Loss of Control Over Eating, Adiposity, and Psychopathology in Overweight Children

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Abstract: **Objective:** *To investigate the relationship between loss of control over eating, adiposity, and psychological distress in a nontreatment sample of overweight children.* **Method:** *Based on self-reports of eating episodes, 112 overweight children, 6–10 years old, were categorized using the Questionnaire of Eating and Weight Patterns–Adolescent Version into those describing episodes of loss of control over eating (LC), and those with no loss of control (NoLC). Groups were compared on measures of adiposity, dieting, and eating behavior, and associated psychological distress.* **Results:** *LC children (33.1%) were heavier and had greater amounts of body fat than NoLC children. They also had higher anxiety, more depressive symptoms, and more body dissatisfaction. 5.3% met questionnaire criteria for BED. Episodes of loss of control occurred infrequently, were often contextual, and involved usual meal foods.* **Discussion:** *As in adults, overweight children reporting loss of control over eating have greater severity of obesity and more psychological distress than those with no such symptoms. It remains unknown whether children who endorse loss of control over eating before adolescence will be those who develop the greatest difficulties with binge eating or obesity in adulthood.* © *2002 by Wiley Periodicals, Inc.* Int J Eat Disord 31: 430–441, 2002.

Key words: *binge eating; obesity; child; race; psychopathology*

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INTRODUCTION

Binge eating is a frequent behavior in overweight adults (Fairburn & Wilson, 1993; Gormally, Black, Daston, & Rardin, 1982; Grisset & Fitzgibbon, 1996; Loro & Orleans, 1981; Marcus, Wing, & Lamparski, 1985; Robertson & Palmer, 1997; Spitzer et al., 1992) and is defined by the consumption of large amounts of food associated with a feeling of loss of control over eating (Fairburn & Wilson, 1993). A smaller proportion of individuals reporting binge eating meet criteria for binge eating disorder (BED), a research diagnostic category of the DSM IV that is characterized by recurrent binge-eating episodes associated with marked distress, but without inappropriate compensatory behaviors. The prevalence of BED in obese adults seeking weight loss treatment may be as high as 20% to 30% (Spitzer et al., 1992; 1993) while rates of BED in community samples have been estimated at somewhat less than 3% (Yanovski, 1999).

In adults, binge eating is often associated with obesity (Smith, Marcus, Lewis, Fitzgibbon, & Schreiner, 1998; Telch, Agras, & Rossiter, 1988) and other disturbed eating behaviors. Besides having less ability to control eating behavior (Grisset & Fitzgibbon, 1996; Kuehnel & Wadden, 1994; Wadden, Foster, Letizia, & Wilk, 1993), obese adults reporting binge eating also have greater concerns with body shape and weight (Marcus, Smith, Santilli, & Kaye, 1992; Spitzer et al., 1993; Wilson, Nonas, & Rosenblum, 1993), report an earlier onset of obesity and dieting, and describe a higher percentage of their lifetimes spent on a diet than non-binge eating obese individuals (Brody, Walsh, & Devlin, 1994). Several studies have shown that obese adult binge eaters also report greater psychological distress, particularly depressive symptoms, when compared with obese non-binge eaters (Kolotkin, Revis, Kirkley, & Janick, 1987; Marcus, Wing, & Hopkins, 1988; Telch & Agras, 1993; Yanovski, Nelson, Dubbert, & Spitzer, 1993).

Binge eating is not restricted to adulthood. Its onset is often traced by adults to late childhood or adolescence (Abbott et al., 1998) and surveys of adolescents suggest that it is highly prevalent among teens (Greenfeld, Quinlan, Harding, Glass, & Bliss, 1987). In a questionnaire-based survey of children aged 12 to 22 years, binge eating, defined as "eating large amounts of food without stopping", was reported by 23.5% of junior high girls and 36.3% of high school girls, while boys had rates of 20% and 25%, respectively (Moore, 1988; 1990). In this study, the prevalence of binge eating increased as weight increased. For a nonclinical sample of girls ages 7–13 years assessed with the Children's Eating Attitude Test, 10.4% reported "going on eating binges where [they felt they] might not be able to stop". Younger children were more likely to endorse binge eating than older ones: 16.5% of third graders reported binge episodes, compared to only 6.8% of sixth graders (Maloney, McGuire, Daniels, & Specker, 1989). Despite these high prevalence rates, only a small percentage of adolescents who report binge eating meet criteria for bulimia nervosa (Greenfeld et al., 1987) or BED (Johnson, Grieve, Adams, & Sandy, 1999).

