THE RELATIONS BETWEEN BODY-ESTEEM, DEPRESSSGENIC FEELINGS AND BEHAVIORS, AND BODY MASS INDEX IN FIRST GRADE CHILDREN

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CHAPTER I

INTRODUCTION

Obesity in the U.S. is increasing at disturbing rates. Data from the National Health and Nutrition Examination Survey indicate that the prevalence of overweight among 6 – 11 year old children in the U.S. has increased from 4% to 19% in the last 30 years (Ogden, Flegal, Carroll & Johnson, 2002; Ogden, Carroll, Curtin, McDowell, Tabak & Flegal, 2006). These increases are of concern, because current research suggests that overweight children may experience unfavorable psychological and social consequences such as lowered self-esteem, increased depressive symptoms, and social stigmatization (Hesketh, Wake & Waters, 2004; Franklin et al., 2006; Sjöberg, Nilsson & Leppert, 2005; Latner & Stunkard, 2003). Research also links childhood overweight to early maturation in children which may in turn be connected to low self-esteem (American Dietetic Association [ADA], 2006; Moon, Park, Koo & Kim, 2004). In order to combat these consequences, behavior modification can be useful in treating obese children (Dietz & Robinson, 2005). One study, using 4^{th} – 6^{th} grade Korean students, found that using behavior modification for obesity management enhanced body image and prevented the further increase of body fat in the participants (Moon et al., 2004).

To develop effective intervention methods to overcome weight problems, one must understand the gender and ethnic differences associated with body-esteem,

depressive symptoms, and body mass index (BMI). Results from a University of California study (Siegel, 2002) addressing these factors in a diverse sample of male and female adolescents were consistent with previous findings (Wadden, Foster, Stunkard, & Linowitz, 1989) suggesting that girls were more influenced by changes in body image than boys. The study also found that changes in body image impacted depressive symptoms more in girls than in boys. In regard to the influence of ethnicity, this study found that, for African American girls, as body image became more negative, there was a more severe impact on mood than for other ethnicities.

Because of the potential impact overweight has on the development of children, it is important to understand the adverse consequences associated with overweight in childhood and to explore methods to combat these consequences and improve the physiological and psychological health of young people. This research examines the relations between body esteem measures, measures of depressegenic feelings and behaviors, and child weight as assessed by body mass index (BMI) and how these factors differ by gender and ethnicity. The sample is drawn from the Families and Schools for Health project among Oklahoma public school children at the beginning of first grade.

This research focuses on the following questions.

In children at the beginning of first grade:

1. What are the relations between body-esteem measures, measures of depressegenic feelings and behaviors, and child weight?
2. Does this differ by gender and/or ethnicity?
3. Do body esteem and depressegenic feelings and behaviors predict BMI?
4. Does this differ by gender and/or ethnicity?

The measures used were BMI, Body-Esteem, Depressegenic Feelings and Behaviors, and demographics such as age, ethnicity, and gender. Body esteem was measured using the 20 item version of Mendelson's Body Esteem Scale (Mendelson & White, 1985). This scale consists of 20 questions, which are divided into three subscales: body esteem appearance, body esteem weight, and body esteem attribution (B. Mendelson, M. Mendelson & White, 2001). This instrument has been shown to have good internal reliability and is considered an appropriate measure for this age group.

To measure depressegenic feelings and behaviors, items were based on the Children's Depression Inventory (CDI) developed by Maria Kovacs (Kovacs 1980-1981, 1992) and taken from Stark and Laurent (2001, Table 2). For this study, the most severe statements from each CDI item were used (i.e., "I am sad all the time;" "I do everything wrong.") and children were asked to answer no, sometimes, or yes that item occurred to them. Responses were scored 0 – 2 with a score of 0 indicating the least depressotypic response and 2 indicating the most depressotypic response.

Data was analyzed using the Statistical Package for the Social Sciences (SPSS) computerized software program version 14.0 (SPSS Inc., Chicago, IL). The analyses conducted included a correlation analysis to examine the relations between variables such as BMI, body esteem, and depressegenic feelings and behaviors. Regression analyses were also used to determine if BMI and body esteem predict depressegenic feelings and behaviors.

CHAPTER II

REVIEW OF LITERATURE

Introduction

Pediatric overweight is becoming more prevalent in the U.S. Data from the National Health and Nutrition Examination Survey for 2003-2004 indicate that 33% of children and adolescents ranging from 2-19 years are overweight or at risk for overweight (Ogden et al., 2006). With this trend, comes numerous medical and psychological complications for overweight children and adolescents including metabolic syndrome (Weiss et al., 2004), impaired glucose tolerance and type 2 diabetes (Weiss, 2007; Hannon, Reo, & Arslanian, 2005), hypertension which can also lead to cardiovascular problems (Sorof et al., 2004), and overweight status in adulthood (Freedman et al., 2005). Psychological complications may include body dissatisfaction (Dohnt & Tiggemann, 2005; Robinson, Chang, Haydel, & Killen, 2001), teasing (Hayden-Wade et al, 2005), social stigmatization (Latner & Stunkard, 2003), decreased self-esteem (Hesketh, Wake, & Waters, 2004; Franklin et al., 2006), depressive symptoms (Sjöberg, Nilsson, & Leppert, 2005), and an elevated risk for the development of eating disorders (Lamerz et al., 2005; Decaluwé, Braet, & Fairburn, 2003).

Although these consequences have been linked to overweight status, research centered on psychological consequences has produced inconsistent results. Not all

studies demonstrate support for these relationships, and psychological difficulties are not experienced by all overweight children (Wardle & Cooke, 2005).

The two main psychological components assessed in this study are body-esteem and depressegenic feelings and behaviors. However, the psychological effects of being overweight are unclear (Pierce & Wardle, 1997), and other factors such as teasing (Hayden-Wade et al., 2005), and social stigmatization (Latner & Stunkard, 2003) may occur in overweight children and are possibly associated with lowered body-esteem and depressive symptoms (Young-Hyman et al, 2006).

Overweight/Obesity

Background

Challenges with research centered on obesity are mainly based on the lack of consistency between measures used to assess obesity. This is due to an incomplete definition of obesity. Obesity should refer to excess body fat, not necessarily weight, because it is the surplus of adipose tissue which is associated with the co-morbid conditions (Prentice & Jebb, 2001). The dilemma, then, is determining what level of adiposity should be defined as 'obese'. This is especially difficult in children, in which differences in percentages of body fat have been seen across ethnicity, gender, and in distributions in the body (Sweeting, 2007).

For instance, African American children and adolescents appear to have lower body fat percentages when compared to Caucasians. This can be seen by the higher levels of fat-free mass and lower levels of fat mass and abdominal fat in African Americans with some evidence demonstrating higher body fat in black female's verses

black males (Dai, Labarthe, Grunbaum, Harrist, & Mueller, 2002; Freedman et al., 2005; Goran & Gower, 1999; Goran, Hunter, Nagy, & Johnson, 1997; Sweeting, 2007). On the other hand, there is some suggestion that Asians, Hispanics, and Chinese have a higher fat mass percentage than Caucasians (Freedman et al., 2005; Li, Zhang, Yang, Okada, Iwata, & Harada, 2005; Prentice & Jebb, 2001).

Additionally, body distributions add to the complexity of this issue. Not only are differences noticed in the overall levels of adiposity, differences in the distribution of fat also occur between sex and ethnic groups. The android fat pattern is characterized by increased fat in the upper portion of the body and is also referred to as 'apple shape'. This type of fat distribution is most often seen in males and is associated with greater risk for cardiovascular disease, type 2 diabetes and metabolic predictors (Behn, 2006; Després, 2007). Conversely, the gynoid pattern, represented by greater amounts of fat in the lower portion of the body (i.e., hip and thigh area) is most commonly seen in females and has been named 'pear shape' (Legato, 1997). Although these are typically considered only in adults or in pubescent adolescents, recent studies have suggested that in pre-pubertal children, the gynoid fat deposits may already be noticed in females (He et al., 2002; Mast, Körtzinger, König, & Müller, 1998).

There are a variety of methods that can be used to measure fat. These tools are categorized as density-based methods [hydrodensitometry or underwater weighing (UWW) and air displacement plethysmography (ADP)], scanning methods [computerized topography (CT), magnetic resonance imaging (MRI) and dual-energy x-ray absorptiometry (DEXA or DXA)], bioelectrical impedance methods [bioelectrical

impedance analysis (BIA)] and anthropometric methods [skinfold measurements (SF), waist circumference (WC) and waist-hip ratio (WHR)] (Sweeting, 2007).

Although these measures exist, several including the density based and scanning methods are limited to research settings due to factors such as time, cost, and mobility. For example, hydrodensitometry is considered the most reliable technique in measuring fat. However, this method would be difficult to use in a research setting, due to the nature of obtaining body fat measures, which requires the individual to be completely submerged in a large tank while exhaling. This submersion process often must be performed numerous times which creates time constraints and is not suitable for many individuals, especially children, because it requires a high degree of water confidence. Furthermore, the design structure of this device makes it difficult to transport (Brodie, Moscrip, & Hutcheon, 1998).

There are pro's and con's for other measurements as well. For instance, the bioelectrical impedance analysis is relatively inexpensive, portable and quick, but it has been shown to be less accurate than other, more sophisticated measures like DEXA (Eisenkölbl, Kartasurya, & Widhalm, 2001; Hosking, Metcalf, Jeffery, Voss, & Wilkin, 2006; Sweeting, 2007). Another method, using skinfold measures, has the benefit of being inexpensive and fairly simple, but subjects must partially undress and reproducibility is difficult to measure, especially if the subject has higher amounts of body fat (Power, Lake, & Cole, 1997).

While there are differences in the benefits and limitations of the measures discussed above, they all hold one common thread. All of these measures directly measure body fat. BMI, on the other hand, measures weight in relation to height, and is

not a measure of body fat mass (Sweeting, 2007). This creates some controversy as to whether BMI is an appropriate measure to assess obesity.

Measures

Body Mass Index (BMI), is widely used in research to assess weight status in children. This formula, is defined as body weight in kilograms divided by height in meters squared [BMI = weight (kg) / height (m^2)] (Keys, Fidanza, Karvonen, Kimura, & Taylor, 1972). BMI is thought to be a reliable, as well as valid tool and is thought to produce more reliable measures of body fatness than measures such as triceps skinfold thickness, which demonstrate decreased reliability as body fat increases (Dietz & Robinson, 1998). BMI is not meant to be used as a diagnostic tool, rather, it should be used as a screening tool to identify individuals who are under- or overweight (Barlow & Dietz, 1998).

