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THE EATING SURVEY: DISORDERED EATING AND CLINICAL CUTOFF
SCORE FOR ADOLESCENTS AGES 14-17

By
David S. Duncan

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

Educational Specialist

Department of Counseling Psychology and Special Education

Brigham Young University

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BRIGHAM YOUNG UNIVERSITY
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ABSTRACT

THE EATING SURVEY: DISORDERED EATING AND CLINICAL CUTOFF SCORE FOR ADOLESCENTS AGES 14-17

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The Eating Survey is a new screening instrument for adolescent eating disturbances. The purpose of this study was to empirically examine how the Eating Survey functions as a total screening instrument and to find a clinical cutoff score for the current 17 items. The participants were 2,569 non-clinical adolescents with a comparative sample of 41 inpatient adolescents aged 14-17. More specifically, this study examined the age and gender differences of the 2,569 non-clinical adolescent males and females. It also compared the 1,662 non-clinical females to a sample of 41 inpatient females. Specificity and sensitivity analyses were conducted to find the most efficient clinical cutoff score while maintaining a balanced approach and a high efficiency rating. The findings of the current study suggests that the Eating Survey appears to function as expected with analysis results showing trends similar to current research. A clinical cutoff score of 51 was found to be the most efficient cutoff while keeping a balanced approach regarding specificity and sensitivity. With a clinical cutoff score of 51, a 14% at-risk base rate was found, which matches both research literature and other screening instruments.

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I am deeply grateful and forever indebted to my wife for her love and patience through such an intense and time-consuming project. She is my strength and support, my sounding board and confidant. She has pushed when I wanted to give in, listened when I struggled, and held me up when I was down.

Finally, I would like to thank my parents for their constant love and unconditional support. They taught me that education was important, that the price was hard work, and that the result would run much deeper than a degree.

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Introduction

According to the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision* (American Psychiatric Association [APA], 2000), Anorexia Nervosa and Bulimia Nervosa are the two specific eating disorder diagnoses. For those that exhibit severe eating disturbance but do not meet the specific criteria of either Anorexia or Bulimia, there is also Eating Disorder – Not Otherwise Specified (NOS).

Eating disorders affect 5-8 million Americans every year (Becker, Grinspoon, Klibanski, & Herzog, 1999; Wilson & Blackhurst, 1999). They also have the highest mortality rate of any psychiatric disorder. In some samples, the mortality rate exceeds 6% (Sullivan, 1995; Herzog, Rathner, & Vandereycken, 1992). The widespread suffering resulting from disordered eating appears to be much higher than these current prevalence rates. This is often due to convoluted diagnostic criteria and categorization. According to Fairburn and Beglin (1990), the quoted prevalence rates are most likely an underestimate and, of that strictly diagnosed subgroup, only a small portion are in treatment (APA, 2000).

Individuals that present for treatment of eating disorders are often in the late stages of the disorder as a result of serious caloric restriction or the binge-purge cycle (Nielsen, 2001; Nicholls & Stanhope, 2000; Whittaker et al., 1989). The delay between symptom onset and treatment often leads to complications that include emaciation, anemia, amenorrhea, seizures, esophageal bleeding, tooth decay, cardiac arrhythmias, broken bones, constipation, infertility, osteoporosis, and other serious complications of an ingrained and entrenched disorder (Beaumont, Garner, & Touyz, 1994; Reijonen, Pratt, Patel, & Gredanus, 2003; Becker et al., 1999). The physical complications combined with substantial emotional suffering can lead to years of costly physical and psychological

treatment. The current health care costs are estimated to be over 6 billion dollars per year (Cloyd, 2005; Nussbaum, 1985; Pfeiffer, Lucas, & Ilstrup, 1986; Root & Powers, 1983; Schneider, Fisher, & Weinerman, 2002).

Previous and extensive research has been focused on college-age women for the particular stressors thought to be predictors of eating disorders. Currently, the research has started to concentrate on the adolescent populations. Eating disorders have become the third most common form of chronic illness among adolescent women aged 15-19 years (Fisher, et al., 1995). Reijonen, et al. (2003) go further and explain “adolescence (ages 15-19) represents the peak period for the onset of eating disorders among women” (p. 214).

Therefore, it appears that it would be very beneficial to develop assessments that could identify these disorders before they become ingrained and even better, while they are sub-threshold, separate, or detached symptoms. Catching these symptoms early in adolescence may reduce the severe outcomes shown in the research (Fisher et al., 1995).

Many of the current assessments used for evaluating eating disorders were normed on adult populations. In a 1978 *Journal of Consulting and Clinical Psychology* article, Achenbach warned of using adult normed psychological instruments with younger individuals. Williamson, Anderson, and Gleaves (2001) suggested that there continues to be a call for adolescent instruments that can assess the central features of anorexia nervosa and bulimia nervosa and yet continue to be brief, self-report inventories that are psychometrically sound for that specific population.

There are a number of assessments currently being used to evaluate disordered eating and eating disorders in the adolescent population. Two of the most widely known and most commonly used adolescent assessments are the *Eating Disorders Inventory* (EDI) and the

Eating Attitudes Test (EAT). Both the EDI and the EAT have notable issues regarding their use with the adolescents.

