of bingeing and purging eventually passed away from pneumonia, sepsis, and “end-stage” kidney damage.

Those people who have disordered eating patterns are also susceptible to bone density loss and fractures (Becker et al., 1999). Do Carmo et al. (2007) completed bone density scans on 15 girls diagnosed with anorexia nervosa and found that most had osteoporosis or osteopenia, a reduction in bone mass which can include decreased

calcification or density. Later, the researchers followed up on these girls. Many of these patients, after treatment and years of time to heal, showed marked individual weight gain and the return of their menstrual cycles. Even with these improvements in the patients' health, nearly half of the women still had low bone density or a worsened state of osteoporosis. This indicates that bone density changes that happen because of disordered eating are mostly irreversible, lifelong damages in patients diagnosed with AN.

Eating disorders have also been shown to have damaging effects to patients' brains, leading to mental deficiencies. Bradley, Taylor, Rovet, and Goldberg, (1997) studied 20 anorexic females that were referred for treatment. The researchers found inefficiency in the cortical processing of non-verbal information in all twenty patients. This is marked by tasks containing equal numbers of geometric and curvilinear abstract figures flashed onto a computer screen. Patients were then asked to note which symbols reoccurred. By using two explicit memory tasks and the Weschler Intelligence Scale for Children-Revised (WISC-R) they found that patients in a starved state showed latency delays in both verbal and nonverbal memory tasks. After weight gain, many patients recovered their verbal memory losses, but deficits persisted in the nonverbal right hemisphere tasks. This suggests and re-emphasizes that many damages caused by eating disorders are irreversible.

**Suicide and mortality rates.** Anorexia Nervosa is regularly considered the mental disorder with the highest mortality rate (Keel et al., 2003). "The mortality rate associated with anorexia nervosa alone, at 0.56 percent per year, is more than 12 times as high as the mortality rate among young women in the general population" (Becker et al., 1999, p. 1093). Hewitt, Coren, and Steel (2001) studied over 10 million death records for

a mention of anorexia nervosa as a primary contributing cause of death. They indicated that the rates of mortality for patients with an eating disorder were near 6.73 per every 100,000 deaths in the United States. Likewise, Muir and Palmer (2004) examined death certificates throughout England and Wales. They found that, according to British prevalence rates, approximately 50 people would be expected to die in association with anorexia nervosa each year.

Studies most often claim suicide and starvation to be the two leading causes of death in patients who have been diagnosed with an eating disorder (Keel et al., 2003). Birmingham, Su, Hlynsky, Goldner, and Gao (2005), found that out of 954 consecutive patients referred to an eating disorder program in the province of British Columbia, 2.6% had died within a 20 year period. The most common cause of mortality was suicide followed by pneumonia, hypoglycemia, liver disease, cancer, alcohol poisoning, and subdural hemorrhage; all of which can be damages associated with long term eating disorders. Similarly, a meta-analysis done by Pompili, Mancinelli, Girardi, Ruberto, and Tatarelli, (2004) found suicide to be the major cause of death in patients. Patients with AN committed suicide more often than their counterparts in the general population. The researchers also found comorbidity with affective disorders, such as severe depression. Depression or a mental state that is characterized by a negative sense of inadequacy and a despondent lack of activity is an important risk factor for suicide. Other than depression, the researchers found that purging-type behavior, a long history of attempted suicide, long clinical histories, and failed treatments were also risk factors for suicide in patients with disordered eating.



Another interesting factor leading to mortality and suicide rates in patients with Anorexia Nervosa is poor psychosocial functioning, which can lead to alcohol abuse. Keel et al. (2003), after completing their five year longitudinal study with nearly 250 women, found a strong link between eating disordered women's social adjustment, consequent alcohol abuse, and suicide. They explained that it may be important for hospitals to pay close attention to eating disordered patients who exhibit poor social adjustment, have mood disorder problems, and have a long standing history of illness or alcohol abuse. Patients who exhibit these risk factors are more likely to commit suicide.

**Relationships and school problems.** Many patients with AN suffer disruptions in interpersonal relationships often due to their eating disorders. O'Mahony and Hollwey (1995) found that as eating disorders become more severe the patient experiences suffering in their relationships. As previously thought, this is not due to the patient's neuroticism. It is more likely due to the excessive amounts of time and the toll that managing an eating disorder takes on the patient and those around them. In addition to this, results from the Broberg, Hjalms, and Nevonan (2001) indicated that many women with eating disorders have a high level of insecure attachment patterns in relationships.

Eldridge, Locke, and Horowitz (1998) describe that many interpersonal problems of those with eating disorders stem from two main underlying dimensions at either extreme too much friendliness or hostility and too much dominance or submissiveness. A patient with an eating disorder is usually overly friendly to those around them or excessively intimidating or unfriendly. Similarly, they are also either exceedingly overbearing or very docile. These interpersonal problems are generally ways of coping with their eating disorder. In other words, these sufferers might be refusing to

acknowledge their eating disorder and consequently deflect this avoidance into extreme passivity with others. Furthermore the researchers describe that those patients who report higher levels of social avoidance and who deny their own vindictiveness are at a higher risk for treatment failure.

