UNIFORMED SERVICES UNIVERSITY OF THE HEALTH SCIENCES
F. EDWARD HÉBERT SCHOOL OF MEDICINE
4301 JONES BRIDGE ROAD
BETHESDA, MARYLAND 20814-4799

February 19, 2010

GRADUATE PROGRAMS IN THE BIOMEDICAL SCIENCES AND PUBLIC HEALTH

Ph.D. Degrees

Interdisciplinary
-Emerging Infectious Diseases
-Molecular & Cell Biology
-Neuroscience

Departmental
-Clinical Psychology
-Environmental Health Sciences
-Medical Psychology
-Medical Zoology

Physician Scientist (MD/Ph.D.)

Doctor of Public Health (Dr.P.H.)

Master of Science Degrees

-Public Health

Masters Degrees

-Military Medical History
-Public Health
-Tropical Medicine & Hygiene

Graduate Education Office

Eleanor S. Metcalf, Ph.D., Associate Dean
Bettina Arnett, Support Specialist
Roni Bull, Support Specialist

Web Site
http://www.usuhs.mil/graded/
http://usuhs.mil/geo/gradpgm_index.html

E-mail Address
graduateprogram@usuhs.mil

Phone Numbers
Commercial: 301-295-9474
Toll Free: 800-772-1747
DSN: 295-9474
FAX: 301-295-6772

APPROVAL SHEET

Title of Thesis: "An Investigation of Loss of Control Eating Disorder in Children"

Name of Candidate: Camden Elliott
Medical and Clinical Psychology
Master of Science
2/18/2010

Thesis and Abstract Approved:

Marian Tanofsky-Kraff, PhD — Date: 2/22/10
Department of Medical and Clinical Psychology

Thesis Advisor

David Krantz, PhD — Date: 19 Feb 10
Department of Medical and Clinical Psychology

Committee Member

Tracy Sbrocco, PhD — Date: 19 Feb 10
Department of Medical and Clinical Psychology

Committee Member

Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
18 FEB 2010		**00-00-2010 to 00-00-2010**

4. TITLE AND SUBTITLE
An Investigation Of Loss Of Control Eating Disorder In Children

5a. CONTRACT NUMBER
5b. GRANT NUMBER
5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)

5d. PROJECT NUMBER
5e. TASK NUMBER
5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Uniformed Services University Of The Health Sciences,4301 Jones Bridge Rd,Bethesda,MD,20814

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

10. SPONSOR/MONITOR'S ACRONYM(S)
11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT

Loss of control (LOC) over eating is reported during middle childhood samples. LOC eating is associated with overweight and disordered eating attitudes and behaviors. However, data suggest that children (6-12y) may have a different clustering of associated disordered eating attitudes and behaviors from those typically reported by adults and adolescents with binge eating. We therefore investigated a newly proposed diagnostic category based on young children?s disordered eating presentation, Loss of Control Eating Disorder (LOC-ED). The Eating Disorder Examination adapted for Children, the Standard Pediatric Eating Episode Interview, and questionnaires to assess psychopathology were administered to 256 non-treatment-seeking youth (age 10.3?1.5y 52.3% girls). Body fat (kg) was measured using air displacement plethysmography. Using the proposed criteria, we identified youth with LOC-ED (n=7), youth with LOC in the absence of the full disorder (subLOC=33), and youth not reporting the experience of LOC (noLOC=216). No child met criteria for DSM-defined binge eating disorder. After adjustment for age, sex and race, LOC-ED youth had more body fat compared to noLOC youth (p=.02), but not to those in the subLOC group (p=.10). SubLOC and noLOC youth did not differ from each other on measures of body fat. Considering the same covariates and BMI z-score, LOC-ED youth had greater Eating and Shape Concerns than subLOC and noLOC youth (ps≤.05). SubLOC youth also had greater Eating and Shape Concerns than noLOC youth (ps<.001). Those with subLOC self-reported more symptoms of anxiety and depression than noLOC youth (ps≤.02), but did not differ from LOC-ED youth. These data suggest that youth with LOC-ED have greater adiposity and disordered eating attitudes than youth not reporting the experience of LOC, as well as those with LOC in the absence of the full disorder. Further investigation is required to determine the impact of LOC-ED on psychosocial functioning and body weight trajectory.

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT **unclassified**	b. ABSTRACT **unclassified**	c. THIS PAGE **unclassified**	**Same as Report (SAR)**	**90**	

Standard Form 298 (Rev. 8-98)
Prescribed by ANSI Std Z39-18

The author hereby certifies that the use of any copyrighted material in the thesis manuscript entitled:

"An Investigation of Loss of Control Eating Disorder in Children"

is appropriately acknowledged and, beyond brief excerpts, is with the permission of the copyright owner.

Camden Elliott

Camden Elliott
Graduate Program
Uniformed Services University

An Investigation of Loss of Control Eating Disorder in Children

Camden Elliott

Uniformed Services University

Abstract

Loss of control (LOC) over eating is reported during middle childhood samples. LOC eating is associated with overweight and disordered eating attitudes and behaviors. However, data suggest that children (6-12y) may have a different clustering of associated disordered eating attitudes and behaviors from those typically reported by adults and adolescents with binge eating. We therefore investigated a newly proposed diagnostic category based on young children's disordered eating presentation, Loss of Control Eating Disorder (LOC-ED). The Eating Disorder Examination adapted for Children, the Standard Pediatric Eating Episode Interview, and questionnaires to assess psychopathology were administered to 256 non-treatment-seeking youth (age 10.3±1.5y, 52.3% girls). Body fat (kg) was measured using air displacement plethysmography. Using the proposed criteria, we identified youth with LOC-ED (n=7), youth with LOC in the absence of the full disorder (subLOC=33), and youth not reporting the experience of LOC (noLOC=216). No child met criteria for DSM-defined binge eating disorder. After adjustment for age, sex and race, LOC-ED youth had more body fat compared to noLOC youth (p=.02), but not to those in the subLOC group (p=.10). SubLOC and noLOC youth did not differ from each other on measures of body fat. Considering the same covariates and BMI z-score, LOC-ED youth had greater Eating and Shape Concerns than subLOC and noLOC youth (ps≤.05). SubLOC youth also had greater Eating and Shape Concerns than noLOC youth (ps<.001). Those with subLOC self-reported more symptoms of anxiety and depression than noLOC youth (ps≤.02), but did not differ from LOC-ED youth. These data suggest that youth with LOC-ED have greater adiposity and disordered eating attitudes than youth not reporting the experience of LOC, as well as those with LOC in the absence of the full disorder. Further investigation is required to determine the impact of LOC-ED on psychosocial functioning and body weight trajectory.

Introduction

Introductory Overview: Childhood Obesity and Disordered Eating

The past few decades have evidenced a rise in the prevalence of obesity (Ogden et al., 2006) and disordered eating (Stice, 1994) in the United States. Retrospective research from both fields indicates that overweight children are at-risk for the development of disordered eating (Fairburn et al., 1998; Fairburn, Welch, Doll, Davies, & O'Connor, 1997). Further, overweight in childhood is predictive of overweight or obesity into adulthood (Field, Cook, & Gillman, 2005; Whitaker, Wright, Pepe, Seidel, & Dietz, 1997). Consequently, children who are overweight in middle childhood may be at increased risk for both the development of eating disorders and further weight gain with age. Binge eating, a type of disordered eating pattern which includes the experience of loss of control over eating while consuming a large amount of food (American Psychiatric Association, 2000), is more prevalent among overweight adults and adolescents, compared to individuals of normal weight (Wilfley, Wilson, & Agras, 2003). Although the definition of binge eating in childhood is emergent, LOC eating is common among overweight youth, and is associated with eating-related and general psychopathology (Tanofsky-Kraff, Marcus, Yanovski, & Yanovski, 2008). Furthermore, LOC may be an early sign of disinhibited eating, and is linked to weight gain with age (Tanofsky-Kraff et al., 2009). Research indicates that full-syndrome eating disorders do not typically manifest until adolescence (Bruce & Wilfley, 1996). Taken together, these findings suggest that intervening with children who exhibit LOC eating behaviors in middle childhood may be an efficacious way to simultaneously prevent the progression of weight gain and disordered eating patterns. Therefore, Loss of Control Eating Disorder in

Children (LOC-ED) has been proposed to identify youth aged 12 years and younger who exhibit signs of pathological LOC eating (Tanofsky-Kraff, Marcus et al., 2008). The following introductory pages provide a review of the literature to clarify the relationships between obesity and disordered eating, and to substantiate the criteria for LOC-ED.

Obesity in the United States: Current Trends and Correlates

Based on estimates from the 2003-2004 National Health and Nutrition Examination Survey (NHANES), 32.2% of adults are obese (body mass index, weight (kg)/height (m^2); BMI $\geq$ 30 kg/m^2) (Ogden et al., 2006). Of further concern are the physical and financial concomitants of obesity. It has been conservatively estimated that healthcare for weight-related diseases, the most common of which are type II diabetes mellitus, coronary heart disease, cancer, and sleep disturbances (Kopelman, 2000), costs the United States an astounding $75 billion each year (Finkelstein, Fiebelkorn, & Wang, 2004). The negative consequences of obesity are not limited to the medical field. As both overweight and non-overweight people consider weight a matter of personal control (Crandall & Martinez, 1996; Harriss, Washull, & Walters, 1990), overweight adults are more likely to be negatively labeled (i.e. lazy, stupid, worthless) (Teachman B.A., Gapinski K.D., Brownell K.D., Rawlins M., & S., 2003) and commonly experience difficulties in social, work, school, and health-care settings (Puhl & Brownell, 2001).

The literature on the relationship between obesity and general psychopathology in adults is mixed, with some (Bjerkeset, Romundstad, Evans, & Gunnell, 2008; Kasen, Cohen, Chen, & Must, 2008; Simon et al., 2006), but not all (John, Meyer, Rumpf, & Hapke, 2005; Lamertz, Jacobi, Yassouridis, Arnold, & Henkel, 2002) investigations

finding a positive association. A recent large epidemiological study aimed to overcome past research limitations by employing more rigorous assessment methodology. The results from this study found a positive relationship between elevated BMI and general psychological distress, with both overweight and obese adults reporting higher current and lifetime prevalence rates of general psychopathology when compared to non-overweight participants. Further, obese adults reported higher rates than did overweight adults, which suggests that greater body mass is associated with elevated psychopathology. Mood, anxiety, and somatoform disorders were most commonly reported (Baumeister & Harter, 2007). A review of the literature on depression and obesity exclusively also show varied findings (Faith, Matz, & Jorge, 2002). Although most studies indicate a higher degree of clinical and sub-clinical depressive symptoms among overweight and obese individuals (Scott et al., 2007), mixed results suggest that other factors may mediate this relationship.

Indeed, studies suggest that body image distress, rates of which are elevated among overweight and obese adults relative to non-overweight control participants (Sarwer, Thompson, & Cash, 2005; Sarwer, Wadden, & Foster, 1998), may partly explain the relationship between overweight and general psychopathology (Friedman, Reichman, Costanzo, & Musante, 2002). For example, in one study, body-related worrying was the most significant predictor of negative affect (Jansen, Havermans, Nederkoorn, & Roefs, 2008). Cross-sectional investigations yield similar results. In a study with both community and treatment-seeking adults, individuals with negative self-evaluation stemming from weight and shape concerns reported more symptoms of depression and lower self-esteem compared to those without such negative evaluation

(Nauta, Hospers, Jansen, & Kok, 2000). Similarly, a community study of obese and overweight women found that those with high negative affect (e.g., feeling distress, nervous, ashamed, guilty, depressed) reported more eating, weight, and shape concerns, and lower self-esteem, compared to those with low negative affect (Jansen et al., 2008). A comparable study with treatment-seeking overweight and obese men and women investigated depressive symptoms only, and found analogous results (Werrij, Mulkens, Hospers, & Jansen, 2006). In sum, these findings indicate that individuals who are dissatisfied with their size, as evidenced by poor body image and concerns with shape and weight, are more likely to have co-morbid psychological distress. Interestingly, overweight and obese women are more likely than men to report body image concerns (Sarwer et al., 2005) and symptoms of depression (Carpenter, Hasin, Allison, & Faith, 2000; Heo, Pietrobelli, Fontaine, Sirey, & Faith, 2006). Given the emphasis on thinness in the definition of Western beauty, it has been suggested that women may be more susceptible to concerns over shape and weight and subsequent negative feelings (Schwartz & Brownell, 2004).

Binge Eating

Binge eating, which is defined as consuming an objectively large amount of food while experiencing a loss of control over eating (LOC) (American Psychiatric Association, 2000), is the most prevalent type of disordered eating pattern reported by obese adults (de Zwaan, 2001; Tanofsky-Kraff et al., 2003). Binge Eating Disorder (BED), a putative diagnostic category in the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders Text Revision (DSM-IV-TR), is characterized by

recurrent binge eating episodes. BED is more prevalent in the overweight and obese population, ranging from 2.9% among overweight adults in a community sample (Smith, Marcus, Lewis, Fitzgibbon, & Schreiner, 1998), to 29% among adults seeking weight loss treatment (Spitzer et al., 1993). With full-syndrome BED (See Appendix A), binge episodes are marked by at least three of five characteristic features. These include eating much more rapidly than normal, eating until feeling uncomfortably full, eating large amounts of food when not feeling physically hungry, eating alone because of being embarrassed about how much one is eating, and feeling disgusted with oneself, depressed or very guilty after overeating (American Psychiatric Association, 2000). In addition, binge episodes often occur in response to negative affect, and are significantly distressing to the individual. Given the link between negative affect and body image distress, it is not surprising that BED is further associated with a variety of psychosocial difficulties, including mood disorders, low self-esteem, poor social functioning, and complications with weight loss in adults (Wilfley et al., 2003). Most importantly, reports of disordered eating cognitions, psychological distress (Wilfley et al., 2003; Yanovski, Nelson, Dubbert, & Spitzer, 1993) and social difficulties (Spitzer et al., 1993; Wilfley et al., 2003) are elevated among adults with BED, even when compared to overweight and obese adults. These findings indicate that BED is associated with increased eating related and general psychopathology beyond that experienced among the overweight population. In studies of overweight and obese adults, those with high negative affect are more likely to report binge eating (Werrij et al., 2006). Thus, within obese and overweight populations, the literature indicates that binge eating revolves around a confluence of negative affect and increased report of eating, weight, and shape concerns.

Pediatric Obesity: An Overview

Trends within the pediatric population mirror those seen with adults. The most current data show that 16.3% of children and adolescents are estimated to fall in the obese category (BMI ≥95th percentile for age and sex), and 11.3% fall above the 97th percentile, which is associated with the onset of medical comorbidities of obesity (Weiss et al., 2004). Overall, 31.9% of youth are further estimated to be overweight (BMI ≥85th percentile for age and sex) (Ogden, Carroll, & Flegal, 2008). Although the most recent data indicate that the incidence of obesity appears to be leveling off, the past few decades have evidenced a tripling in the prevalence of pediatric overweight (Ogden et al., 2006). Consequently, similar to the adult population, pediatric weight-related health problems have become more prevalent, and increased body fat has been identified as the main causative agent behind the heightened risk of type II diabetes mellitus and cardiovascular disease seen in children and adolescents (Goran, Ball, & Cruz, 2003). Other common health problems associated with childhood obesity include endocrine, pulmonary, and gastrointestinal difficulties, as well as disturbed sleeping patterns (Zametkin, Zoon, Klein, & Munson, 2004).

Similar to obese adults, overweight children experience weight-related stigmatization. Negative attitudes towards overweight shapes are expressed by children as early as pre-school (Wardle, Volz, & Golding, 1995), are present in elementary-school aged children (Schwartz & Puhl, 2003), and have worsened in recent years (Latner & Stunkard, 2003). Research consistently shows that classmates label overweight children as “mean, stupid, ugly, unhappy, and lazy,” and consider a peer’s overweight status as indicative of poor academic and social performance (Schwartz & Puhl, 2003).

Furthermore, overweight youth are victimized for their size, as evidenced by increased report of aggressive acts, such as weight-related teasing and bullying (Storch & Ledley, 2005). Peer victimization of overweight children is also related to decreased interest (Storch et al., 2007) and enjoyment (Faith, Leone, Ayers, Moonseong, & Pietrobelli, 2002) in physical activity, which may further perpetuate weight gain in this population.

Psychosocial Difficulties and Childhood Overweight

Given the negative experiences reported by overweight youth, it is not surprising that overweight children experience a range of psychosocial difficulties. For example, cross-sectional and longitudinal studies show a relationship between elevated weight and low self-esteem and self-worth in children and adolescents (Allen, Byrne, Blair, & Davis, 2006; Braet, Mervielde, & Vandereycken, 1997; Stradmeijer, Bosch, Koops, & Seidel, 2000; Strauss, 2000; Zametkin et al., 2004). There is also evidence for heightened symptoms of depression (Erikson, Robinson, Haydel, & Killen, 2000; Schwartz & Puhl, 2003) and anxiety (Storch et al., 2007; Warschburger, 2005). Further, overweight children and adolescents report lower social acceptance (Stradmeijer et al., 2000), more social anxiety (Warschburger, 2005), and loneliness due to victimizing experiences (Storch & Ledley, 2005). A four-year longitudinal study showed that obese children between the ages of 9-10 years who reported lower self-esteem across time were more likely to begin problem behaviors, such as smoking and drinking four years later (Strauss, 2000). It has been suggested that elevated rates of externalizing behaviors among overweight children (Stradmeijer et al., 2000; Tanofsky-Kraff et al., 2004) may serve as a means of handling weight-based stigmatization (Storch et al., 2007).