In adolescence, as in adulthood, those with binge eating are more likely to exhibit depressive symptomatology and abnormal eating attitudes or concerns. In one study of overweight adolescents (Berkowitz, Stunkard, & Stallings, 1993), severity of binge eating was positively correlated with both the disinhibition score of the Eating Inventory (Stunkard & Messick, 1985), and with the depressive subscale of the Children's Depression Inventory (Kovacs & Beck, 1977), and was negatively correlated with happiness and satisfaction as measured by the Piers-Harris Self Concept Scale (Piers, 1984).

In summary, the available data suggest that binge eating is reported commonly by preadolescents and adolescents, and that in adolescents, as in adults, it is associated with

increased body weight, disturbed eating attitudes and concerns, and with depressive symptomatology. However, little is known about the nature of binge eating episodes or their associations with psychological distress in younger children. It is also not known whether binge eating affects body composition during middle childhood.

The purpose of this study was to investigate self-reported binge eating behaviors in overweight children. It has been argued that loss of control, and not the amount of food consumed, is the crucial element in binge eating (Pratt, Niego, & Agras, 1998). Because of the exploratory nature of this study, we evaluated self-defined episodes of loss of control, regardless of the presence of objective overeating, in a nontreatment sample of overweight children, and examined the relationship between such episodes and both adiposity and psychological distress. We also obtained children's descriptions of episodes involving loss of control during eating, to better characterize their size, macronutrient composition, and context.

METHODS

Subjects

Subjects were 112 children (60 female and 52 male), ages 6–10 years, with Body Mass Index (BMI) above the 85th percentile for age, race, and sex (Must, Dallal, & Dietz, 1991) who were recruited to participate in metabolic studies at the NIH that did not involve obesity treatment. Subjects were recruited through notices mailed to first- through fifth-grade children in the Montgomery County and Prince Georges County, Maryland school districts and through notices mailed to local family physicians and pediatricians. None of the children were currently undergoing weight loss treatment. All subjects were medication-free for at least 2 weeks before they were studied, and none had significant medical disease. All had normal physical examinations and normal hepatic, renal, and thyroid function. The study was approved by the National Institutes of Health Institutional Review Board. Each subject gave written assent, and a parent gave written consent, for participation in the protocol.

Protocol

Participants were studied at the NIH Warren Grant Magnuson Clinical Center. At one visit, subjects underwent physical examination, a bone age roentgenogram, and measurement of height and weight, as well as a variety of interviews evaluating eating attitudes and behaviors and psychological functioning. Measurement instruments included the Children's Depression Inventory (CDI; Kovacs & Beck, 1977), the State-Trait Anxiety Inventory for Children, A-Trait scale (STAIC; Spielberger, Edwards, Lushene, Montuori, & Platzek, 1973), and the Children's Version of the Eating Attitudes Test (ChEAT; Maloney, McGuire, & Daniels, 1988). Parents completed the Child Behavior Checklist for Ages 4–18 (CBCL/4–18; Achenbach, 1991).

During a subsequent overnight inpatient visit, generally occurring within a few weeks of their initial visit, subjects were assessed using the Questionnaire of Eating and Weight Patterns–Adolescent Version (QEWP-A; Johnson et al., 1999). The QEWP-A differs from the original QEWP (Spitzer et al., 1992) in that simpler synonyms are substituted for more difficult words. In addition, two items from the original QEWP (questions 9 and 12) are combined to form a single, two-part question. Thus, the QEWP-A is a 12-item scale whose

content focuses directly on the behavioral criteria for binge eating disorder and related symptomatology, containing questions on overeating and loss of control, distress related to eating behavior, importance of weight and shape, and compensatory weight control behaviors. The QEWP-A appears to have adequate concurrent validity when correlated to measures of abnormal eating attitudes and depression (Johnson et al., 1999). It also has good test–retest reliability over a 3-week interval, although male's responses seem to be more stable over time than those of females (Johnson, Kvile, & Reed, 2001).

In view of the exploratory nature of this study, we adopted a modified protocol for QEWP-A administration. While the original instructions for the QEWP-A indicate that questions on loss of control should be skipped when episodic overeating is denied, all study subjects were always asked these questions, to identify individuals who endorsed loss of control without endorsing overeating. When the concept of loss of control was not readily understood, the question was expanded into: "It is like when you start to eat, and you eat and eat and eat, and you just can't stop." Second, questions regarding use of inappropriate compensatory methods for weight control were not restricted to the previous 3 months. Whenever overeating or loss of control were endorsed on the QEWP-A, dietary recall was used to obtain descriptions of the most recent episode. Children were asked to describe the foods and drinks consumed and to estimate intake by referring to simple line drawings depictings portions sizes of basic types of food and many frequently used containers (Van Horn et al., 1993). Children were also asked to describe where and when the episode occurred.