Consequently many of these interpersonal damages and difficulties can influence self-esteem patterns negatively (Geller, Zaitsoff, & Srikameswaran, 2002). Low self-esteem or depression can affect many aspects of an eating disorder patient's life including school performance. Many students with an eating disorder are unable to perform at their highest level. Fisher et al. (1995) describes impaired concentration as well as poor problem solving and planning in relation to school work and activities. Harper, Ford, Berrett, Hardman, et al. (2001) have further documented that students with eating disorders show an "inability to successfully engage in school work . . . Their ability to think and concentrate on school subjects is decreased, distorted, and sometimes completely destroyed as a result of their eating disorders" (p. 95).

### **Longitudinal Course**

Taken together, several studies indicate that there are many risks for eating disorders but most of them begin to manifest and escalate in early adolescence. These risks then peak in the late adolescence including the freshman year in college and then steadily decrease over time. Certain childhood risk factors seem to predict or correlate with eating disorder symptomatology that manifests itself in later adolescence. For instance children ages one to ten who consistently struggle around meals, have early digestive or gastro-intestinal problems, negative emotionality, and/or experience

maltreatment or abuse are at greater risk for eating disorders and disordered eating in their later adolescent life (Micali, 2005).

Several studies have indicated the onset of puberty is a significant change in an adolescent's life that may have some influence on eating disorder problems. Many young girls are well aware of the socio-cultural body ideals of thinness before they go through puberty. These socially acceptable ideals of extreme thinness create many social schemas regarding personal body image in a pre-pubescent girl (Sands, Tricker, Sherman, & Armatas, 1997). When a young woman goes through puberty, her body fat levels begin to increase, her breasts develop, and her hips widen. These natural changes in a woman's body are directly opposite to that extreme socio-cultural ideal of thinness. Subsequently, those girls who have difficulty in adapting to these developmental changes have many challenges. These challenges seem to manifest in difficulty in body image satisfaction, increased concerns about eating, and problematic eating behaviors (Mussell, Binford, & Fulkerson, 2000; Swarr & Richards, 1996; Shisslak et al., 1995).

In addition to trouble adapting to developmental changes, the timing of a girl's puberty can also be an important risk factor in developing an eating disorder. Young women who experience early pubertal development and its accompanying increase in body fat oftentimes feel different and much heavier than their later-blooming peers. In order to counteract this perceived difference some girls tend to adopt problematic eating behaviors that can include extreme dieting and exercising (McCabe & Ricciardelli, 2004; Swarr & Richards, 1996).

In addition to puberty and the subsequent physical changes that occur, high impulsivity, which is evident in adolescence, can be highly correlated with eating

disorders. Eddy et al. (2002) and Wonderlich, Connolly, and Stice (2004) looked at many behavioral factors that have been linked to elevated impulsivity, high risk, and susceptibility to eating disorders. These factors are stealing, delinquency, aggression, substance abuse, and attempts at suicide. Many of these behavioral impulsivity problems can manifest themselves as early as the junior high school years. The transition to junior high school is most often a difficult one. It is marked by the onset of dating, increased academic pressure, and an increased vulnerability to peer and media influences. These peer and media influences oftentimes push girls to attempt to attain the slender socio-cultural ideal. By striving for this extreme thinness on top of adjusting to the junior high transitions many girls experience a susceptibility to eating problems (Alonso, Rodríguez, Alonso, Carretero, & Martín, 2005; Shisslak et al., 1995). Due to these increased risk factors these adolescents, ages 14 to 19, represent the peak years of risk for the onset of eating disorders (Duncan, 2005; Reijonen et al., 2003).

There is a seemingly steady rise in risk for an eating disorder from early adolescence to the late high school years. This rise in risk significantly tapers off and steadily decreases through the college years, ages 20 to 28 (Stice & Spoor, 2007; Wiechmann, 2007; Winters, 2005). A longitudinal study done by Heatherton, Mahamedi, Striepe, Field, and Keel (1997) suggests that “maturing into adulthood and getting away from the enormous social influences that emphasize thinness (such as being on a college campus) help most of the women escape from chronic dieting and abnormal eating” (p. 123). This later period of young life illustrates most individuals settling down, getting married, having children, and establishing careers. Most adults in this life stage seem to have a strong sense of identity that can reflect different responsibility and character, not

necessarily only those roles society establishes. This suggests that the importance earlier placed on the socio-cultural physical ideal of extreme thinness is diminishing (Heatherton et al., 1997; Keel, Baxter, Heatherton, & Joiner, 2007).