Further, cross-sectional studies with youth ranging from ages 7-16 years reliably show increased reports of body dissatisfaction and weight, shape, and eating concerns, among overweight compared to normal-weight children (Allen et al., 2006; Burrows & Cooper, 2002; Stradmeijer et al., 2000). Body dissatisfaction may be further indicated through evidence of dietary restraint (Tanofsky-Kraff, Faden, Yanovski, Wilfley, & Yanovski, 2005) and attempts at weight loss (Field et al., 1999). Similar to adults, research with children shows that concern over weight and shape may mediate the relationship between elevated BMI and psychological distress. In a sample of obese, overweight, and non overweight children aged 7-13 years, regardless of weight status, children who reported heightened shape and weight concerns also had more symptoms of depression, lower levels of general and appearance-specific self-esteem, and higher body dissatisfaction than youth without high shape and weight concerns (Allen et al., 2006). Further, this same study also found that weight concerns fully mediated the relationship between BMI and depression, self-esteem, and appearance self-esteem, and partially mediated the relationship between BMI and body dissatisfaction. Similarly, with a sample of third grade students, Erikson and colleagues (Erikson et al., 2000) found that for overweight girls, weight concerns explained the relationship between elevated BMI and depression. Taken together, these studies indicate that, like overweight adults, not all overweight youth experience psychological distress. Rather, it is the youth who experience core symptoms of disordered eating, including increased dietary restraint and concerns over weight, shape, and eating that may be the most likely to exhibit co-morbid general psychopathology and problem behaviors.

Bridging Overweight and the Development of Disordered Eating

It has been suggested that social pressures to be thin may place overweight youth at increased risk for the development of disordered eating habits and cognitions (Neumark-Sztainer, 2005). Although there are no prospective, longitudinal studies to date that examine the emergence of full-syndrome eating disorders among children, research with both younger and older adolescents implicate increased concerns with body image and negative affect in the emergence of disordered eating patterns. For example, in a large epidemiological study of middle and high school students, thin body preoccupation, which includes concerns over eating, weight, and shape, was predictive of the development of full and subthreshold eating disorders across a three year time span (The McKnight Investigators, 2003). Similar constructs have been also identified in the initial onset of disordered eating symptoms. “Weight concerns,” a broad term including concerns over eating, weight, and shape, predicted the onset of bulimic symptoms among ninth grade girls (Killen et al., 1996) as well as binge eating behaviors in a five-year longitudinal study of middle and high school students (Neumark-Sztainer et al., 2007). Similarly, body dissatisfaction and negative affect predicted the emergence (Stice & Agras, 1998) and maintenance (Cooley & Toray, 2001; Wichstrom, 2000) of disordered eating behaviors in early and late adolescence. Other studies highlight the role of peer relationships in the development of disordered eating. Across samples of both elementary and middle school students, self-report of weight concerns was positively associated with weight-related teasing and was most strongly predicted by the importance peers put on weight and eating (Stice, Presnell, & Spangler, 2002; Taylor et al., 1998). Further, in a sample of girls aged 13-17, low perceived social support from peers was predictive of

binge eating onset (Stice et al., 2002). In sum, these findings indicate that negative attitudes about body weight and shape, difficulties with peers, and negative affect are related to the onset and maintenance of full and sub-threshold disordered eating behaviors among adolescents.

Retrospective studies with adults with BED and bulimia nervosa corroborate adolescent research by implicating similar factors in the emergence of disordered eating patterns (Fairburn et al., 1998; Fairburn et al., 1997). Compared to non-disordered eating adults, those with eating disorders recall being heavier as children and report more exposure to negative self-evaluation, depression, and conduct problems before the onset of their eating disorder. They also experienced more critical comments and teasing about shape, weight, or appearance. Further, recall of critical comments from family members about weight, shape, and appearance remained heightened when BED participants were compared to adults with psychiatric controls. This finding indicates that although some individual risk factors for the development of psychopathology may be shared (i.e., negative self-evaluation or history of depression) (Fairburn et al., 1997), negative body-related comments in childhood may have particular relevance to the development of disordered eating (Fairburn et al., 1998).

In sum, compared to normal weight youth, overweight children and adolescents are more likely to exhibit increased correlates of disordered eating, including dieting behaviors and increased psychological distress related to eating, weight, and shape concerns. The research implicating body concerns as a mediator in the relationship between elevated BMI and psychological distress further indicates that concern over shape and weight may be a key factor related to future disordered eating and

psychological distress in overweight children. The literature also highlights the importance of peer evaluation in influencing body image and concerns over weight. Elevated psychosocial difficulties and weight-related teasing experienced by overweight youth, in addition to elevated concern over weight and appearance, may explain why overweight children are at increased-risk for the development of disordered eating.

Binge Eating in Adolescence and Childhood

There is evidence that the prevalence of BED in adolescence is less common than among adults, as prevalence rates among obese, treatment seeking youth range from only 1-6% (Decaluwé & Braet, 2003; Glasofer et al., 2007), as compared to 30% in analogous adult samples (Spitzer et al., 1993). However, Glasofer and colleagues found that, similar to adults, obese treatment-seeking adolescents who met criteria for BED reported heightened levels of eating, weight, and shape concerns, as well as increased symptoms of anxiety and depression compared to those who did not (Glasofer et al., 2007). Sub-threshold binge eating in adolescence is more prevalent, ranging from approximately 20% in community samples (Johnson, Rohan, & Kirk, 2002) to 36.5% in obese adolescents seeking weight-loss treatment (Decaluwé & Braet, 2003). Further, similar to adults and adolescents with full-syndrome BED, studies indicate that adolescent sub-threshold binge eating is associated with increased levels of eating, weight, and shape concerns (Decaluwé & Braet, 2003; Glasofer et al., 2007), symptoms of depression (Berkowitz, Stunkard, & Stallings, 1993) and anxiety (Glasofer et al., 2007), low self-esteem (Decaluwé & Braet, 2003), and parent report of internalizing and externalizing behaviors (Glasofer et al., 2007). In adolescence, the frequency of binge episodes is

positively related to level of psychological distress (Glasofer et al., 2007), which further substantiates the association between binge eating and heightened psychopathology.

Binge eating behaviors are also more common among overweight and obese children, compared to non-overweight youth (Tanofsky-Kraff et al., 2004). The first study of this nature found that 17.9% of overweight children aged 6-10 years experienced at least one binge eating episode in the six months prior to assessment, and 5.3% met criteria for BED (Morgan et al., 2002). However, since this study used a self-assessment questionnaire for the diagnosis of BED, this rate is likely an overestimation. In studies using more rigorous interview methodology, rates of binge eating ranged from 6.2% in a sample of overweight and non-overweight, non-weight-loss treatment seeking children aged 6-13 years (Tanofsky-Kraff et al., 2004) to 36% among overweight, treatment-seeking children between the ages of 6-12y (Tzischinsky & Latzer, 2006). In studies including both overweight and obese children and adolescents (10-16y), the prevalence of binge eating ranged from 10.2-36.5% (Decaluwé & Braet, 2003; Decaluwé, Braet, & Fairburn, 2003; Goossens, Braet, & Decaluwé, 2007), with the highest reports among inpatient treatment seekers (Decaluwé et al., 2003). Results from these studies indicate that, similar to adults and adolescents with BED, children who binge eat experience heightened general psychopathology, as well as more eating- and weight-related concerns. To date, only two other studies have assessed the prevalence of BED in childhood using interview methodology. Tanofsky-Kraff and colleagues identified no cases of BED in a sample of non-treatment seeking normal weight and overweight youth (Tanofsky-Kraff et al., 2004). In an obese treatment-seeking sample of combined children

and adolescents (10-16y), the prevalence was still minimal, at only 1% (Goossens et al., 2007).

Assessing Binge Eating in Childhood

Difficulties identifying and assessing disordered eating patterns in youth may partly explain the discrepancy between the prevalence of binge eating in children and the diagnosis of BED. In recent years, research has shown that the traditional methods used to assess eating behaviors in youth, namely self-assessment measures and parent report, may not adequately reflect the nature of children's eating behaviors. More specifically, on self-report assessments, youth may not fully comprehend the term "binge eating" (Johnson, Grieve, Adams, & Sandy, 1999). Discrepancies between answers on children's report of eating habits on self-assessment questionnaire versus clinical interview confirm this finding, and suggest that children may also not understand the term "loss of control," to correctly report binge eating behaviors (Tanofsky-Kraff et al., 2003). Further, studies comparing child and parent report on eating questionnaires have found low concurrence regarding type and frequency of disordered eating behaviors, indicating that parents may not be fully aware of their child's disordered eating patterns (Johnson et al., 1999; Steinberg et al., 2004; Tanofsky-Kraff, Yanovski, & Yanovski, 2005).

Specific attention has been given to the utility of the Eating Disorder Examination (Fairburn & Cooper, 1993) adapted for children (ChEDE) (Bryant-Waugh, Cooper, Taylor, & Lask, 1996) for assessing binge eating during childhood (Decaluwé & Braet, 2003; Eddy et al., 2007; Tanofsky-Kraff et al., 2004). The ChEDE is an improvement over past assessment techniques in that it queries in greater detail about the experience of

LOC and binge eating behaviors, and uses language adapted for children. The ChEDE also differentiates between a subjective binge episode (SBE), which occurs when an individual experiences LOC over eating, but does not consume a large amount of food (but views the amount of food as excessive), and an objective binge episode (OBE), which occurs when an individual experiences LOC over eating while also consuming a large amount of food. Given the varying nutritional needs at different stages of childhood growth (Kroke et al., 2004), as well as the differing caloric requirements from various physical activities (Hill, Melby, Johnson, & Peters, 1995), researchers have had difficulty in determining what constitutes an unambiguously large amount of food for children's binge episodes. Therefore, while the ChEDE is an improvement over past assessment techniques, there remains some ambiguity over how to best define binge eating in childhood.

However, research with adults and children indicates that the experience of LOC, rather than the amount of food consumed, may be more important in characterizing disordered overeating episodes. For example, Pratt and colleagues found no difference in body weight or psychopathology between adults experiencing OBEs versus SBEs (Pratt, Niego, & Agras, 1998). Furthermore, adult women with BED reported the experience of LOC, rather than the amount of food consumed, as more crucial to defining a binge episode (Johnson, Carr-Nangle, Nangle, Antony, & Zayfert, 1997). The importance of LOC is further corroborated in research with children. Most studies involving middle childhood samples show no significant differences in disordered eating attitudes, symptoms of general psychopathology, or BMI, between children experiencing OBEs and SBEs (Goossens et al., 2007; Morgan et al., 2002; Tanofsky-Kraff et al., 2004). It has

further been suggested that LOC is the most critical component in defining binge episodes during childhood since, unlike adolescents and adults, children simply may not have access to a large amounts of food (Goossens et al., 2007).

Loss of Control Eating in Childhood

As the concept of LOC eating has gained increasing attention in recent years, investigators have specifically examined this construct in children. In a study of both overweight and normal weight children ages 6-13 years, LOC was reported by 9.4% of the sample (Tanofsky-Kraff et al., 2004). Prevalence rates among overweight and obese children are considerably higher, ranging from 15%-29.5% (Levine, Ringham, Kalarchian, Wisniewski, & Marcus, 2006; Morgan et al., 2002; Tanofsky-Kraff, Faden et al., 2005). Children who experience LOC eating are similar to individuals with BED in that they report increased depressive symptoms (Morgan et al., 2002; Tanofsky-Kraff, Faden et al., 2005), more dietary restraint, higher eating, weight, and shape concerns (Tanofsky-Kraff, Faden et al., 2005; Tanofsky-Kraff et al., 2004), and increased negative affect (Tanofsky-Kraff, Theim et al., 2007), when compared to both non-overweight peers and overweight peers who do not experience LOC eating. In light of these findings, there is general agreement among researchers in the field that the experience of LOC, not the amount of food consumed during a binge episode, is the most salient factor in defining pathological overeating in children (Marcus & Kalarchian, 2003; Tanofsky-Kraff, Marcus et al., 2008).

Binge and LOC Eating and Obesity

There is further evidence that binge and LOC eating are not only associated with overweight, but may also play a causal role in weight gain over time. For example, a five-year longitudinal study of eating-disordered women found that those with a diagnosis of BED at baseline remained the heaviest over time compared to women with bulimia nervosa (Fairburn, Cooper, Doll, Norman, & O'Connor, 2000). In addition, in a retrospective study with adults with BED, Reas and Grilo found that for 16% of their sample, binge eating began when individuals were of normal weight, but was associated with later onset of overweight (Reas & Grilo, 2007). Studies with younger populations show analogous trends. Among female adolescents, binge eating was predictive of weight gain (Stice, Cameron, Killen, Hayward, & Taylor, 1999) and the onset of obesity (Stice et al., 2002). Further, longitudinal studies of children at risk for overweight, by virtue of their current body weight or by having at least one overweight parent, have found that baseline report of both binge and LOC eating were predictive of increased body fat mass over time (Tanofsky-Kraff et al., 2006; Tanofsky-Kraff et al., 2009). Similarly, in a study of both normal and overweight children and adolescents, Field et al. found that, for boys, binge eating predicted future weight gain (Field et al., 2003). In all of these cohorts, binge eaters were also more likely to report dieting behaviors. It has been suggested that one possible explanation for weight gain among some individuals who diet are the repetitive bouts of binge eating that often occur between periods of restriction (Field et al., 2003).

Behavioral correlates associated with binge and LOC eating may further elucidate the relationship between disordered overeating and weight gain with age. Binge eating is often associated with eating when not hungry, which has been described in more recent

years as eating in the absence of hunger (EAH). EAH encompasses both eating in response to an external cue or to an emotion (Van Strien, Schippers, & Cox, 1995). EAH is associated with overweight in boys (Faith et al., 2006) and in girls (Fisher et al., 2007; Moens & Braet, 2007), and appears to persist over time (Shunk & Birch, 2004). In addition, even after taking into account potential increased energy needs from extra body weight, overweight children continue to eat in excess of what their body requires, which may partly explain why overweight children increasingly gain weight with age (Fisher et al., 2007).

Emotional Eating is described as "eating in response to a range of negative emotions such as anxiety, depression, anger, and loneliness, to cope with negative affect" (Faith, Allison, & Geliebter, 1997). Eating in response to negative emotion is commonly reported by adults with BED (Eldredge & Agras, 1996; Greeno, Wing, & Shiffman, 2000; Kenardy, Arnow, & Agras, 1996; Masheb & Grilo, 2006), and is also prevalent among children who report LOC eating (Goossens et al., 2007; Shapiro et al., 2007; Tanofsky-Kraff, Theim et al., 2007). In one study, overweight youth reported significantly greater EAH in response to negative affect, but not in response to external cues, relative to non-overweight youth. However, youth with LOC reported greater eating in response to both negative emotion and external cues relative to youth without LOC (Tanofsky-Kraff, Ranzenhofer et al., 2008). This finding suggests that the combination of increased eating to external cues and to negative emotions may explain why children with LOC are more susceptible to increased weight gain in comparison to non-overweight children, as well as to overweight children without LOC.

Regardless of the direction of association between overweight and binge eating, research suggests that the two are inextricably linked. In addition to body- and weight-related concerns, overweight children report experiencing negative affect (Schwartz & Puhl, 2003; Storch et al., 2007), difficulties with peer interaction (Storch et al., 2007), and decreased self-esteem (Storch & Ledley, 2005; Strauss, 2000). They are also more likely to report eating in response to cues other than hunger, including emotional eating. Taken together, these findings suggest that overweight children, especially those who experience LOC, may use food as an ineffective mechanism to cope with negative feelings associated with peer rejection and weight-related distress.

Theoretical Explanations of Binge Eating

Indeed, recent adult theory does implicate inadequate coping skills and negative affect in the initiation of binge eating behaviors (Stice, 1994). However, binge eating has traditionally been explained by Restraint Theory (Polivy & Herman, 1985), which posits that cognitive preoccupation with food and eating, in combination with caloric deprivation from restrained eating (i.e. dieting) leads to binge eating. After a binge, in an effort to compensate, the individual reverts to a dieting mentality, restarting the diet-binge cycle. Although retrospective studies with adults have reliably found that restraint appears to play a role in the development and maintenance of binge eating in some individuals, between 33-55% of adults retrospectively recall binge eating behaviors preceding dieting behaviors (Grilo & Masheb, 2000; Marcus & Kalarchian, 2003; Marcus, Moulton, & Greeno, 1995; Spurrell, Wilfley, Tanofsky, & Brownell, 1997), which suggests that there are multiple pathways toward the development of disordered

eating. Studies investigating the temporal onset of dieting and binge eating in children have found similar results. More specifically, based on parent and self-reports of obese youth with disordered eating, 19% of children reported the onset of binge eating before dieting (Claus, Braet, & Decaluwé, 2006). Further, 45% of these youth reported no dieting history. Similarly, a study of LOC eating in youth found that some children who experience LOC never diet, and for those children who do, dieting does not always precede LOC eating behaviors (Tanofsky-Kraff, Faden et al., 2005). In addition, although overweight children and adolescents report restricting their intake, some studies have found that those without LOC eating do not differ significantly from those with LOC eating on interview assessment of restraint (Eddy et al., 2007; Glasofer et al., 2007). These data indicate that factors other than restraint over eating may be more prominent in contributing to binge eating in both adults and children.

Given the prevalence of anxiety and mood disorders among individuals who binge eat, and the relationship between negative emotion and binge eating episodes, other theorists have emphasized the role of negative affect. According to Escape Theory (Heatherton & Baumeister, 1991), individuals who binge eat have unattainably high standards which they inevitably fail to meet, leading to a negative view of the self and feelings of inadequacy. These feelings manifest as negative affective states, such as depression and anxiety. To avoid these aversive feelings, the individual shifts from a high level of self-awareness to a low level of self-awareness and focuses on an immediate cue: food. Disinhibition occurs at this low level of self-awareness, and a binge episode ensues.