The *Eating Survey* (ES) is a 20-item, self-report, adolescent eating disorders assessment instrument. Hardman (Hardman & Richards, 2000) developed the *ES* with a preliminary set of 25 diagnostic screening questions that, after receiving feedback, were revised to 20 questions. He wrote these questions from his clinical experience while working with patients diagnosed with eating disorders. Cloyd (2005) conducted an item-by-item psychometric study of the *ES* as part of his doctoral dissertation. How well it specifically functions as a single score adolescent screening instrument remains in question.

Statement of Problem

Research and assessment instruments designed for screening eating disorders have primarily focused on the young adult and adult populations with a large portion of that research specifically focusing on college populations. Most of this research is conducted to help guide diagnosis and treatment efforts for that age group. Partially as a result of the availability of college-age subjects, most of the widely used assessment instruments have been created for, and normed on, the adult population.

Many of the current generation of assessments do not adequately address the unique challenges of assessing child or adolescent beliefs and behaviors surrounding disordered eating. Only by assessing needs before thoughts and behaviors become clinical, can practitioners develop preventative techniques for the general adolescent population, come up with cutoffs for determining non-clinical, at-risk, and clinical populations, and explore any age-related patterns.

There is a need to develop an adolescent specific instrument to explore disturbed eating thoughts and behaviors and how they are manifest in non-clinical and clinical adolescent samples. Only after an adolescent screening instrument is developed can preventative techniques be created rather than waiting until the behaviors are ingrained, the diagnosis is made, and the costs, both human and monetary, have risen. The ES has been developed specifically for use with an adolescent population, but specifics about how this instrument functions as a screening instrument are yet to be determined.

Statement of Purpose

The ES is an instrument created exclusively for use with early to late adolescent population, both clinical and non-clinical. This measure assesses a wide range of disordered thinking and behaviors in adolescents. Particular features geared toward the adolescent population include brevity, developmentally appropriate language level, and ease of use.

The current study explores specifically how the ES functions. This study describes the normative distribution and descriptive statistics of the ES with both non-clinical and clinical adolescent participants. Second, it analyzes the age-related patterns in non-clinical females and males. Third, it examines the differences in non-clinical females and males. Fourth, it studies the differences in non-clinical females vs. clinical females. Finally, the study investigates the clinical cutoffs for the ES by conducting a sensitivity, specificity, and efficiency analysis.

Specific Questions:

- 1) What are the distribution attributes of ES scores for all non-clinical females and males?

- 2) What are the age-related patterns of ES scores for non-clinical females and males
- 3) What are the differences in ES scores between non-clinical females and males?
- 4) What are the differences in ES scores between non-clinical and clinical females?
- 5) What is an efficient clinical cutoff score on the ES?

Importance of the Study

This study adds to the existing body of knowledge by examining various clinical cutoffs for the ES, which is an assessment designed specifically as a screening instrument for eating disorders and disordered eating in adolescents. It also adds to the existing body of knowledge concerning the age-related patterns of disturbed eating in non-clinical and clinical adolescent populations. If the analysis of the collected data can point to a highly efficient cutoff score, this study may ultimately help researchers, educators, and psychologists more effectively identify adolescents who may benefit from early intervention and preventative efforts by offering an additional and psychometrically sound screening instrument designed for, and normed on, an adolescent population.

Review of Literature

Eating Disorders Diagnostic Information

Research studies on eating disorders can be difficult to compare due to the many ways in which terms can be defined and outcomes assessed. This is due to the complexity of assessment, diagnosis, and human psychopathology. According to the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision* (APA, 2000) Anorexia Nervosa and Bulimia Nervosa are the two specific eating disorder diagnoses. For those that meet the criteria for a severe eating disturbance but do not meet the specific criteria of either Anorexia or Bulimia, there is also Eating Disorder – Not Otherwise Specified (NOS).

As a brief overview, the key diagnostic feature for Anorexia Nervosa is a refusal to maintain 85% of normal body weight for age and height. It includes an intense fear of gaining weight, a disturbance in body image, and an absence of at least three consecutive menstrual cycles in post-menarcheal females. Bulimia Nervosa includes recurrent episodes of binge eating as defined by eating a definitively larger amount of food than normal in a specified period of time while experiencing a lack of control. It also includes compensatory behaviors such as vomiting and misuse of laxatives, a disturbance in body image, and a rate of these behaviors occurring of at least twice a week for 3 months. Finally examples of an Eating Disorder-NOS include the diagnostic criteria for Anorexia Nervosa with the inclusion of regular menses or Bulimia Nervosa with a frequency less than twice a week for a duration of less than 3 months (APA, 2000).

Prevalence

Eating disorders, which include anorexia nervosa, bulimia nervosa, binge eating disorder, and eating disorder not otherwise specified, affect 5-8 million Americans every year (Becker et al. 1999; Wilson & Blackhurst, 1999) with lifetime risks in women estimated at 8% for bulimic syndromes, and around 3% for anorexic syndromes (Patton, Selzer, Coffey, Carlin, & Wolfe, 1999). They also have the highest mortality rate of any psychiatric disorder. In some samples, the mortality rate exceeds 6% (Sullivan, 1995; Herzog et al., 1992). The staggering mortality rate for individuals admitted to university hospitals for eating disorder treatment is over 10% (APA, 2000).

The widespread suffering resulting from disordered eating appears to be much higher than these current prevalence rates. This is often due to convoluted diagnostic criteria and categorization. The more stringently enforced criteria undoubtedly lead to substantially lower prevalence outcomes. Sixteen studies were examined by Fairburn and Beglin (1990) to look into these differences specifically with bulimia. The self-report measures showed a prevalence rate of almost 10%, while strict adherence to the DSM III criteria indicated prevalence rates of only 2.6%. When a clinical interview was added to the DSM-III-R criteria, only a 1.5% prevalence rate was found.