### **Prevention**

According to Duncan (2005) and Wiechmann (2007), a prevention program should be most effective if administered and taught during the ninth grade year, typically ages 14 to 15. This age group would be a good target group for prevention according to the longitudinal course for eating disorder discussed above. If risks for eating disorder start to increase around age 14 it is only logical that a prevention program should be implemented to counteract these risks. Additionally the incidence rates of those diagnosed with eating disorders increase through the adolescent years. A prevention program should be successful if implemented before many adolescents have developed an eating disorder. Many studies conducted on eating disorder prevention program agree with this longitudinal course, and timeline for implementing a prevention program (Abascal, Brown, Winzelberg, Dev, & Taylor 2004, Carter, Stewart, Dunn, & Fairburn 1997, Grave, De Luca, & Campello 2001, Mussell et al. 2000, Tilgner, Wertheim, & Paxton 2004, and Varnado-Sullivan & Horton 2006).

Various studies have discussed the importance of holding and administering a prevention program in the schools. It is “doubtful that the typically requested one-session intervention focused on information about eating disorders and their consequences could lead to lasting behavior change” (Varnado-Sullivan & Horton, 2006, p. 699). By administering a prevention program in the schools, not only would the population being

taught be the ideal 'risk' population, but teaching and administering a curriculum would be convenient as well as commonplace.

Abascal, Brown, Winzelberg, Dev, and Taylor (2004) , studied an online prevention program with 78 female sophomores. Participants were divided into three separate groups after assessing motivation for improving their body image and risk for disordered eating through questionnaires, (a) a higher-risk and higher-motivated group, (b) a group with lower-risk or lower-motivated students, and (c) a mixed group with varied risks and motivations included. The researchers found that all three groups improved their knowledge about eating disorders, nutrition, and exercise. By using the Eating Disorders Examination- Questionnaire (EDE-Q), a self-report survey, the researchers were able to examine pre and post-intervention results for shape and weight concerns. They found that higher-risk and higher-motivated students showed significant pre to post EDE-Q improvements in attitudes and behaviors related to eating disorders. Overall, their results suggest that their eating disorder curriculum improved body image and disordered eating attitudes in both higher-risk and lower-risk students.

Comparably, Tilgner, Wetheim, and Paxton (2004) examined an eating disorder prevention video used in schools. By using the Eating Disorder Inventory (EDI) researchers were able to see changes in body dissatisfaction and drive for thinness. The researchers saw significant change from pre-intervention EDI results to post-intervention EDI results. These significant changes were in drive for thinness, intention to diet, and knowledge about eating disorders.

Grave, De Luca, and Campello (2001) also suggested that a prevention program can include aspects to improve participant's knowledge of eating disorders and healthy

eating habits. These researchers investigated the effectiveness of a school-based eating disorder prevention program. They used the Eating Attitudes Test (EAT) for children and the EDE-Q to look at different key features and attitudes of an eating disorder. After the intervention concluded participant's knowledge increased and there was a significant reduction on EDE-Q results indicating a decrease in some disordered attitudes toward eating. After a 12-month follow up, the researchers found that many students maintained their change in attitudes. Additionally, Favaro, Zanetti, Huon, Santonastaso (2005) found overall that those students who participated in their prevention program reported fewer incidences of developing eating disorders one year after the curriculum was taught.

One of the most important things to keep in mind while administering a prevention program in an educational setting is to, "help those students at risk and not harm those who are low risk" (Abascal et al., 2004, p. 2). Many of these prevention programs reviewed contained goals to (a) modify and increase knowledge, attitudes and behaviors pertaining to body size/shape, nutrition and eating habits, (b) enhance body and self images, and (c) improve self-efficacy in combating social and socio-cultural/media influences. The most common positive change in these programs was a consistent increase in knowledge about eating disorders, nutrition, and exercise. Also many of the student's abnormal attitudes toward disordered eating improved (Grave et al., 2001; Mussell et al., 2000; Tilgner, et al., 2004).

The purpose of the present study was to test the effectiveness of the EDPSEC curriculum in changing attitudes and beliefs about eating in ninth graders.

The specific questions for this study were:

1. *Was the EDPSEC curriculum administered with integrity?*

2. *Was there differential change over time in EAT-26 scores according to group membership (experimental vs. control groups)?*
3. *Was there differential change over time in ES scores according to group membership (experimental vs. control groups)?*
4. *Was there a correlation between EAT-26 scores and ES scores?*



## Method

A description of the participants and the instruments used in this study are detailed in the following section. Additionally, a description of the procedures followed and an explanation of the data analyses are also given.

### Participants

Participants included 48 ninth grade students from a local Utah junior high school. The experimental group included eight male and nineteen female students in their seventh period ninth grade health class. The control group included seven male and fourteen female students in two separate seventh period gym classes: weight lifting and racquetball. Both the control and experimental groups were enrolled in their classes during the fourth quarter of the 2008–2009 school year.

### Instruments

The Eating Survey (ES) and the Eating Attitudes Test (EAT-26) were administered to the three separate ninth grade classrooms. The results from these instruments were used as pre-post tests for quantitative data analysis.