Participants also completed questionnaires regarding body dissatisfaction and dieting behaviors. They chose both their actual and ideal body size from among eight silhouettes (Stunkard, Sorenson, & Schulsinger, 1983) and were asked the question, "Have you ever been on a diet?" Children were also asked two additional questions from a demographic and dieting questionnaire developed by Maloney et al. (1989) to solicit children's ideas about self-dieting patterns: "Have you ever wanted to be thin?" and "Have you ever tried to lose weight?"

All questionnaires were orally administered by trained interviewers. Children were allowed to read the written questions while an interviewer read them aloud. Explanations were provided in a standardized manner whenever there was indication a question was not understood. Anthropometric measurements were obtained as previously described (Lohman, Roche, & Martorell, 1988), including measurement of height (measured three times to the nearest 1 mm) by a calibrated stadiometer (Holtain Ltd., Crymmych, Wales) to the nearest 1 mm and weight by calibrated digital scale (Scale-Tronix, Wheaton, IL) to the nearest 0.1 kg. Each subject also underwent a roentgenogram of the left hand and wrist for determination of bone maturity (Greulich & Pyle, 1959), and dual energy xray absorptiometry (DXA, Hologic QDR-2000, Waltham, MA) in the pencil beam mode for determination of body fat mass and lean body mass.

Analysis

Subjects were initially categorized into four groups, based on their answers to the QEWP-A: those who reported at least one episode of overeating associated with loss of control (LC + OE); those who described loss of control alone, without overeating (LC alone); a group who endorsed simple overeating episodes without loss of control (OE) and a no-episode group (NE). No attempt was made by the interviewer to determine if

the self-described episodes involving overeating were objective or subjective in nature. The four groups were then compared on all the other behavioral and anthropometric variables investigated in this study.

Results from these preliminary analyses revealed that this classification system did not yield distinct subgroups. Because the questionnaire methodology did not include a determination of whether binge episodes were objectively large, LC + OE and LC alone differed only in terms of the child's perception of the episode size. Further, LC + OE and LC alone groups were not statistically different in any variable examined in this study, with the exception of higher levels of body dissatisfaction in the LC + OE group (<0.05). OE children, on the other hand, were statistically indistinguishable from NE children. These findings were consistent with the literature suggesting that loss of control should be considered the most relevant parameter in describing binge eating (Johnson, Carr-Nangle, Nangle, Antony, & Zayfert, 1997; Pratt et al., 1998). We therefore recategorized study participants into two groups for analysis: those who reported at least one episode of loss of control, with or without overeating (loss of control—LC); and those who described no loss of control, including episodes of simple overeating (NoLC).

Psychological tests were scored according to their manuals. Energy intake and macronutrient composition of each eating episode were obtained using the Minnesota Nutrition Data System (NDS) Software, Food Database Version 13; Nutrient Database Version 28 developed by the Nutrition Coordinating Center (NCC), University of Minnesota, Minneapolis (Food Database Version 13; Nutrient Database Version 28). Comparisons between groups were performed using analysis of variance. Means ± *SD* are reported, unless otherwise indicated. Bone age was included as a covariate in the analysis of BMI and total body fat to adjust for differences in overall growth, and BMI was used as a covariate in the analysis of CBCL total score, ChEAT, body dissatisfaction, and caloric intake. Chi-square tests were used to analyze categorical data. Differences between groups were considered significant when $p \leq 0.05$.

RESULTS

Thirty seven children (33.1%) reported at least one episode of loss of control, with (17.9%) or without (15.2%) overeating, and were categorized in the loss of control group (LC). The remaining 75 children (66.9%) endorsed simple overeating episodes (14.3%) or reported no eating episodes (52.6%), and were, thus, included in the no-loss of control group (NoLC). Children in these groups did not differ significantly in age, gender distribution, or bone age (Table 1). There was a higher proportion of African American individuals in the LC group than in the NoLC group (Fisher Exact test, $p = 0.041$). To determine the impact of this racial difference, race × group analyses of variance were performed for all continuous variables (data not shown). The race × group interaction term was significant for the analysis of CHEAT scores, but not for any other behavioral or anthropometric correlates investigated in this study and, therefore, race was included as a factor in the ChEAT ANOVA model presented.

Analysis of covariance, adjusting for bone age (Table 1), revealed that BMI was greater in LC children than NoLC (LC 27.9 ± 4.2; NoLC 24.6 ± 4.2, $p < 0.001$). BMI differences were largely due to differences in total body fat mass (LC 25.6 ± 7.5; NoLC 21.3 ± 7.5, $p = 0.006$).