Height and weight measurements, such as BMI, are simplistic and low cost making them the most practical tool for assessing nutritional status (Mei, Grummer-Strawn, Pietrobelli, Goulding, Goran, & Dietz, 2002). But there are other strengths which makes BMI a preferred tool to assess obesity. For instance, it can be easily obtained, since the only measures needed to calculate BMI are height and weight which are then plugged into a formula to determine BMI score. Also, BMI is correlated strongly with body fat percentage, especially at extreme BMI levels, and is associated only weakly with height allowing for the accurate identification of the fattest individuals (Freedman et al., 2005). These strengths have contributed to the recommendation of BMI as the preferred measure for assessing obesity among children and adolescents (Barlow &

Dietz, 1998; Himes & Dietz, 1994; Krebs, Himes, Jacobson, Nicklas, Guilday, & Styne, 2007).

However, problems with this measure do exist. First, BMI varies between genders and according to age and level of maturity. Before the age of 12, girls and boys have similar BMI levels, but after the age of 12 BMI levels are higher among females (Demerath et al., 2006; Freedman et al., 2005; Sweeting, 2007). In regard to age, BMI fluctuates throughout childhood and adolescence. An increase in BMI is seen from birth to around 1 year, followed by a decline around the age of 6. This period is termed adiposity re-bound. It is the point at with BMI reaches its lowest point and begins to increase. This increase continues throughout the remainder of childhood and adolescence (Adair, 2007; Eisenmann, Heelan, & Welk, 2004). These variations contribute to the difficulty in determining the significance of BMI scores in children and adolescents (Sweeting, 2007).

A second disadvantage of BMI is that it reflects both fat and fat-free mass, which as previously discussed differ by gender and ethnicity. For this reason, Caucasian children with the same BMI as African American children will have higher fat measurements. Furthermore, females have greater amount of body fat than boys at the same BMI (Daniels, Khoury, & Morrison, 1997). Similar to the first limitation, this means that the significance of any particular BMI will vary.

Another limitation of BMI is connected to its relation to height. BMI is an index of weight in relation to height; therefore another aspect of variance is according to height. This means that BMI could also be affected by leg length. Furthermore, since height is

different for girls and boys as well as age, this association also varies according to sex and age (Sweeting, 2007).

Another problem with using BMI is due to the absence of a clear definition with specific cut-off points to define childhood and adolescent obesity. Specific BMI scores have been established for adults which classify individuals into groups (overweight and obese classes I, II, and III) pertaining to their BMI score and based upon the risks of co morbidities associated with each group. However, the risks associated with specific levels of BMI have not been adequately explored in children and adolescents. As a result this has created challenges in the literature, since different definition and cut-offs for obesity have been used. One definition with specific cut-off points which is commonly used are the growth curve percentiles.

Growth curve percentile charts were developed by the National Centers for Health Statistics (NCHS) in 1977. These provide percentile curves to assess growth of infants (birth to 36 months) and children and adolescent (2 to 20 years) in the United States and have also been adapted for use globally by the World Health Organization. Since their first implementation, the NCHS growth charts have undergone several revisions (Kuczmarski et al., 2000). Currently, sixteen total growth charts exist with separate charts for infants and children/adolescents as well as for boys and girls. Charts for boys and girls consist of weight-for-age-percentiles, stature-for-age percentiles, weight-for-stature percentiles and body mass index-for-age percentiles.

Cut off percentiles are used to determine if the child is at risk for underweight or overweight. These percentiles have been provided by the Expert Committee on Clinical Guidelines for Overweight in Adolescent Preventive Services and are used by the NCHS.

The recommended BMI-for-age cutoffs are: ≥95th percentile – overweight, 85th to < 95th percentile – risk for overweight, and < 5th percentile – underweight (Himes & Dietz, 1994). These are the terms used in this study.

Rural Population

Research has suggested that overweight children are more prevalent in rural areas (Gauthier, Hickner, & Noel, 2000; Davis et al, 2005). Some factors unique to rural children could be environmental factors such as a lack of facilities to promote healthy lifestyles or fewer opportunities for organized casual play due to greater travel distances. Long travel distances may also impact accessibility to quality food (Janicke et al., 2007). Even when healthy food selections are available, cost may create a barrier to consuming more healthful options due to higher poverty rate in rural communities. Data from the U.S Census Bureau found that in 2006, 15.2% of families outside metropolitan statistical areas fell below the poverty line compared to 11.8% of families living inside metropolitan areas (U.S. Census Bureau, 2006).

To add to these difficulties, rural communities are typically medically underserved. One large scale, national study found that rural children were less likely that metropolitan children to have health insurance and were almost 50% less likely to have preventative healthcare visits (Lutfiyya, Lipsky, Wisdom-Behounek, & Inpanbutr-Martinkus, 2007). These barriers make it more difficult for rural families to practice healthy lifestyle behaviors. Therefore, it is not surprising that when compared to urban children, rural children are 25% more likely to be overweight according to the 2003 National Survey of Children's Health (NSCH). (Lutfiyya et al., 2007).

Gender differences have been noticed as well. In a study assessing BMI in rural first grade children in Wyoming over a six year period, boys, but not girls, showed a progressive increase in BMI (Smith, Vendela, Bartee, & Carr, 2008). Higher rates of obesity occurring in boys were also found in a sample of 7 to 13 year old children in Ontario (Galloway, 2007).

Ethnic Differences

Distributions of overweight also vary across ethnicity with African American, Hispanic, and Native American children more likely to be overweight than Caucasian children (Ogden et al., 2006). In a sample of rural Oklahoma students (ages 6 to 17), Native American children had the highest prevalence of overweight and obesity (53.8%), followed closely by African American (51.7%), and Hispanic children (50.5%). Caucasian children had the lowest prevalence of overweight and obesity (37.6%) (Eichner, Moore, Perveen, Kobza, Abbott, & Stephens, 2008).

Psychological Consequences

Body-Esteem vs. Self-Esteem

Body-esteem can be defined as self evaluations of one's body or appearance (Gray, 1977). This is similar to self-esteem which is defined as an individual's attitude toward one's self, either positive or negative (Rosenberg, 1965). Numerous studies look at self-esteem and sometimes body-image rather than body-esteem (Hesketh, Wake, & Waters, 2004; Young-Hyman et al, 2003 O'Dea & Caputi, 2001). Although body image and self-esteem appear to be similar, they are not. In fact, research findings have

demonstrated that overweight children can be at risk for experiencing lower body-esteem without being at risk for low self-esteem (Mendelson & White, 1982).

Research has attempted to address these issues by utilizing domain specific measures of self-esteem. The Self Perception Profile for Children (SPPC) developed by Harter is an example of this. The domains within this model include social acceptance, athletic competence, physical appearance, and behavioral conduct (Harter, 1985).

This lack of consistency among self- esteem, body-esteem and body image scales offers a challenge in comparing and interpreting previous research findings. Previous studies looking specifically at body-esteem using the body esteem scale by Mendelson (B. Mendelson, M. Mendelson, & White, 2001) are preferred in the current study for drawing comparisons. However, since some self-esteem scales include subscales reflecting body appearance, these findings may also be utilized for the current review.

Body-Esteem Scale

The body-esteem scale for children was developed by BK Mendelson, and originally consisted of 24 items with a yes or no response. This scale was designed with the idea that body-esteem may be multidimensional, and suggested 3 possible domains: body-esteem (BE) appearance, which assessed general feelings about appearance (e.g., "I like what I look like in pictures."); BE-weight, assessing satisfaction with weight (e.g., (My weight makes me unhappy."); and BE-attribution, which measures evaluations ascribed to others concerning one's body or appearance (e.g., "Kids my own age like my looks;" Mendelson et al., 2001; Mendelson & White, 1993-1994).

The original 24 item scale was assessed for internal reliability. Correlations for individual items to total score were poor, decreasing internal reliability. Therefore, 4 items were dropped creating the 20 item Body-esteem scale for children. High internal reliability was indicated (Cronbach alpha, .88). Due to good internal reliability, the 20 item Revised Body-Esteem Scale for Children is recommended for researchers working with children (Mendelson & White, 1993-1994).

One strength for this scale is in the design. For instance, it has equal amounts of "yes" and "no" responses for high body-esteem which are dispersed evenly throughout the scale. Another strength which this scale may have over other scales like, the Harter Physical Appearance Subscale (Harter, 1985, 1988) or the Piers-Harris Physical Appearance and Attributes Subscale (Piers & Harris, 1964), is that the Body-Esteem Scale for Children is multidimensional which gives it the advantage by extracting specific items which may have individual roles in body-esteem (Mendelson & White, 1993-94).

Body-Esteem Findings

One of the few studies which included the assessment of body-esteem rather than the more global domain of self-esteem, found that low body-esteem has been linked to higher weight status in girls as young as 5 years old (Davison & Birch, 2001). Gender differences have also been studied in body-esteem. Mendelson and White found that overweight girls had lower body-esteem scores than overweight boys (Mendelson & White, 1985).

Studies assessing the physical component of self-esteem of children have also pointed to a relationship between their weight and feelings about their body. A study

conducted by Allen and colleagues assessing 7- to 13-year-old children demonstrated significantly lower levels of appearance self-esteem in overweight children compared to healthy weight children (Allen, Byrne, Blair, & Davis, 2006). These results were consistent with another study involving 9- to 13-year old Australian children. Findings suggested that overweight and obese children scored significantly lower in the physical appearance domain compared to their normal weight peers with girls scoring lower than boys (Franklin, Denyer, Steinbeck, Caterson, & Hill, 2006).

Research aimed at exploring the reasons that some overweight children have lower self-esteem exists, but has not been fully explored. Some research has been done assessing cause and effect beliefs and self-esteem. There is some suggestion that feelings about the causes of overweight, and whether the individual attributes those causes as a result of their own actions or from external causes, may be associated with the degree of low self-esteem (Pierce & Wardle, 1997).

For instance, one study looking at a sample of preadolescent schoolchildren in London, found that children with lower self-esteem believed that they were responsible or at fault for being overweight. On the other hand, those with a more positive self-esteem attributed the cause of overweight to external reasons (Pierce & Wardle, 1997). This study also explored feelings about the effects of obesity and whether or not social interactions are linked to an individual's weight. Findings suggested that, in this group of children, those who believed that their social interactions (i.e., had fewer friends, excluded from games and sports, and were ashamed of their body) were negatively affected by their weight did appear to have lower self-esteem (Pierce & Wardle, 1997).