**Eating Survey.** The ES was specifically designed for adolescent samples. Duncan (2005) conducted a study to determine the effectiveness of the ES when assessing adolescents. Using a robust sample of high school students the ES was found to effectively assess eating disorder risks in adolescents. The ES is a 20-item measure that asks students to report how frequently they experience disordered eating and weight related attitudes, beliefs, and behaviors (Hardman & Richards, 2000). Cloyd (2005) completed a factor analysis of the ES and found that the 19 questions loaded onto four factors; Factor 1- a preoccupation with thinness ideal, Factor 2- dieting, Factor 3- items

denoting a diagnostic criteria of disordered eating, and Factor 4- content related to rigid or ritualistic thoughts and behaviors. The four factors are intercorrelated, Factor 1 and 2 with the highest correlation (.53), Factors 1 and 3 are relatively high as well (.50), and Factors 2 and 4 have the weakest correlation (.17). The validity of the ES seems to be supported by this factor analysis. Additionally, Cloyd (2005) ran a composite scale Cronbach's alpha that showed an internal consistency reliability of .89. Moreover, the EDPSEC specifically includes the use of the ES as part of the curriculum. It is the first handout done before any lesson or instructional event. At the end of the curriculum, students fill out the ES again. This is meant to help students assess the impact the series of classes has had on them.

Directions on the top of the eating survey explain, "Answer the following questions honestly. Write the number of your answer in the space at the left. Use the following scale to respond to each question: 1-Often, 2-Sometimes, 3- Rarely, 4-Never." The ES consists of 20 questions that are rated on this scale. Questions include: "I diet to lose weight", "I feel fat", "I want to be thinner than my friends", "People worry about my eating habits", "My greatest fear is becoming fat", etc. (Hardman & Richards, 2000).

**Eating Attitudes Test.** The EAT-26 is commonly used in studies with college age women and occasionally with adolescents (Winters, 2005). The EAT has shown a validity coefficient of 0.87 and a reliability coefficient of 0.79 for anorexic patients and 0.94 for control subjects (Garner & Garfinkel, 1979). The EAT-26 was chosen to use in conjunction with the ES in this study because, unlike the EAT, which consist of 40 questions, it is shorter and more convenient to use in a classroom setting without losing much validity or reliability. Additionally, the EAT-26 is one of the most widely used

tools in screening for eating disorders. Given that the ES is a relatively new tool, the EAT-26 will act as a support in assessing changing attitudes and beliefs about disordered eating.

There are no directions printed on the top of our EAT-26, but students were instructed to answer as honestly as possible when the surveys were handed out. Unlike the ES, the EAT-26 has a bubble sheet format with six scale choices: Always, Usually, Often, Sometimes, Rarely, and Never. Students used these scale choices to rate each question, for example: “Am terrified about being overweight,” “Cut my food into small pieces,” “Take longer than others to eat my meals,” “Give too much time and thought to food,” “Have the impulse to vomit after meals” (Garner & Garfinkel, 1979).

### **Procedures**

The Center for Change has created new prevention curriculum entitled “Eating Disorders: Physical, Social, & Emotional Consequences” (EDPSEC). It was specifically designed for classroom use in junior and senior high schools. The curriculum includes multiple teaching options. The administration option selected for this study included five, 75-minute sessions. Due to the junior high’s schedule of 45-minute classes the health teacher broke these five sections into nine, 45-minute sessions.

The EDPSEC aligns well with the Utah State Curriculum for junior high health, which provides guidelines that should be met by secondary health education. For ninth grade the Nutrition and Fitness Core Standard includes objective three: *Analyze the relationship between a healthy sense of self and eating patterns*. The guidelines for this objective are to (a) Identify characteristics of a healthy self and body, (b) Compare body image and body acceptance and the influence of one on the other, (c) Predict how

external and internal factors impact body image and acceptance; e.g., media, fashion, trauma, abuse, perfectionism, control, lack of self-worth, (d) Explain the potential impact of negative body image and acceptance; e.g., fad dieting, starvation, compulsive eating and/or exercising, bulimia, anorexia, other disordered eating, (e) Develop strategies for improving body image and acceptance, (f) Identify warning signs and short- and long-term effects of disordered eating, and (g) Identify ways to help someone who is experiencing disordered eating (Harrington, Greenwood, Moulding, & Wojtech, 1999).

Included in each of the EDPSEC session's topics for instruction there are handouts, DVD segments, and homework assignments. Session one's objectives are (a) To introduce students to the subject of eating disorders, (b) To help them understand and explore the use of coping mechanisms in their own and other people's lives, and (c) To help them recognize that eating disorders are especially destructive coping mechanisms. This section is outlined with an introduction, followed by the topics: Coping with Stress, Turn-About Experiences, and a Professional Perspective on Eating Disorders (Harper, Ford, Berrett, Hardman, Richards, 2001).