Stice (Stice, 1994) further expounded on previous theories to include societal influences in his Dual-Pathway Model. In a sense, the Dual-Pathway Model is a blending

of Restraint Theory and Escape Theory in that it includes both a restraint (dietary restriction), as well as an affect-regulation pathway to binge eating (Stice, Agras, & Hammer, 1999). Stice's theory incorporates the work of McCarthy (McCarthy, 1990), who proposed that body dissatisfaction and an inability to change one's body leads to feelings of helplessness and depression in women. Stice suggests that internalization of an unattainable "thin ideal" (McCarthy, 1990) promoted by the culture results in body dissatisfaction, especially in women who are overweight. Dieting ensues as an attempt to lose weight to meet the cultural ideal of thinness. Both dieting and negative feelings about self-image lead to negative affect. Binge eating results as an attempt to avoid negative emotion from dieting and body image distress (affect regulation pathway), as well as from a physiological need for food from caloric deprivation (restraint pathway).

Interpersonal theory proposes that the quality of an individual's interactions with others either enhances or impairs one's psychological state (Sullivan, 1953). Given the associations between overweight, depression, social difficulties, and binge eating (Wilfley et al., 2003), Wilfley and colleagues suggested that binge eating occurs in response to feelings of low self-esteem and negative affect resulting from problems with social functioning (Wilfley, Pike, & Striegel-Moore, 1997). In treatment trials, IPT has been successful in the treatment of binge eating in adults, which supports the application of interpersonal theory to BED (Wilfley et al., 1993; Wilfley et al., 2002). Similar to adults with BED, overweight youth experience significant social problems, which may result in negative affective states. Taken together, these findings suggest that interpersonal difficulties may play an important role in LOC eating for adults and children, alike.

Emotion Regulation and Affectivity

Research conducted by Eisenberg and colleagues on emotion regulation and affective states may explain why some children are more vulnerable than others to LOC eating patterns. Emotion regulation is defined as the ability to "inhibit, enhance, maintain, and modulate emotional arousal to accomplish one's goals" (Eisenberg et al., 1997), pg. 642). Examples of effective emotion regulation skills include cognitive restructuring and shifting attention when necessary. Eisenberg and colleagues have found that children who experience high, strong levels of negative emotion, with low abilities to self-regulate and effectively cope, are more likely to exhibit maladaptive external behaviors (Eisenberg, Guthrie et al., 2000). These children are also more apt to have decreased social competency at school over time (Eisenberg, Fabes, Guthrie, & Reiser, 2000; Eisenberg et al., 1997), which may lead to additional negative affect and externalizing behaviors with age. Eisenberg and colleagues further suggest that although some children experience negative emotions more strongly than others, the ability to regulate emotion moderates the relationship between negative affect and negative outcome. In other words, it is the child's ability to effectively regulate negative emotional states, not the actual experience of negative emotion that is related to the development of disturbed behavior (Eisenberg, Guthrie et al., 2000) and poor social functioning (Eisenberg et al., 1997).

Although many children experience social difficulties, peer teasing, and weight stigmatization, not all develop disordered eating behaviors. Perhaps children who strongly experience negative feelings, without effective emotion regulation abilities, are more affected by difficult peer interactions and perceived societal pressures to be thin (Tanofsky-Kraff, Goossens et al., 2007). As adult theories suggest, binge eating is

conceptualized as a coping mechanism for negative affective states resulting from body image concerns (Stice, Cameron et al., 1999) and difficulties with interpersonal relationships (Wilfley et al., 1997). It is possible that LOC eating may be one ineffective behavioral manifestation in children who experience intense and frequent feelings of negative affect without effective regulation abilities. This notion is evidenced, in part, by one study conducted with girls aged 11-15 years, which showed that higher disordered eating attitudes were associated with increased negative affect, more difficulty recognizing emotion, and less constructive coping with negative emotion (Sim & Zeman, 2006).

Disordered Eating: Importance of Early Detection

It has been clearly established that youth in middle childhood experience binge and LOC eating behaviors (Tanofsky-Kraff, 2008). Intervention efforts may prove beneficial as studies with adults indicate that early-onset of binge eating symptoms can be associated with poorer prognosis. As previously addressed, there is evidence for two pathways toward the development of binge eating, one in which dieting precedes binge eating, and another, in which binge eating precedes dieting behaviors (Abbott et al., 1998; Reas & Grilo, 2007; Spurrell et al., 1997; Tanofsky-Kraff, Faden et al., 2005). Retrospective studies with adults indicate that the group for which binge eating occurs first may suffer from greater eating-related pathology. For example, adults who binged before they dieted reported experiencing their first binge between ages 11 and 13 years, whereas those who dieted before binging report binge eating onset in the mid to late twenties (Abbott et al., 1998; Grilo & Masheb, 2000; Safer, Lively, Telch, & Agras,

2002; Spurrell et al., 1997). The same pattern holds for the onset of BED, where adults with BED who reported binge eating first were initially diagnosed in late adolescence, whereas those who dieted first were diagnosed in their mid-twenties or early thirties (Grilo & Masheb, 2000; Reas & Grilo, 2007; Spurrell et al., 1997). Early onset of binge eating is also associated with greater prevalence of lifetime psychiatric disorders (Spurrell et al., 1997) and earlier onset of overweight (Grilo & Masheb, 2000; Spurrell et al., 1997). Further, early onset binge eating is predictive of poor treatment outcome (Agras et al., 1995) and is associated with a higher relapse rate post-treatment for BED (Safer et al., 2002). In sum, retrospective studies of adults with BED indicate that early onset of binge eating behaviors is related to greater pathology later in life. Although no studies have prospectively examined youth with LOC to see how symptoms progress with time, there is evidence that problem eating behaviors in childhood and adolescence persist over time, and are related to later onset of full-syndrome eating disorders in adulthood (Kotler, Cohen, Davies, Pine, & Walsh, 2001). For this reason, early identification of pathological overeating behaviors and intervention with youth who exhibit such patterns may be an efficacious prevention technique.

Revising Criterion for Applicability to Children

Early recognition of disordered eating behaviors in children requires accurate identification of symptom manifestation. Among all age groups, definitively meeting criteria for an eating disorder is difficult, as between 40-60% of both children (Nicholls, Chater, & Lask, 2000) and adults (Turner & Bryant-Waugh, 2004) who present with eating-related disturbances are given the diagnosis of Eating Disorder Not Otherwise

Specified (ED-NOS; (American Psychiatric Association, 2000). Among adults and adolescents, most individuals given the diagnosis of ED-NOS show traits similar to one of the primary eating disorders (anorexia nervosa and bulimia nervosa) and BED (Workgroup for the Classification of Eating Disorders in Children and Adolescents (WCEDCA), 2007). Yet, there is empirical evidence that researchers tend to study what is defined (Grilo, Devlin, Cachelin, & Yanovski, 1997). As the two current diagnostic categories (anorexia and bulimia nervosa) cover such a narrow proportion of individuals with disordered eating, limiting studies to individuals who meet strict diagnostic criteria as set forth by the DSM-IV may hinder future research initiatives (Wilfley, Bishop, Wilson, & Agras, 2007).

In addition to current considerations of diagnostic categories within the DSM-IV-TR, there are further issues specific to children. Diagnosing children is especially challenging as the capabilities for advanced comprehension of emotion and factors contributing to emotional experience are developing into adolescence (Workgroup for the Classification of Eating Disorders in Children and Adolescents (WCEDCA), 2007). These cognitive and emotional limitations further complicate clear diagnosis of disturbed eating in youth. Children may not be able to fully recognize or describe eating-related cognitions, or label the associations between emotion, regulation, and eating behaviors. Considering these difficulties, researchers in other areas have revised adult diagnostic criteria to make it more appropriately suited for conducting research with children (Luby et al., 2002; Scheeringa, Peebles, Cook, & Zeanah, 2001; Scheeringa, Zeanah, Drell, & Larrieu, 1995). Specific to disordered eating, revised criteria for

anorexia nervosa and bulimia nervosa has proven useful for research investigations and clinical treatment of children (Bryant-Waugh & Lask, 1995).

Revised Criteria for BED in Children

The prevalence of LOC eating behaviors in children, with a relative lack of full-syndrome BED diagnosis, suggests that a diagnostic revision for binge eating specific to children is warranted. In 2003, Marcus and Kalarchian proposed provisional research criteria for BED adapted for children (Marcus & Kalarchian, 2003), See Appendix B). Given the relevance of LOC to children's overeating episodes, they suggested that LOC eating, irrespective of the size of the binge, is a more reliable indicator of pathological overeating in children. Further, based upon evidence that EAH can be detected as early as age five in girls (Carper, Fisher, & Birch, 2000; Shunk & Birch, 2004), shows temporal stability, and may be indicative of disinhibited eating (Fisher & Birch, 2002; Shunk & Birch, 2004), the revised criteria emphasized food seeking in the absence of hunger as another primary characteristic of children's binge episodes. Based on other available research (Carper et al., 2000; Stice, Agras et al., 1999), associated features included eating in response to negative affect, food seeking as a reward, or sneaking/hiding food. In the provisional criteria, one of the three associated features was required for a diagnosis. Shapiro and colleagues conducted a pilot study using the revised criteria in a group of weight-loss treatment-seeking overweight children, and found a 29% prevalence rate of BED in this sample (Shapiro et al., 2007). Although this prevalence may be slightly elevated since the investigators did not use a frequency criterion to diagnose BED, analogous rates have been found among obese treatment-seeking adults (Spitzer et

al., 1993). This similarity provides preliminary support for the effectiveness of using revised criteria emphasizing the experience of LOC, regardless of the amount of food consumed, as an improved marker of pathological overeating in children.

Characteristics of Binge and LOC Eating Episodes

Although Marcus and Kalarchian's criteria provided a framework to assess pathological overeating in children, their criteria were limited in that they were created at a time when there was a lack of research specifically examining the features of children's binge eating episodes. Among adults with BED, binge episodes are characterized by eating in the absence of hunger, eating more quickly than usual, eating until overly full, experiencing negative emotion before and after eating, and eating in secret (American Psychiatric Association, 2000). Dissociation, or alexythymia, during or after eating is further experienced by some individuals (American Psychiatric Association, 2000), See Appendix A). A multi-site investigation of binge eating behaviors in youth indicated that adolescents' LOC episodes are similar to binge eating episodes as described by the DSM-IV-TR (Tanofsky-Kraff, Goossens et al., 2007). Specifically, a hierarchical cluster analysis identified a subset of adolescents, primarily overweight, Caucasian females, most of whom experienced at least one LOC eating episode in the past month. Forty-seven percent of these participants met full or subthreshold frequency criteria for BED (defined as at least four OBEs or eight SBEs per month), compared to a 6% prevalence within the overall sample. This cluster of adolescents also had more disordered eating pathology, as evidenced by higher reports of eating concerns, shape concerns, and global scores on the ChEDE, as compared to the rest of the sample. LOC episodes for the disordered eating cluster were comparable to those of adults with BED. Specifically,

episodes were characterized by eating in the absence of hunger, eating in response to a negative emotion or trigger, eating in secret, feeling negative emotion (i.e. guilt and/or shame) before and after eating, and a sense of "numbing" while eating. When children (8-12y) and adolescents (13-18y) were separated, children endorsed less of the qualitative probes compared to the overall sample. However, a separate hierarchical cluster analysis with children only (≤12y) revealed a somewhat modified disordered eating cluster. Similar to the adolescent cluster, the younger group reported LOC and eating in the absence of hunger. The child cluster also ate in response to negative affect, experienced an emotional trigger before the episode, felt a negative emotion before and after the eating episode, and reported eating in secret and feeling "numb" while eating. Interestingly, while nearly half of the full-sample disordered eating cluster met criteria for full or sub-threshold BED, only 13% of the younger disordered eating cluster met criteria. Further, unlike the adolescent cluster, children reported eating quickly and consuming more than others. They were also more likely to experience LOC in the afternoon, at a home other than their own. It is possible that LOC patterns may be better established in adolescence, but only emerging in childhood. For this reason, children may experience LOC episodes less frequently than adolescents. Further, episodes may be more likely to occur in a novel setting, when normative eating regulations present in the home environment are absent. In sum, there appear to be characteristic features of LOC eating unique to middle childhood.

Loss of Control Eating Disorder

Building upon Marcus and Kalarchian's criteria (Marcus & Kalarchian, 2003) with data obtained from the multi-site study (Tanofsky-Kraff, Goossens et al., 2007), Tanofsky-Kraff and colleagues proposed new research criteria for pathological overeating in children (Tanofsky-Kraff, Marcus et al., 2008). The revised diagnosis is termed Loss of Control Eating Disorder (LOC-ED) in children aged 6-12 years (See Appendix C), to emphasize the importance of LOC in characterizing problematic eating patterns in youth and to avoid re-defining the term "binge." Similar to Marcus and Kalarchian's initial criteria, the revised criteria include the experience of LOC and eating in the absence of hunger as the primary features of LOC episodes. However, based on the contextual factors specific to LOC eating episodes reported by the younger children's "disordered eating" cluster identified in the multi-site study, Tanofsky-Kraff and colleagues increased the associated features of LOC episodes from three to five. Similar to the adult criteria for BED, characteristics of binge episodes include eating in response to negative affect, feeling secrecy regarding the episode, and feeling a negative emotion, such as shame or guilt, after eating. Further, as children often endorsed the perception of eating more than others and experiencing feelings of numbness or lack of awareness while eating, these features were also included as characteristics of LOC episodes in the revised criteria. As children rarely meet the BED frequency criterion of two episodes per week over the course of at least three months, the revised criterion require only two LOC episodes per month. While the revised frequency criterion is broader than that required for a diagnosis of BED, as most studies to date have classified LOC eating during youth based on one episode per month, they provide a more conservative criterion for characterizing pathological LOC eating specific to middle childhood.

Purpose and Rationale

As evidenced by the growing proportion of disordered eating habits and overweight in youth, preventative efforts are necessary. Given the relationship between eating disorders and overweight (Fairburn et al., 1998; Fairburn et al., 1997), joint research and preventative efforts for eating disorders and obesity have been recommended (Neumark-Sztainer, 2005; Yanovski, 2003). Although there are psychological and physical consequences associated with LOC eating, many children who experience LOC do not meet full criteria for BED. Nevertheless, these children may represent a specific subset of the overweight population who are at increased risk for both weight gain and further disordered eating. As previously discussed, early-onset of binge eating is associated with a poorer prognosis and weight gain in adulthood. Since full-syndrome BED typically does not manifest before late adolescence (Bruce & Wilfley, 1996), early, accurate identification of disordered overeating patterns in childhood, such as LOC eating and its correlates, may mitigate the development of full-syndrome BED, as well as associated obesity in adulthood. In addition, by identifying children who exhibit pathological LOC eating behaviors, a specific diagnosis other than ED-NOS may initiate further research to inform prevention and treatment efforts.

Aims and Hypotheses

This study aims to identify whether the criteria for LOC-ED successfully differentiate between children with and without pathological LOC eating. A review of the literature indicates that LOC eating, across adult, adolescent, and child samples, is associated with increased disordered eating habits and cognitions, as well as higher levels

of general psychopathology. Further, similar to the adult population, disinhibited eating is related to overweight in youth. These relationships are most pronounced in individuals with greater levels disordered eating (Glasofer et al., 2007; Wilfley et al., 2003). Based on the data similar to adults and adolescents with BED, it is hypothesized that youth with LOC-ED will report increased disordered eating cognitions and exhibit higher measures of BMI and fat mass, compared to those without LOC, and to children who experience LOC, but do not meet the provisionary diagnosis. Further, given the prevalence of co-morbid psychological distress among individuals who binge eat, as well as the relationship between overweight, negative affect, and body-image concerns, youth with LOC-ED are expected to report more symptoms of depression and anxiety and to exhibit more internalizing and externalizing problem behaviors, based on parent report, compared to youth without LOC-ED. Research also indicates that LOC eating in youth is associated with eating in the absence of hunger and emotional eating (Tanofsky-Kraff, Ranzenhofer et al., 2008; Tanofsky-Kraff, Theim et al., 2007). As binge eating is proposed to serve as a coping mechanism for negative affect (Stice, 1994), report of emotional eating and eating in the absence of hunger should be elevated among youth with LOC-ED, similar to adults and adolescents with BED. If these criteria effectively identify children with greater adverse psychological and physical correlates, they may present a valuable construct to identify children who display early signs of pathological overeating, and are at a particularly high risk for future weight gain and potentially the development of full-syndrome disordered eating.

Specific Aims and Hypotheses

Specific Aim I: To assess if the proposed criteria identify children with increased symptoms of disordered eating.

Hypothesis I: Children with LOC-ED will report elevated scores on the ChEDE subscales, the child version of the Eating Disorders Inventory, the Emotional Eating Scale for Children, and the Eating in the Absence of Hunger Questionnaire for Children, compared to children with sub-threshold LOC. Children without LOC will report the lowest ratings on these measures.

Specific Aim II: To assess if the proposed criteria identify children with elevated weight and fat mass.

Hypothesis II: Children with LOC-ED will exhibit higher BMI z-scores and greater body fat mass than children with sub-threshold LOC. Children without LOC will have the lowest BMI z-scores and least body fat mass.

Specific Aim III: To assess if the proposed criteria identify children with higher general psychopathology.

Hypothesis III: Children with LOC-ED will report lower psychological functioning as evidenced by higher scores on the Children's Depression Inventory, the trait scale of the State Trait Anxiety Inventory for Children, and the Internalizing and Externalizing scales of the Child Behavior Checklist, compared to children with sub-threshold LOC. Children without LOC will show the highest levels of psychological functioning.