Body Dissatisfaction

Body dissatisfaction is a growing concern for many individuals (Stice & Whitenton, 2002). Originally, research suggested that the emergence of body dissatisfaction began in adolescence. However more recent studies propose that feelings of dissatisfaction with one's body and the desire to be thinner may develop earlier in life. Some studies have documented body dissatisfaction in pre-adolescent girls (Davison, Markey, & Birch, 2002; Dohnt & Tiggemann, 2005; Robinson, Chang, Haydel, & Killen, 2001). Furthermore, Dohnt and Tiggemann, reported signs of body dissatisfaction and the desire to be thinner in their sample of 5-7 year old girls in Australia (2005). About one-third of the young girls in this study displayed dieting awareness and the desire to lose weight. The girls in this study also demonstrated considerable understanding of the potential positive (increased popularity, likeability) and negative (teasing about weight) social consequences of increased weight (Dohnt & Tiggemann, 2005). This study is consistent with previous research, which suggests that the recognition and adoption of sociocultural ideals of the attractive body begins somewhere around the age of six. Not only do feelings of body dissatisfaction seem to be developing earlier in girls, it seems to be increasing with age (Bearman, Presnell, Martinez, & Stice, 2006; Davison & Birch, 2001; Davison, Markey, & Birch, 2002).

Differences in body dissatisfaction may be due to gender, ethnic and socioeconomic factors. Girls are thought to have greater body dissatisfaction than boys and desire thinner body shapes (Robinson, et al., 2001). In fact several studies exploring body dissatisfaction use only girls (Dohnt & Tiggemann, 2005; Stice & Whitenton, 2002). Although ethnic differences and body dissatisfaction have not been thoroughly

explored, findings from one study suggest that White and Latina girls have greater body dissatisfaction than Asian girls (Robinson, et al., 2001). Padgett and Brio compared African American and Caucasian girls in a review of the literature and reported that African American girls report being considered attractive at higher BMI's than Caucasian girls (2003).

Traditionally it has been accepted that individuals of higher socioeconomic status are more likely to diet, have a greater desire for thinness, and are more preoccupied with their weight (Dornbusch, Carlsmith, Dumcan, Gross, Martin, & Ritter, 1984; Kemper, Sargent & Draane, 1994; Striegel-Moore, Silberstein, & Rodin, 1986), but inconsistencies in findings do exist (Robinson, et al., 2001). One study found interesting ethnic differences among body dissatisfaction and socioeconomic status in 3rd grade children in which African American girls of higher socioeconomic status reported significantly more overweight concerns compared to African American girls of lower socioeconomic status. However, in Caucasian girls the opposite trend was seen with girls of higher socioeconomic status reporting less overweight concerns and girls of lower socioeconomic status reporting higher overweight concerns (Robinson, et al, 2001).

Although evidence of body dissatisfaction has been suggested in overweight populations, it is not solely a marker of obesity (Wardle & Cooke, 2005). Even normal- and under-weight individuals express dissatisfaction with their bodies (Fitzgibbon, Blackman, & Avellone, 2000; Wadden, Foster, Stunkard, & Linowitz, 1989). Furthermore, not all overweight or obese children and adolescents are even aware that they are overweight, as found in a study conducted by O'Dea and Caputi who found that

approximately 50 percent of 6- to 12-year-old overweight children reported their weight as 'about right' (2001).

Stigmatization

An understanding of the implications and effects of obesity in relation to societal views is necessary in order to understand how an overweight or obese individual's well-being and quality of life may be affected. Stigmatization of obese children has been explored in past research (Bacardi-Gascón, Leon-Reyes, & Jiménez-Cruz, 2007; Latner & Stunkard, 2003; Margulies, Floyd, & Hojnoski, 2007; Musher-Eizenman, Holub, Miller, Goldstein, & Edwards-Leeper, 2004; Puhl & Latner, 2007), and can include teasing (i.e., name calling, offensive remarks), bullying (i.e., hitting, kicking, shoving), and relational discrimination (i.e., social exclusion, being ignored, target of rumors) These negative acts can occur in varying degrees from very mild to extreme, and have the potential to cause adverse effects in the development of these young victims (Puhl & Latner, 2007).

Furthermore, it is suggested that the stigmatization of obese children in the U.S. may be getting worse. Latner and Stunkard conducted a study in 2003 which replicated a previous study conducted between 1961 and 1968 assessing the stigmatization of obese 5th and 6th grade children to see if the increased prevalence of childhood obesity has had an effect on this stigma over the past 40 years. Findings suggested that children are more strongly biased against obese children compared to those in wheelchair/crutches, children missing a body part such as a hand, or who are facially disfigured, and these biases have become stronger over the last 40 years (Latner & Stunkard, 2003).

Moreover, research suggests that these biases not only come from peers (Latner & Stunkard, 2003; Margulies, Floyd & Hojnoski, 2007; Musher-Eizenman, et al., 2004), but from educators (Bauer, Yang, & Austin, 2004), and even parents (Davison & Birch, 2001). Thus, overweight children are victims of stereotyping and bias at multiple levels which is concerning, especially during this critical and vulnerable stage when the child is developing and forming social relationships (Puhl & Latner, 2007).

In some overweight/obese children, consequences of this stigma may be detrimental to quality of life. Several studies found that among severely overweight children, quality of life was similar to that of children with cancer undergoing chemotherapy. Teasing directed at overweight children is thought to be more severe and may be a contributor to decreased quality of life (Hayden-Wade, Stein, Ghaderi, Saelens, Zabinski, & Wilfley, 2005).

Although results appear inconsistent, pediatric overweight (especially in adolescence) has been associated with lower self-esteem. Inconsistencies may be due to factorial influences: gender, race, teasing experiences (Pierce & Wardle, 1997). Teasing has been linked to lowered self-esteem and depressive symptoms for girls and boys across ethnic groups.

Depression

Development

Depression is thought to emerge, not from one single risk factor, rather, through a combination of biological (e.g., genetic, neurobiological, neuropsychological, neurochemical, neuroendocrine) psychological (e.g., affective, cognitive, socioemotional,

socio-cognitive), and social system factors (e.g., community, culture) (Cicchetti & Toth, 1998; Foster & MacQueen, 2008). However, understanding the developmental process of depression is challenging, since depressive disorder can emerge from an assortment of pathways, and risk factors for depression may result in a variety of outcomes which may or may not include depression (Cicchetti & Toth, 1998).

The developmental psychopathology approach used by Cicchetti and Toth to understand depression in children and adolescents aims to address early developmental experiences by using an integrated approach to viewing the organization of the four biological and psychological domains (i.e., cognitive, socioemotional, biological, representational). Their position is that the venues in which depression presents its-self are not isolated, but instead integrated across the biological and psychological systems. Incoherent or depressotypic organizations across these domains are thought to result in depressive disorders during some point in the individual's life-time. Furthermore, this integration evolves developmentally within a multilevel social ecology which can be explained using a transactional model (Cicchetti & Schneider-Rosen, 1984; Cicchetti & Toth, 1998). Thus, the development of depression in an individual depends on the interaction and influences between both proximal and distal aspects of the environment, and positive or negative outcomes are dependent upon the presence or absence of various factors.

The multilevel transaction model uses 4 ecological levels to demonstrate how various environmental systems converge, contributing to the exacerbation or the decrease in the likelihood of forming depressotypic organizations resulting in the development of a depressive illness. The 4 levels to this model are: the Macrosystem, Exosystem,

Microsystem, and Ontogenic Development. The outermost level of this model is the macrosystem. This level encompasses the beliefs and values of the culture in which the individual exists. Little research on young children has been conducted in this area. However, this level should not go ignored, because societal attitudes, when depression is present, can impact how or if it is addressed (e.g. resources, support, and likelihood that treatment will be sought) (Cicchetti & Toth, 1998).

The next level, slightly closer to the individual is the exosystem. This level includes the facets of the community in which the child and family live such as schools and neighborhoods. These environments can influence depression by their contribution to psychological, as well as academic adjustment. For instance, depression has been related to the perception of having low academic competence in elementary school children (Blechman, McEnroe, & Carella, 1986; Cole, 1991). More recently, longitudinal studies assessing self-perceived competence and relation to depression in 3rd thru 6th grade children has been conducted. Results suggest that children's perceptions of themselves are mediated by feedback from significant others, and negative self-perceptions are closely related to the emergence of depression (Cole, Martin, & Powers, 1997). Furthermore, a pattern can be observed in children who report depressive symptoms which also show an increase in negative self-perceptions and a tendency to underestimate their competence levels (McGrath & Repetti, 2002). This environmental level is of particular importance, because it is the most accessible avenue for community supports to intervene when a child is depressed.

The next ecological level, the microsystem, refers to the immediate environment, most often the family. Research has established the tendency of depression to run in

families resulting in a substantial amount of work in this area, especially in the connection between genetic and environmental factors and the presence of depression (Cicchetti & Toth, 1998). However, this subject has not thoroughly been explored for this age group. Past literature has linked these factors by suggesting that a depressed parent will influence the environment in which the child exists. Thus, convergence exists between biological and environmental factors through the parent. The impact of a mother's depression on her offspring has been seen as early as infancy when non-depressed mothers were asked to show somber responses to their infant's positive affect displays. These babies responded by returning the somber response and adverting gaze from their mother (Cohn & Elmore, 1988; Cohn & Tronick, 1983).

One study found that offspring of depressed caregivers are six times more likely to be diagnosed with major depressive disorder (MDD) (Downey & Coyne, 1990). Investigation of why children of depressed caregivers are at risk for developing depression continues. However, several hypotheses exist when considering the association between depression and children of depressed parents.

The hypothesis most often researched is that the problems of children are a direct result of living with a depressed parent, especially a depressed mother. Another hypothesis is that parental depression and problems of the child are both caused by preexisting conditions such as marital troubles or family stress which explains the association between the parent and the child. The third hypothesis is that there is a genetic predisposition which explains the link between depression in the parent and child (Downey & Coyne, 1990). However, the link between genetics and depression can only partially account for the problems of children with a depressed parent, which has been

demonstrated through twin and adoption studies as well as other population-based studies (Foster & MacQueen, 2008; Rietschel et al, 2008; Shih, Belmonte, & Zandi, 2004). For this reason, the integration of both the contextual risk factors and genetic factors may be a useful approach to aid in explaining the development of depression (Downey & Coyne, 1990).