Session two's objectives are to (a) To help students recognize the subtle process of becoming trapped by a negative coping mechanism and to give students a model of the process by examining the development of an eating disorder and (b) To introduce students to the danger of an eating disorder as a coping mechanism by examining the physical consequences of an eating disorder. Section two topics include: Recognizing the Signs of an Eating Disorder, Developing an Eating Disorder, and the Physical Consequences of Eating Disorders (Harper et al., 2001).

The objective for session three is to continue to educate students about the negative impact of an eating disorder by examining emotional and social consequences. Section three's topics include: Eating Disorders as an Emotional Shut-off Valve, the Emotional and Social Consequences of Eating Disorders, and the Social Impact of Eating Disorders (Harper et al., 2001).

Session four's objectives are (a) To give students an awareness of the importance of accurate beliefs about life, food, and food use and to examine how inaccurate beliefs lead one to the use of coping mechanisms like an eating disorder, (b) To teach students to recognize the signs and symptoms that reveal that someone is already trapped by an eating disorder, and (c) To utilize proper techniques for helping the sufferer. Section four topics comprise Getting Tapped and Getting Free, Personal Beliefs That Can Trap, Signs and Symptoms of an Eating Disorder, and How to Help Someone with an Eating Disorder (Harper et al., 2001).

Finally, the objectives for session five are (a) To introduce students to characteristics of a healthy life by examining these characteristics in recovered eating disorder sufferers and (b) To guide students in determining how to implement the characteristics in their own lives. The topics for section five include a conclusion and give the students advice on living healthy lives, having healthy thoughts, and participating in healthy behaviors (Harper et al., 2001).

This curriculum was administered to the seventh period ninth grade health class by the health teacher. At least one of the two researchers was present at each class period to fill out treatment integrity lists on each section of the EDSPEC sessions. Each integrity checklist included questions relating to number of handouts used, if the

discussions were explained clearly and adequately, students' reactions, if the DVD segment was played, if the homework was passed out and later collected, and any other observations noticed during the lesson.

The ES and the EAT-26 was administered to all students prior to the first session, and collected from all students following the final session. Students' were asked to place only numbers, assigned by the health teacher on their surveys. Informed consent was obtained from the students' parents before beginning the study as well as student assent before any data were collected. Later, the teacher matched obtained consent forms with student numbers. All students in the experimental group received the curriculum and completed the surveys. Only surveys for students whose parents consented were delivered to the researcher by the teacher.

A control group was formed using students from two seventh period, ninth grade gym classes: weight lifting and racquetball. The same period was used for this group so that there was no possibility of overlap between the control and experimental students. Informed consent was obtained from the students' parents as well as students' assent prior to collecting any data. All students in the gym classes were asked to take both surveys: pre and post. Students were asked to place only numbers, assigned by their teachers on their surveys. Later, the teachers matched the obtained consent form with student numbers. Only surveys for students whose parents consented were delivered to the researcher by each gym teacher. The final control group consisted of thirteen girls from the racquetball class and one girl and seven boys from the weight lifting class.

**Data Analysis**

Split plot ANOVA tested the differential change over time according to group membership (control vs. experimental). Separate split plot ANOVA was conducted on both the ES and EAT-26. Correlations were drawn between the ES and the EAT-26.

## Results

### Research Question 1

Was the EDPSEC curriculum administered with integrity?

Treatment Integrity can be defined as the degree to which an independent variable is implemented as intended. Integrity in treatment is also important for not only purposes of external validity but in study replication as well (Wheeler, Baggett, Fox, & Blevins, 2006). In this study it is especially important to assess if the curriculum was being implemented and taught as was intended by the designers.

During the administration of the EDSPEC at least one of the two researchers was present to fill out a treatment integrity checklist. Each integrity checklist included first, a question on the number of handouts used according to how many handouts were provided in the curriculum, if they were explained adequately, if the discussions before/after the handouts were properly facilitated, and if the students seemed to be engaged and participating. Second, a question about if the provided DVD segment was played, if it was introduced and explained adequately, and if there was discussion afterward. Third, there was a question on if the homework was passed out and explained. Fourth, an additional question was used to ask for any extra information or observations from the session that day.

After observing all sessions it was found that 17 out of 17 handouts were used, 4 out of 6 DVD segments were played, and 2 out of 4 homework assignments were passed out and collected. Many of the handouts were used in a group activity format; the teacher had mentioned that her students work well in groups, and this was observed as an effective use of the handouts provided in the EDPSEC. One DVD segment was missed



because of technical difficulties, and the other due to time constraints. Class discussion and involvement was typically high. However, as the class moved through the curriculum, near the end of the sessions, the students seemed to lack interest and get bored. Overall treatment integrity was 85%, which is considered high.

### **Research Question 2**

Was there differential change over time in EAT-26 scores according to group membership (experimental vs. control groups)?