Table 1. Children were categorized into those describing episodes of loss of control during eating (LC) and those who did not describe episodes of loss of control (NoLC)

	LC (37)	NoLC (75)	Statistic	*P*
Age (y)	8.3 ± 1.5	8.7 ± 1.4	$F = 1.9$	n.s.
Gender				
Female *N* (%)	22 (59.5)	38 (50.7)	Fisher Exact Test	n.s
Male *N* (%)	15 (40.5)	37 (49.3)		
Race				
Black *N* (%)	21 (56.8)	26 (34.7)	Fisher Exact Test	0.41
White *N* (%)	16 (43.2)	49 (65.3)		
Bone age (y)	9.8 ± 2.2	10.0 ± 2.0	$F = 0.2$	n.s.
BMI (Kg/h^2)	27.9 ± 4.2	24.6 ± 4.2	$F = 14.5$	$p < 0.001$
DXA fat mass[a] (Kg)	25.6 ± 7.5	21.3 ± 7.5	$F = 7.9$	$p = 0.006$

[a]Sample sizes for DXA fat mass were: LC (35); No LC (73).

Psychological Ratings

Because we anticipated that some differences in psychological variables could be related to differences in BMI, we explored the relationship between BMI and all psychological ratings used in this study. BMI was correlated with CBCL total score, body dissatisfaction, ChEAT scores, and caloric content of eating episodes and was included as a covariate for these analyses. When compared to NoLC (Table 2), LC children had more anxious tendencies as measured by the Spielberger Trait Anxiety Scale (LC 40.3 ± 6.2; NoLC 36.0 ± 7.1, $p = 0.002$) and more depressive symptoms as measured by the CDI total score (LC 10.7 ± 7.1; NoLC 6.8 ± 5.6, $p = 0.002$) and by the Negative Mood subscale (LC 2.5 ± 2.1; NoLC 1.4 ± 1.4, $p = 0.002$). Parent reports of behavior on the Child Behavior Checklist were not different between groups.

Eating Attitudes were examined with the ChEAT. The significant race × group interaction suggested that that differences in race distribution might be important determinants of variations in the ChEAT scores, with African American children in the LC group presenting more eating and dieting concerns and disturbed attitudes than the African Americans in the NoLC group (African American LC 16.3 ± 7.9; African American NoLC 9.4 ± 7.9, $p = 0.005$). Differences between LC and NoLC White children did not reach statistical significance. Body dissatisfaction, assessed by differences between silhouettes

Table 2. Psychological ratings of children describing episodes of loss of control during eating (LC) and of children who did not describe episodes of loss of control (NoLC)

	LC (37)	NoLC (75)	*F*	*P*
Trait anxiety	40.3 ± 6.2	36.0 ± 7.1	9.9	$p = 0.002$
CD total	10.7 ± 7.1	6.8 ± 5.6	10.0	$p = 0.002$
CDI neg. mood	2.5 ± 2.1	1.4 ± 1.4	10.3	$p = 0.002$
CBCL competence	16.4 ± 3.2	17.8 ± 3.8	3.3	n.s.
CBCL total score	31.8 ± 18.1	28.6 ± 18.0	0.7	n.s.
ChEAT	12.8 ± 6.9	8.9 ± 7.1	7.8	Group, $p = 0.006$
			4.1	Group × Race, $p = 0.044$
Body dissatisfaction	2.2 ± 1.3	1.6 ± 1.3	4.0	$p = 0.048$

[a]Sample sizes for: Spielberger Trait Anxiety Scale and ChEAT: No LC (74); for CBCL Total Competence and Total Score: LC (35)

representing current and ideal body weight, was significantly higher in the LC group (LC 2.2 ± 1.3; NoLC 1.6 ± 1.3, $p = 0.048$).

Features Associated With Disordered Eating

Features associated with disordered eating were examined through questions from the QEWP-A (Table 3). More LC children (62.2%) than NoLC children (32.0%, $p = 0.004$) considered weight and body shape to be of marked importance for self-esteem. More than 70% of subjects in each group endorsed distress regarding eating too much, including those in the NoLC group (Table 3).

When asked if they had had ever tried to lose weight, the great majority of subjects in both groups responded positively. About 50% of the children said they had actually dieted to lose weight, and there were no differences between the groups in endorsing this item. Use of compensatory behaviors was infrequent as a whole, but significantly more LC children reported ever exercising for more than 1 hour, at least once a week, exclusively to control weight (LC 29.7%, NoLC 6.7%, $p = 0.003$). In the LC group, one child reported frequent vomiting and fasting for the purpose of inducing weight loss, one child reported vomiting once a week, and another reported occasional fasting, while no such behaviors were reported by NoLC children.