One study found that genetic factors accounted for greater than one-third of familial aggregation of depression and was especially strong in women. Thus, hereditability is thought to be a major factor in the outcome of depression among family members. However, environmental factors do play a role (Bierut, Heath, Bucholz, Dinwiddie, Madden, Statham, Dunne, & Martin, 1999). The role of environmental factors continues to be explored in children and adolescents. One study suggested that from middle childhood to adolescence, little difference exist between the extent of environmental factors influencing depression, but differences may occur between the kinds of environmental factors. Of the environmental factors explored, shared stressful life events and social support networks do not appear to be contributing variables of the environmental influence on depression (Rice, Harold, & Thapar, 2005). On the other hand, another study showed contradictory results suggesting that environmental experience contributed little or not at all to the link between depression and family origin, but heredity contributed substantially through enduring characteristics of temperament shared by offspring (Kendler, Walters, Truett, Heath, Neale, Martin, & Eaves, 1994).

Finally, the last level in the ecological transaction model is ontogenic development. This refers to the presence or absence of certain risk or protective factors within a person which affect their adaptation. One of these factors may include

homeostatic and physiological regulation which begins early on in an individual's life as infants work to self-regulate. This process of brain development is contingent on the caregivers, and because parents vary in their ability to read their child's signals and assist in homeostatic regulation, an infant living in an unstable, verses a consistent environment may suffer developmentally. These effects may be seen later on in the child's temperament and emotional regulation (Cicchetti & Toth, 1998).

Prevalence and Effects of Depression

The prevalence of depression in children and adolescents is difficult to determine, because many cases are thought to be undiagnosed and likely go untreated. Depression can go unrecognized, because depressive symptoms may be attributed to the normal stress of adolescence or thought of as a stage the youths are going through (Saluja, Iachan, Scheidt, Overpeck, Sun, & Giedd, 2004). Furthermore, its effects extend beyond the depressed individual. Depression not only hurts those directly dealing with this disorder, but it also has indirect negative effects on the family and friends of a depressed individual. Society is also affected due to the financial burden depression imposes. In 2000 the economic burden to society was estimated at $83.1 billion with the greatest percentage, approximately two-thirds, coming from workplace costs due to factors such as reduced productivity and absenteeism (Greenberg, Kessler, Birnbaum, Leong, Lowe, Berglund, & Corey-Lisle, 2003).

Few studies have been conducted assessing the prevalence of depression in younger adolescents. However, it is estimated that in the United States, depression affects up to 8% of children and 8.3% of older adolescents (Birmaher et al., 1996). One

study looked at depression in youth aged 10-15 years and found that the prevalence of depression may be higher than previous estimates and increased with age, especially in females (Saluja et al., 2004).

Ethnic and Gender Differences

One study assessing ethnic and gender differences among African American and Euro-American 3rd thru 5th grade children found a greater prevalence of depressive symptoms in African American boys compared to African American girls, and Euro-American boys and girls. Furthermore, depressive symptoms increased over time for African American boys, but decreased or remained the same in all other groups (Kistner, David-Ferdon, Lopez, & Dunkel, 2007). Inconsistent findings however, were seen in an older sample of adolescents 11 thru 15 years old, where African American students reported the least amount of depressive symptoms at 15 percent. American Indian youth had the highest reported incidence of depressive symptoms at 29 percent followed by Hispanics at 22 percent, Caucasians at 18 percent, and Asian Americans at 17% (Saluja et al, 2004). Overall, the relations between ethnicity and depression and its effects on BMI are still largely under-explored, and further research is needed (Wardle & Cooke, 2005).

Past research has not found significant differences in rates of depression between pre-adolescent boys and girls (Baily, Zauszniewski, Heinzer, & Hemstrom-Krainess, 2007), though one study did find a modest association between depressive symptoms in third-grade (mean age, 8.4 years) girls ($r = 0.14$, $p < 0.01$) but not boys ($r = 0.01$, $p<0.78$) (Erickson, Robinson, Haydel, & Killen, 2000). Still, the majority of research suggests that gender differences occur later in adolescents, at around the age of 13-15, where girls

begin to display higher rates of depression than boys. The greatest increase between genders is thought to occur between the ages of 15 to 18 years (Falkner, Neumark-Sztainer, Story, Jeffery, Beuhring, & Resnick, 2001; Hankin, Abramson, Moffitt, Silva, McGee, & Angell, 1998). These gender differences may be due to a combination of the greater quantity of new challenges which girls face compared to boys, and the tendency for girls to develop more risk factors for depression before adolescence than boys (Nolen-Hoeksema & Girgus, 1994).

However, other studies have suggested that prevalence and severity of depressive symptoms are similar for boys and girls, rather difference among gender occur in the way depressive symptoms are expressed (Bennett, Ambrosini, Kudes, Metz, & Rabinovich, 2005; Kovacs, 2001; Masi, Favilla, Mucci, Poli, & Romano, 2001). For instance, depressed girls may experience more guilt, body image dissatisfaction, sadness/depressed mood, self-disappointment, self-blame, feelings of failure, concentration problems, difficulty working, fatigue, and health worries than depressed boys. Whereas, boys with major depressive disorder reported more anhedonia, morning depressed mood, and morning fatigue (Bennett et al., 2005). Understanding these differences may provide useful information in understanding the different etiologies of depression between genders.

Depression and Weight

A substantial amount of research has been conducted on depression as a consequence of obesity. However, these studies have not fully explained the nature of the connection between obesity and depression (Wardle & Cooke, 2005). One study

however, did suggest a link between childhood onset obesity and psychopathology in adulthood, with obese children showing more psychopathology later in life compared to those who developed obesity at an older age. These findings suggest the possibility that childhood obesity may be a predictor of future psychological distress (Mills & Andrianopoulos, 1993). This finding is of great concern due to the increasing rates of childhood obesity.

However, in a review of more recent evidence of the relationships between childhood obesity and depression, Wardle and Cooke conclude that research in the past 10 years typically demonstrate small effects if any and effects which are seen are rarely of clinical significance. However, there are limitations to past research which may overshadow significant findings. For instance, depression is often measured by different methods such as diagnostic interviews or self-reported questionnaires. Likewise, obesity may be assessed in different ways including self-reported verses measured weights and heights to calculate BMI, or other measures besides BMI such as a bioelectric impedance or skinfold measurements. The presence of these factors reduces the sensitivity of the analyses possibly affecting outcomes (Wardle & Cooke, 2005).

Confounding variables may also be disguising significant relations between childhood obesity and depression. One area of exploration is assessing the role of weight and shape concern. This method suggests that individuals with increased weight and shape concern, which is described as a preoccupation with issues relating to weight and shape, will evaluate their self worth largely in terms of weight and shape. Therefore, this may be a factor in individual differences as to why some overweight children experience psychological problems while others do not. The majority of research assessing weight

and depression do not control for this variable. However, Allen and colleagues did address the role of weight and shape concern to psychological problems including depression as well as body dissatisfaction and self-esteem in overweight 7 to 13 year old children. Results found that overweight children with high levels of weight and shape concern are at increased risk of experiencing psychological problems. These findings suggest that weight and shape concern are more closely associated with psychological problems in overweight or obese children than weight alone (Allen et al, 2006). The role of weight and shape concern may be a beneficial direction for future research exploring childhood overweight and depression.

Risk Factors and Consequences of Depression

Kovacs describes the consequences of depression as neither normal developmental processes nor momentary problems that dissolve with time (Kovacs, 1989). Depression can interfere with the child's ability to function competently, affecting academic outcomes and social interactions.Certain factors are thought to be linked to an increased risk of developing depression in children. Some of these risk factors may include having a parent with a depressive disorder, children of single parent families or of divorced homes, children classified as having low socioeconomic status, children who have undergone acute and chronic life events, such as the significant loss of a parent through death or divorce or child maltreatment, or children who are dissatisfied with their bodies (Bierut, 1999; Dopheide, 2006; Swallen, Reither, Haas, & Meier, 2005).

Whether or not certain tendencies come before or after the onset of depression, other behaviors have been identified by their connection with adolescents with higher

reported rates of depressive symptoms. Some of these associated behaviors may include bullying as either the perpetrators or the victims, and substance abuse (Saluja et al, 2004). An even more severe outcome is the association between depression and increased risk of suicide (Fergusson, Beautrais, & Horwood, 2003; Sourander, Helstelä, Haavisto, & Bergroth, 2001). Suicide is ranked the 3rd leading cause of death in children 10 to 14 years and 15 to 19 years old, with 7.1% of deaths by suicide in 10 to 14 year old children and 11.6% in 15 to 19 year old individuals (Martin, Kung, Mathews, Hoyert, Strobino, Guyer, & Sutton, 2008).

Even with the numerous risk factors for child and adolescent depression, many children exposed to risk factors never develop depression and have demonstrated positive social and academic functioning in spite of adversity. Originally, this resilience effect was thought of as a remarkable or special characteristic which was innate in some children. However, research since then has brought about new insight. In discussing resilience research, Masten describes resilience as an "ordinary phenomenon" which can be attributed to basic human adaptation systems (Masten, 2001, pg 227).

This resilience among children and adolescent's at risk for depression was assessed by Silk and colleagues. They found that both social (e.g., warm parenting, nonconflictual marital relationships, safe communities) and biological (adequate quantity and quality of sleep) influences contributed to the resilience effect among children and adolescents, and were likely related to the positive outcome in affective regulation due to adaptive functioning (Silk, Vanderbilt-Adriance, Shaw, Forbes, Whalen, Ryan, & Dahl, 2007). Conversely, individual resilience was not enough to overcome the effects of high environmental challenge in a longitudinal study from birth to adolescence. High

environmental challenge included factors such as poor parenting, antisocial peers, low-resource communities, and economic hardship (Sameroff & Rosenblum, 2006).

Relations of Body-Esteem and Depression

Research similar to the present has been conducted on relations of body-esteem and depression in children and adolescents. However, many use different scales or look at self-esteem or body image as opposed to body-esteem. Moreover, previous studies in this field may or may not include a weight component for analysis. It appears thus far that no studies such as this have been conducted on very young children (7-8 years). Most studies in this area focus on adolescents typically around the ages of 11-18 years (Ivarsson, Svalander, Litlere, & Nevonen, 2006; Siegel, 2002; Sjöberg, Nilsson, & Leppert, 2005).

One study, which most closely parallels the purpose of the current study, was conducted in Sweden by Ivarsson and colleagues. This study used both the CDI and the Body-Esteem Scale to assess depression and weight. However, the sample was older and included adolescents with a mean age of 14.6 years. Stepwise elimination revealed that when BMI deviates from ideal (i.e., underweight or overweight) girls and boys display similarities and differences in respect to depression and body-esteem. Similarities between genders included the tendency for children with lower BMI scores to have a more positive attitude about their body and be more satisfied with their weight. Gender differences existed in relation to the presence of weight problems and depression. For example, an association between both lower than normal BMI and CDI depressed mood,

and overweight status and CDI negative self-esteem was found in girls but not boys (Ivarsson et al., 2006).