A 2 x 2 split plot ANOVA was calculated to examine the effects of group membership (control vs. experimental) and time (pre-test vs. post-test) on EAT-26 scores. There was a significant interaction between group membership and time ( $F(1, 44) = 5.012, p = .03$ ). In addition, the main effect for time was significant ( $F(1, 44) = 4.514, p = .039$ ). The main effect for group was not significant ( $F(1, 44) = 2.027, p > .05$ ). Ideally, the absolute value for each group would be the same. In looking only at the slope of change regardless of this absolute value these results support the hypothesis that significant change occurred in test scores after receiving the curriculum as illustrated in Figure 1 below.

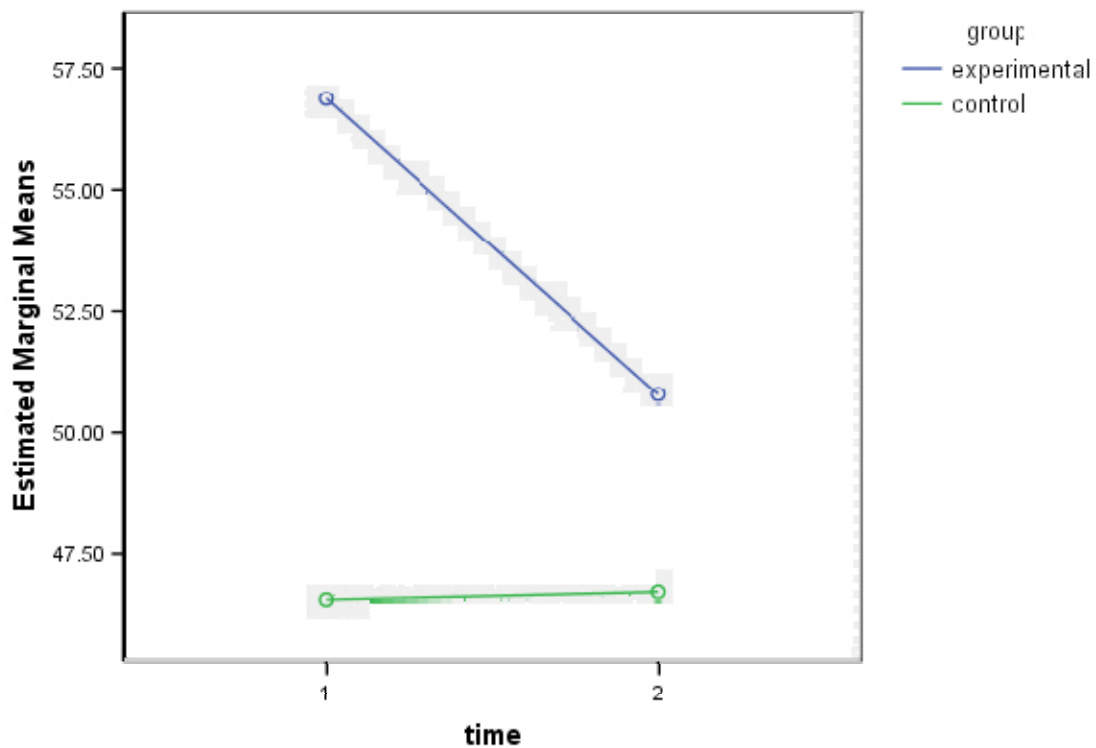


Figure 1. EAT-26 pre and post test total scores plot.

### Research Question 3

Was there differential change over time in ES scores according to group membership (experimental vs. control groups)?

A 2 x 2 split plot ANOVA was calculated to examine the effects of group membership (control vs. experimental) and time (pretest vs. posttest) on ES scores. No significant main effects or interactions were found. The interaction between group membership and time ( $F(1, 44) = .053, p > .05$ ), the main effect for time ( $F(1, 44) = 3.351, p > .05$ ), and the main effect for group ( $F(1, 44) = .142, p > .05$ ) were all not significant. These results indicate that ES scores were not influenced by either time or receiving the curriculum as illustrated in Figure 2 below.