These low incident rates of the disorders are generally quoted in the research for overall prevalence. However, Fairburn and Beglin (1990) cite a number of studies that state that the prevalence of the major key features of bulimia are much higher using self-reports. The symptom means were: weekly binge eating 15.7% with a range of 5-39%, strict dieting or fasting 29% with a range of 7-55%, weekly self induced vomiting 2.4% with a range of 0-4%, and weekly laxative use as 2.7% with a range of 1-5%. When these same behaviors

were less often than weekly, vomiting and laxative use rates rose significantly. Any one of these factors could lead to severe suffering and complications, although none of them in isolation would lead to an eating disorder diagnosis. When overall adolescent female eating disturbances were measured by the *Eating Attitudes Test*, Fisher, Pastore, Schneider, Pegler, and Napolitano (1993) found that 15-17.5% of adolescents received scores of 21 or higher. Other research on adolescent females found severely disordered eating symptoms prevalence rates from 9-25% (Graber, Brooks-Gunn, Paikoff, & Warren, 1994; Shisslak, Crago, Estes, 1995; Stice, Killen, Hayward, & Taylor, 1998).

Clearly, the prevalence of key symptoms and subsequent emotional and physical pain is much higher than the often-quoted prevalence rates. The reality is that many individuals suffering with eating disorder symptoms do not manifest with clear diagnostic criteria, but the afflictions are still present. Herzog et al. (1993) indicate that 52% of the women screened for inclusion in their study were sufficiently disabled to seek and warrant clinical treatment but did not meet the full DSM-III-R criteria for diagnosis with an eating disorder. According to Fairburn and Beglin, (1990), the quoted prevalence rates are most likely an underestimate and, of the strictly diagnosed subgroup, only a small portion are in treatment.

Costs of Eating Disorders

Individuals that present for treatment of eating disorders are often in the late stages of the disorder. This is a direct result of serious caloric restriction or the binge-purge cycle (Nielsen, 2001; Nicholls & Stanhope, 2000; Whittaker et al., 1989). Those suffering often resort to extreme dieting, excessive exercising, self-induced vomiting, and/or taking purgatives or diuretics (Becker et al., 1999; Fairburn & Garner, 1986).

Research indicates that these behaviors often develop into severe complications only after the individuals have been suffering silently for years. Becker et al. (1999) report that there can be substantial delays between the onset of symptoms and the seeking of treatment. This delay leads to complications that include emaciation, anemia, amenorrhea, seizures, esophageal bleeding, tooth decay, cardiac arrhythmias, broken bones, constipation, infertility, osteoporosis, and other serious complications of an ingrained and entrenched disorder (Beaumont et al., 1994; Becker et al., 1999; Reijonen et al., 2003). Some of these complications occur nearly immediately (i.e. constipation and anemia), but many, like osteoporosis, are not manifest for many years and are frequently irreversible. The physical complications combined with substantial emotional suffering can lead to years of costly physical and psychological treatment. The current health care costs are estimated to be over 6 billion dollars per year (Cloyd, 2005; Nussbaum, 1985; Pfeiffer et al., 1986; Root & Powers, 1983; Schneider et al., 2002).

Previous Research

Previous and extensive research has been focused on college-age women for the particular stressors thought to be predictors of eating disorders. Boskind-White & White (1983) described a number of risk factors related to college life. They discuss how many college women are vulnerable because they are middle-class, have a strong achievement orientation, are very intelligent and attractive, and desire a traditional lifestyle. On the other hand, these same women tend to have low self-esteem, a strong desire for perfection, and an obsession with food.

Post college, the relatively low rate of eating disorders among adults (older than college students) may also reflect developmental processes such as settling down, committed

relationships, growing autonomy from parents and peers and their overall influence over physical appearance, and the transition from student to professional (Heatherton, Nichols, Mahamedi, & Keel, 1995).

Adolescent Research and the Benefits of Prevention

Currently, the research has started to concentrate on the adolescent populations. Eating disorders have become the third most common form of chronic illness among adolescent women aged 15-19 years (Fisher et al., 1995). Reijonen et al. (2003) go further and discuss that “adolescence (ages 15-19) represents the peak period for the onset of eating disorders among women” (p. 214). Research shows that a substantial number of young females begin dieting before adolescence, and, by the time they are in high school, many of them have become chronic dieters (Heatherton & Polivy, 1992; Rosen & Gross, 1987). Many more engage in a variety of disordered eating such as binge eating and purging (Leon, Fulkerson, Perry, & Cudeck, 1993). As a result of the severe consequences of eating disorders and their development in adolescence, numerous studies point towards the importance of early detection of disordered eating, especially vomiting, laxative use, and other dangerous behaviors among adolescents (Reijonen et al., 2003).

Therefore, it appears that it would be very beneficial to develop assessments that could identify these disorders before they become ingrained and, even better, while they are sub-threshold, separate, or detached symptoms. Prevention can only be done if symptoms are caught before they become the subsequent severe complications of a full criteria eating disorder. Smolak and Levine (1994) also found evidence that it is very difficult to change disordered eating behaviors once they have become ingrained. For example, Herzog, Sacks, Keller, Lavori, Ransom, and Gray (1993) stated that the most severe outcomes of

any eating disorder were for individuals who presented for treatment and that met the full criteria for Anorexia. Lewinsohn, Striegel-Moore, and Seeley (2000) found that adolescents ages 10 to 19 have the highest incidence of Anorexia Nervosa. Therefore, it would seem that the most severe outcomes are for those that present with risk factors or a diagnosis of anorexia nervosa in adolescence.