Other findings have shown that body satisfaction is positively correlated with self-esteem and negatively correlated with depression, indicating that depression predicts body image (Siegel, 2002). However, one study found that in sixth through ninth grade, Caucasian girls' poor body image predicts depression, playing an important role in the persistence rather than the onset of depression (Rierdan, Koff, & Stubbs, 1989). In regard to gender differences, boys feel more positive about their bodies throughout adolescence and girls have an increase in negative perceptions of body weight as puberty progresses. Girls seem to have negative body images, lower self-esteem, and are more likely to be depressed than adolescent boys (Robinson, et al., 2001). These results are consistent in multiethnic samples as well (Siegel, 2002; Young-Hyman et al., 2006).

CHAPTER III

METHODOLOGY

Design

This research involved cross-sectional data from the Families and Schools for Health (FiSH) Study, which is a population-based cohort study being conducted by Oklahoma State University under the direction of Amanda Harrist. The FiSH program assesses children across the rural region of north central Oklahoma. Data used for this thesis was provided from assessments taken from participants in the first wave of the FiSH program during the first four months of the children's first grade year in the fall of 2005. This study was approved by the Oklahoma State University Institutional Review Board for Human Subjects.

Recruitment Strategies

A total of 20 elementary schools agreed to participate in the study with consent obtained from the schools' administrations. Families with first-grade children were recruited. Informed consent was obtained from a parent of each participant and child interviews and anthropometric assessments were conducted with the child's assent.

Sampling Methods

Assessments, including depressegenic feelings and behaviors and body-esteem, were completed at the child's school as part of a structured individual interview. Each interview lasted approximately one hour and was administered by trained research assistants. The interviews took place in a quiet place at the child's school such as a library, an empty cafeteria or at the end of the hall. Several other scales were included in the interview. However, this study is only focusing on the Body Esteem Scale and the measure of depressegenic feelings and behaviors. Children's anthropometric measures were taken by trained research assistants at a separate visit, and took place in a designated spot such as the gymnasium, cafeteria, or in the hallway outside the child's classroom.

Measures

Height and weight were taken at the child's school by trained researchers. Before going to the schools, each researcher demonstrated that they could obtain the appropriate height from a standard person to within ±.5 cm. Children were asked to remove their shoes and any bulky clothing such as sweaters or jackets. Weight was assessed on regularly, calibrated digital scales. Height was determined using portable, wooden height boards. Height was taken at least two times to ensure accuracy. If the two measurements were within ± .3 cm, an average of the two measures was calculated and used in the analysis. If the measurements were not within the specified range, a third measurement was taken and the outlying measurement was discarded.

Body Mass Index (BMI) was calculated using the formula for BMI: weight (kg) / height (m^2) (Keys et al., 1972). The height and weight, gathered by the researcher was

used in this formula. BMI scores were converted to BMI z-scores and BMI for age percentiles using the statistical analysis program, EPI Info (Centers for Disease Control and Prevention, Atlanta, Georgia). BMI z-scores were used to control for the varying age of the children. BMI varies in children by age, so standardization is required to compare children of different ages.

Depressegenic Feelings and Behaviors Questionnaire (DFB) was based on the Children's Depression Inventory, developed by Maria Kovacs (Kovacs 1980-1981, 1985), and taken from Stark and Laurent (2001, Table 2). The depressegenic feelings and behavior assessment was administered by a trained researcher during the child's interview and contained 26 questions. For this study, the most severe statements from each CDI item were used (i.e., "I am sad all the time;" "I do everything wrong.") (Stark and Laurent, 2001), and children were asked to answer no, sometimes, or yes that item occurred to them. The child could either respond vocally or point to their response on a prepared sheet of paper with the 3 response choices. Responses were scored 0 – 2 with a score of 0 indicating the least depressotypic response and 2 indicating the most depressotypic response (Kovacs, 1992, 2003). Cronbach alpha for this study is 0.86, demonstrating good internal consistency reliability.

The 20 item Body Esteem Scale (BES) for Children, developed by Mendelson and White was used to measure body-esteem. This scale's total score has been show to have a good internal reliability (Cronbach alpha, .88) and is an appropriate measure for this age group (Mendelson & White, 1993-94). Reliability for each subscale in the BES for the current study and for the original study is reported in the Reliability Table in Appendix III on page 73. The scale has demonstrated validity as is related to Harter's

measure of Physical Appearance. Three domains are identified with "yes" or "no" questions in each. The domains are: Body-esteem (BE) Appearance, BE-Weight, and BE-Attribution. A variety of questions are posed to the child under each domain and the child is given the opportunity to respond verbally or to point to the appropriate response. The scale is scored by adding the total responses. Higher scores indicate higher body-esteem (Mendelson & White, 1993-94).

Statistical analyses

SPSS version 14.0 was used to analyze data (SPSS Inc., Chicago, IL). Descriptive analyses were performed to determine the demographics and other variables (BMI, body esteem, and DFB). In addition to the descriptive analysis, correlations, t-tests, and one-way ANOVA with multiple comparisons were used, as well as regression. Initial One-way ANOVA and Post Hoc Tests [i.e., Least Square Difference (LSD)] analyses indicated no interesting relations with ethnicity in this sample. Therefore, no further analyses concerning ethnicity were conducted. In the regression equation BMI z-score was the dependant variable and gender, body-esteem and depressegenic feelings and behaviors were the independent variables. Significance was $p<.05$.

CHAPTER IV

FINDINGS

Scales: Additional Information

The version of the Body-Esteem Scale which was used by the FiSH program is located in Appendix II, on page 71. The measure of Depressegeinc Feelings and Behaviors consists of 26 items instead of the original 27-item scale, because the question regarding suicide was deemed inappropriate for the purposes of this study, thus the question was dropped. Note that the 24-item Body-Esteem Scale was administered; however, this analysis used the 20-item version for the current study, because it demonstrated better reliability. Item descriptions and mean responses for the Body-Esteem Scale and the measure of Depressegenic Feelings and Behaviors, as well as the questions which make up each of the sub-scales can be found in Appendix III. The Body-Esteem Scale is on page 74 and the measure of Depressegenic Feelings and Behaviors is on page 75 and 76.

Demographic Features of Sample

This sample was divided fairly evenly in regards to gender with 52.6% being male and 47.4% being female. The mean age of the sample was 6.87 years (± .42, p = .02) with boys (6.91 ± .42) being slightly older than girls (6.83 ± .41, p= .02). BMI groupings

were based on the Centers for Disease Control and Prevention (CDC) guidelines: non-overweight < 85th percentile, at risk for overweight 85th – 95th percentile, overweight > 95th percentile. This sample was predominately made up of white (73.7%) and Native American (17.5%) children. Table 1 contains the demographic breakdown of the sample.

Table 1: Demographic features of the sample

Variable	(Mean & SD) OR [*n* (%)]
Age (mean, SD) (*n* = 597)	
Combined	6.87 ± .42
Male	6.91 ± .42
Female	6.83 ± .41
Gender [*n* (%)] (*n* = 607)	
Male	319 (52.6)
Female	288 (47.4)
BMI [*n* (%)] (*n* = 597)	
Non-overweight	405 (66.6)
At risk for overweight	98 (16.1)
Overweight	94 (15.5)
BMI z-score (*n* = 597)	
Combined	.56 ± 1.03
Male	.63 ± 1.05
Female	.49 ± 1.00
Body-Esteem (mean, SD)	
Body-Esteem total (*n* = 564)	34.81 ± 3.74
Male (*n* = 295)	34.94 ± 3.55
Female (*n* = 268)	34.68 ± 3.95
Ethnicity [*n* (%)] (*n* = 582)	
Native American	102 (17.5)
African American	15 (2.6)
Hispanic	15 (2.6)
Asian	2 (0.3)
White	429 (73.7)
Multiracial	19 (3.3)

Table provides: mean and standard deviations or *n* and percentage
BMI groupings: non-overweight < 85th percentile, at risk for overweight 85th – 95th percentile, overweight > 95th percentile

Descriptive data for BMI, Body-Esteem, and DFB

Table 2 contains the descriptive data (means, standard deviations, and p-values) for BMI, body-esteem, and depressegenic feelings and behaviors scale. Significant differences between genders were seem in the DFB total score (r = .05). No significant differences in body-esteem are indicated in this analysis.

Table 2: Descriptive data for BMI, Body-Esteem, and DFB by Gender

Measure	Gender	*n*	Mean	SD	P
BMI z-score	Boys	314	.63	1.05	.099
	Girls	283	.49	1.00	
BE appearance	Boys	297	21.08	2.28	.55
	Girls	272	20.96	2.50	
BE weight	Boys	303	5.13	.87	.14
	Girls	272	5.02	.92	
BE attribution	Boys	301	5.10	.93	.71
	Girls	271	5.12	.92	
BE total score	Boys	295	34.93	3.55	.42
	Girls	268	34.8	3.95	
DFB total score	Boys	293	15.28	8.94	.05*
	Girls	269	16.81	9.24	

t-test p values: * <.05, **<.01

Relations between Body-Esteem, Depressegenic Feelings and Behaviors, and Body Mass Index (BMI)

Pearson's correlation was used to assess the relations between body-esteem measures, depressegenic feelings and behaviors, and BMI. Table 3 displays the correlations between each variable in the total sample. Note that higher body-esteem scores reflect a more positive body-esteem and higher depressegenic scores reflect the likelihood of endorsing more depressegenic thoughts and behaviors. For BMI, significant negative correlations were found between body-esteem (BE) weight and BMI, and BE total and BMI. These correlations suggest that as body-esteem decreases, BMI

increases or conversely, as body-esteem increases, BMI decreases. Thus, the worse one feels about their body, the more overweight one is. No significant relationship was found between BMI and depressegenic feelings and behaviors.

Significant negative correlations were also seen for depressegenic feelings and behaviors and BE weight as well as, depressegenic feelings and behaviors and BE total score. In regard to body-esteem and depressegenic feelings and behaviors, as body-esteem score decreases, indicating lower body-esteem, the DFB score increases, indicating more depressegenic feelings and behaviors. Conversely, another interpretation could be that as body-esteem increases, DFB scores decreases. Thus, children who feel better about their bodies have less depressegenic feelings and behaviors than those who feel poorly about the way their body looks.