Eating Episodes

Forty-three descriptions of eating episodes were obtained, 33 of loss of control from LC children (18 of loss of control associated with self-reported overeating and 15 of loss of control alone, without self-reported overeating), and 10 of simple overeating episodes (OE) from NoLC children (Table 4). Exploratory regression analysis indicated that (as expected) BMI was significantly correlated with caloric intake, and BMI was therefore included as a covariate in this analysis. Even after adjusting for BMI, overeating episodes with no loss of control had significantly higher caloric intake than LC episodes (Fig. 1, OE 1968.7 ± 708.7 kcal; LC 1055.9 ± 708.8 kcal, $p = 0.001$). Caloric content of both types of LC episodes, i.e., those associated with the self-perceived ingestion of an unusually large

Table 3. Features associated with disordered eating in children describing episodes of loss of control during eating (LC) and those who did not describe episodes of loss of control (No LC)

	LC (37) *N* (%)	NoLC (75) *N* (%)	Fisher Exact Test *P*
Weight and shape "pretty important" or "very important" for self-evaluation	23 (62.2)	24 (32.0)	0.004
Distress regarding eating too much	25 (73.5)	36 (75.0)	n.s.
Distress regarding loss of control	30 (81.1)	N/A	N/A
Weight loss efforts			
Exercise >1 h, at least 1/week	11 (29.7)	5 (6.7)	0.003
Dieted	20 (54.0)	30 (40.0)	n.s.
Wanted to be thinner	31 (83.8)	55 (74.3)	n.s.
Tried to lose weight	32 (86.5)	59 (79.7)	n.s

[a]Sample sizes for Distress Regarding Eating Too Much were: LC (34); NoLC (48). Sample size for "Wanted to be thinner" and "Tried to lose weight" was: NoLC (74). N/A, not applicable.

Table 4. Nutritional composition of eating episodes in 33 children who described episodes of loss of control during eating (LC) and in the 10 children that reported simple overeating episodes without loss of control (OE)

	LC (33)	OE (10)	*F*	*P*
Energy intake (Kcal)	1055.9 ± 708.8	1968.7 ± 708.7	12.7	0.001
% Fat	37.4 ± 12.4	39.8 ± 6.7	0.3	n.s.
% Protein	15.1 ± 7.4	20.6 ± 8.9	3.9	0.056
% Carbohydrate	49.4 ± 16.5	39.9 ± 13.01	2.7	n.s.

amount of food (LC + OE) and those without it (LC alone), varied widely, ranging from 19 to 3000 calories. Macronutrient composition of eating episodes was not significantly different among groups, but OE episodes tended to have a higher percentage of protein than LC episodes (percentage of calories from protein: LC 15.1 ± 7.4%, OE 20.6 ± 8.9%, $p = 0.056$; percentage of calories from fat: LC 37.4 ± 12.4%, OE 39.8 ± 6.7%; percentage of calories from carbohydrate: LC 49.4 ± 16.5%, OE 39.9 ± 13.1%). Thirty-six (81.8%) of all reported episodes occurred at a usual meal time, seven (15.9%) occurred at a snack time, and only one (2.3%) was secretive. Episodes were often described as taking place at a special occasion, such as a holiday, a party, or during a meal at a restaurant (Table 4). Subjects reporting episodes of loss of control were equally likely to report episodes during meals for special occasions as during meals on routine days, while most overeating episodes occurred during a special occasion, but this difference did not reach statistical significance (Fisher Exact Test, $p = 0.067$). Frequency of episodes tended to be low, with no significant differences between the groups. Half the reported episodes (58.8%) took place less than once per week. Nine children (18.8%) reported episodes

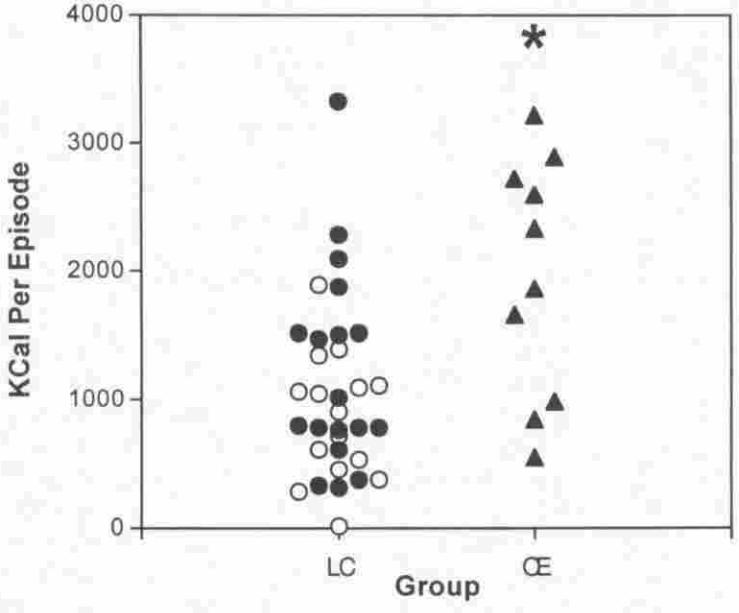

Figure 1. Caloric content of eating episodes in subjects endorsing both loss of control and overeating (●), loss of control alone (○), and overeating alone (▲). LC, loss of control; OE, overeating. *$p = 0.001$.

occurring more than once per week and only six (5.3%) met questionnaire criteria for BED, with episodes taking place at least twice per week.