Catching these symptoms early in adolescence may reduce these severe outcomes. Finding these symptoms early, and the early symptoms, appears to be associated with improved prognosis (Fisher et al., 1995). Eating disorders in an adolescent sample showed that very few experienced reoccurrence, and that the disorder had clear onset and offset or specific timetable rather than the recurrent or chronic disorders that seem to appear in adult research samples (Lewinsohn et al., 2000). This finding contrasts the overwhelming evidence of adult eating disorders course and outcome and leads to the importance of early detection of key symptoms and subsequent intervention. Heatherton, Mahamedi, Striepe, Field, and Keel (1997) also reasoned that disordered eating behaviors may be part of a temporary developmental phase. In other words, by finding symptoms early in adolescence, it may be possible to change the long documented negative course and outcome of eating disorders and make many more of them limited in time with clear offset and limited or no reoccurrences.

Problems with Using Adult Instruments with Adolescents

Some of the current assessments used for evaluating eating disorders were normed on adult populations. They were often developed with readily available college populations, and therefore, do not tend to generalize well to an adolescent population. Attempts to use these instruments on an adolescent population may skew results or invalidate the testing

and any subsequent studies. Others have taken the same items from adult normed assessments and gathered original data to discover new norms for the adolescent population.

In a 1978 *Journal of Consulting and Clinical Psychology* article, Achenbach warned of using adult normed psychological instruments with younger individuals. He discussed how using these assessments on the adolescent population may be more accurately measuring behavior related to an individual's developmental level rather than psychological disorders. Achenbach cautioned that overlooking developmental differences between adults and adolescents could invalidate the testing results.

Others have stated the same concern. Yule, Gold, and Busch (1981) warned about simply using revisions of adult assessment instruments on the adolescent population. Kotler, Cohen, Davies, Pine, and Walsh (2001) discuss how adolescence is a time of marked increase in disordered thinking regarding eating behaviors that may lead to adult disorders. This certainly underscores the need to assess adolescents with instruments normed on adolescents and psychometrically validated on adolescents. In 2001, Williamson et al. suggested that there continues to be a call for adolescent instruments that can assess the central features of anorexia nervosa and bulimia nervosa and yet continue to be brief, self-report inventories that are psychometrically sound for that specific population. Pratt, Phillips, and Greydanus (2003) have echoed this call for more research that focuses specifically on the adolescent community and that pays attention to developmental stages.

Current Instruments

There are a number of assessments currently being used to evaluate disordered eating and eating disorders in the adolescent population. The assessments can be divided into

different age populations, and they can be separated into structured inventories or self reports. Each of these are also developed for specific purposes such as measures of body image, exercise, food intake, bingeing and purging, restricting, or the more emotional areas such as disordered thoughts, feelings, and attitudes. The list goes on and on with a wide variety of categories. With such a list, it may be difficult for clinicians to know what is available and which are valid and reliable especially with an adolescent population. It also makes it difficult for researchers to do accurate, reliable, and valid comparisons. Because the ES is a brief, adolescent, self-report, screening assessment, for the current study, we will concisely focus on the same. Although there are a number of assessments currently being used, for the purpose of brevity, only two of the most widely used instruments will be discussed in depth.

Two of the most widely known and most commonly used adolescent assessments are the *Eating Disorders Inventory* (EDI) and the *Eating Attitudes Test* (EAT). Both of these instruments are widely used, brief, self-report, screening assessments available for use with an adolescent population. Both also have revisions (EDI-2 and EAT-26) that are updates and extensions of the original assessment.

The *Eating Disorders Inventory* (EDI) (Garner & Olmstead, 1984) is a self-report assessment consisting of 64 items in 8 scales in which participants rate their beliefs and behaviors on a six-point likert scale ranging from “Never” to “Always”. It purports to measure belief and behavioral characteristics of anorexia nervosa and bulimia nervosa for ages 12 and over. It also boasts high internal reliability with coefficient alphas ranging from 0.83 to 0.93. Although it was not originally designed as a screening instrument, it has

been recommended for use in that manner most notably because of its relatively brief 20 minute time requirement.

The Eating Disorders Inventory-2 (EDI-2) (Garner, 1991) is an expanded version of the EDI that retains the original 64 items and extends 27 more items in 3 provisional scales. Both the EDI and EDI-2 take approximately 20 minutes to complete. Both have been shown to be very discriminatory in detecting individuals with eating disorders and are easy to administer and score. In follow-up studies on the standardization of the EDI, non-clinical female adolescent samples showed strong reliability for the 11-18 year old subgroup (Garner, Olmstead, & Polivy, 1983; Rosen, Silberg, & Gross, 1988; Shore & Porter, 1988).