Methods

Participants

Participants were 256 children aged 6-12 years participating in ongoing non-intervention studies in the Unit of Growth and Obesity at the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD), National Institutes of Health (NIH). One study investigated youth at-risk for overweight. Participants for this study were recruited through flyers mailed to doctors and to parents of children at local schools. Advertisements were also posted in the local newspapers. All recruitment efforts advertised a study for children who were either overweight, or had at least one overweight parent. To participate, participants were required to be at increased risk for overweight in adulthood due to their own overweight (BMI for age and sex of 95th percentile) or their parents' overweight (BMI of >25 kg/m²). The second study investigated eating behaviors of both overweight and non-overweight youth. Participants in this study were recruited from youth participating in other on-going studies, as well as from newspaper advertisements and flyers mailed to physicians' offices advertising a study on children's eating behavior. Participants were required to have negative urine glucose and normal electrolytes, hepatic, and thyroid function in order to participate. Children were excluded from this study if they had any major medical problem likely to affect caloric intake and/or body weight, history of an eating disorder other than BED, or a weight change of >5 lbs. within three months prior to the study. Children were further excluded if they were pregnant or had a diagnosed psychiatric disorder that would impact adherence to protocol, or were taking any medication likely to affect caloric intake and/or body weight. The third study from which participants were drawn was a pilot study for the prevention study for excessive weight gain. Participants were recruited through

referrals from area doctors offices, advertisements in local newspapers, and flyers posted at the NIH, USUHS, and local facilities. Flyers were also posted on free online services and local news stations, and on online local middle and high school parent listservs. The third study included English speaking females only, who were between the 85th and 97th BMI percentile and had experienced at least one LOC episode in the past month. Participants were also required to have normal laboratory testing, including negative urine glucose and normal electrolytes, hepatic, and thyroid function. Participants were excluded if they had a major health or mental illness, an obesity-related health issue, inadequate cognitive functioning, or were regularly using prescription medication. Further exclusion criteria included involvement in psychotherapy or a structured weight loss program, weight loss during the past 2 months greater than 3% of body weight, current or recent pregnancy, breastfeeding, and current or past eating disorder diagnosis other than BED. For all three studies, children were required to be in good general health. Participants were obese (body mass index, BMI >95th percentile for age and sex), overweight (85th $\geq$ BMI $\leq$95th percentile for age and sex), and non-overweight (Barlow & Committee, 2007; Ogden et al., 2002). No study participants were participating in weight-loss treatment. For all studies, children gave written assent and parents gave written consent for participation in the study. All studies were approved by the National Institute of Child Health and Human Development institutional review board.

Measures

Disordered Eating Measures

a. The *Eating Disorder Examination version 12.OD/C.2 (EDE)* (Fairburn & Cooper, 1993) *adapted for Children (ChEDE)* (Bryant-Waugh et al., 1996) is a semi-structured interview with 21 items designed to assess disordered eating habits and cognitions. The ChEDE differs from the adult version only in that it uses language more appropriate for children aged 8-14 years and incorporates a sort task into the two items that assess the critical overvaluation of shape and weight. The ChEDE consists of four subscales, the Restraint, Eating Concern, Shape Concern, Weight Concern scales, that assess disordered eating cognitions and related behaviors. An average of the four subscales if used to determine a Global Score. The ChEDE also assesses for frequency of specific eating episodes in the three months prior to the interview. This section distinguishes between three types of eating episodes, objective overeating (OO, large amount of food consumed without LOC), objective binge episode (OBE, large amount of food consumed with LOC), subjective binge episode (SBE, LOC experienced without consumption of a large amount of food, but viewed as excessive), and no episodes (NE, normal eating). For the purpose of the present study, OBEs and SBEs were combined to form one variable, Loss of Control (LOC). Although all data is obtained during one interview session, measures of disordered eating behaviors (OBE, SBE) are generated from variables different from those used to determine the global and subscale scores. This technique is standard format within the disordered eating literature. Interviewers were either graduate students from the Uniformed Services University of the Health Sciences or research assistants working at the Unit on Growth and Obesity, NICHD. All interviewers underwent 15-20 hours of training

given by a clinical psychologist. This training involved a review of the criteria for eating disorders and a description of each EDE and ChEDE question. Prior to conducting interviews, each trainee listened to audiotapes of sample adult and child interviews, conducted a practice EDE and ChEDE, and observed the trainer conducting a ChEDE. Each interviewer was also viewed administering a ChEDE, during which the trainer coded along with the trainee. Training was continued until the trainee demonstrated at least 95% agreement with the trainer ratings. To ensure administration quality, we audiotaped each interview and held ongoing weekly meetings to review every interview throughout data collection. In a sample of overweight and non-overweight children, the ChEDE demonstrated excellent interrater reliability (intraclass correlation) for subscales, ranging from .95 to .99 (all *p*s <.01). Cohen's kappa for presence of the different eating episode categories was 1.00 ($p<.01$) (Tanofsky-Kraff et al., 2004).

b. The *Standard Pediatric Eating Episode Interview (SPEEI)* (Tanofsky-Kraff, Goossens et al., 2007) was designed based on correlates of adult binge episodes and clinical reports of child LOC eating patterns. It assesses the behavioral, contextual, emotional, and psychological nature of children's eating episodes. More specifically, this measure inquires about the details of an eating episode, such as time and place, emotional experience before and after, and hunger levels of the individual. For the purposes of the present study, the SPEEI was given to assess criteria for LOC-ED (see Appendix B). The SPEEI was administered after the overeating section of the ChEDE to all children regarding their self-described largest episode (OBE, SBE, OO, NE).

a. *The Eating Disorder Inventory-II for Children (EDI-C)* (Garner, 1990) is a 91-item self-assessment questionnaire that explores attitudes about food in relation to developmental issues. The EDI-C includes 11 subscales, three of which assess attitudes about eating, shape and weight (drive for thinness, bulimia, body dissatisfaction), five that are related to clinically established psychological traits that accompany eating disorders (maturity fears, feelings of ineffectiveness, perfectionism, interpersonal distrust, interoceptive awareness), and three provisional scales that assess traits often observed in individuals with eating disorders (asceticism, impulse regulation, and social insecurity). The EDI-C was adapted by Dr. Garner from the adult version of the EDI-II (Garner, 1991), and differs from the adult version in that one-third of the questions are re-worded for use with children. Psychometric properties for the English version of the EDI-C are currently under investigation. The Swedish version shows a good overall alpha level among both disordered (.94) and non-disordered eating (.93) adolescents (13-17y). The original eight subscales of the adult version have good psychometric properties, with Cronbach's alphas ranging from .80-.91. However, there is a lack of internal consistency among the provisional scales (all $\alpha s < 0.8$) (Eberenz & Gleaves, 1994).

b. The *Emotional Eating Scale for Children and Adolescents (EES-C)* (Tanofsky-Kraff, Theim et al., 2007) is a 25-item self-report measure used to assess the urge to eat in response to emotion. It generates 3 subscales (eating in response to Anger/Frustration/Anxiety, Depressive symptoms, and Feeling unsettled). The EES-C is based on the original EES for adults (Arnow, Kenardy, & Agras, 1995),

but uses child-friendly language, and incorporates sample questions and responses to ensure that concepts are clearly understood and directions are followed. Unlike the adult version, the EES-C also queries about eating in response to positive emotion (happiness), and includes an additional item for all questions to determine the frequency of emotional eating. The EES-C has demonstrated good test-retest reliability as well as good convergent and discriminant validity.

c. The *Eating in the Absence of Hunger Questionnaire for Children (EAH-C)* (Tanofsky-Kraff, Ranzenhofer et al., 2008) is a 14-item self-assessment questionnaire that measures the frequency with which one eats when not hungry and/or already full. The EAH-C measures EAH in response to internal (emotional cues) and external (e.g. sensory and social cues) and has three subscales, Negative Affect, External Eating, and Fatigue/Boredom. The EAH-C queries both the child and the parent about the child's eating behaviors. The EAH-C has good internal consistency and convergent validity.

Physical Measures

a. *Body Mass Index* (BMI) Height was measured to the nearest mm, using a stadiometer calibrated before each child's measurement to the nearest 1mm. Weight was measured to the nearest 0.1 kg on a digital calibrated scale. BMI scores were standardized to BMI z-scores using the Centers for Disease Control and Prevention 2000 standards (Kuczmarski et al., 2002).

b. *Body fat mass* was measured using either air displacement plethysmography with the BodPod or with dual-energy x-ray absorptiometry (DXA) scans. DXA

scanning employed either the pencil-beam (QDR-2000; Hologic, Bedford, MA) or fan-beam (QDR-4500A; Hologic) mode. Compared to pencil-beam, the fan-beam instrument underestimates body fat mass for children by approximately 2.29 kg (Robotham et al., 2006). To adjust for this discrepancy, 2.29 kg was added to fat mass measures of all youth assessed with the fan-beam mode. Further, compared to pencil-beam DXA scanning, the BodPod underestimates fat mass for girls by approximately 3% (Nicholson et al., 2001). Therefore, before merging BodPod and DXA data, body fat mass scores for all females were adjusted by 3%.

Measures of General Psychopathology

c. The *Children's Depression Inventory (CDI)* (Kovacs, 1995) is a 27-item self-report questionnaire designed to assess depressive symptoms in children and adolescents. The CDI generates a total score comprised of five subscale scores (negative mood, interpersonal problems, ineffectiveness, anhedonia, and negative self-esteem). A total score of 19 is considered clinically significant (Kazdin & Peiti, 1982). The CDI has good psychometric properties (Curry & Craighead, 1993) and has been well-validated for use with children (Kovacs, 1995).

d. The *State-Trait Anxiety Inventory for Children* (*STAI-C*) (Spielberger, Edwards, Lushene, Montuori, & Platzek, 1973) is a self-assessment measure for children with two separate scales, each comprised of 20 items, to measure state and trait anxiety. The STAI-C has been shown to have high internal consistency and adequate validity (Spielberger, Gorsuch, & Lushene, 1970). For the purposes of this study, only trait anxiety was examined.

e. The *Child Behavior Checklist (CBCL)* (Achenbach & Edelbrock, 1991) for children 4-18 years old is a self-report questionnaire completed by parents. The CBCL examines the child's home behavior, as well as school performance and social adjustment. The CBCL further assesses a range of internalizing and externalizing symptoms. The CBCL is extensively used and has excellent psychometric properties (McConaughy, 1993). Increased scores on the Internalizing scale are associated with anxiety disorders, while increased scores on the Externalizing scale correlate with Conduct Disorder, Oppositional Disorder, and Attention Deficit Disorder. Although major depression and dysthymia correlate significantly with both scales, the correlation is stronger with the Internalizing scale (Edelbrock & Costello, 1988).

Procedure

For all studies, participants observed a twelve-hour fast before reporting to the Clinical Center of the NIH for a baseline screening assessment. Before the assessment began, each parent and child participant signed an informed consent and assent form, respectively. As a part of the baseline physical examination, all physical measures (height, weight, measure of fat mass) were collected. Pubertal stage was examined for each child and identified as one of the five Tanner pubertal stages (Marshall & Tanner, 1969, 1970), based on pubertal breast stage for girls and testicular volume (cm^3) for boys. Socioeconomic status (SES) was measured by parent report on the four-factor Hollingshead scale, which considers parental education, occupation, sex, and marital status in the determination of SES (Hollingshead, 1975). Lower scores on a scale of 1 to 5 indicate higher SES. Parents and children further completed all self-assessment

questionnaires, and the ChEDE was conducted with each participant. During the overeating section of the ChEDE, the SPEEI was administered to all children to gather contextual information about one specific eating episode, and for those reporting LOC, to assess for the presence or absence of LOC-ED. Based on responses to the overeating section of the ChEDE and the SPEEI, children were categorized into one of three groups. Children reporting no loss of control in the past month (NE or OO) were assigned to the no LOC group (noLOC). Youth who experienced loss of control over eating in the past month (SBE or OBE), but did not meet the criteria for LOC-ED based on frequency of LOC episodes and on the situational factors as assessed by the SPEEI, were categorized as sub-threshold LOC (subLOC). Children who reported two or more LOC episodes within the past month and met criteria for LOC-ED were placed in the LOC-ED group.

Power Analysis

Analysis of power was conducted with nQuery Advisor software (O'Brien & Muller, 1993). Based on data obtained from previous studies, power analysis indicated that a sample size ranging from a liberal estimate of thirteen, to a conservative estimate of thirty participants in each group would provide 80% power to detect a main effect.

Data Analysis

All data were analyzed using SPSS (v.16), a statistical software package commonly used for data analysis in the social sciences. Between-group demographic

differences on sex, race, SES, and Tanner stage were analyzed using a chi-square test. For all dependent variables, prior to analysis, outliers were recoded to represent the 75th percentile. On dependent measures with multiple scales, including the ChEDE, EDI-C, EESC, EAH, CDI, and CBCL, a Multivariate Analysis of Covariance (MANCOVA) with contrast tests was performed to assess for group differences. For measures involving only one variable, including BMI z-score, body fat mass, and the trait scale of the STAI-C, an ANCOVA with contrast tests was performed. Initially, age, sex, race, and SES were included as covariates in the model for each analysis. However, when these covariates were non-significant, they were removed from the analysis to maximize power.

In the original analysis, the Eating Concern subscale did not represent a normal distribution, as a large majority of the sample (79.1%) reported no eating concerns. Further, the value of the 75th percentile was zero, which prevented appropriate adjustment of outliers. To account for this problem, the data were re-analyzed using the residual scores of the Eating Concern subscale. The residual plot more closely approximated a normal distribution, with nine visible outliers. Outliers were accounted for by recoding to the tenth highest value reported by participants.

Two of the disordered eating measures, the EES-C, and the EAH-C, were created during the period of data collection, and the EDI-C was included later in the data collection period. Subsequently, the sample size for analyses of these measures is smaller (EDI-C, n=92; EES-C, n=80; EAH-C, n= 74), as not all participants completed them.

Results

Participant Demographics

Of a total sample of 256 participants, 133 (52.3%) were female. Participants' ages ranged from 6.08 to 12.99y (M = 10.30y, SD = 1.52). The sample represented a range of races and ethnicities, including Caucasian (59.0%), African American (34.8%), Asian (2.7%), and Hispanic (3.5%) participants. The majority of the participants were not overweight (65.6%), with BMI ranging from 12.9 to 51.6 kg/m^2 (M = 22.08 kg/m^2, SD = 7.12). Group demographics for the noLOC, subLOC, and LOC-ED groups are presented in Table 1. Groups were not different based on age, sex, race, or pubertal status measured by Tanner stage (all p's < .05), but did differ significantly with regard to SES (Chi-square = 22.03, p = 0.02), such that youth in the noLOC group had a lower average SES than those in the subLOC and LOC-ED groups. As expected, groups also differed significantly based on percent overweight. The LOC-ED group (71.4%) had the highest percentage of overweight participants, followed by the subLOC (53.1%) and noLOC (29.1%) groups (Chi-square = 11.92, p = 0.003). Between-group differences were further observed based on the frequency of binge and LOC eating episodes (all p's < 0.001). The LOC-ED group had the greatest binge (M = 5.86, SD = 10.04) and LOC (M = 7.57, SD = 9.32) episode frequencies, followed by the subLOC [binge (M = 0.52, SD = 0.81); LOC (M = 1.63, SD = 1.07)] and noLOC (no episodes) groups.

Hypothesis I: Disordered Eating

1. *Eating Disorder Examination adapted for Children*

Group means and standard deviations for the ChEDE are presented in Table 2. There was an overall significant main effect on the global scale of the ChEDE ($F_{(5,246)}$ = 15.85, $p < 0.001$), as well as for the individual Eating Concern ($F_{(2,246)}$ = 45.06, $p < 0.001$), Shape Concern ($F_{(2,246)}$ = 17.05, $p < 0.001$), and Weight Concern ($F_{(2,246)}$ = 11.28, $p < 0.001$)] subscales. There was no overall main effect on the Restraint subscale ($F_{(2,246)}$ = 5.84, p = 0.12). Post-hoc analyses showed that overall, the LOC-ED group reported significantly greater disordered eating compared to the noLOC ($p < 0.001$), but not the subLOC group (p = 0.10) on the Global Scale. Further, the subLOC group had significantly higher Global scores than the noLOC group ($p < 0.001$). Similarly, on the Weight Concern scale, the noLOC group had lower scores compared to the subLOC and LOC-ED groups (all p's = 0.001), but the subLOC and LOC-ED groups did not differ significantly (p = 0.10). However, on the Shape Concern and Eating Concern scales, significant differences were detected between all three groups. The noLOC group had significantly lower scores on Eating Concern and Shape Concern scales compared to the LOC-ED and subLOC groups (all p's < 0.001). Further, the LOC-ED group had higher scores relative to the subLOC group [Eating Concern (p = 0.002); Shape Concern (p = 0.05)] (See Figure 1).

2. Children's Eating Disorders Inventory

Group means and standard deviations for the EDI-C are presented in Table 3. The Drive for Thinness, Body Dissatisfaction, and Bulimia subscales assess for disordered eating pathologies. Overall, a between group difference was observed on the Body Dissatisfaction ($F_{(2,86)}$= 3.86, p = 0.03) subscale, but not on the Drive for Thinness ($F_{(2,86)}$= 2.54, p =.09) or Bulimia ($F_{(2,68)}$ = 1.81, p = 0.17) subscales. On the Body

Dissatisfaction subscale, youth in the noLOC group had significantly lower scores compared the subLOC ($p = 0.04$) and LOC-ED ($p = 0.05$) groups. Although an overall main effect was not observed on the Drive for Thinness scale, the noLOC group trended towards lower scores compared to the subLOC ($p = 0.09$) and LOC-ED ($p = 0.08$) groups. The LOC-ED and subLOC groups did not differ significantly on these scales [Drive for Thinness ($p = 0.41$); Body Dissatisfaction ($p = 0.42$)] (See Figure 2).