DISCUSSION

We assessed self-reported binge eating behaviors and their physical and behavioral correlates in a nontreatment sample of overweight children, finding that those reporting at least one episode of loss of control over eating, regardless of the presence of self-defined overeating, were heavier and had higher scores on scales of anxiety, depression, body dissatisfaction, and disturbed eating attitudes than those not reporting loss of control. Episodes of loss of control were described by 33% of overweight children 6–10 year olds, of whom 15% did not perceive their eating during the episode as unusually large. The behavior of children endorsing loss of control but not overeating may be of special interest because it has been argued that loss of control is the most important component defining binge eating (Johnson et al., 1997; Pratt et al., 1998). Such children were statistically indistinguishable from those who endorsed loss of control associated with overeating, in terms of weight status and levels of general psychopathology. Six children (5.3%) met questionnaire criteria for BED. Because at least some of the episodes elicited by the QEWP-A might not meet strict criteria for objective binge episodes, a prevalence for BED of 5.3% in overweight children may prove to be an overestimate of the actual number of children meeting criteria for binge eating disorder.

Overweight African American children in this study had higher levels of disturbed eating attitudes as measured by the ChEAT and reported more episodes of loss of control than White children. However, such episodes were associated with adiposity and psychological distress in both White and African American children. It is unclear whether at least some of the greater indices of disturbed eating in African Americans, could be secondary to a differential response to the instrument, which has primarily been validated in Whites. Although eating disorders have been classically described as more prevalent in Whites, there is evidence suggesting that binge eating is a very significant problem in adult and adolescent African American populations (Childress, Brewerton, Hodges, & Jarrel, 1993; Striegel-Moore et al., 2000). African American children and adolescents are more likely to be overweight than Whites (Troiano & Flegal, 1998). Longitudinal studies are needed to determine if dysfunctional eating attitudes or behaviors play an role in the development of obesity in this group.

Some (Moore, 1988; 1989; Spitzer et al., 1992; Telch et al., 1988) but not all (De Zwaan, Nutzinger, & Schoenbeck, 1994; Striegel-Moore, Wilson, Wilfley, Elder, & Brownell, 1998) previous studies, have reported positive associations between BMI and binge eating. We found that overweight children who report episodes of loss of control not only have greater body weight, and BMI but also have greater adiposity (determined by DXA) than those with no loss of control, regardless of the presence of overeating. We also found that the association between binge eating and depressive symptoms in adults (Telch & Agras, 1993) and adolescents (Berkowitz et al., 1993; Johnson et al., 1999) also holds true for overweight children who report episodes of loss of control. Not only do LC children have more depressive symptoms, particularly negative mood, than NoLC, but they also have more anxious traits. As with adults, LC children also have higher degrees of associated eating pathology, as evidenced by their greater body dissatisfaction, even after adjustment for differences in BMI, and by considering weight and shape more important for their self-esteem than NoLC children.

We found few differences in the reported dieting behaviors of those who did, and did not, endorse loss of control. Although dieting was defined for children as "eating less than you would like in order to lose weight," we did not determine whether subjects were actually successful in restricting calories for any length of time. Therefore, the true prevalence of caloric restriction and its association with loss of control cannot be determined from this study. We did find, however, that half of LC children did not report ever having attempted to diet, and that there was no relationship between reporting having attempted dieting and reporting episodes of loss of control.

The episodes of loss of control described by study children occurred either on special occasions such as holidays and meals at restaurants, or on routine days and consisted of usual meal foods consumed at meals. In contrast to typical adult binge eating episodes, only one episode was secretive. Children's descriptions of simple overeating episodes were similar to the "feasting" episodes previously described in adolescents (Neumark-Sztainer & Story, 1998). They were large in terms of caloric intake and tended to occur more often on special occasions than loss of control episodes. Studies following children through adolescence may help to determine how eating episodes associated with loss of control change with maturity and to characterize fully the relationship between reported episodes of overeating or loss of control and body weight.

The results of this study are limited by the exclusive use of self-report questionnaires for the diagnosis of binge eating behaviors in young children. There may also be limitations in the ability of young children to understand the concepts utilized in these instruments, including the concepts of "a large amount of food" and "diet". To address these limitations, all questionnaires were orally administered by trained interviewers and explanations were provided whenever there was indication that the questions were not understood. Nevertheless, future studies using structured clinical interviews should be carried out to verify these findings.