On the other hand, the EDI and EDI-2 are both relatively lengthy, at 64 and 91 questions respectively, for a screening instrument. In addition, the non-clinical comparison group consisted of an adult, college age population with a mean age of 19.9 years. This age difference between the non-clinical comparison group and the adolescent participants was statistically significant. (Ash, 2004)

The *Eating Attitudes Test* (EAT) (Garner & Garfinkel, 1979) is a well-known and widely used self-report assessment. Consisting of 40 items, this assessment is to be used with adolescents and adults and is used specifically for anorexia nervosa. This inventory uses a 6-point likert scale that ranges from “Never” to “Always”. Psychometric analysis showed strong internal consistency (.79-.94) and test-retest reliability (.84) (Carter & Moss, 1984; Garner & Garfinkel, 1979).

The EAT-26 was developed after a factor analysis of the original EAT indicated that 26 of the items made up the majority of variability observed (Garner, Olmsted, Bohr, &

Garfinkel, 1982). This assessment is also well received because of its ease of use with no prior training required to administer and less than 15 minutes to complete.

The most notable drawback of both the EAT and EAT-26 is that research has suggested that there is a high rate of false positives in the non-clinical sample (Carter & Moss, 1984; Meadows, Palmer, Newball, & Kenrick, 1986; Williams, Hand, & Tarnopolsky, 1982). Therefore, these authors recommend that it not be used as a stand-alone, non-clinical screening assessment. Wood, Waller, Miller, and Slade (1990) discussed “a marked increase with age in the proportion of females who were in the at-risk range of 20+” (p. 282). Their suggestion was that normal scores for a 16 year-old might indicate clinical range symptoms for a younger teenager. In other words, significance of scores and cutoffs for deviant scores may vary, depending on the age of the child. Therefore, scoring *must* take into account the age of the child, adolescent, or adult.

Development of the Eating Survey

Hardman and Richards (2000) created the *ES* with a set of 25 preliminary diagnostic screening questions. Hardman wrote these questions from his clinical experience while working with patients identified with eating disorders. He also examined and compared item content on several other eating disorder surveys. Hardman then gave the list of items to the treatment staff at the Center for Change in Orem, Utah. He asked them to review the items for readability, clarity, and diagnostic relevance. From this feedback, Hardman then revised the items and administered them to a group of females ages 13 to 30, with mean age of approximately 19 years, who were receiving treatment at the Center for Change inpatient eating disorders treatment program. Based on their responses, Hardman then revised the item pool down to 20 questions by dropping unremarkable or confusing items.

The current ES is a 20-item assessment measure (Appendix A) that requires participants to report disordered eating and weight related attitudes and behaviors by asking how frequently they experience them. Once the revisions were completed, the staff at the Center for Change then began to collect normative data on the ES (R. Hardman, personal communication, Sept 21, 2005).

Although Cloyd (2005) conducted an item-by-item psychometric study of the ES as part of his doctoral dissertation, research on how the ES functions as a total screening instrument has not been conducted. Scoring of the instrument will be done using his recommendations, but there continues to be a need to explore specifically how the ES functions with areas such as non-clinical and clinical, age and gender related patterns, and clinical cutoffs.

Statement of Problem

Research and assessment instruments designed for eating disorders have primarily focused on the young adult and adult populations with a large portion of that research specifically focusing on college populations. Most of this research is conducted to help guide diagnosis and treatment efforts for that age group. Partially as a result of the availability of college-age subjects, most of the widely used assessment instruments have been created for, and normed on, the adult population.

Many of the current generation of assessments do not adequately address the unique challenges of assessing child or adolescent beliefs and behaviors surrounding disordered eating. Only by assessing needs before thoughts and behaviors become clinical, can we create preventative techniques for the general adolescent population, come up with cutoffs

for determining non-clinical, at-risk, and clinical populations, and explore any age-related patterns.

There is a need to develop an adolescent specific instrument to explore disturbed eating thoughts and behaviors and how they are manifest in non-clinical and clinical adolescent samples. Only after an adolescent screening instrument is developed can preventative techniques be developed rather than waiting until the behaviors are ingrained, the diagnosis is made, and the costs, both human and monetary, have risen. The ES has been developed specifically for use as a screening instrument for the adolescent population. Although Cloyd (2005) conducted a psychometric analysis at the item level, we do not currently know how it specifically functions as a total screening instrument nor how to identify the most efficient clinical cutoff scores.

Statement of Purpose

The ES is an instrument created exclusively for use with early to late adolescent populations, both clinical and non-clinical. This measure assesses a wide range of disordered thinking and behaviors in adolescents. Particular features geared toward the adolescent population include: brevity, developmentally appropriate language level, and ease of use.

The current study explores specifically how the ES functions as a total score screening instrument. This study describes the normative distribution and descriptive statistics of the ES with both non-clinical and clinical adolescent participants. Second, it analyzes the age related patterns in non-clinical females and males. Third, it examines the differences in non-clinical females and males. Fourth, it studies the differences in non-

clinical females vs. clinical females. Finally, the study investigates the clinical cutoffs for the ES by conducting a sensitivity, specificity, and efficiency analysis.

Specific Questions:

- 1) What are the distribution attributes of ES scores for all non-clinical females and males?
- 2) What are the age-related patterns of ES scores for non-clinical females and males
- 3) What are the differences in ES scores between non-clinical females and males?
- 4) What are the differences in ES scores between non-clinical and clinical females?
- 5) What is an efficient clinical cutoff score on the ES?

Methods

Participants

The Center for Change in Orem, Utah is an inpatient treatment center for women and adolescents with eating disorders. From 1998 through 2000, staff from the Center for Change administered the ES to middle and high school students in Utah and Nevada prior to making educational and preventative presentations at their schools. During the same time the ES was also given at the Center for Change during intake. In total, 2,610 participants ages 14-17 were surveyed during this time, with 1,703 female and 907 male.