On the other subscales of the EDI-C, which assess personality variables commonly observed among eating disordered individuals, between-group differences were non-significant [Perfectionism ($F_{(2,86)} = 1.66$, $p = 0.20$); Interpersonal Distrust ($F_{(2,86)} = 1.26$, $p = 0.29$); Maturity Fears ($F_{(2,68)} = 1.90$, $p = 0.16$); Asceticism ($F_{(2,68)} = 1.45$, $p= 0.24$); Impulse Regulation ($F_{(2,68)} = 1.37$; $p = 0.26$); Ineffectiveness ($F_{(2,68} = 1.33$, $p = 0.27$; Social Insecurity ($F_{(2,86)} = 2.19$; $p = 0.12$); Interoceptive Awareness ($F_{(2,68)} = 2.72$, $p = 0.07$). However, post-hoc analyses revealed that the LOC-ED group had significantly lower scores on the social insecurity scale compared to the subLOC group ($p= 0.04$), and trended toward less social insecurity compared to the noLOC group ($p = 0.06$). Further, the subLOC group had higher scores on the Interoceptive Awareness scale compared to the noLOC group ($p = 0.03$).

3. Emotional Eating Scale for Children

Significant between group differences were found on all three subscales of the EESC [*Anger, Anxiety, Frustration* ($F_{(2,75)} = 9.75$, $p<0.001$); *Depression* ($F_{(2,75)} = 3.32$, $p = 0.04$); *Uncertainty* ($F_{(2,75)} = 3.55$, $p = 0.03$)] (See Table 4). The subLOC group reported greater emotional eating compared to the noLOC group on all three subscales [*Anger, Anxiety, Frustration* ($p < 0.001$); *Depression* ($p = 0.01$); *Uncertainty* ($p = 0.02$)]. By

contrast, the LOC-ED group did not report greater emotional eating compared to either the noLOC [*AAF* (p = 0.26); *Depression* (p = 0.55); *Uncertainty* (p = 0.69)] or the subLOC [*AAF* (p = 0.28); *Depression* (p = 0.35); *Uncertainty* (p = 0.07)] groups.

4. Eating in the Absence of Hunger Scale

Based on child report of EAH, there was a significant overall main effect on the Negative Affect ($F_{(2,69)} = 3.26$, p = 0.04) and Fatigue/Boredom subscale ($F_{(2,69)} = 8.33$, p = 0.001, but not on the External Eating subscale ($F_{(2,69)} = 0.87$, p = 0.43) (See Table 4). Youth in the subLOC group were more likely to report higher scores on the Negative Affect scale compared to the noLOC group (p= 0.01), the LOC-ED group did not differ significantly compared to either the noLOC (p = 0.42) or the subLOC (p = 0.62) groups. On the Fatigue/Boredom scale, the noLOC group had lower scores compared to the subLOC and LOC-ED groups (all p's = 0.002). The LOC-ED and subLOC groups did not differ significantly (p = 0.13).

Overall main effects were also detected based on parent report of EAH on the Negative Affect ($F_{(2,69)} = 4.08$, p = 0.02) and Fatigue/Boredom ($F_{(2,69)} = 6.23$, p = 0.003), but not on the External Eating subscale ($F_{(2,69)} = 1.00$, p = 0.38) (See Table 4). According to parent report, the subLOC (p = 0.01) group had higher scores on the Negative Affect scale relative to the noLOC group and the LOC-ED group trended toward higher scores (p = 0.06). Similar to child report, the LOC-ED and subLOC groups did not differ significantly from each other (p = 0.56). Parent reported scores on the Fatigue/Boredom scale most closely replicated those of child report. Youth in the LOC-ED group had higher scores compared to the noLOC group (p = 0.003) and trended toward significance

compared to the subLOC group (p = 0.07) group. Further, the subLOC group had higher scores compared to the noLOC group (p = 0.02) (See Figure 3).

Hypothesis II: Body Weight and Fat Mass

Group statistics for body weight and fat mass are presented in Table 5.

1. Body Weight

Significant between group differences on BMI z-score were observed ($F_{(2,248)} = 6.94$, p = 0.001). Post-hoc analyses revealed that, as expected, the noLOC group had a significantly lower average BMI z-score than both the LOC-ED (p = 0.005) and subLOC (p = 0.01) groups. Although the LOC-ED group had a higher average BMI z-score than the subLOC group, this difference was non-significant (p = 0.15) (See Figure 4).

2. Body Fat Mass

Group body fat mass means are presented in Table 3. There was a significant main effect for body fat mass ($F_{(2, 236)}= 4.11$, p = 0.02). Post-hoc analyses show that the LOC-ED group had significantly higher body fat mass than the noLOC group (p = .01) but the not subLOC (p = 0.11) group. The subLOC and noLOC groups dud not differ significantly (p = 0.11) (See Figure 4).

Hypothesis III: General Psychopathology

Group statistics on measures of general psychopathology are presented in Table 6. A graphical representation of the data is presented in Figure 5.

1. *Children's Depression Inventory*

Overall, between group differences were detected on the CDI Total scale ($F_{(2,242)} = 3.23$, $p = 0.04$). This overall difference is explained by between group differences on the Negative Mood ($F_{(2,242)} = 4.87$, $p = 0.008$), Ineffectiveness, ($F_{(2,242)} = 2.78$, $p = 0.06$), and Negative Self-Esteem ($F_{(2,242)} = 3.13$, $p = 0.05$), but not the Interpersonal Problems ($F_{(2,242)} = 1.30$, $p = 0.28$) or the Anhedonia ($F_{(2,242)} = 0.64$, $p= 0.53$) subscales of the CDI. The subLOC group reported more symptoms of depression compared to the noLOC group on the Total scale ($p = 0.02$). By contrast, the LOC-ED group did not report more overall symptoms of depression compared to either the noLOC ($p = 0.49$) or subLOC ($p = 0.10$) groups. This pattern was also observed on the individual subscales. Report of depressive symptoms was elevated in the subLOC compared to the noLOC group on the Negative Mood ($p = 0.002$), Ineffectiveness ($p = 0.03$), and Negative Self-Esteem ($p = 0.02$) subscales. However, the LOC-ED group did not report more symptoms of depression compared to the subLOC [Negative Mood ($p = 0.31$); Ineffectiveness ($p = 0.15$); Negative Self-Esteem ($p = 0.15$)] or the noLOC [Negative Mood ($p = 0.73$); Ineffectiveness ($p = 0.61$); Negative Self-Esteem ($p = 0.65$)] groups.

2. *State-Trait Anxiety Inventory for Children, Trait Scale*

There were significant between group differences on the trait scale of the STAI-C ($F_{(2,242)} = 3.16$, $p = 0.04$). As expected, youth in the subLOC group reported significantly more symptoms of anxiety compared to youth without LOC ($p = 0.01$). However, contrary to the hypothesis, youth within the LOC-ED group did not report more anxiety compared those within the subLOC ($p = 0.22$) or the noLOC ($p = 0.94$) groups.

3. Child's Behavior Checklist

No significant between-group differences were detected on the Internalizing Scale ($F_{(2,239)} = 1.63$, $p = 0.20$) or Externalizing Scale ($F_{(2,239)} = 1.65$, $p = 0.20$) of the CBCL.

Discussion

Summary of Study

Although LOC eating is commonly reported by children and associated with increased eating-related and general psychopathology (Tanofsky-Kraff et al., 2004), BED is rarely diagnosed in middle childhood (Marcus & Kalarchian, 2003; Tanofsky-Kraff, Marcus et al., 2008). A subset of children who experience LOC eating appear to be more pathological, based on a clustering of contextual factors related to disordered eating, such as eating past satiation and experiencing a negative emotion after eating (Tanofsky-Kraff, Goossens et al., 2007). Although these children do not experience the full-syndrome of BED as defined in the DSM-IV-TR (American Psychiatric Association, 2000), they may represent a subset of youth with greater eating-related pathology, who are at increased risk for further development of disordered eating and overweight (Tanofsky-Kraff, Marcus et al., 2008). The purpose of this study was to examine the effectiveness of the proposed LOC-ED criteria for identifying youth with pathological overeating in a sample of 256 boys and girls.

Although there were no significant differences between groups at baseline with regard to most demographics variables, groups differed significantly on percent overweight and number of reported LOC episodes. These factors were most elevated among the LOC-ED group, followed by the subLOC and noLOC groups, respectively.

Research shows that children who experience LOC report more disordered eating habits and cognitions relative to youth who do not (Goossens et al., 2007; Tanofsky-Kraff et al., 2004). Therefore, in testing the effectiveness of the proposed criteria, we expected youth with LOC-ED to report the most disordered eating pathology, followed by the subLOC group, then the noLOC group. Based on the ChEDE, our first hypothesis was confirmed. Youth in the LOC-ED group reported significantly greater disordered eating pathology relative to youth in the subLOC group on the Eating and Shape Concern subscales. Further, as expected, both the subLOC and LOC-ED groups had higher scores on the Global, as well as all four subscales of the ChEDE relative to the noLOC group.

Of the three subscales of the EDI-C which assess for disordered eating patterns, the Body Dissatisfaction subscale was significant. On this scale, group means were in the expected direction, and the noLOC group endorsed significantly less symptoms of disordered eating compared to the subLOC and LOC-ED groups. Although the LOC-ED group had a higher score overall on the Body Dissatisfaction scale compared to the subLOC group, in contrast to results from the ChEDE, this difference was non-significant. However, past research has shown greater accuracy with interview, as opposed to self-report measures in assessing disordered eating behaviors in children (Tanofsky-Kraff et al., 2003). In accordance with this literature, this suggests that the ChEDE may have more accurately detected fine distinctions between subLOC and LOC-ED youth. Further, as both the ChEDE and the EDI-C are based on adult and adolescent constructs, these measures may less accurately distinguish children with and without pathological overeating behaviors. For example, it is of note that although scores on the ChEDE Weight Concern subscale, which measures distress over one's numerical

weight, were higher among youth in the LOC-ED group relative to the subLOC group, this subscale was not a significant distinguishing factor between the two groups. Interestingly, this finding is consistent with another study that found that concerns over eating and shape, but not weight, were significantly different between youth with and without LOC (Goossens et al., 2007). It is possible that concerns over body shape and eating may be more relative to disordered eating cognitions during childhood, as children may be less likely than adults or adolescents to have access to a scale, or to understand an appropriate weight for their body size.

In sum, the results from the ChEDE indicate that the criteria for LOC-ED distinguish youth with greater disordered eating pathology from those without. As research indicates that concerns over weight, eating, and body shape may hold particular significance in predicting future onset of full and partial-syndrome eating disorders (Killen et al., 1996; The McKnight Investigators, 2003), youth who meet criteria for LOC-ED may be at highest risk for continued progression of disordered eating patterns.

There is further evidence that LOC is associated with overweight (Tanofsky-Kraff et al., 2004) and linked with weight gain over time (Tanofsky-Kraff et al., 2009). Youth with LOC-ED were expected to have the highest average BMI z-score and total body fat mass, followed by the subLOC, then the noLOC group. This hypothesis was only partially supported. As expected, the noLOC group had a significantly lower average BMI z-score than both the LOC-ED and subLOC groups. Youth with LOC-ED had a higher average BMI z-score compared to the subLOC group, but this difference was non-significant. Although BMI is commonly used as an indicator of obesity in both clinical and research settings, it is a limited measure in that it includes both muscle mass and

body fat. In other words, a very healthy, but muscular individual of normal height can be classified as overweight based on BMI categories. Further, medical co-morbidities associated with body weight are related to an excess in body fat, not overall body mass (Prentice & Jebb, 2001). For these reasons, a direct measure of body fat in youth may bear greater prognostic value than a more overall measure, like BMI. On measures of body fat mass, the LOC-ED group had the greatest body fat mass, which was significantly higher compared to the noLOC group. This finding suggests that the criteria may identify youth at the highest risk for future increases in total body fat mass and associated medical co-morbidities.

Symptoms of anxiety and depression often co-occur with eating disorders, including BED (Wilfley et al., 2003). Further, there is evidence that general psychopathology is elevated among youth who report LOC eating, compared to those who do not (Morgan et al., 2002; Tanofsky-Kraff, Faden et al., 2005). Given the relationship between disordered eating and general psychopathology, we expected youth with LOC-ED to experience the most general psychopathology, followed by youth in the subLOC group, then the noLOC group. Based on the available literature, a similar relationship was expected with eating habits commonly related to emotion, including emotional eating (Tanofsky-Kraff, Theim et al., 2007) and eating in the absence of hunger (Tanofsky-Kraff, Ranzenhofer et al., 2008). Findings on these measures were somewhat unexpected. Consistent with previous research, based on self-report, youth in the subLOC group had greater symptoms of anxiety and depression, as well as more emotional eating, when compared to the noLOC group. However, overall, the LOC-ED group did not report significantly more pathology. In fact, on these measures, mean

scores for the LOC-ED group most closely resembled those of the noLOC group. Similarly, no significant between-group differences were detected on the Internalizing or Externalizing scales of the CBCL. There are several potential explanations for these unexpected findings. This study employed only self-report measures of general psychopathology, rather than a multi-factorial approach. As there is evidence that children's CDI scores may not be stable over time, it has been suggested that the CDI may be reflective of current mood, rather than more general depressive traits (Cole & Martin, 2005). Further, it has been suggested that parents may be less accurate at recognizing private, subjective feelings often indicative of internalizing problems (Grills & Ollendick, 2003). Thus, for the present study, a broader assessment technique may have yielded different results. Further, although statistically significant differences were detected between the noLOC and subLOC groups on self-report measures of general psychopathology, group means did not approach a range reflective of clinical significance. It is possible that since clinically significant depression most often manifests in middle to late adolescence (Hankin et al., 1998), symptoms of general psychopathology and their relation to disordered eating patterns may be emergent in middle childhood, especially among non-treatment seeking samples.

Alternatively, another potential explanation for these discrepant findings is that youth within the LOC-ED group may be less emotionally conscious. For years, a general lack of emotional awareness has been observed among individuals with eating disorders in both clinical and research settings (Sifneos, 1973). More specifically, individuals with eating disorders often exhibit the affective component of alexithymia, which involves difficulty identifying and expressing emotional states (Lawson, Emanuelli, Sines, &

Waller, 2008). Studies show that alexithymia is more prevalent among eating-disordered individuals when compared to controls (Cochrane, Brewerton, Wilson, & Hodges, 1993; Kessler, Schwarze, Filipic, Traue, & von Wietersheim, 2006), and is experienced at similar levels across adult and adolescent disordered eating samples (Zonnevylle-Bender et al., 2004). Although research with BED, specifically, is limited, one study found that alexithymia was elevated among obese women with BED, compared to non-disordered eating obese women. This same study also found that the component of alexithymia that involves difficulty distinguishing between affective states and bodily sensations was predictive of emotional eating for those with BED, but not for those without (Pinaquy, Chabrol, Simon, Louvet, & Barbe, 2003). Perhaps individuals with BED are more likely to mis-label emotional arousal as physical sensations, such as hunger, leading to emotional eating patterns. There is further evidence that alexithymic patterns are predictive of poor treatment outcome (Speranza, Loas, Wallier, & Corcos, 2007) and continue with recovery from disordered eating (Iancu, Cohen, Ben Yehuda, & Kotler, 2006; Schmidt, Jiwany, & Treasure, 1993). Such research indicates that alexithymia may be a stable trait that plays an etiological role in the development of disordered eating patterns. Thus, one plausible explanation for a lack of self-report of general psychopathology within the LOC-ED group is that these youth have more difficulty recognizing and labeling negative affective states. Interestingly, youth in the LOC-ED group did have elevated mean scores on the Fatigue/Boredom subscale of the EAH-C, relative to both the noLOC and subLOC groups. It is plausible that youth in this sample recognize that they are eating when not hungry, but in struggling to identify their affective state, mislabeled feelings of negative affect (i.e. lonely, sad) as boredom or

fatigue. In support of this notion, some of the youth in the LOC-ED group reported a sensation of numbing out while experiencing LOC, which suggests a discord between affect and behavior. Given the suggested links between disordered eating and difficulties with self-awareness and emotional coping (Heatherton & Baumeister, 1991), there is considerable theoretical support for this conclusion, as well.

Limitations and Strengths

A primary limitation of this study is the relatively small sample size of the LOC-ED group. Based on the sample size of the groups for this study, although overall power was adequate, for pairwise comparisons between the subLOC and LOC-ED groups, there was adequate power to detect significant differences when the effect size was large, but not medium. On several measures, the mean scores for the subLOC and LOC-ED groups fell in the expected direction (i.e. EAH Fatigue/Boredom, BMI z-score), but were slightly short of reaching statistical significance. With a larger sample size, the true nature of these trends may become apparent. Further, as study participants were volunteers, our sample was not recruited in a truly population-based fashion, which may limit the generalizeability of the findings. Finally, as the design for this study was cross-sectional, results are purely correlational and have no predictive value.

Strengths of this study include the use of interview methodology, which is considered the gold standard in the eating disorders field, to assess for disordered eating habits, cognitions, and behaviors, as well as for the criteria for LOC-ED. Further, the sample was racially diverse and equally represented both sexes.

Concluding Remarks and Future Directions

The primary goal of this study was to examine the utility of the proposed LOC-ED criteria for differentiating between youth with and without pathological LOC eating episodes. As hypothesized, youth in the LOC-ED group had significantly higher reports of disordered eating habits and cognitions, as well as greater body fat mass, compared to the other groups. Although the results of this study indicate that the criteria for LOC-ED may identify a group at increased risk for continued development of eating pathology and weight gain with age, the prognostic value of LOC during childhood is yet to be determined, since studies to date have been cross-sectional. For this reason, the field will greatly benefit from longitudinal research examining the progression of LOC and related disordered eating habits over time in youth with LOC-ED. Although future studies will better direct prevention efforts, the initial findings from this study suggest that early intervention efforts with youth who meet the criteria for LOC-ED may have utility in impeding further development of disordered eating symptoms and overweight.

Although both adult theory and research tie disordered eating to difficulties with affective regulation and coping, the field is limited in its understanding of how emotion expression and regulation manifest among children who exhibit LOC eating behaviors. Given the links between alexithymia and eating disorders, studies examining how youth who experience LOC process and cope with various emotional states, and how these abilities change with maturation, are greatly needed. Such research may also contribute to the understanding of how alexithymia potentially relates to the development and maintenance of disordered eating patterns. In addition, given the limitations of self-assessment questionnaires, future research should incorporate multiple informants, as

well as a variety of assessment techniques, including subjective self-reports, as well more objective measures, such as lab paradigms of eating behaviors.