We conclude that few overweight children meet criteria for binge eating disorder, but those reported even one episode with loss of control over eating have greater adiposity, more anxiety, more depressed mood, and greater body dissatisfaction than those not endorsing loss of control, whether or not they perceive their eating during that episode as excessive. It remains unknown whether young children who endorse loss of control over eating will be those who develop the greatest difficulties with binge eating or obesity in adulthood.

REFERENCES

Abbott, D.W., de Zwaan M., Mussell, M.P., Raymond, N.C., Seim, H.C., Crow, S.J., Crosby, R.D., & Mitchell, J.E. (1998). Onset of binge eating and dieting in overweight women: implications for etiology, associated features and treatment. Journal of Psychosomatic Research, 44, 367–374.

Achenbach, T.M. (1991). Manual for the Child Behavior Checklist/4–18 and 1991 profile. Burlington, VT: University of Vermont Department of Psychiatry.

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

Brody, M.L., Walsh, B.T., & Devlin, M.J. (1994). Binge eating disorder: reliability and validity of a new diagnostic category. Journal Consulting Clinical Psychology 62, 381–386.

Childress A.C., Brewerton, T.D., Hodges, E.L., & Jarrel, M.P. (1993). The Kids' Eating Disorders Survey (KEDS): A study of middle school students. Journal of the American Academy of Child and Adolescent Psychiatry, 32, 843–850.

De Zwaan, M., Nutzinger, D.O., & Schoenbeck G. (1994). Binge eating in overweight women. Comprehensive Psychiatry, 33, 256–261

Fairburn, C.G., & Wilson, G.T. (1993). Binge eating, definition and classification. In: Fairburn, C.G., & Wilson, G.T. (Eds.), Binge eating, nature, assessment and treatment (pp. 3–14). New York: Guilford Press.

Gormally, J., Black, S., Daston, S., & Rardin, D. (1982). The assessment of binge eating severity among obese persons. Addictive Behaviors, 7, 47–55.
Greenfeld, D., Quinlan, D.M., Harding, P., Glass, E., & Bliss, A. (1987). Eating behavior in an adolescent population. International Journal of Eating Disorders, 6, 99–111.
Greulich, W.W., & Pyle, S.I. (1959). Radiographic atlas of skeletal development of the hand and wrist. Stanford: Stanford University Press.
Grisset, N.I., & Fitzgibbon, M.L. (1996). The clinical significance of binge eating in an obese population: Support for BED and questions regarding its criteria. Addictive Behaviors, 21, 57–66.
Johnson, W.G., Kirk, A.A. & Reed A.E. (2001). Adolescent version of the questionnaire of eating and weight patterns: Reliability and gender differences. International Journal of Eating Disorders, 29, 94–96.
Johnson, W.G., Grieve, F.G., Adams C.D., & Sandy, J. (1999). Measuring binge eating in adolescents: Adolescent and parent version of the questionnaire of eating and weight patterns. International Journal of Eating Disorders, 26, 301–314.
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, 631–635.
Kolotkin, R.L., Revis, E.S., Kirkley, B.G., & Janick, L. (1987). Binge-eating in obesity: Associated MMPI characteristics. Journal Consulting and Clinical Psychology, 55, 872–876.
Kovacs, M., & Beck, A.T. (1977). An empirical-clinical approach toward a definition of childhood depression. Em Schulterbrandt, J.G., & Raskin, A. (Eds), Depression in childhood: diagnosis, treatment, and conceptual models. New York: Raven.
Kuehnel, R.H., & Wadden, T.A. (1994). Binge eating disorder, weight cycling, and psychopathology. International Journal of Eating Disorders, 15, 321–329.
Lohman T.G., Roche A.F., & Martorell R. (1988). Anthropometric standardization reference manual Champaign IL: Human Kinetics Publishers, Inc.
Loro, A.D., & Orleans, C.S. (1981). Binge-eating in obesity: preliminary findings and guidelines for behavioral analysis and treatment. Addictive Behaviors, 6, 155–166.
Maloney, M.J., McGuire, J.B., Daniels, S.R., & Specker, B. (1989). Dieting behavior and attitudes in children. Pediatrics, 84, 482–489.
Maloney, M.J., McGuire, J.B., & Daniels, S.R. (1988). Reliability testing of the children's version of the Eating Attitudes Test. Journal of the American Academy of Child and Adolescent Psychiatry, 27, 541–543.
Marcus, M.D., Smith D., Santilli R., & Kaye, W. (1992). Characterization of eating disordered behavior in obese binge eaters. International Journal of Eating Disorders, 12, 249–255.
Marcus M.D., Wing R.R., & Hopkins, J. (1988). Obese binge eaters: Affect, cognitions, and response to behavioral weight control. Journal of Consultant and Clinical Psychology, 56, 433–439.
Marcus, M.D., Wing R.R., & Lamparski D.M. (1985). Binge eating and dietary restraint in obese patients. Addictive Behaviors, 10, 163–168.
Moore D.C. (1990). Body image and eating behavior in adolescent boys. American Journal of Diseases of Childhood, 144, 475–479.
Moore D.C. (1988). Body image and eating behavior in adolescent girls. American Journal of Diseases of Childhood, 142, 1114–1118.
Must, A., Dallal, G.E., & Dietz, W.H. (1991) Reference data for obesity: 85th and 95th percentiles of body mass index (wt/ht2) and triceps skinfold thickness. American Journal of Clinical Nutrition, 53, 839–846.
Neumark-Sztainer, D., & Story, M. (1998). Dieting and binge eating among adolescents: What do they really mean? Journal of the American Dietetic Association, 98, 446–450.
Piers E.V. (1984). Piers-Harris Children's Self-Concept Scale, Revised Manual. Los Angeles, CA:Western Psychological Services.
Pratt E.M., Niego, S.H., & Agras, W.S. (1998). Does the size of a binge matter? International Journal of Eating Disorders, 24, 307–312.
Robertson D.N., & Palmer R.L. (1997). The prevalence and correlates of binge-eating in a British community sample. International Journal of Eating Disorders, 22, 323–327.
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 adults. Annals of Behavioral Medicine, 20, 227–232.
Spielberger , C.D., Edwards, C.D., Lushene, R.E., Montuori, J., & Platzek, D. (1973). STAIC Preliminary Manual. Palo Alto, CA: Consulting Psychologist Press, Inc.
Spitzer, R.L., Yanovski, S., Wadden, T., Wing, R., Marcus, M.D., Stunkard, A., Devlin M., Mitchell, J., Hasin, D., & Horne, R.L. (1993). Binge eating disorder: Its further validation in a multisite study. International Journal of Eating Disorders, 13, 137–153.
Spitzer, R.L., Devlin, M., Walsh, T.B., Hasin, D., Wing, R., Marcus, M., Stunkard, A., Wadden, T., Yanovski, S., Agras, S., Mitchel, J., & Nonas, C. (1992). Binge eating disorder: A multisite field trial of the diagnostic criteria. International Journal of Eating Disorders, 11, 191–203.
Striegel-Moore R.H., Schreiber G.B., Lo A., Crawford P., Obarzanek E., & Rodin J. (2000). Eating disorder symptoms in a cohort of 11 to 16-year-old Black and White girls: The NHLBI growth and health study. International Journal of Eating Disorders, 27, 49–66.