The non-clinical group was made up of 2,569 junior high and high school students. This 14-17 age group of participants reflects 81.6% of the total non-clinical survey sample during this period. Of this group, 1,821(70.9%) were from Utah (Salt Lake, Utah, and Davis counties), 614(23.9%) were from Las Vegas, Nevada, and 175(7%) had the home state data unrecorded in the SPSS file. The gender statistics were 1,662 females (64.7%) and 907 males (35.3%). The age ranged from 14 to 17. Of the respondents 375 were age 14; 901 were age 15; 610 were age 16; and 683 were age 17. The clinical group was made up of 41 inpatient participants. All were female. Eight of the respondents age age 14; 5 were age 15; 14 were age 16; and 14 were age 17.

Development of the Eating Survey

Hardman & Richards (2000) created the *ES* with an initial set of 25 diagnostic screening questions. Hardman wrote these questions from his clinical experience while working with patients identified with eating disorders. He also examined and compared item content on several other eating disorder surveys. Hardman then gave the list of items to the treatment staff at the Center for Change in Orem, Utah. He asked them to review the

items for readability, clarity, and diagnostic relevance. From this feedback, Hardman then revised the items and administered the revised ES to 120 women ages 13 to 30 (mean approximately 19) who were receiving treatment at the Center for Change inpatient eating disorders treatment program. Based on their responses, Hardman then revised the item pool to 20 questions by dropping unremarkable or confusing items.

The current ES is a 20-item assessment measure that requires participants to report disordered eating and weight related attitudes and behaviors by asking how frequently they experience them. Once the revisions were completed, the staff at the Center for Change then began to collect data on the ES (R. Hardman, personal communication, September 21, 2005).

Cloyd (2005) conducted a psychometric study of the ES as part of his doctoral dissertation. He reported that the initial study he conducted appears to support the ES as a reliable and valid adolescent screening instrument. His recommendation is to score the current ES as a one-dimensional instrument and to delete item 18 because it does not clearly load on any of the four factors. Finally, Cloyd questioned the need for items 8 and 9 as they appear to measure severely disordered eating behaviors that appear to be too closely associated with an existing eating disorder diagnosis. After conferencing directly with the developers of the ES and discussing the instruments intended use as a screening instrument and not a diagnostic scale, items 8 and 9 were also removed on their recommendation. This makes the current ES a 17-item instrument.

Data Analysis

All analyses were conducted using the statistical program SPSS version 11.0. The first step was to derive the Mean, SD, Median, Minimum, Maximum, and Range

descriptive statistics for all non-clinical females and males combined and separately. Second, the same information was derived for non-clinical females and males for 14-year-olds, 15-year-olds, 16-year-olds, and 17-year-olds separately to check for any age related patterns. Oneway ANOVA's and a Factorial Analysis of Variance were also conducted to check to see if there were any age, gender, or interaction affects. Third, Univariate Analysis of Variance was conducted to identify any differences in ES scores between non-clinical females and males. Fourth, a t-test was conducted to identify any differences between non-clinical and clinical females. And finally, a series of Crosstabs were conducted to find the most efficient cutoff score.

Results

Research Question 1

What are the distribution attributes of ES scores for all non-clinical females and males?

Descriptive statistics were conducted to find the mean and standard deviation for all non-clinical participants and then separately for gender. The total ES mean score for the 2569 non-clinical participants was 35.54 with a standard deviation of 10.42. For the 1662 non-clinical females, the mean score was 38.73 with a standard deviation of 10.28. Fitting with previous research, the 907 non-clinical male's scores were much lower with a mean score of 29.67 with a standard deviation of 7.80. The means, standard deviations, medians, minimums, maximums, and ranges are shown in Table 1.

Table 1

Distribution of Non-Clinical Eating Survey Scores

| | <i>Mean</i> | <i>N</i> | <i>Std. Deviation</i> | <i>Median</i> | <i>Minimum</i> | <i>Maximum</i> | <i>Range</i> |
|--------|-------------|----------|-----------------------|---------------|----------------|----------------|--------------|
| Total | 35.53 | 2,569 | 10.42 | 34 | 17 | 67 | 50 |
| Female | 38.74 | 1,662 | 10.28 | 38 | 17 | 67 | 50 |
| Male | 29.67 | 907 | 7.80 | 29 | 17 | 67 | 50 |

Research Question 2

What are the age-related patterns of ES scores for non-clinical females and males?

Descriptive statistics were used to find the mean and standard deviation for non-clinical females and males for each year of age 14-17 to check for any age-related patterns. Oneway ANOVA's and a Factorial Analysis of Variance were also conducted to check to see if there were any age, gender, or interaction effects. When a Oneway ANOVA was conducted there was a significant age trend for females ($F(3/1658) = 3.077, p = 0.027$) but not for males ($F(3/903) = 0.960, p = 0.41$). Although the age trend was statistically significant, the greatest change in overall mean scores was only about 1.7 points from the age of 14 to 16 years old. The Factorial ANOVA resulted in no significant age by gender interaction ($F(3/2561) = 1.099, p = 0.348$). The means, standard deviations, medians, minimums, maximums, and ranges are shown in Table 2.