Overall, these findings suggest utility for the proposed criteria for LOC-ED in identifying youth with increased levels of eating, shape, and weight concerns, who are more likely to become more overweight in the future. Further research with the criteria should investigate the validity of the frequency criterion, in order to determine whether LOC frequency or episode characteristics show greater valence in determining pathological eating during childhood.

Table 1 Group Demographics (n= 256)

	NoLOC (n=216)	**SubLOC** (n=33)	**LOC-ED** (n=7)	**p-value**
Age (y)	10.26±1.56	10.46±1.24	11.06±1.50	0.32

Sex (% F)	50.0%	60.6%	85.7%	0.12
Race				0.44
Caucasian	60.6%	51.5%	42.9%	
Black	32.9%	45.5%	42.9%	
Hispanic	3.7%	0%	14.3%	
Asian	2.8%	3.0%	0%	
Median SES	3	2	2	0.02
Median Tanner	2	2	2	0.52
Overweight	29.1%	53.1%	71.4%	0.003
LOC Episodes				<0.001
Mean		1.63±1.07	7.57±9.32	
Median		1	3	
Binge Episodes				
Mean		0.52±0.81	5.86±10.04	<0.001
Median		0	1	

Table 2 Children's Eating Disorders Examination (Hypothesis I)

	NoLOC	**SubLOC**	**LOC-ED**	**p-value**
Restraint	0.30 ± 0.50	0.50 ± 0.65	0.90 ± 0.66	0.12
Eating Concerns	0.05 ± 0.17	0.37 ± 0.42	0.69 ± 0.36	< 0.001

Shape Concerns	0.33 ± 0.49	0.81 ± 0.58	1.31 ± 0.46	< 0.001
Weight Concerns	0.59 ± 0.85	1.33 ± 1.17	2.14 ± 1.14	< 0.001
Global	0.33 ± 0.43	0.78 ± 0.64	1.21 ± 0.56	< 0.001

Figure 1. Children's Eating Disorders Examination

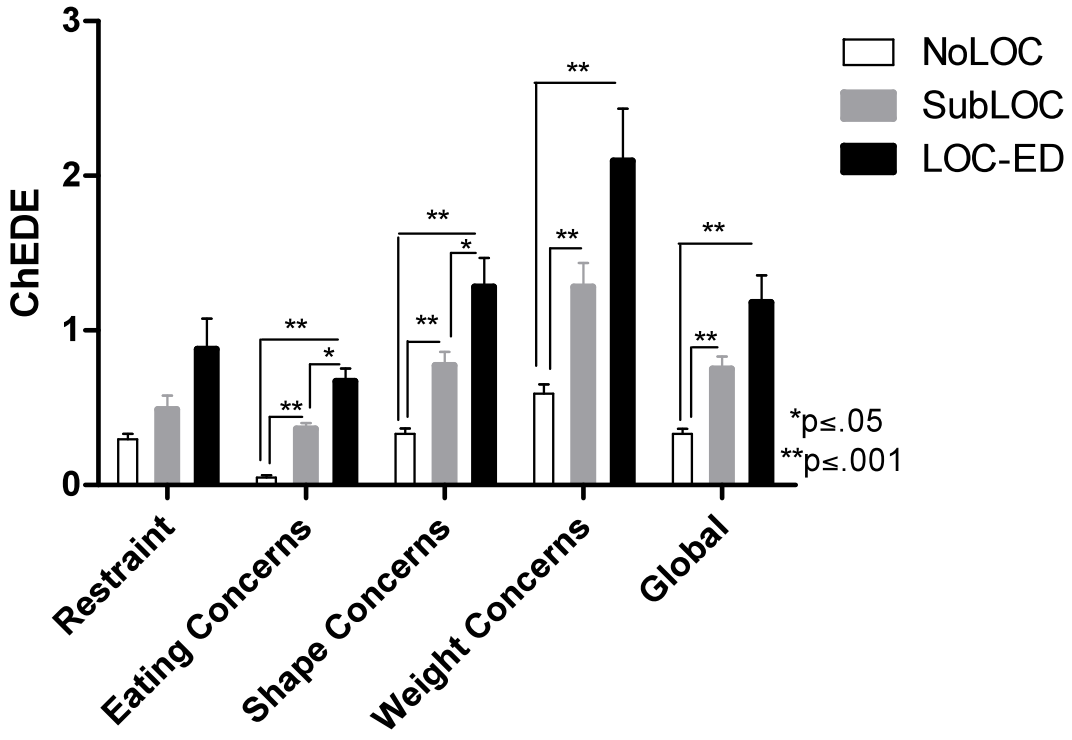


Table 3 Eating Disorders Inventory for Children

	NoLOC	**SubLOC**	**LOC-ED**	**p-value**
Drive for Thinness	1.64±2.68	3.27±3.68	5.80±4.49	0.09
Body Dissatisfaction	2.25±3.32	4.91±5.11	8.40±6.66	0.03

Bulimia	3.00±1.19	3.46±1.58	3.87±2.17	0.17
Perfectionism	6.16±3.88	7.55±3.98	5.20±4.21	0.20
Social Insecurity	3.11±3.09	3.65±2.97	0.60±0.89	0.19
Interpersonal Distrust	3.75±2.81	5.27±2.83	4.20±3.35	0.29
Asceticism	7.61±3.75	9.25±4.51	10.50±4.51	0.24
Interoceptive Awareness	4.68±3.06	6.58±3.25	6.50±4.43	0.07
Impulse Regulation	3.96±2.92	5.21±3.33	3.50±1.29	0.26
Ineffectiveness	2.45±2.92	2.84±2.14	5.00±4.16	0.27
Maturity Fears	9.80±4.75	7.84±4.98	10.50±5.80	0.16

Figure 2. Eating Disorders Inventory for Children

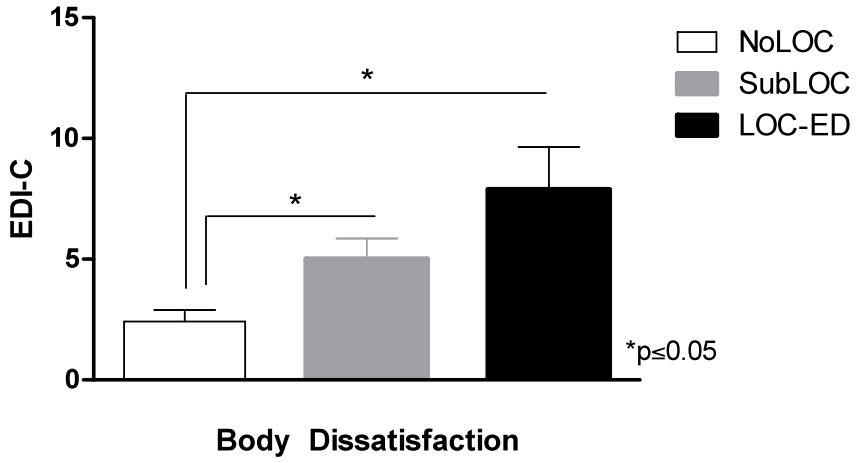


Table 4 Emotional Eating and Eating in the Absence of Hunger (Hypothesis I)

	NoLOC	**SubLOC**	**LOC-ED**	**p-value**
EESC				
Anger, Frustration, Anxiety	0.30±0.45	1.09±0.85	0.74±0.73	<0.001

Depression	0.57±0.64	1.25±1.00	1.04±0.93	0.04
Uncertainty	0.68±0.84	1.39±0.91	0.82±0.71	0.03
EAH-C				
		Child Report		
Negative Affect	1.42±0.56	1.95±0.72	1.86±0.64	0.04
External Eating	2.39±0.83	2.88±0.86	3.19±0.38	0.43
Fatigue/Boredom	1.61±0.71	2.43±1.01	3.19±0.43	0.001
		Parent Report		
Negative Affect	1.21±0.46	1.72±0.71	2.00±0.61	0.02
External Eating	2.49±0.81	3.00±0.96	3.44±1.03	0.38
Fatigue/Boredom	1.39±0.56	1.99±0.88	2.75±0.79	0.003

Figure 3. Eating in the Absence of Hunger Questionnaire

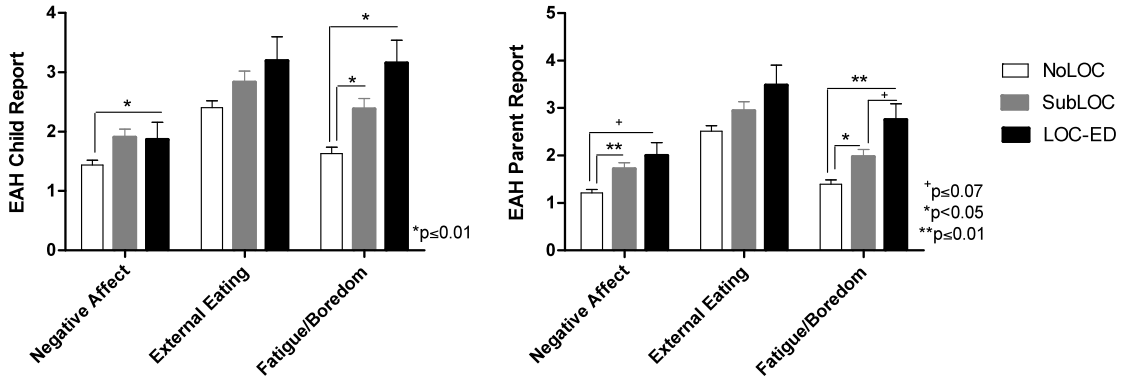


Table 5 Body Measures (Hypothesis II)

	NoLOC	**SubLOC**	**LOC-ED**	**p-value**
BMI z-score (kg/m^2)	0.83±1.21	1.38±1.11	2.07±0.55	0.001
Body Fat Mass	15.01±11.45	19.51±12.32	30.37±9.76	0.02

Figure 4. Body Measures

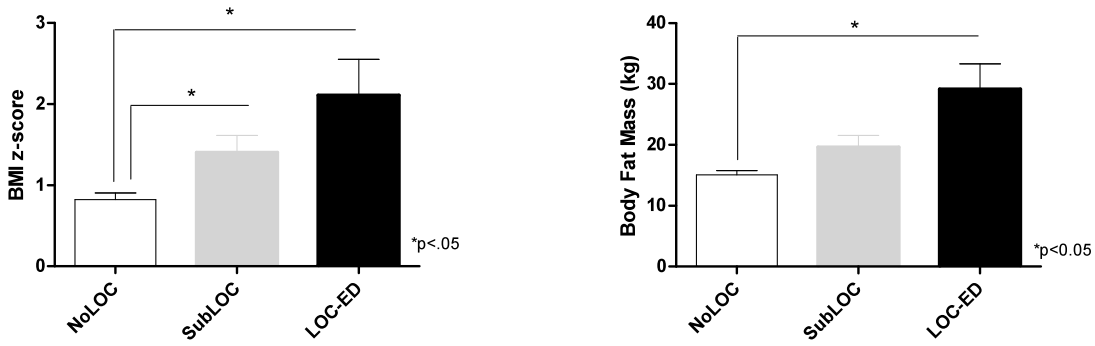
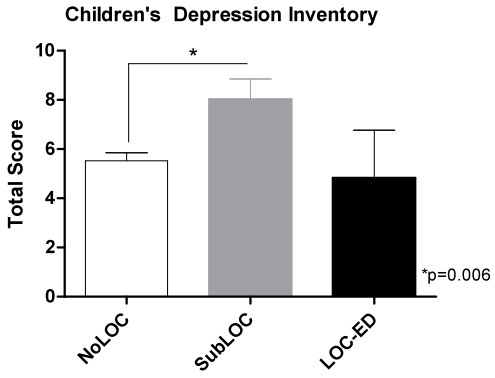
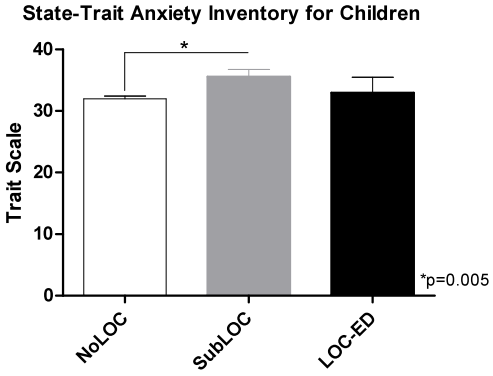


Table 6 General Psychopathology (Hypothesis III)

	NoLOC	SubLOC	LOC-ED	p-value
CDI				
Negative Mood	1.14±1.28	1.94±1.37	1.33±1.51	0.01
Interpersonal Problems	0.48±0.75	0.70±0.85	0.17±0.41	0.28
Ineffectiveness	0.90±1.29	1.47±1.57	0.67±1.21	0.06
Anhedonia	2.37±2.23	2.78±1.98	1.83±1.17	0.53
Negative Self-Esteem	0.58±0.81	1.02±0.93	0.50±0.84	0.05
Total	5.55±4.91	7.94±4.72	4.50±1.64	0.04
STAI-T	32.04±7.05	35.45±5.70	32.14±7.10	0.04
CBCL				
Internalizing Scale	47.82±10.35	50.94±9.13	55.00±8.10	0.20
Externalizing Scale	46.78±9.94	50.42±11.32	51.29±6.95	0.20

Figure 5. General Psychopathology





Appendix A: Research Criteria for Binge Eating Disorder

A. Recurrent episodes of binge eating. An episode of binge eating is characterized by both of the following: 1. Eating, in a discrete period of time (e.g. within a 2-hour period), an amount of food that is definitely larger than most people would eat in a similar period of time under similar circumstances 2. A sense of lack of control over eating during the episode (e.g. a feeling that one cannot stop eating or control what or how much one is eating
B. The binge episodes are associated with three (or more) of the following: 1. Eating much more rapidly than normal. 2. Eating until feeling uncomfortably full. 3. Eating large amounts of food when not feeling physically hungry. 4. Eating alone because of being embarrassed about how much one is eating. 5. Feeling disgusted with oneself, depressed or very guilty after overeating.
C. Marked distress regarding binge eating is present.
D. The binge eating occurs, on average, at least 2 days a week, for 6 months.
E. The binge eating is not associated with regular use of inappropriate compensatory behaviors (e.g. purging, fasting, excessive exercise), and does not occur exclusively during the course of Anorexia Nervosa or Bulimia Nervosa.

Appendix B: Provisional BED Research Criteria for Children

A. Recurrent episodes of binge eating. An episode of binge eating is characterized by both of the following:

1. Food seeking in the absence of hunger. 2. A sense of lack of control over eating.
B. Binge eating episodes are associated with one or more of the following: 1. Food seeking in response to negative affect. 2. Food seeking as a reward. 3. Sneaking or hiding food.
C. The LOC eating episodes occur, on average, at least twice a month for three months.
D. Eating is not associated with the regular use of inappropriate compensatory behaviors and does not occur exclusively during the course of anorexia nervosa or bulimia nervosa.

Appendix C: Proposed Research Criteria for Loss of Control Eating Disorder

A. Recurrent episodes of LOC eating. An episode of LOC eating is characterized by both of the following: 1. A sense of lack of control over eating. 2. Food seeking in the absence of hunger or past satiation.
B. The LOC eating episodes are associated with three or more of the following: 4. Eating in response to negative affect. 5. Secrecy regarding the episode. 6. Feelings of numbness (lack of awareness) while eating. 7. Eating more, or the perception of eating more, than others. 5. Negative affect following eating (e.g., shame/guilt).
C. The LOC eating episodes occur, on average, at least twice a month for three months.
D. Eating is not associated with the regular use of inappropriate compensatory behaviors and does not occur exclusively during the course of anorexia nervosa, bulimia nervosa, or binge eating disorder.

References

Abbott, D. W., De Zwaan, M., Mussell, M. P., Raymond, N. C., Seim, H. C., & Crow, S. J., et al. (1998). Onset of binge eating and dieting in overweight women: Implications for etiology, associated features and treatment. *Journal of Psychosomatic Research, 44*(3-4), 367-374.

Achenbach, T. M., & Edelbrock, C. (1991). *Manual for the Child Behavior Checklist and the Revised Child Behavior Profile*. Burlington, VT: University of Vermont Department of Psychiatry.

Agras, W. S., Telch, C. F., Arnow, B., Eldgredge, K., Detzer, M. J., & Henderson, J., et al. (1995). Does interpersonal therapy help patients with binge eating disorder who fail to respond to cognitive-behavioral therapy? *Journal of Consulting and Clinical Psychology, 63*(3), 356-360.

Allen, K. L., Byrne, S. M., Blair, E. M., & Davis, E. A. (2006). Why do some overweight children experience psychological problems? The role of weight and shape concerns. *International Journal of Pediatric Obesity, 1*(4), 239-247.

American Psychiatric Association. (2000). *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision* (4th ed.). Washington, D.C.: American Psychiatric Association.

Arnow, B., Kenardy, J., & Agras, W. S. (1995). The Emotional Eating Scale: The development of a measure to assess coping with negative affect by eating. *International Journal of Eating Disorders, 18*(1), 79-90.

Barlow, S. E., & Committee, T. E. (2007). Expert committee recommendations regarding the prevention, assessment, and treatment of child and adolescent overweight and \obesity: Summary report. *Pediatrics, 120*(S4), S164-S192.

Baumeister, H., & Harter, M. (2007). Mental disorders in patients with obesity in comparison to healthy probands. *International Journal of Obesity, 31*, 1155-1164.

Berkowitz, R., Stunkard, A. J., & Stallings, V. A. (1993). Binge-eating disorder in obese adolescent girls. *Annals of the New York Academy of Sciences, 699*(200-206).