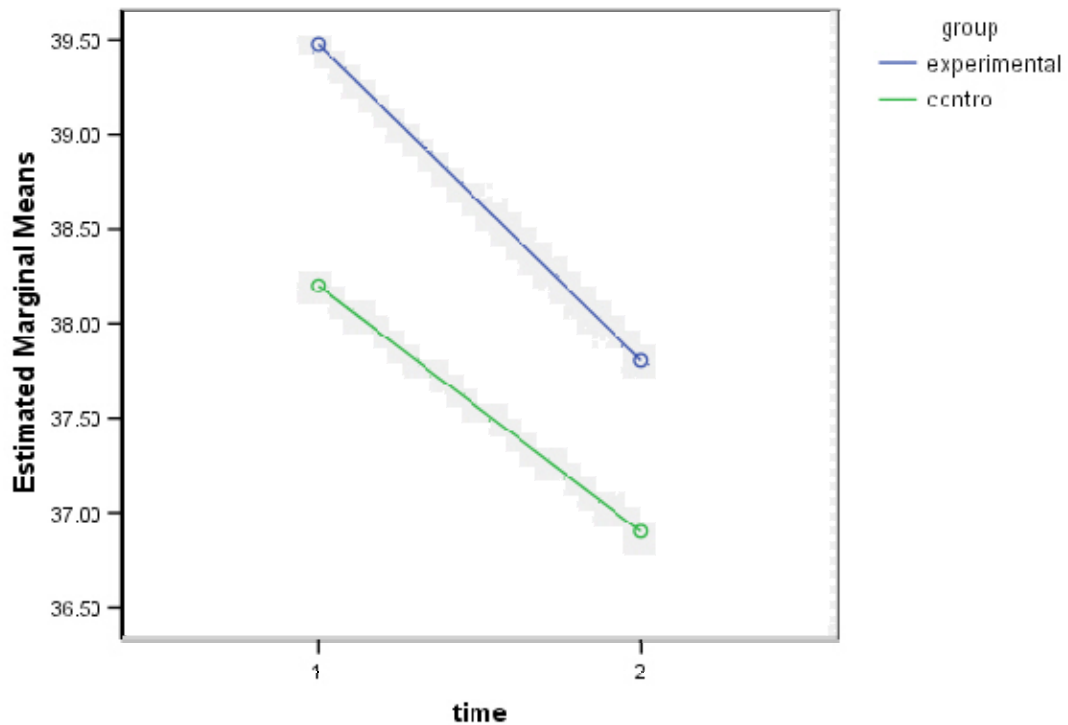


Figure 2. ES pre and post test total scores plot.

#### Research Question 4

Was there a correlation between EAT-26 scores and ES scores?

A Pearson correlation coefficient was calculated for the relationship between the ES total pre-test scores and the EAT-26 total pre-test scores. A strong positive correlation was found ( $r(44) = .741, p < .001$ ). The relationship between ES total post scores and EAT-26 total post scores was also calculated ( $r(44) = .817, p < .001$ ). This indicates a significant relationship between both surveys. Subjects scored similarly on both the Eating Survey and the Eating Attitudes Test. Additionally, Table 1 below shows the minimum and maximum total scores on each measure and the mean total score and standard deviation for each measure.

Table 1

*ES and EAT-26 Descriptive Statistics Summary*

Measure	N	Minimum	Maximum	Mean	Std. Deviation
ES pre-test	46	21	65	38.92	9.76
ES post-test	46	20	65	37.41	10.23
EAT-26 pre-test	46	27	126	52.39	17.76
EAT-26 post-test	46	26	136	49.02	17.91

## Discussion

Many schools do not currently use research based curriculums and professionals agree that it is of the utmost importance, especially for preventative curriculums, to test their effectiveness before they are administered in a school setting (Cook & Cook, 2004). Likewise, it is important to hold and administer a prevention program in the schools, especially for the commonality of eating disorders and the severely damaging effects they can have on students (Abascal, Brown, Winzelberg, Dev, & Taylor, 2004; Bardick et al., 2004; Mussell et al., 2000; Varnado-Sullivan & Horton, 2006; Wade, Davidson, & O'Dea, 2003).

In order to incorporate the knowledge found in these research articles the effectiveness of an eating disorder curriculum, *Eating Disorders: Physical, Social, and Emotional Consequences, A High School Curriculum about Anorexia, Bulimia, and Compulsive Eating* (EDPSEC), created for its use in schools, was tested by examining the differences in pre and post test results on both the Eating Survey (ES) and the Eating Attitudes Test (EAT-26).

### Major Findings

Overall significant results were found indicating the effectiveness of the curriculum; it seems to be productive in affecting unhealthy and troubled attitudes toward eating. Results show significant positive change in EAT-26 scores for those who received the curriculum, and very little change for those who did not receive the curriculum. No significant results were found for the ES, but students' EAT-26 scores and ES scores correlated highly.

Administering and testing the EDPSEC curriculum in a junior high setting during the ninth grade year was decided because the transition to junior high school and the developmental changes manifesting at this age have been shown as a high risk factor for eating problems, indicating the climax for the onset of an eating disorder (Alonso, Rodríguez, Alonso, Carretero, & Martín, 2005; Mussell, Binford, & Fulkerson, 2000; Swarr & Richards, 1996; Shisslak et al., 1995). This prevention program was expected to be effective at these young ages, which are essentially the beginning of the increase in incidence rates (Duncan, 2005; Reijonen et al., 2003; Wiechmann, 2007).