Table 2

Distribution of Non-Clinical Eating Survey Scores According to Age

| <i>Age</i> | <i>Gender</i> | <i>Mean</i> | <i>N</i> | <i>Std. Deviation</i> | <i>Median</i> | <i>Minimum</i> | <i>Maximum</i> | <i>Range</i> |
|------------|---------------|-------------|----------|-----------------------|---------------|----------------|----------------|--------------|
| 14 | Total | 34.61 | 375 | 9.82 | 33 | 17 | 65 | 48 |
| | Female | 37.58 | 224 | 10.05 | 37 | 17 | 65 | 48 |
| | Male | 30.20 | 151 | 7.60 | 29 | 17 | 62 | 45 |
| 15 | Total | 34.46 | 901 | 10.21 | 32 | 17 | 67 | 50 |
| | Female | 38.07 | 536 | 10.35 | 37 | 17 | 67 | 50 |
| | Male | 29.15 | 365 | 7.28 | 28 | 17 | 62 | 45 |
| 16 | Total | 36.19 | 610 | 10.82 | 35 | 17 | 67 | 50 |
| | Female | 39.28 | 407 | 10.45 | 39 | 17 | 65 | 48 |
| | Male | 29.99 | 203 | 8.71 | 28 | 17 | 67 | 50 |
| 17 | Total | 35.54 | 683 | 10.46 | 36 | 17 | 66 | 49 |
| | Female | 38.74 | 495 | 10.11 | 39 | 19 | 66 | 47 |
| | Male | 29.67 | 188 | 7.90 | 29 | 17 | 66 | 49 |

Research Question 3

What are the differences in ES scores between non-clinical females and males?

A Univariate Analysis of Variance was conducted to examine the differences in ES scores between the non-clinical females and males. A significant difference between the non-clinical females and males was found ($F(1/2,561) = 454.398, p < 0.001$) with the females scoring significantly higher than the males. This finding fits with current research. Overall, the females averaged over nine points higher on the ES. The standard deviation

also indicated much more variability with the female's scores. The standard deviation for the females was 10.28 while the standard deviation for the males was 7.80 points on the ES.

Research Question 4

What are the differences in ES scores between non-clinical and clinical females?

A *t*-test was conducted to examine the differences between the non-clinical and clinical females. As expected, the clinical females had significantly higher scores than the non-clinical females ($t(44.022) = -17.108, p < 0.001$). The average ES score of an inpatient female was 58.68 compared to the average non-clinical female's score of just 38.74. That is a difference of nearly 20 points. The standard deviation of the inpatient females was 7.29 indicating even less variability than the males standard deviation of 7.80 and much less than the 10.28 standard deviation of the non-clinical females.

Research Question 5

What is the most efficient clinical cutoff score on the ES?

First, a frequencies count was conducted with a running cumulative percentage for both the non-clinical in-school group and the inpatient group to visually determine a good starting point. A series of Crosstabs was then conducted to establish specificity and sensitivity percentages for various possible cutoff scores. Overall, the best efficiency came with a cutoff score of 55 (see Table 3). With this cutoff score, the specificity (the ability to correctly determine non-clinical individuals) was 92.6% while the sensitivity (the ability to correctly identify clinical individuals) was 75.6%. This brought the overall efficiency rating to 92.2%. But given that the ES is a screening instrument and not a diagnostic tool, it was concerning to have the sensitivity so low and in such contrast to the specificity.

Table 3

Statistical Data Using a Clinical Cutoff Score of 55

| Group | School Participants | Inpatient Participants |
|--------------|-------------------------------------|------------------------------------|
| Non Clinical | $n = 1,539$ 92.6% Specificity | $n = 10$ 24.4% Type II error |
| Clinical | $n = 123$ 7.4% Type I Error | $n = 31$ 75.6% Sensitivity |
| Totals | 1,662 | 41 |

Note. Overall Efficiency = 92.2%.

Therefore, we found that with a cutoff score of 51 (see Table 4), the specificity was 86.6% with a sensitivity of 87.8%. This seems to provide a much more balanced approach. With a cutoff score of 51 only 14.4% of the non-clinical sample was identified to have behavior ratings that were similar to the inpatient females and just 12.2% of the clinical population was missed. In other words, these results indicate that with a cutoff score of 51, there appears to be 14.4% Type I error and 12.2% Type II error. The overall efficiency rating was 85.6%, which is still quite high for a screening instrument. A cutoff score of 51 seemed to not only fit the purpose of the ES as a screening instrument, but it also was able to keep the overall efficiency very high.

Table 4

Statistical Data Using a Clinical Cutoff Score of 51

| Group | School Participants | Inpatient Participants |
|----------------|------------------------------------|-----------------------------------|
| Non Clinical | $n = 1422$ 85.6% Specificity | $n = 5$ 12.2% Type II Error |
| Clinical Group | 240 14.4% Type I Error | 36 87.8% Sensitivity |
| Totals | $n = 1662$ | $n = 41$ |

Note. Overall Efficiency = 85.6%.

Supplementary Analysis

Cloyd (2005) recommended that items 8 and 9 of the ES be eliminated because they were closely associated with an existing eating disorder. He mentioned that this didn't appear to fit the purpose of the ES as a screening instrument. As a supplementary analysis, a Crosstabs was conducted to explore this issue. Overall, 68.3% of the inpatient females responded with a "Rarely", "Sometimes", or "Often" on questions 8 and/or 9. When examining the non-clinical sample, 11.3% responded similarly.