Braet, C., Mervielde, I., & Vandereycken, W. (1997). Pychological aspects of childhood obesity: A controlled study in a clinical and non-clinical sample. *Journal of Pediatric Psychology, 22*(1), 59-71.

Bruce, B., & Wilfley, D. (1996). Binge eating among the overweight population: A serious and prevalent problem. *Journal of the American Dietetic Association, 96*(1), 58-61.

Bryant-Waugh, R., Cooper, P., Taylor, C., & Lask, B. (1996). The use of the Eating Disorder Examination with children: A pilot study. *International Journal of Eating Disorders, 19*(4), 391-397.

Bryant-Waugh, R., & Lask, B. (1995). Eating disorders in children. *Journal of Child Psychology and Psychiatry, and Allied Disciplines 36*(2), 191-202.

Burrows, A., & Cooper, M. (2002). Possible risk factors for the development of eating disorders in overweight pre-adolescent girls. *International Journal of Obesity, 26*(9), 1268-1273.

Carpenter, K. M., Hasin, D. H., Allison, D. B., & Faith, M. S. (2000). Relationships between obesity and DSM-IV Major Depressive Disorder, suicide ideation, and suicide attempts: Results from a general population study. *American Journal of Public Health, 90*(2), 251-257.

Carper, J. L., Fisher, J. O., & Birch, L. L. (2000). Young girls' emerging dietary restraint *Appetite, 35*(2), 121-129.

Claus, L., Braet, C., & Decaluwé, V. (2006). Dieting history in obese youngsters with and without disordered eating. *International Journal of Eating Disorders, 39*(8), 721-728.

Cochrane, C. E., Brewerton, T. D., Wilson, D. B., & Hodges, E. L. (1993). Alexythymia in eating disorders. *International Journal of Eating Disorders, 14*(2), 219-222.

Cole, D. A., & Martin, N. C. (2005). The longitudinal structure of the Children's Depression Inventory: Testing a latent trait-state model. *Psychological Assessment, 17*(2), 144-155.

Cooley, E., & Toray, T. (2001). Body image and personality predictors or eating disorder symptoms during the college years. *International Journal of Eating Disorders, 30*(1), 28-36.

Crandall, C. S., & Martinez, R. (1996). Culture, idealogy, and antifat attitudes. *Personality and Social Psychology Bulletin, 22*(11), 1165-1176.

Curry, J. F., & Craighead, W. E. (1993). Depression. In T. H. Hollendick & M. Hersen (Eds.), *Handbook of Child and Adolescent Assessment* (pp. 251-268). Needham Heights, MA: Allyn and Bacon.

de Zwaan, M. (2001). Binge eating disorder and obesity. *International Journal of Obesity, 25*(Suppl. 1), S51-S55.

Decaluwé, V., & Braet, C. (2003). Prevalence of binge-eating disorder in obese children and adolescents seeking weight-loss treatment *International Journal of Obesity, 27*, 404-409.

Decaluwé, V., Braet, C., & Fairburn, C. G. (2003). Binge eating in obese children and adolescents. . *International Journal of Eating Disorders, 33*(1), 78-84.

Eberenz, K. P., & Gleaves, D. H. (1994). An examination of internal consistency and factor structure of the Eating Disorders Inventory-2 in a clinical sample. *International Journal of Eating Disorders, 16*(4), 371-379.

Eddy, K. T., Tanofsky-Kraff, M., Thompson-Brenner, H., Herzog, D. B., Brown, T. A., & Ludwig, D. S. (2007). Eating disorder pathology among overweight treatment-seeking youth: Clinical correlates and cross-sectional risk modeling. *Behavior Research and Therapy, 45*(10), 2360-2371.

Edelbrock, C., & Costello, A. J. (1988). Convergence between statistically derived behavior problem syndromes and child psychiatric diagnoses. *Journal of Abnormal Child Psychology, 16*(2), 219-231.

Eisenberg, N., Fabes, R. A., Guthrie, I. K., & Reiser, M. (2000). Dispositional emotionality and regulation: Their role in predicting quality of social functioning. . *Journal of Personality and Social Psychology, 78*(1), 136-157.

Eisenberg, N., Fabes, R. A., Shepard, S. A., Murphy, B. C., Guthrie, I. K., & Jones, S., et al. . (1997). Contemporaneous and longitudinal predication of children's social functioning from regulation and emotionality. *Child Development, 68*(4), 642-664.

Eisenberg, N., Guthrie, I. K., Fabes, R. A., Shepard, S., Losoya, S., & Murphy, B. C., et al. . (2000). Predication of elementary school children's externalizing problem behaviors from attentional and behavioral regulation and negative emotionality. *Child Development, 71*(5), 1367-1382.

Eldredge, K. L., & Agras, S. (1996). Weight and shape overconcern and emotional eating in binge eating disorder *International Journal of Eating Disorders, 19*(1), 73-82.

Erikson, S. J., Robinson, T. N., Haydel, K. F., & Killen, J. D. (2000). Are overweight children unhappy? Body mass index, depressive symptoms, and overweight concerns in elementary school children *Archives of Pediatrics and Adolescent Medicine, 154*, 931-935.

Fairburn, C. G., & Cooper, Z. (1993). The Eating Disorders Examination (12th ed.). In C. G. Fairburn & G. T. Wilson (Eds.), *Binge Eating: Nature, Assessment, and Treatment* (Vol. 12 ed., pp. 317-360). New York: Guilford.

Fairburn, C. G., Cooper, Z., Doll, H. A., Norman, P., & O'Connor, M. (2000). The natural course of bulimia nervosa and binge eating disorder in young women. *Archives of General Psychiatry, 57*(7), 659-665.

Fairburn, C. G., Doll, H. A., Welch, S. L., Hay, P. J., Davies, B. A., & O'Connor, M. E. (1998). Risk factors for binge eating disorder. *Archives of General Psychiatry, 55*(5), 425-432.

Fairburn, C. G., Welch, S. L., Doll, H. A., Davies, B. A., & O'Connor, M. E. (1997). Risk factors for bulimia nervosa. A community-based case-control study. *Archives of General Psychiatry, 54*(6), 509-517.

Faith, M. S., Allison, D. B., & Geliebter, A. (1997). Emotional Eating and Obesity: Theoretical Considerations and Practical Recommendations. In S. Dalton (Ed.), *Overweight and Weight Management: The Health Professional's Guide to Understanding and Practice* (pp. 439-440). Gaithersberg: Aspen Publishers, Inc.

Faith, M. S., Berkowitz, R. I., V.A., S., J., K., M., S., & A.J., S. (2006). Eating in the absence of hunger: A genetic marker for childhood obesity in pre-pubertal boys? *Obesity 14*(1), 131-138.

Faith, M. S., Leone, M. A., Ayers, T. S., Moonseong, H., & Pietrobelli, A. (2002). Weight criticism during physical activity, coping skills, and reported physical activity in children. *Pediatrics, 110*(2), e23.

Faith, M. S., Matz, P. E., & Jorge, M. A. (2002). Obesity-depression associations in the population. *Journal of Psychosomatic Research, 53,* 935-942.

Field, A. E., Austin, S. B., Taylor, C. B., Malspeis, S., Rosner, B., & Rockett, H. R., et al. (2003). Relation between dieting and weight change among preadolescents and adolescents. *Pediatrics, 112*(4), 900-906.

Field, A. E., Camargo, C. A., Taylor, C. B., Berkey, C. S., Frazier, A. L., & Gillman, M. W., et al. (1999). Overweight, weight concerns, and bulimic behaviors among girls and boys. *Journal of the American Academy of Child & Adolescent Psychiatry, 38*(6), 754-760.

Field, A. E., Cook, N. R., & Gillman, M. W. (2005). Weight status in childhood as a predictor of becoming overweight or hypertensive in early adulthood. *Obesity Research, 13*(1), 163-169.

Finkelstein, E. A., Fiebelkorn, I. C., & Wang, G. (2004). State-level estimates of annual medical expenditures attributable to obesity. *Obesity Research, 12*(1), 18-24.

Fisher, J. O., & Birch, L. L. (2002). Eating in the absence of hunger and overweight in girls from 5 to 7 y of age. *The American Journal of Clinical Nutrition, 76*(1), 226-231.

Fisher, J. O., Cai, G., Jaramillo, S. J., Cole, S. A., Comuzzie, A. G., & Butte, N. F. (2007). Heritability of hyperphagic eating behavior and appetite-related hormones among Hispanic children. *Obesity 15*(6), 1484-1495.

Friedman, K. E., Reichman, S. K., Costanzo, P. R., & Musante, G. J. (2002). Body image partially mediates the relationship between obesity and psychological distress. *Obesity Research, 10*(1), 33-41.

Garner, D. M. (1990). *Manual for the Eating Disorder Inventory II*. Odessa, FL: Psychological Assessment Resources.

Garner, D. M. (1991). *Eating Disorders Inventory-2: Professional Manual*. Lutz, FL: Psychological Assessment Resources.

Glasofer, D. R., Tanofsky-Kraff, M., Eddy, K. T., Yanovski, S. Z., Theim, K. R., & Mirch, M. C., et al. (2007). Binge eating in overweight treatment-seeking adolescents. *Journal of Pediatric Psychology,, 32*(1), 95-105.

Goossens, L., Braet, C., & Decaluwé, V. (2007). Loss of control over eating in obese youngsters. *Behavior Research and Therapy, 45*(1), 1-9.

Goran, M. I., Ball, G. D. C., & Cruz, M. L. (2003). Obesity and risk of type 2 diabetes and cardiovascular disease in children and adolescents. *Cardiovascular Endocrinology 2, 88*(4), 1417-1427.

Greeno, C. G., Wing, R. R., & Shiffman, S. (2000). Binge antecedents in obese women with and without binge eating disorder. *Journal of Consulting and Clinical Psychology, 68*(1), 95-102.

Grills, A. E., & Ollendick, T. H. (2003). Multiple informant agreement and the Anxiety Disorders Interview Schedule for Parents and Children. *Journal of the American Academy of Child & Adolescent Psychiatry, 42*(1), 30-40.

Grilo, C. M., Devlin, M. J., Cachelin, F. M., & Yanovski, S. Z. (1997). Report of the National Institutes of Health (NIH) Workshop on the Development of Research Priorities in Eating Disorders. *Psychopharmagology Bulletin, 33*(3), 321-333.

Grilo, C. M., & Masheb, R. M. (2000). Onset of dieting vs binge eating in outpatients with binge eating disorder. *International Journal of Obesity, 24*(4), 404-409.

Hankin, B. L., Abramson, L. Y., Moffitt, T. E., Silva, P. A., McGee, R., & Angell, K. E. (1998). Development of depression from preadolescence to young adulthood: Emerging gender differences in a 10-year longitudinal study. *Journal of Abnormal Psychology, 107*(1), 128-140.

Harriss, M. B., Washull, S., & Walters, L. (1990). Feeling fat: Motivations, knowledge, and attitudes of overweight women and men. *Psychological Reports, 3*, 1191-1202.

Heatherton, T. F., & Baumeister, R. F. (1991). Binge eating as escape from self-awareness. *Psychological Bulletin, 110*(1), 86-108.

Heo, M., Pietrobelli, A., Fontaine, K. R., Sirey, J. A., & Faith, M. S. (2006). Depressive mood and obesity in US adults: Comparison and moderation by sex, age, and race. *International Journal of Obesity, 30*, 513-519.

Hill, J. O., Melby, C., Johnson, S. L., & Peters, J. C. (1995). Physical activity and energy requirements. *American Journal of Clinical Nutrition, 62*(5S), 1059S-1066S.

Hollingshead, A. (1975). *Four factor index of social status*. New Haven, CT: Yale University.

Iancu, I., Cohen, E., Ben Yehuda, Y., & Kotler, M. (2006). Treatmetn of eating disorders improves eating symptoms but not alexythymia and dissociation proneness. *Comprehensive Psychiatry, 47*(3), 189-193.

Jansen, A., Havermans, R., Nederkoorn, C., & Roefs, A. (2008). Jolly fat or sad fat? Subtyping non-eating dsiordered overweight and obesity along an affect dimension. *Appetite, In press*.

John, U., Meyer, C., Rumpf, H.-J., & Hapke, U. (2005). Relationships of psychiatric disorders with overweight and obeisty in an adult general population. *Obesity Research, 13*, 101-109.

Johnson, W. G., Carr-Nangle, R. E., Nangle, D. W., Antony, M. M., & Zayfert, C. (1997). What is binge eating? A comparison of binge eater, peer, and professional judgements of eating episodes. *Addictive Behaviors, 22*(5), 631-635.

Johnson, W. G., Grieve, F. G., Adams, C. D., & Sandy, J. (1999). Measuring binge eating in adolescents: Adolescent and parent versions of the questionnaire of eating and weight patterns *International Journal of Eating Disorders, 26*(3), 301-314.

Johnson, W. G., Rohan, K. J., & Kirk, A. A. (2002). Prevalence and correlates of binge eating in white and African American adolescents. *Eating Behaviors, 3*(2), 179-189.

Kazdin, A., & Peiti, T. (1982). Self-report and interview measures of childhood and adolescent depression. *Journal of Child Psychology and Psychiatry, 23*(4), 437-457.

Kenardy, J., Arnow, B., & Agras, S. (1996). The aversiveness of specific emotional states associated with binge-eating in obese subjects. *Australian and New Zealand Journal of Psychiatry, 30*(6), 839-844.

Kessler, H., Schwarze, M., Filipic, S., Traue, H. C., & von Wietersheim, J. (2006). Alexithymia and facial emotion recognition in patients with eating disorders. *International Journal of Eating Disorders, 39*(3), 245-251.

Killen, J. D., Barr-Taylor, C., Hayward, C., Farish Haydel, K., Wilson, D. M., & Hammer, L., et al. (1996). Weight concerns influence the development of eating disorders: A 4-year prospective study. *Journal of Consulting and Clinical Psychology, 64*(5), 936-940.

Kopelman, P. G. (2000). Obesity as a medical problem. *Nature, 404*, 635-614.

Kotler, L. A., Cohen, P., Davies, M., Pine, D. S., & Walsh, B. T. (2001). Longitudinal relationships between childhood, adolescent, and adult eating disorders. *Journal of the American Academy of Child & Adolescent Psychiatry, 40*(12), 1434-1440.

Kovacs, M. (1995). The Children's Depression Inventory (CDI). *Psychopharmacology Bulletin, 21*, 995-998.

Kroke, A., Manz, F., Kersting, M., Remer, T., Sichert-Hellert, W., & Alexy, U., et al. (2004). The DONALD study: History, current status, and future perspectives. *European Journal of Nutrition, 43*(1), 45-54.

Kuczmarski, R. J., Ogden, C. L., Guo, S. S., Grummer-Strawn, L. L., Flegal, K. M., & Mei, Z., et al. (2002). 2000 CDC growth charts for the United States: Methods and development. *Vital Health Statistics, 11*(246), 1-190.

Lamertz, C. M., Jacobi, C., Yassouridis, A., Arnold, K., & Henkel, A. W. (2002). Are obese adolescents and young adults at higher risk for mental disorders? A community survey. *Obesity Research, 10,* 1152-1160.

Latner, J. D., & Stunkard, A. J. (2003). Getting worse: The stigmatization of obese children. *Obesity Research, 11*(3), 452-456.

Lawson, R., Emanuelli, F., Sines, J., & Waller, G. (2008). Emotional awareness and core beliefs among women with eating disorders. *European Eating Disorders Review, 16*(2), 155-159.

Levine, M. D., Ringham, R. M., Kalarchian, M. A., Wisniewski, L., & Marcus, M. D. (2006). Overeating among seriously overweight children seeking treatment: Results of the children's eating disorder examination. *International Journal of Eating Disorders, 39*(2), 135-140.

Luby, J. L., Heffelfinger, A. K., Mrakotsky, C., Hessler, M., Brown, K., & Hildebrand, T. (2002). Preschool Major Depressive Disorder: Preliminary Validation for Developmentally Modified DSM-IV Criteria. *Journal of the American Academy of Child & Adolescent Psychiatry, 41*(8), 928-937.

Marcus, M. D., & Kalarchian, M. A. (2003). Binge eating in children and adolescents. *International Journal of Eating Disorders, 34*(S1), S47-S57.

Marcus, M. D., Moulton, M. M., & Greeno, C. G. (1995). Binge eating onset in obese patients with binge eating disorder *Addictive Behaviors, 20*(6), 747-755.

Marshall, W. A., & Tanner, J. M. (1969). Variations in pattern of pubertal changed in girls. *Archives of Disorders of Childhood, 44*(235), 291-303.

Marshall, W. A., & Tanner, J. M. (1970). Variations in pattern of pubertal changes in boys. *Archives of Disorders of Childhood, 45*(239), 13-23.

Masheb, R. M., & Grilo, C. M. (2006). Emotional overeating and its associations with eating disorder psychopathology among overweight patients with binge eating disorder. *International Journal of Eating Disorders, 39*(2), 141-146.

McCarthy, M. (1990). The thin ideal, depression, and eating disorders in women. *Behavioral Research and Therapy, 28*, 205-218.

McConaughy, S. H. (1993). Advances in empirically based assessment of children's behavioral and emotional problems. *School Psychology Review, 22*(2), 285-307.

Moens, E., & Braet, C. (2007). Predictors of disinhibited eating in children with and without overweight *Behavior Research and Therapy, 45*(6), 1357-1368.

Morgan, C. M., Yanovski, S. Z., Nguyen, T. T., McDuffie, J., Sebring, N., & Jorge, M. R., et al. (2002). Loss of control over eating, adiposity, and psychopathology in overweight children. *International Journal of Eating Disorders, 31*(4), 430-441.

Nauta, H., Hospers, H. J., Jansen, A., & Kok, G. (2000). Cognitions in obese binge eaters and obese non-binge eaters. *Cognitive Therapy and Research, 24*(5), 521-531.