Table 3 Correlations: BMI, Body-Esteem Weight, Body-Esteem Total Score, and DFB Total Score for both Boys and Girls

Measure	BE weight	BE total	DFB total
BMI z-score	-.207*	-.112*	-.042
BE weight	-	-.644*	-.304*
BE total score	-	-	-.507*
DFB total score	-	-	-
M	5.08	34.81	15..98
SD	.891	3.76	9.08

*$p < .001$

Further correlation analyses were conducted to investigate the influence of gender on the relationships between the variables. In Table 4, boys and girls' were analyzed separately to investigate the possibility of gender differences. Although a significant relationship between BMI and body-esteem was evident using combined data from both

boys and girls, when a separate analysis of the sexes was performed, the correlation analysis indicates that a correlation between BMI and BE weight exists in girls (r = -.270) and boys (r = -.160) at the 0.001 level. Furthermore, while there is no significant correlation between BMI and BE total score in boys, the girls demonstrate a negative correlation (r = -.182) at the 0.005 level between girls' BMI z-score and body-esteem total score. No significant correlation was found between BMI z-scores and depressegenic feelings and behaviors for boys or girls. In both boys and girls, there was a significant negative correlation between DFB total score and BE total score and DFB and BE weight (see Table 4).

Table 4: Correlations Between BMI, Body-Esteem Weight, Body-Esteem, and DFB for Boys and Girls

Measure	BE weight	BE total score	DFB total score
BMI z-score			
Boys	-.160*	-.051	-.063
Girls	-.270*	-.182**	-.008
BE weight			
Boys	-	.566*	-.227*
Girls	-	.718*	-.378*
BE total score			
Boys		-	-.474*
Girls		-	-.538*

*$p < .001$;** $p < .005$

Gender Differences

Gender differences were assessed across specified BMI classes. Pearson Chi-Square test did not reveal significant gender differences among BMI groups with a value of 3.89 (p=.14). Although BMI for age and gender account for the natural differences between boys and girls at this age, it is possible that differences in proportions could

exist. For instance, this sample of children was not distributed in the expected 85% (not overweight), 10% (at risk for overweight), and 5% (overweight) categories. See table 5 for BMI distributions across gender.

Table 5: BMI Groupings across Gender

	Boys	Girls
BMI groups [*n* (%)]		
Non-overweight	208 (66.2)	197 (69.6)
At risk for overweight	48 (15.3)	50 (17.7)
Overweight	58 (18.5)	36 (12.7)

Given: % within gender of child
BMI groupings: non-overweight < 85th percentile, at risk for overweight 85th – 95th percentile, overweight > 95th percentile

Differences among Ethnicity

One-way ANOVA was used to assess ethnic differences between groups for BMI z-score, body-esteem total scale and subscales, and DFB total score. No significant differences were found. Ethnic differences across BMI groups were also measured using cross-tabulation and were not found to be significant.

BMI Predictors

Table 6 contains the results of the regression analysis, which was used to assess if the scales (total body-esteem and total DFB scores) were predictors of BMI. The first model, including both boys and girls, demonstrated significant results for body-esteem and total DFB scores (p=.002) explaining 1.9% of the difference in BMI. Therefore, it can be proposed that for rural first grade children body-esteem and depression do predict BMI.

However, when performing the same regression analysis separately for boys and girls, it appears that the girls were driving the significance. For instance, when assessing just girls, depressegenic feelings and behaviors, and body-esteem predict BMI (p=.001) and explain 4.2% of the variance in BMI, as shown in Table 6. Whereas, in the sub-sample of only boys, the regression analysis was not significant (p=.334) for body-esteem or depressegenic feelings and behaviors, indicating that in boys, depressegenic feelings and behaviors, and body-esteem do not predict BMI for this young age group. This difference between gender shows that body-esteem and depressegenic feelings and behaviors predict BMI in rural first grade girls but not boys.

Table 6: BMI Predictors

Model	Adjusted R Square	Standardized ß	Sig.
All Children (n = 547)			
Model	.019		.002
Body-esteem		-.169	.001
DFB		-.119	.016
Boys (n = 286)			
Model	.001		.334
Body-esteem		-.081	.229
DFB		-.090	.183
Girls (n = 261)			
Model	.042		.001
Body-esteem		-.265	.000
DFB		-.145	.046

Dependent Variable: BMI z-score
Significance: $p < .05$

CHAPTER V

CONCLUSION

In summary, this research found that in this sample of rural first grade children, body-esteem was negatively correlated with BMI, so children who tend to display lower body-esteem have higher BMI scores. Thus, the worse a child feels about their body, the heavier they tend to be. In regard to gender, the girls in this sample demonstrated more negative body esteem . Thus, girls with a higher BMI are likely to feel worse about their body than boys, which is consistent with previous research findings (Davison & Birch, 2001, Mendelson & White, 1985).

Ethnicity did not appear to be a significant factor in the relations between body-esteem or depressegenic feelings and behaviors and BMI. However, it is important to mention that although this sample is a good representation of white and Native American children, it is not a complete representation of other ethnicities.

Furthermore, body-esteem appears to predict BMI in girls, but was not found to be significant in boys when separate analyses were performed for each group. In addition, depressegenic feelings and behaviors did appear to predict BMI when assessing all children. However, further analyses, revealed that this was only true for girls.

Discussion

In this sample of rural first grade children, 32% were overweight or at risk for overweight. This percentage is similar to National Health and Nutrition Examination Survey (NHANES) for 2003-2004 which found 33% of children and adolescents ranging from 2-19 years are overweight or at risk for overweight (Ogden et al., 2006). Of this sample of children, there were no significant differences found in weight status between gender, which is also consistent with past research (Demerath et al., 2006; Freedman et al., 2005; Sweeting, 2007).

In regard to depressegenic feelings and behaviors and BMI groups, the findings in this study were in congruence with previous research, suggesting no relationship between depressegenic feelings and behaviors and BMI when looking at the simple correlation. Thus, in the general population, overweight children were no more or less likely to experience depressegenic feelings and behaviors than their normal weight peers (Brewis, 2003; Eisenberg, Neumark-Sztainer, & Story, 2003; Wardle & Cooke, 2005). This finding suggests that underweight, normal weight, and overweight children are all equally at risk for experiencing depressegenic feelings and behaviors.

Additionally, ethnicity, failed to show any significant differences in depressegenic feelings and behaviors. It is difficult to determine whether this finding is consistent with previous literature, because very little research has been conducted regarding the role of ethnicity on depressegenic feelings and behaviors and weight status (Wardle & Cooke, 2005). Furthermore, it is important to keep in mind that ethnicity was not evenly

distributed in this sample. For this reason, conclusions regarding ethnicity are difficult to draw.

Interestingly, even though depressegenic feelings and behaviors were not related to BMI in the correlation analyses, the findings from the regression analyses using depressegenic feelings and behaviors and body-esteem as predictors suggest that depressegenic feelings and behaviors predict BMI in girls ($p = 0.046$), but not boys ($p = 0.180$). Past literature has suggested an association with adolescent obesity and depression, but this study used older participants between the ages of 15 – 17 years (Sjöberg et al, 2005). This finding was unexpected because previous research has suggested that gender differences in depressive symptoms are typically not noticed in pre-adolescent children but seem to occur later, around the ages of 13 – 15 years old. This gender gap is thought to increase with age and pubertal development (Bailey et al., 2007; Falkner et al., 2001; Hankin et al, 1998; Siegel, 2002). However, one study did find that depressive symptoms were significantly greater in girls verses boys in a relatively young sample of third grade students (mean age, 8.4 years) (Erickson et al., 2000).

It is important to keep in mind the complex nature of depression when looking for associations between variables. For instance, depression may emerge from a variety of factors and if present can produce various outcomes (Cicchetti & Toth, 1998; Foster & MacQueen, 2008). It could be that overweight concerns, not necessarily depressive thoughts and feelings are responsible for the association between depressegenic feelings and behaviors and obesity. Several studies assessing all three variables found that when controlling for overweight concerns, depression was no longer a significant predictor of

BMI (Allen et al., 2006; Erickson, et al., 2000). Therefore, in the current study, the connection between depressegenic feelings and behaviors and BMI may not be significant, because it depends on the extent of concern the individual has regarding their weight, which was not controlled for in this study.

In considering the role of body-esteem, girls' BMI was more likely to be associated with changes in body-esteem compared to boys. Furthermore, body-esteem seems to predict BMI in girls but not boys, which is consistent with previous research. (Young-Hyman et al., 2003) However, gender differences may become non-significant when controlling for body image and self-esteem (Allgood-Merten, Lewinsohn, & Hops, 1990; Siegel, Yancey, Aneshensel, & Schuler, 1999).

Summary

In conclusion, this study posed two main questions along with two sub-questions. The aims and results of the current study, as well as the larger study, Families and Schools for Health (FiSH), will be described here in the context of Cicchetti and Toth's ecological transactional model which was discussed previously in the developmental process of depression (1998). Because this model is designed to aid in the understanding of how multiple factors can influence the emergence of depression, it is an appropriate framework to understand the influence of multiple factors on overweight and obesity in children.

In review, this model consisted of four levels. Beginning with the outermost level and working inward the levels were as follows: the macrosystem, the exosystem, the

microsystem, and ontogenic development. Although the two outermost levels, the macrosystem and exosystem are not addressed in this current study the FiSH study does touch on these levels, especially the exosystem. The exosystem comprises the community in which the individual resides, which includes the school environment. Much of the effort of the FiSH program deals with the children's school environment and includes factors such as peer relations, and the classroom environment. For example, some of the questions asked in the interview include: "It's easy for me to make friends at school;" "I have nobody to talk to in class;" "People care about each other in this school;" or "Students in my class just look out for themselves." Because the school setting is an important contributor to the development of social and academic skills, especially in this young sample, the role of factors such as body-esteem, depressegenic feelings and behaviors, and BMI are important influences to assess. Furthermore, because this level is most assessable for community support to intervene, the intervention component of the FiSH study has the potential to provide direction for future intervention at the community level. Although FiSH measures do not assess the macrosystem, or societal attitudes and cultures, it could be a starting point for drawing implications by assessing and comparing findings form other ecological levels between ethnicity.

The next level, the microsystem is also thoroughly assessed in the FiSH study. This level looks at the immediate environment, most often the family environment. Much of the intervention was assessing different approaches to nutrition education at this level, to see which approach produced the most positive effects. For the purposes of this study, these effects could be viewed as influences on body-esteem, depression, or body

fatness. However, a longitudinal design as opposed to the cross-sectional design of the current study is needed to make inferences regarding intervention methods.