Discussion

The primary purpose of this study was two-fold. First, we wanted to see how the ES functions between ages and genders in regards to overall adolescent eating disturbances. Second, we wanted to discover the most efficient cutoff score that addresses the specific needs of the ES as a screening instrument.

Overall, the results of the ES distributions and analysis appear to match the current research trends. The overall distribution of scores indicated that females scored higher than males and had a much more variability in their endorsement of disturbed eating. The findings that non-clinical females endorse significantly more severe eating disturbances than males is unremarkable, but does add to the current body of research endorsing this trend. A more notable result was to find that although males averaged much lower scores, overall, the minimum, maximum and range of the scores were not much different from the females. In other words, it appears that a small percentage of males are endorsing a wide range of significant eating disturbances not much different from the females. This trend occurred across ages.

The finding that gender appeared as the most significant variable fits with current research, as does the positive age effect for females. Overall, this study continues the research patterns that females are endorsing more eating disturbances or more severe eating disturbances with age. On the other hand, with just a maximum increase of 1.6 total points overall from age 14-16 brings into question the meaningfulness of this finding. Only a longitudinal study could examine if this significant age trend is a result of the vast majority of the subjects actually having a 1.6-point increase or that a very small number of adolescents are actually making up the vast majority of the change. Either way, no

significant jump in eating disturbances at any specific age, such as dating age or entrance into high school, was substantiated. The findings only corroborate the current research patterns of a statistically significant overall age effect from 14-17 years of age (Whitaker et al., 1989; Wood et al., 1990).

The second purpose of the current study was to extend Cloyd's (2005) research on the ES specifically to use the current data to find the most efficient clinical cutoff score for the instrument while using his recommended scoring methods. The purpose of finding the most efficient cutoff score for the ES is to be able to have strong specificity (the ability to correctly determine non-clinical individuals) along with strong sensitivity (the ability to correctly identify clinical individuals) with as little Type I and Type II error as possible.

During the analysis of cutoff scores, the highest overall efficiency rating found was 92% with a clinical cutoff of 55. Although this cutoff showed the highest efficiency rating at 92% and specificity of 92% as well, it also appears to miss a large portion (almost 25%) of the clinical population. As the ES was originally created as a screening instrument and not a diagnostic tool, it would appear to benefit the ES to err on the side of over-sensitivity to minimize the probability of missing anyone that is truly suffering from severe eating disturbances.

Further analysis showed that a clinical cutoff of 51 appeared to achieve a much more balanced result. With a clinical cutoff of 51 the specificity dropped a little to 86% while the sensitivity rose to 88%. This shows that with this cutoff score only 12% of the clinical group was missed instead of the previous 25%. The overall efficiency continued to be very high at 86% as well. With the current sample, there appears to be 14% Type I error and 12% Type II error.

The Type II error is expected because this is not a diagnostic instrument, and therefore, it would be expected that it would subsequently miss a number of diagnostic cases especially irregular cases with abnormal symptomology. On the other hand, the Type I error appears to show middle and high school females that may be exhibiting eating behaviors that are similar to inpatient females. These appear to be the cases being identified by the ES as those that would benefit from further diagnostic testing and/or clinical assistance to assess whether the behaviors are severe enough to warrant treatment. The 14% base rate identified with a clinical cutoff of 51 or higher appears to match comparable at-risk base rates of 9-25% observed in current research along with adolescent Eating Attitudes Test base rate scores of 15-17.5% (Fisher et al. 1993; Graber et al. 1994; Shisslak et al., 1995; Stice et al., 1988).

Limitations

There are a number of limitations to this study. Screening instruments in general have limited items to assess a wide range of attributes. This brevity generally allows for a greater amount of error. Self-reports also have limitations such as under and over representation of symptoms. But the benefits of such a cost effective and brief scale with little or no training required to administer is a method not likely to succumb to full scale diagnostic testing or interviews.

Another limitation is the relatively small clinical population used. The 41 inpatient participants was a very small comparative sample and was certainly at a statistical disadvantage in comparison to the large non-clinical sample. Another limitation of this clinical sample was the lack of diagnostic information in the data set. Information regarding the inpatient's presenting symptoms or diagnosis (i.e. Anorexia Nervosa, Bulimia

Nervosa, etc.) was not available, and therefore, comparisons using that information were beyond the scope of this study.

Finally, the ability to generalize this study is hindered by the lack of ethnic information available and a limited geographical area. It would appear that this study would be most generalizable to non-clinical adolescents from the states in the intermountain West.

Conclusions

The findings of this study adds to the existing body of adolescent eating disorders research and provides initial evidence for a clinical cutoff score of 51. Overall, the ES functions as expected in regards to trends found in the current research on adolescent eating disorders. It is recommended that a total score cutoff of 51 be used for the current 17-item ES. This score appears to be the most balanced approach in keeping a very high efficiency rating of 86% while eliminating the vast majority of Type II error. The 14% Type I error, or the sensitivity of the ES, is similar to current at-risk or base rate research, and it matches the base rates of other screening instruments. It is also recommended that further research studies on the ES collect more complete descriptive data and includes a larger clinical sample that is comprised of both males and females.

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Appendix

Eating Survey (ES; Hardman & Richards, 2000)

Please choose one of the following options that best describes you.

1 = Never, 2 = Rarely, 3 = Sometimes, or 4 = Often

- _____ 1. My eating habits are different from 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 what I will or will not eat in a day.
- _____ 6. I want to eat alone so no one can watch me eat.
- _____ 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.