Neumark-Sztainer, D. R. (2005). Can we simultaneously work toward the prevention of obesity and eating disorders in children and adolescents? *International Journal of Eating Disorders, 38*(3), 220-227.

Neumark-Sztainer, D. R., Wall, M. M., Haines, J. I., Story, M. T., Sherwood, N. E., & van den Berg, P. A. (2007). Shared risk and protective factors for overweight and disordered eating in adolescents. *American Journal of Preventative Medicine, 35*(5), 359-369.

Nicholls, D., Chater, R., & Lask, B. (2000). Children into DSM don't go: A comparison of classification systems for eating disorders in childhood and early adolescence. *International Journal of Eating Disorders, 28*(3), 317-324.

Nicholson, J. C., McDuffie, J. R., Bonat, S. H., Russell, D. L., Boyce, K. A., & McCann, S., et al. (2001). Estimation of body fatness by air displacement plethysmorgraphy in african american and white children. *Pediatric Research, 50*(4), 467-473.

O'Brien, G., & Muller, K. E. (1993). In *Applied Analysis of Variance in Behavioral Science* (pp. 297-394). New York: Marcel Dekker.

Ogden, C. L., Carroll, M. D., Curtin, L. R., McDowell, M. A., Tabak, C. J., & Flegal, K. M. (2006). Prevalence of overweight and obesity in the United States. *The Journal of the American Medical Association, 295*(13), 1549-1555.

Ogden, C. L., Carroll, M. D., & Flegal, K. M. (2008). High body mass index for age among US children and adolescents, 2003-2006. *Journal of the American Medical Association, 299*(20), 2401-2405.

Ogden, C. L., Kuczmarski, R. J., Flegal, K. M., Mei, Z., Guo, S., & Wei, R., et al. (2002). Centers for Disease Control and Prevention 2000 growth charts for the United States: Improvements to the 1977 National Center for Health Statistics version *Pediatrics, 109*(1), 45-60.

Pinaquy, S., Chabrol, H., Simon, C., Louvet, J. P., & Barbe, P. (2003). Emotional eating, alexithymia, and binge-eating disorder in obese women. *Obesity Research, 11*(2), 195-201.

Polivy, J., & Herman, C. P. (1985). Dieting and bingeing: A causal analysis. *The American Psychologist, 40*(2), 193-201.

Pratt, E. M., Niego, S. H., & Agras, S. (1998). Does the size of a binge matter? *International Journal of Eating Disorders, 24*(3), 307-312.

Prentice, A. M., & Jebb, S. A. (2001). Beyond body mass index. *Obesity Reviews, 2*(3), 141-147.

Puhl, R., & Brownell, K. D. (2001). Bias, discrimination, and obesity. *Obesity Research, 9*(12), 788-805.

Reas, D. L., & Grilo, C. M. (2007). Timing and sequence of the onset of overweight, dieting, and binge eating in overweight patients with binge eating disorder. *International Journal of Eating Disorders, 40*(2), 165-170.

Robotham, D. R., Schoeller, D. A., Mercado, A. B., Mirch, M., Theim, K. R., & Reynolds, J. C., et al. (2006). Estimates of body fat in children by hologic QDR-2000 and QDR-4500A dual-energy x-ray absorptiometers compared with deuterium dilution. *Journal of Pediatric Gastroenterology and Nutritions, 42*(3), 331-335.

Safer, D. L., Lively, T. J., Telch, C. F., & Agras, W. S. (2002). Predictors of relapse following successful dialectical behavior therapy for binge eating disorder. *International Journal of Eating Disorders, 32*(2), 155-163.

Sarwer, D. B., Thompson, J. K., & Cash, T. F. (2005). Body image and obesity in adulthood. *Psychiatric Clinics of North America, 28*(1), 69-87.

Sarwer, D. B., Wadden, T. A., & Foster, G. D. (1998). Assessment of Body Image Dissatisfaction in Obese Women: Specificity, Severity, and Clinical Significance. *Journal of Consulting and Clinical Psychology, 66651-654*(4).

Scheeringa, M. S., Peebles, C. D., Cook, C. A., & Zeanah, C. (2001). Toward Establishing Procedural, Criterion, and Discriminant Validity for PTSD in Early Childhood. *Journal of the American Academy of Child & Adolescent Psychiatry, 40*(1), 52-60.

Scheeringa, M. S., Zeanah, C. H., Drell, M. J., & Larrieu, J. A. (1995). Two Approaches to the Diagnosis of Posttraumatic Stress Disorder in Infancy and Early Childhood. *Journal of the American Academy of Child & Adolescent Psychiatry, 34*(2), 191-200.

Schmidt, U., Jiwany, A., & Treasure, J. (1993). A controlled study of alexithymia in eating disorders. *Comprehensive Psychiatry, 34*(1), 54-58.

Schwartz, M. B., & Brownell, K. D. (2004). Obesity and Body Image. *Body Image, 1*(1), 43-56.

Schwartz, M. B., & Puhl, R. (2003). Childhood obesity: A societal problem to solve. *Obesity Reviews, 4*(1), 57-71.

Scott, K. M., Bruffaerts, R., Simon, G. E., Alonso, J., Angermeyer, M., & de Girolama, G., et al. (2007). Obesity and mental disorders in the general population: results from the world mental health surveys. *International Journal of Obesity, 32*(1), 192-200.

Shapiro, J. R., Woolson, S. L., Hamer, R. M., Kalarchian, M. A., Marcus, M. D., & Bulik, C. M. (2007). Evaluating binge eating disorder in children: development of the children's binge eating disorder scale (C-BEDS). *International Journal of Eating Disorders, 40*(1), 82-89.

Shunk, J. A., & Birch, L. L. (2004). Girls at risk for overweight at age 5 are at risk for dietary restraint, disinhibited overeating, weight concerns, and greater weight gain from 5 to 9 years. *Journal of the American Dietetic Association, 104*(7), 1120-1126.

Sifneos, P. E. (1973). The prevalence of "alexithymic" characteristics in psychosomatic patients. *Psychotherapy and psychosomatics, 22*(2), 255-262.

Sim, L., & Zeman, J. (2006). The contribution of emotion regulation to body dissatisfaction and disordered eating in early adolescent girls *Journal of Youth and Adolescence, 35*(2), 207-216.

Smith, D. E., Marcus, M. D., Lewis, C. E., Fitzgibbon, M., & Schreiner, P. (1998). Prevalence of binge eating disorder, obesity, and depression in a biracial cohort of young adult. *Annals of Behavioral Medicine, 20*(3), 227-232.

Speranza, M., Loas, G., Wallier, J., & Corcos, M. (2007). Predictive value of alexithymia in patients with eating disorders: A 3-year prospective study. *Journal of Psychosomatic Research, 63*(4), 365-371.

Spielberger, C. D., Edwards, C. D., Lushene, R. E., Montuori, J., & Platzek, D. (1973). *STAIC Preliminary Manual*. Palo Alto, CA: Consulting Psychologists Press.

Spielberger, C. D., Gorsuch, R. L., & Lushene, R. E. (1970). *STAI Manual for the State-Trait Anxiety Inventory ("Self-Evaluation Questionnaire")*. Palo Alto, CA: Consulting Psychologists Press.

Spitzer, R. L., Yanovski, S., Wadden, T., Wing, R., Marcus, M. D., & Stunkard, A. J. (1993). Binge eating disorder: its further validation in a multisite study. *International Journal of Eating Disorders, 13*(2), 137-153.

Spurrell, E. B., Wilfley, D. E., Tanofsky, M. B., & Brownell, K. D. (1997). Age of onset for binge eating: Are there different pathways to binge eating? *International Journal of Eating Disorders, 21*(1), 55-65.

Steinberg, E., Tanofsky-Kraff, M., Cohen, M., Elberg, J., Freedman, R. J., & Semega-Janneh, M., et al. (2004). Comparison of the child and parent forms of the Questionniare on Eating and Weight Patterns in the assessment of childnre's eating-disordered behaviors. *International Journal of Eating Disorders, 36*(2), 183-194.

Stice, E. (1994). Review of the evidence of a sociocultural model of bulimia nervosa and an explanation of the mechanisms of action. *Clinical Psychology Review, 14*(7), 633-661.

Stice, E., Agras, S., & Hammer, L. D. (1999). Risk factors for the emergence of childhood eating disturbances: A five-year prospective study. *International Journal of Eating Disorders, 25*(4), 375-387.

Stice, E., & Agras, W. S. (1998). Predicting onset and cessation of bulimic behaviors during adolescence: A longitudinal grouping analysis. *Behavior Therapy, 29*(2), 257-276.

Stice, E., Cameron, R. P., Killen, J. D., Hayward, C., & Taylor, C. B. (1999). Naturalistic weight-reduction efforts prospectively predict growth in relative weight and onset of obesity among female adolescents. *Journal of Consulting and Clinical Psychology, 67*(6), 967-974.

Stice, E., Presnell, K., & Spangler, D. (2002). Risk factors for binge eating onset in adolescent girls: A 2-year prospective investigation. *Health Psychology, 21*(2), 131-138.

Storch, E. A., & Ledley, D. R. (2005). Peer victimization and psychosocial adjustment in children: Current knowledge and future directions. *Clinical Pediatrics, 44*(1), 29-38.

Storch, E. A., Milsom, V., DeBraganza, N., Lewin, A., Geffken, G., & Silverstein, J. (2007). Peer victimization, psychosocial adjustment, and physical activity in overweight and at-risk-for-overweight youth. *Journal of Pediatric Psychology, 32*(1), 80-89.

Stradmeijer, M., Bosch, J., Koops, W., & Seidel, J. (2000). Family functioning and psychosocial adjustment in overweight youngsters. *International Journal of Eating Disorders, 27*(110-114).

Strauss, R. S. (2000). Childhood obesity and self-esteem. *Pediatrics, 105*(1), e15.

Sullivan, H. (1953). *The interpersonal theory of psychiatry*. New York: W.W. Norton.

Tanofsky-Kraff, M. (2008). Binge Eating Among Children and Adolescents. In E. Jelalian & R. G. Steele (Eds.), *Handbook of Childhood and Adolescent Obesity*: Springer US.

Tanofsky-Kraff, M., Cohen, M. L., Yanovski, S. Z., Cox, C., Theim, K. R., & Keil, M., et al. (2006). A prospective study of psychological predictors of body fat gain among children at high risk for adult obesity *Pediatrics, 117*(4), 1203-1209.

Tanofsky-Kraff, M., Faden, D., Yanovski, S. Z., Wilfley, D. E., & Yanovski, J. A. (2005). The perceived onset of diet and loss of control eating behaviors in overweight children. *International Journal of Eating Disorders, 38*(2), 112-122.

Tanofsky-Kraff, M., Goossens, L., Eddy, K. T., Ringham, R., Goldschmidt, A., & Yanovski, S. Z., et al. (2007). A mulstisite investigation of binge eating behaviors in children and adolescents. *Journal of Consulting and Clinical Psychology, 75*(6), 901-913.

Tanofsky-Kraff, M., Marcus, M. D., Yanovski, S. Z., & Yanovski, J. A. (2008). Loss of control eating disorder in children age 12 years and younger: Proposed research criteria. *Eating Behaviors, 9*(3), 360-365.

Tanofsky-Kraff, M., Morgan, C. M., Yanovski, S. Z., Marmarosh, C., Wilfley, D. E., & Yanovski, J. A. (2003). Comparison of assessment of children's eating disorder behaviors by interview and questionnaire. *International Journal of Eating Disorders, 33*(2), 213-214.

Tanofsky-Kraff, M., Ranzenhofer, L. M., Yanovski, S. Z., Schvey, N., Faith, M., Gustafson, J., et al. (2008). Psychometric properties of a new questionnaire to assess eating in the absence of hunger in children and adolescents *Appetite, 51*(1), 148-155.

Tanofsky-Kraff, M., Theim, K. R., Yanovski, S. Z., Bassett, A. M., Burns, N. P., & Ranzenhofer, L. M., et al. (2007). Validation of the Emotional Eating Scale adapted for use in children and adolescents (EES-C). *International Journal of Eating Disorders, 40*(3), 232-240.

Tanofsky-Kraff, M., Yanovski, S. Z., Schvey, N. A., Olsen, C. H., Gustafson, J., & Yanovski, J. A. (2009). A prospective study of loss of control eating for body weight gain in children at high risk for adult obesity. *International Journal of Eating Disorders, 42*(1), 26-30.

Tanofsky-Kraff, M., Yanovski, S. Z., Wilfley, D. E., Marmarosh, C., Morgan, C. M., & Yanovski, J. A. (2004). Eating disordered behaviors, body fat, and psychopathology in overweight and normal-weight children. *Journal of Counseling and Clinical Psychology, 72*(1), 53-61.

Tanofsky-Kraff, M., Yanovski, S. Z., & Yanovski, J. A. (2005). Comparison of child interview and parent reports of children's disordered eating behaviors. *Eating Behaviors, 6*(1), 95-99.

Taylor, C. B., Sharpe, T. B., Shisslak, C., Bryson, S., Estes, L., & Gray, N., et al. (1998). Factors associated with weight concerns in adolescent girls. *International Journal of Eating Disorders, 24*(1), 31-42.

Teachman B.A., Gapinski K.D., Brownell K.D., Rawlins M., & S., J. (2003). Demonstrations of implicit anti-fat bias: the impact of providing causal information and evoking empathy. *Health Psychology, 22*(1), 68-78.

The McKnight Investigators. (2003). Risk factors for the onset of eating disorders in adolescent girls: Results of the McKnight longitudinal risk factor study. *American Journal of Psychiatry, 160*(2), 248-254.

Turner, H., & Bryant-Waugh, R. (2004). Eating disorder not otherwise specified (EDNOS): profiles of clients presenting at a community eating disorder service. *European Eating Disorders Review, 12*(1), 18-26.

Tzischinsky, O., & Latzer, Y. (2006). Sleep-wake cycles in obese children with and without binge eating episodes. *Journal of Paediatrics and Child Health, 42*, 688-693.

Van Strien, T., Schippers, G. M., & Cox, W. M. (1995). On the relationship between emotional and external eating behavior. *Addictive Behaviors, 20*(5), 585-594.

Wardle, J., Volz, C., & Golding, C. (1995). Social variation in attitudes to obesity in children. *International Journal of Obesity and Related Metabolic Disorders: Journal for the International Association for the Study of Obesity, 19*(8), 562-569.

Warschburger, P. (2005). The unhappy obese child. *International Journal of Obesity, 29,* S127-S129.

Weiss, R., Dziura, J., Burgert, T., Tamborlane, W. V., Taksali, S. E., & Yeckel, C. W., et al. (2004). Obesity and the metabolic syndrome in children and adolescents. *New England Journal of Medicine, 350*(2362-2374).

Werrij, M. Q., Mulkens, S., Hospers, H. J., & Jansen, A. (2006). Overweight and obesity: The significance of depressed mood. *Patient Education and Counseling, 62*(1), 126-131.

Whitaker, R. C., Wright, J. A., Pepe, M. S., Seidel, K. D., & Dietz, W. H. (1997). Predicting obesity in young adulthood from childhood and parental obesity. *The New England Journal of Medicine, 337*(13), 869-873.

Wichstrom, L. (2000). Psychological and behavioral factors unpredictive of disorded eating: A prospective study of the general adolesccent population in Norway. *International Journal of Eating Disorders, 28*(1), 33-42.

Wilfley, D. E., Agras, W. S., Telch, C. F., Rossiter, E. M., Schneider, J. A., & Cole, A. G., et al. (1993). Group Cognitive—Behavioral Therapy and Group Interpersonal Psychotherapy for the Nonpurging Bulimic Individual: A Controlled Comparison. *Journal of Consulting and Clinical Psychology, 61*(2), 296-305.

Wilfley, D. E., Bishop, M. E., Wilson, G. T., & Agras, W. S. (2007). Classification of eating disorders: toward DSM-V. *International Journal of Eating Disorders, 40*(S3), S123-S129.

Wilfley, D. E., Pike, K. M., & Striegel-Moore, R. H. (1997). Towards an integrated model of risk for binge eating disorder. *Journal of Gender, Culture, and Health, 2*, 1-3.

Wilfley, D. E., Welch, R. R., Stein, R. I., Spurrell, E. B., Cohen, L. R., & Saelens, B. E., et al. (2002). A Randomized Comparison of Group Cognitive-Behavioral Therapy and Group Interpersonal Psychotherapy for the Treatment of Overweight Individuals With Binge-Eating Disorder *Archives of General Psychiatry, 59*(8), 713-721.

Wilfley, D. E., Wilson, G. T., & Agras, W. S. (2003). The clinical significance of binge eating disorder. *International Journal of Eating Disorders, 34*(Suppl. 1), S96-S106.

Workgroup for the Classification of Eating Disorders in Children and Adolescents (WCEDCA). (2007). Classification of Child and Adolescent Eating Disturbances. *International Journal of Eating Disorders, 40*(S3), S117-S122.

Yanovski, S. Z. (2003). Binge eating disorder and obesity in 2003: Could treating an eating disorder have a positive effect on the obesity epidemic? . *International Journal of Eating Disorders, 34*(S), S117-120.

Yanovski, S. Z., Nelson, J. E., Dubbert, B. K., & Spitzer, R. L. (1993). Association of binge eating disorder and psychiatric comorbidity in obese subjects. *American Journal of Psychiatry, 150*(12), 1472-1479.

Zametkin, A. J., Zoon, C. K., Klein, H. W., & Munson, S. (2004). Psychiatric Aspects of Child and Adolescent Obesity. *Focus, 2*(4), 625-641.

Zonnevylle-Bender, M., Van Goozen, S., Cohen-Kettenis, P. T., Van Elburg, A., De Wildt, M., & Stevelmans, E., et al. . (2004). Emotional functioning in anorexia nervosa patients: Adolescents compared to adults. *Depression and Anxiety, 19*(1), 35-42.