Like, the exosystem, the FiSH study also gathered data during the child interviews which would fall under the microsystem level. These questions pertained to the family environment. Some examples of the questions asked at the family level include: "Does your mother/father encourage you to lose weight;" "Does your mother/father tease you because she/he thinks you are not muscular enough?" The interview also asked the child to identify the most important male and female adult in their life (biological mother/father, step-mother/father, grand-mother/father), which gave direction as to who to address the questions above to, and provided insight into the family structure. The questions above could provide relevant information pertaining to body-esteem, depressegenic thoughts and behaviors, and body weight influences at this level.

The last level of the ecological transactional model is the ontogenic development level. This is the level in which the current study addresses, because this level includes the factors within a person that effect outcomes such as body-esteem, depressegenic feelings and behaviors, and childhood overweight and obesity. The purpose of this study was to evaluate the relationship between these variables. This was carried out by looking at the scores on measures including the Body-Esteem Scale, the measure of Depressegenic Feelings and Behaviors, and Body Mass Index.

Our first aim was to assess the relations between body esteem measures, measures of depressegenic feelings and behaviors, and child weight, and if this differs by gender and/or ethnicity. We found a modest association ($r = -.112$, $p = .008$) between body-esteem and BMI in the sample of girls and boys. However, when splitting the sample

into boys and girls it seems that the modest significant relationship was coming from the girls ($r = -.182$, $p = .003$), not the boys. No significant differences in ethnicity were found across BMI groups or body-esteem total scale or subscales. Therefore, we can conclude that in first grade girls BMI is influenced by body-esteem, whereas, when body-esteem decreases, BMI increases, or when body-esteem increases, BMI decreases. Thus, the worse a first grade girl feels about her body, the higher the BMI. Conversely, the better she feels about her body, the lower the BMI score. On the other hand, BMI does not seem to be associated with depression in first grade boys or girls regardless of ethnicity

Our second aim was to assess whether body-esteem and depressegenic feelings and behaviors predict BMI, and if this differs by gender and/or ethnicity. Our initial assessment suggested that body-esteem and depressegenic feelings and behaviors predicted 1.9% of the variance in BMI ($p = .002$). However, a further analysis revealed that this was only true in girls, in which these variables predicted 4.2% of the variance in BMI ($p = .001$) Therefore, we can conclude that body-esteem and depressegenic feelings and behaviors predict BMI in first grade girls, but not boys.

Limitations

Although careful consideration was give to the design of the study, limitations do exist. The first limitation, which is important to mention, is in regard to the cross-sectional design of the study. Since cross-sectional data was used, it must be kept in mind that directionality of these results cannot be determined. Thus, we cannot interpret

form these results that being overweight or obese cause's depressegenic feelings or behaviors or that depressegenic feelings and behaviors come first followed by increased weight status. Likewise, body-esteem is limited in terms of causality.

Another limitation exists in the generalizability of the findings. Although the data included results from 607 first grade children, across 20 different elementary schools, the ethnic distribution of those who consented to participate did not represent an ethnically diverse sample. For this reason, results of the present study can only be generalized to rural, predominately white and Native American first grade children. Because this population and age group is under-explored regarding issues of body-esteem, depression, and BMI, caution must also be taken in comparing this sample with other literature on this topic.

Further limitations include a variety of factors which were not controlled for in the design of this study. Initially socioeconomic status was to be assessed in this study. However, due to difficulties in merging and accessing the data, and the limited amount of parent completed data on socioeconomic status, this variable was not assessed in this study. Socioeconomic status is thought to possibly influence body-esteem, depression, and BMI. For example, although findings are not consistent (Robinson, et al., 2001), it has been suggested that individuals of higher socioeconomic status are more likely to diet, have a greater desire for thinness, and are more preoccupied with their weight (Dornbusch, Carlsmith, Dumcan, Gross, Martin, & Ritter, 1984; Striegel-Moore, Silberstein, & Rodin, 1986). For this reason it could be suggested that levels of body-esteem could be influenced by socioeconomic status. Past research has also linked low-socioeconomic status as a predictor of depression in children (Bierut, 1999; Dopheide,

2006; Swallen, Reither, Haas, & Meier, 2005), and children of low socioeconomic status are at increased risk for obesity compared with children of higher socioeconomic status (Wang & Zhang, 2002).

Weight and shape concern is another variable which was not controlled for in this study, which may have had significant influences. Findings from previous studies which have assessed this variable in relation to depression, body-esteem, and BMI have found a connection between overweight children with high levels of weight and shape concern and an increased risk of experiencing psychological problems. These findings suggest that weight and shape concern, not BMI are contributing to the adverse psychological effects such as lowered body-esteem and depressive symptoms (Allen et al, 2006; Erickson, et al., 2000).

Family structure could have been another variable worth exploring in this sample. It would be interesting to see if there were any differences in body-esteem, depressegenic feelings and behavior, and BMI in children coming from homes with separated parent's verses those of intact families. Past literature has suggested that one of the risk factors for the development of depressive symptoms is children coming from single parent or divorced homes (Bierut, 1999; Dopheide, 2006; Swallen, Reither, Haas, & Meier, 2005). In fact, one study found lower CDI scores in adolescents from separated families compared to those of intact families. This study also found that adolescents from separated families scored somewhat lower on the Body-Esteem Scale than the adolescents from intact families. These results suggest that adolescents from separated homes report more depressive symptoms and have slightly lower body-esteem (Ivarsson,

et al., 2006). It would be interesting to see if these findings were apparent in this group of young, rural children.

The internal reliability for the body-esteem subscales (BE-weight $\alpha = 0.36$; BE-appearance $\alpha = 0.72$; BE-attribution $\alpha = 0.40$) are lower than those of the original study (BE-weight $\alpha = 0.77$; BE-appearance $\alpha = 0.87$; BE-attribution $\alpha = 0.54$), which leaves room to question the internal reliability of this scale. The overall reliability is lower than desired as well. Overall reliability for the body-esteem scale in this study is $\alpha = 0.79$ compared to the original study in which $\alpha = 0.88$ (Mendelson & White, 1993-94). A final limitation is that the body-esteem and depressegenic feelings and behaviors were based on self-report.

Implication for Research and Practice

With childhood overweight and obesity becoming more common (Ogden et al., 2006), coupled by the association between body-esteem and BMI as well as the threat of depressegenic feelings and behaviors which some children may experience, it is important to recognize and understand the risks and consequences associated with these trends, so that we can help to prevent the physical, social, and psychological deterioration of our youth (Dohnt & Tiggemann, 2005; Hannon, et al., 2005; Hayden-Wade et al, 2005; Hesketh, et al., 2004; Franklin et al., 2006; Latner & Stunkard, 2003; Robinson, et al., 2001; Sjöberg, et al., 2005; Sorof et al., 2004: Weiss et al., 2004; Weiss, 2007). The role of body-esteem and depressegenic feelings and behaviors as they relate to childhood

and adolescent overweight and obesity is an area which needs further exploration, especially in young children such as those included in this study.

Body-esteem findings of the current study were notable and consistent with a previous study assessing young children which suggests a negative correlation between body-esteem and BMI, especially in girls (Davison & Birch, 2001). However, it is difficult to make comparisons with other studies since this sample consists of young, rural children, who largely under-explored. Thus, little data assessing the relations between body-esteem, depressegenic feelings and behaviors, and BMI exists for this demographic group. Therefore, additional research with longitudinal data is needed to determine directionality of body-esteem and depressegenic symptoms with regard to BMI. A follow-up study with this sample, as well as a duplication of the analyses in another group of young, rural children is needed to assess whether the strength of the correlations and/or the level of prediction between body-esteem, depression, and BMI were intensified in this sample later on in adolescents. Further exploration is needed to better understand the development of these variables in this rural population.

Future research exploring childhood overweight and depression should also assess the role of weight and shape concern in longitudinal designs, as this has been suggested to be a key factor in the occurrence of depressive symptoms (Allen et al, 2006; Erickson, et al., 2000). In addition to weight concern, socioeconomic status and family structure are other variables which should be included in future research designs.

The most important implication for professions working with children in either the healthcare setting or community setting is to be sensitive to the difficult issues which children are encountering, especially regarding overweight children who have

demonstrated greater susceptibility for lower body-esteem. Feelings of dissatisfaction with one's body have been found to develop early on in life, and this study supports previous findings suggesting the early age in which sociocultural ideals of the attractive body are recognized and adopted (Dohnt & Tiggemann, 2005). Young children are impressionable, as they are forming their own identity; therefore, the age of these students, as well as the fact that data was gathered at the beginning of the first grade school year demonstrates the vulnerability and susceptibility of these children. Considering the sociocultural pressures for thinness, professionals working with young children should be sensitive to the possible presence of lowered body-esteem, especially in overweight girls.

With the increasing focus on how to implement intervention programs and strategies to prevent childhood overweight and obesity, results from this study provide some direction for the future. Since findings demonstrated a relationship between BMI and body-esteem, especially body-esteem weight, intervention programs designed at promoting more positive body-image is an important partner to the instruction of healthy lifestyle changes, such as healthful foods, proper eating habits, and physical activities.

This study offers useful information into aspects of depressegenic feelings and behaviors, body-esteem, and BMI in a group of children who have been largely ignored. Although this study is an important first step, as it provides useful information and insight into the body-esteem, depressegenic feelings and behaviors, and BMI relations of rural first grade children, further research is needed to understand the developmental progression of these variables overtime in order to plan appropriate intervention

programs to effectively reach and improve the health and well-being of this all to often ignored group of children.

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APPENDIX I

INSTITUTIONAL REVIEW BOARD

Request for Determination of Non-Human Subject or
Non-Research

Oklahoma State University Institutional Review Board

Request for Determination of Non-Human Subject or Non-Research

If no, then research does not involve human subjects, no other information is required.
If yes, proceed to the following questions.