Although studies on reviewing preventative curriculum were few, the significant results found for this particular curriculum are a promising addition to the current literature. The ES and EAT-26 fundamentally test attitudes toward eating and can indicate a potential risk for current and future disordered eating. There has been some question as to the effectiveness of prevention programs for eating disorders (Carter, Stewart, Dunn, & Fairburn, 1997). This study, however, indicates that prevention programs can yield positive results, which is similar to numerous other studies (Abascal, Brown, Winzelberg, Dev, & Taylor, 2004; Favaro, Zanetti, Huon, & Santonastaso, 2005; Grave, De Luca, & Campello, 2001; Tilgner, Wertheim, & Paxton, 2004).

It is interesting to discuss the possibilities of difference between the ES and EAT-26 results. Although the tests correlate highly, only the interaction effect for the EAT-26 was found to be significant. There could be many reasons for this including the differences of the tests in general, although very similar, each test asks different questions. Not only are there different questions on each test, but they are written in different prose. The ES was specifically written for adolescents. Consequently it is

easier to read and might ring with certain transparent clarity to these young students. The EAT-26 on the other hand is more difficult to read since it is written at a higher level meant for adults. The ES is at the level of an adolescent and as such the students might remember those questions from day to day and not questions from the EAT-26. Change could occur in the participants eating attitudes just by having been exposed to the more easily understood questions concerning disordered eating on the ES. Therefore, the results on the ES would not be significant from pre to post-test according to group membership because there was similar change in both the control and experimental groups.

Additionally, the ES is a relatively new test (Cloyd, 2005), unlike the EAT-26, which is one of the most widely used inventories for measuring behaviors and attitudes of disordered eating (Garner & Garfinkel, 1979). The EAT-26 might be more sensitive to change than the ES. Also, the sample for this study was relatively small, and perhaps a more robust sample would boost the trend of the current results and create a significant change in the ES scores.

Although only significant change was found after receiving the curriculum on one of the two measures, the curriculum in general seemed to produce positive outcomes. Not only does the curriculum seem to affect eating attitudes, but it also fulfills requirements and includes all aspects for the state of Utah guidelines for health education that fall under the Nutrition and Fitness core standard, objective three (Harrington, Greenwood, Moulding, & Wojtech, 1999). The curriculum itself is well put together; it includes many resources and seems easy for teachers to implement in the classroom.

Moreover results indicate that teaching this curriculum in the classroom does little to no harm to participating students.

### **Limitations**

The study was conducted in a ninth grade junior high class, and therefore should not be generalized beyond that particular grade and setting. It was also conducted in Nebo School district Utah, and caution should be taken when generalizing results to other areas of the state and country. The study should apply most to those curious in preventative curriculums focused on changing eating attitudes in the ninth grade.

This study has certain limitations which include first, the small sample size. Second, the curriculum was only tested in one classroom and with one teacher. Results may differ with other teaching styles and differences in treatment integrity of the curriculum. Third, the study is also based on self-report surveys, which can in some cases be unreliable; although with this type of study it is difficult to use any other measure. Fourth, the study contained no follow-up to assess long term effects of the curriculum.

### **Conclusion and Implications for Future Research**

In conclusion, this study seems to shed light on the importance of teaching an eating disorder preventative curriculum to adolescents. Moreover, a school-based program can yield positive results in changing some attitudes toward disordered eating. However, the results and limitations prevent any definite conclusions about the effectiveness of the program at this time. Future research on the EDPSEC could benefit with a larger sample in many different schools, a follow up to determine possible long term effects, and additional measures that are not self-report.



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## Appendix A

### Eating Survey (ES; Hardman & Richards, 2001)

Answer the following questions honestly. Write the number of your answer in the space at the left. Use the following scale to respond to each question:

1= OFTEN 2=SOMETIMES 3=RARELY 4=NEVER

- \_\_\_ 1. My eating habits are different from those of my friends.
- \_\_\_ 2. I diet to lose weight.
- \_\_\_ 3. I feel fat.
- \_\_\_ 4. I weigh myself on the scale.
- \_\_\_ 5. I worry about food and about what I will or will not eat in a day.
- \_\_\_ 6. I want to eat alone so no one can watch me.
- \_\_\_ 7. I compare myself to other people.
- \_\_\_ 8. I eat large amounts of food and I make myself vomit.
- \_\_\_ 9. I use laxatives to control my weight.
- \_\_\_ 10. I believe there is something wrong with how I look.
- \_\_\_ 11. I want to be thinner than my friends.
- \_\_\_ 12. I feel I have to do things perfectly.
- \_\_\_ 13. I play games with food (e.g. lie about what I eat, hide food, cut food in small pieces, etc.).
- \_\_\_ 14. My acceptance from the opposite sex is based on how thin I am.
- \_\_\_ 15. People worry about my eating habits.
- \_\_\_ 16. I dislike myself.
- \_\_\_ 17. I feel I must exercise every day.
- \_\_\_ 18. I miss meals to control my weight.
- \_\_\_ 19. I eat the same foods every day.
- \_\_\_ 20. My greatest fear is becoming fat.



25. Enjoy trying new rich foods
26. Have the impulse to vomit after meals