Striegel-Moore R.H., Wilson T.G., Wilfley D.W., Elder K.A., & Brownell K.D. (1998). Binge eating in an obese community sample. International Journal of Eating Disorders, 23, 27–37.
Stunkard, A.J., Messick S. (1985). The three-factor eating questionnaire to measure dietary restraint, disinhibition and hunger. Journal of Psychosomatic Research, 29, 71–83.
Stunkard, A.J., Sorenson, T.I., & Schulsinger, F. (1983). Use of the Danish Adoption Register for the study of obesity and thinness. In Kety, S., Rowland, L.P., Sidman, R.L., & Mathysse, S.W. (Eds), The genetics of neurological and psychiatric disorders (pp. 115–120). New York: Raven Press.
Telch C.F., & Agras S.W. (1993). Obesity, binge eating and psychopathology: Are they related? International Journal of Eating Disorders, 15, 53–61.
Telch C.F., Agras, S.W., & Rossiter E.M. (1988). Binge eating increases with increasing adiposity. International Journal of Eating Disorders, 7, 115–119.
Troiano, R.P., Flegal, K.M. (1998). Overweight children and adolescents: Description, epidemiology, and demographics. Pediatrics, 101(3 Supp), 497–504.
VanHorn, L.V., Stumbo, P., MoagStahlberg, A., Obarzanek, E., Hartmuller, V.W., Farris, R.P., Kimm, S.Y.S., Frederick, M., Snetselaar, L., & Liu, K. (1993). The dietary intervention study in children (DISC): Dietary assessment methods for 8- to 10-year-olds. Journal of the American Dietetic Association, 93, 1396–1403.
Wadden, T.A., Foster, G.D., Letizia, K.A., Wilk, J.E. (1993). Metabolic, anthropometric, and psychological characteristics of obese binge eaters. International Journal of Eating Disorders, 14, 17–25.
Wilson, G.T., Nonas, C.A., Rosenblum, G.D. (1993). Assessment of binge eating in obese patients. International Journal of Eating Disorders, 13, 25–33.
Yanovski, S.Z. (1999). Diagnosis and prevalence of eating disorders in obesity. In Ailhaud G, Guy-Grand B, et al., (Eds.), Progress in Obesity Research: 8 (pp. 229–236). London: John Libby & Co.
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, 1472–1479.