All of the following must be "no" to qualify as "non-human subject":

B. Does the study involve intervention or interaction with a "human subject"?
☒ No ☐ Yes

C. Does the study involve access to identifiable private information?
☒ No ☐ Yes

D. Are data/specimens received by the Investigator with identifiable private information?
☒ No ☐ Yes

E. Are the data/specimen(s) coded such that a link exists that could allow the data/specimen(s) to be re-identified?
☐ No ☒ Yes
If "Yes," is there a written agreement that prohibits the PI and his/her staff access to the link?
☐ No ☒ Yes

6. **Signatures**

Signature of PI Lauren Lee **Date** 8/28/07

Signature of Faculty Advisor Clay Kennedy **Date** 8/27/07
(If PI is a student)

FSH Project PI Linda Lamb 8/28/07

☒ Based on the information provided, the OSU-Stillwater IRB has determined that this project **does not** qualify as human subject research as defined in 45 CFR 46.102(d) and (f) and **is not subject to oversight by the OSU IRB.**

☐ Based on the information provided, the OSU-Stillwater IRB has determined that this research **does** qualify as human subject research and **submission of an application for review by the IRB is required.**

Sue C Jacobs

Dr. Sue C. Jacobs, IRB Chair

9/4/07
Date

APPENDIX II

SCALE

24-Item Body-Esteem Scale

BES

You are doing such a great job! I can't believe you're able to answer all my questions. Okay, you've told me about yourself, your feelings, and about what it's like at school. Now let's talk about how you feel about your LOOKS. Let's use this GREEN poster. Sometimes I feel good about how I look and sometimes I don't feel so good about my looks. Tell me how you feel, and this time it's easy because you can just say YES that's true, or NO that's not true about yourself.

	Yes	No
1. I like what I look like in pictures ["pictures" = photographs]	○	○
2. Kids my own age like my looks.	○	○
3. I'm pretty happy about the way I look.	○	○
4. Most people have a nicer body than I do.	○	○
5. My weight makes me unhappy.	○	○
6. I like what I see when I look in the mirror.	○	○
7. I wish I were thinner.	○	○
8. There are lots of things I'd change about my looks if I could.	○	○
9. I'm proud of my body.	○	○
10. I really like what I weigh.	○	○
11. I wish I looked better.	○	○
12. I often feel ashamed of how I look. ["ashamed" = bad or embarrassed]	○	○
13. Other people make fun of the way I look.	○	○
14. I think I have a good body.	○	○
15. I'm looking as nice as I'd like to.	○	○
16. It's pretty tough to look like me.	○	○
17. I wish I were fatter.	○	○
18. I often wish I looked like someone else.	○	○
19. My classmates would like to look like me.	○	○
20. I have a high opinion about the way I look.	○	○
21. My looks upset me.	○	○
22. I'm as nice looking as most people.	○	○
23. My parents like my looks.	○	○
24. I worry about the way I look.	○	○

APPENDIX III

MEAN RESPONSE

Reliability table

Item description and mean responses for the
Body-Esteem Scale

Item description and mean responses for the measure of
Depressegenic Feelings and Behaviors

Reliability Table

Subscales	Reliability for *Original* Study	Reliability for *This* Study
Body-Esteem		
Body-Esteem Appearance	.α = 0.87	.α = 0.72
Body-Esteem Weight	.α = 0.77	.α = 0.36
Body-Esteem Attribution	.α = 0.54	.α = 0.40
Body-Esteem Total	.α = 0.88	.α = 0.79
Depressegenic Feelings and Behaviors		
Overall scale		α = 0.86

Body Esteem Scale

Items	Mean	Frequency	
		Yes (%)	No (%)
BE-Appearance (n=569)	21.02		
I like what I look like in pictures.	1.89	518 (89.6)	60 (10.4)
I am pretty happy about the way I look.	1.92	530 (91.7)	48 (8.3)
I like what I see when I like in the mirror.	1.86	498 (86.3)	79 (13.7)
There are lots of things I'd change about my looks if I could.	1.42	336 (58.1)	242 (41.9)
I'm proud of my body.	1.89	512 (88.7)	65 (11.3)
I wish I looked better.	1.51	285 (49.2)	294 (50.8)
I think I have a good body.	1.89	513 (88.9)	64 (11.1)
I am looking as nice as I'd like to.	1.88	508 (87.9)	70 (12.1)
I often wished I looked like someone else.	1.61	224 (38.7)	355 (61.3)
My looks upset me.	1.78	127 (22.0)	451 (78.0)
I am as nice looking as most people.	1.73	418 (72.8)	156 (27.2)
I worry about the way I look.	1.65	199 (34.4)	379 (65.6)
BE-Weight (n=576)	5.08		
My weight makes me unhappy.	1.71	169 (29.2)	409 (70.8)
I wish I were thinner.	1.57	251 (43.4)	327 (56.6)
I really like what I weigh.	1.81	467 (80.8)	111 (19.2)
BE-Attribution	5.11		
Kids my own age like my looks.	1.69	395 (68.7)	180 (31.3)
I often feel ashamed of how I look.	1.71	166 (28.8)	411 (71.2)
Other people make fun of the way I look.	1.71	169 (29.2)	410 (70.8)
Not Used			
Most people have a nicer body than I do.	1.63	211 (36.8)	363 (63.2)
My parents like my looks.	1.94	540 (93.8)	36 (6.3)
TOTAL SCALES (n=20)	34.81		

Yes or no responses were obtained for each question with scores ranging from 1 to 2. Answers indicating high body-esteem = 2, low body-esteem = 1.

Depressegenic Feelings and Behavior Measures

Items	Mean	SD	Frequency		
			No (%)	Sometimes (%)	Yes (%)
I am sad all the time.	.75	.72	240 (41.3)	246 (42.3)	95 (16.4)
Terrible things will happen to me.	.70	.77	288 (49.6)	183 (31.5)	110 (18.9)
All bad things are my fault.	.47	.69	371 (64.0)	143 (24.7)	66 (11.4)
I feel like crying everyday.	.48	.71	378 (65.1)	129 (22.2)	74 (12.7)
Things bother me all the time.	.83	.80	243 (41.9)	192 (33.1)	145 (25.0)
I can't make up my mind.	.95	.78	193 (33.3)	224 (38.6)	163 (28.1)
I am bad all the time.	.40	.65	400 (69.1)	127 (21.9)	52 (9.0)
I don't want to be with people at all.	.48	.70	369 (63.5)	144 (24.8)	68 (11.7)
I never do what I am told.	.54	.73	353 (60.9)	144 (24.8)	83 (14.3)
I get into fights all the time.	.45	.71	397 (68.4)	107 (18.4)	76 (13.1)
I do everything wrong.	.47	.69	375 (64.8)	139 (24.0)	65 (11.2)
I have to push to do my school work.	.70	.86	325 (56.2)	101 (17.5)	152 (26.3)
I do very badly in school.	.33	.62	438 (75.5)	94 (16.2)	48 (8.3)
I can never be as good as other kids.	.56	.73	341 (58.8)	154 (26.6)	85 (14.7)
Nothing is fun at all.	.64	.79	320 (55.4)	147 (25.4)	111 (19.2)
I have trouble sleeping every night.	1.02	.84	198 (34.1)	173 (29.8)	209 (36.0)
I am tired all the time.	1.01	.84	198 (34.3)	176 (30.4)	204 (35.3)

Most days I don't feel like eating.	.81	.80	252 (43.5)	189 (32.6)	138 (23.8)
I worry about aches and pains.	.84	.88	273 (47.4)	120 (20.8)	183 (31.8)
I feel alone all the time.	.67	.78	303 (52.2)	166 (28.6)	111 (19.1)
I never have fun at school.	.63	.79	330 (56.9)	139 (24.0)	111 (19.1)
I do not have any friends.	.42	.73	417 (71.9)	81 (14.0)	82 (14.1)
Nothing will ever work out for me.	.82	.74	222 (38.2)	242 (41.7)	117 (20.1)
I hate myself.	.35	.67	444 (76.4)	73 (12.6)	64 (11.0)
I look ugly.	.21	.54	496 (85.5)	48 (8.3)	36 (6.2)
Nobody really loves me.	.39	.70	427 (73.7)	79 (13.6)	73 (12.6)
TOTAL – SCALES (n=26 items)	16.02	9.102			

This scale measures depression symptoms from no symptoms to mild to severe symptoms. A score of 0, 1, or 2 is given to each item with a score of 2 representing the most severe choice.

VITA

Lauren Nicole Lee

Candidate for the Degree of

Master of Science

Thesis: THE RELATIONSHIP BETWEEN BODY ESTEEM, DEPRESSEGENIC FEELINGS AND BEHAVIORS, AND WEIGHT IN FIRST GRADE CHILDREN

Major Field: Nutritional Science

Biographical:

Personal Data: Born in Muskogee, Oklahoma, on September 1, 1983, the daughter of Casey and Jan Fishburn. Married Garrett Lee of Muskogee, OK on July 8, 2006. Currently live with husband Garrett in Stillwater, OK.

Education: Graduated from Hilldale High School, Muskogee, Oklahoma in May 2002; received Bachelor of Science degree in Nutritional Sciences, with option in Dietetics from Oklahoma State University, Stillwater, Oklahoma in May 2006. Completed the requirements for the Master of Science degree with a major in Nutritional Science at Oklahoma State University in July 2008.

Experience: Employed by Oklahoma State University, College of Human and Environmental Sciences as an undergraduate and as a graduate research assistant for the Families in Schools for Health Project, 2005-2007. Employed by Oklahoma State University Seretean Wellness Center as a graduate assistant, 2008 to present.

Professional Membership: American Dietetic Association, Oklahoma Dietetic Association.

Name: Lauren N. Lee Date of Degree: July, 2008

Institution: Oklahoma State University Location: Stillwater, Oklahoma

Title of Study: THE RELATIONS BETWEEN BODY-ESTEEM, DEPRESSEGENIC FEELINGS AND BEHAVIORS, AND BODY MASS INDEX IN FIRST GRADE CHILDREN

Pages in Study: 76 Candidate for the Degree of Master of Science

Major Field: Nutritional Science

Research suggests that overweight children may experience unfavorable psychological and social consequences such as lowered self-esteem and depressive symptoms. This study explores the relationship between body-esteem, depression, and BMI in first grade children, and how these factors differ by gender. Data was collected from 607 first grade children (52.6% males) at the beginning of the 2005 school year. Body-esteem was measured using the Body-Esteem Scale (BES) and depressegenic feelings and behaviors were assessed with a measure developed for the current study. BMI was calculated for each child based on measures of height and weight. Correlation analyses by gender revealed a negative correlation between body-esteem and BMI in girls ($r = -0.182$, $p = 0.003$) suggesting that, for only girls, as positive feelings about one's body decreases, BMI increases. Initial regression analyses suggested that depressegenic feelings and behaviors and body-esteem predicted BMI in girls ($p = 0.001$) but not boys. Further research examining the relations between body-esteem, depressegenic feelings and behaviors, and BMI in young children is needed to build on the current study and expand our understanding of overweight and obesity in very young children, so that effective treatment approaches may be developed and implemented.

ADVISER'S APPROVAL: Dr. Tay Kennedy