



Research report

Pre-meal affective state and laboratory test meal intake in adolescent girls with loss of control eating[☆]

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ABSTRACT

Loss of control eating confers risk for excess weight gain and exacerbated disordered eating. Affect theory proposes that loss of control eating is used to cope with negative mood states. Self-report data suggest that negative affect may contribute to the etiology of loss of control eating, but this theory has not been well-tested using laboratory paradigms. We examined associations between pre-meal affective states and intake during a laboratory test meal. One-hundred and ten adolescent girls with reported loss of control eating whose body mass index fell between the 75th and 97th percentile for age and sex completed state mood ratings prior to a test-meal. Results indicated that pre-meal state negative affect was associated with greater carbohydrate and less protein consumption, as well as greater snack and dessert and less fruit and dairy intake. All girls experienced significant decreases in negative affect from pre- to post-meal, but intake during the meal was unassociated with post-meal affect. In support of affect theory, negative affective states reported among girls with loss of control may be a driving factor for increased energy-dense food intake, which may play a role in excess weight gain.

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Introduction

Loss of control (LOC) eating, defined as the subjective experience of being unable to stop eating or control what or how much one is eating, is prevalent among overweight youth (Tanofsky-Kraff, 2008). In contrast with classic binge eating episodes that require the consumption of a large amount of food, LOC eating encompasses episodes during which a lack of control is experienced but the amount consumed is ambiguously large. LOC eating in youth is associated with emotional distress including more depressive symptoms, greater internalizing symptoms, and the

use of less adaptive emotion regulation strategies (Czaja, Rief, & Hilbert, 2009; Hilbert & Czaja, 2009; Johnson, Rohan, & Kirk, 2002; Tanofsky-Kraff et al., 2004). Children with LOC are heavier (Neumark-Sztainer et al., 1997; Tanofsky-Kraff et al., 2004) and gain excess weight and body fat over time (Sonneville et al., 2012; Tanofsky-Kraff et al., 2006; Tanofsky-Kraff, Yanovski, et al., 2009). Furthermore, LOC prospectively predicts worsening eating pathology, including a greater likelihood of developing partial or full-syndrome binge eating disorder (BED) (Tanofsky-Kraff et al., 2011).

One model that has been proposed to explain LOC eating behavior is affect theory (Hawkins & Clement, 1984; Kenardy, Arnow, & Agras, 1996). Affect theory suggests that negative mood states trigger episodes of uncontrolled eating in order to escape from, or alleviate, adverse emotions. This process may constitute a maladaptive strategy because relief is reinforcing, yet oftentimes produces only temporary abatement of the negative mood state (Stein et al., 2007), leading to repeated bouts of eating in order to reduce negative mood.

In support of affect theory are self-report data in adults (Eldredge & Agras, 1996; Masheb & Grilo, 2006; Ricca et al., 2009; Wolfe, Baker, Smith, & Kelly-Weeder, 2009) and children (Czaja

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et al., 2009; Goossens, Braet, & Decaluwe, 2007; Tanofsky-Kraff et al., 2007) linking negative mood states to episodes of LOC. In a laboratory test meal among adults with BED, pre-meal negative affect was found to act as a precipitant to eating episodes accompanied by LOC and labeled as binges (Telch & Agras, 1996). Similarly, ecological momentary assessment studies in adults with BED (Greeno, Wing, & Shiffman, 2000; Stein et al., 2007) and sub-threshold binge eating (Deaver, Miltenberger, Smyth, Meidinger, & Crosby, 2003; Wegner et al., 2002) suggest that negative affect is a common precipitant of binge episodes in the natural environment. Affect theory may also be relevant to understanding LOC eating behavior in children. In a large sample of non-treatment-seeking boys and girls (8–18 years), those with LOC reported worse mood prior to and after eating in the laboratory compared to their counterparts without LOC (Tanofsky-Kraff et al., 2009).

Hypotheses surrounding the specific eating patterns of adults and youth with binge and LOC eating pathology include 1. individuals with binge/LOC eating consume more *overall* energy compared to their non-binge eating, non-LOC counterparts and 2. despite consuming a similar overall amount of food compared to those without binge or LOC eating, those reporting these behaviors exhibit a shift in food preferences toward more highly palatable foods, defined as foods with the following properties: highly energy-dense, and containing relatively high amounts of sugar and fat, and low amounts of protein. The latter hypothesis suggests that even if individuals with binge or LOC eating do not consume more overall energy than non-binge/LOC eating peers at a specific “moment in time,” they may be more prone to weight- and body fat-gain as a result of consuming a diet comprised of a greater proportion of highly-palatable foods (Tanofsky-Kraff, McDuffie, et al., 2009).

Among adults, laboratory studies have generally established that those with BED consume more energy compared to their counterparts without BED (Walsh & Boudreau, 2003; Yanovski et al., 1992). Additionally, women with BED were found to consume a greater proportion of calories from fat, and less from protein (Yanovski et al., 1992). Among children, laboratory findings lend mixed support to the hypotheses that binge eating is associated with greater total and highly-palatable food intake. In a sample of overweight treatment-seeking boys and girls ages 6–12 years, binge eating was associated with greater overall, but not macronutrient, intake (Mirch et al., 2006). Among 8–13 year olds, those with LOC consumed more overall energy, protein, and fat compared to non-LOC peers during a post-meal “snack” array (Hilbert, Tuschen-Caffier, & Czaja, 2010). In a third study among children and adolescents (8–18 years old), LOC youth exhibited a pattern of eating in which they consumed more snack and dessert type foods, greater percent calories from carbohydrates, and fewer percent calories from protein (Tanofsky-Kraff, McDuffie, et al., 2009). In this study, only among overweight girls did those with LOC demonstrate greater overall caloric intake (Tanofsky-Kraff, McDuffie, et al., 2009). Taken together, findings suggest a possible relationship between LOC eating and overall and palatable food intake, yet such associations may be moderated by developmental stage (i.e. adolescence), female sex, or overweight status.

Despite findings indicating that negative affect often precedes “binge” or “LOC” episodes, as well as findings suggesting that individuals with LOC eating may consume more energy-dense, highly palatable foods compared to those without LOC eating, less is known about the foods consumed in response to negative affect among individuals who experience LOC. Among adult women with recurrent binge eating, exposure to a negative mood induction resulted in increased consumption of a highly palatable food, chocolate (Chua, Touyz, & Hill, 2004). Among youth, there is a relative dearth of knowledge in this area, especially as assessed under controlled laboratory paradigms. Among 8–13 year olds, there was minimal evidence to suggest that negative mood contributed to

the prediction of total or macronutrient intake, yet analyses included youth with and without LOC (Hilbert et al., 2010). In contrast, one study suggests that among girls ages 6–12 years who experience LOC, exposure to a sad (versus neutral) mood induction was associated with increased fat intake during a laboratory test meal, despite no relationship between negative affect and overall intake (Goldschmidt, Tanofsky-Kraff, & Wilfley, 2011).

Taken together, findings point to the possibility that negative affect may be associated with increased total intake and/or increased intake of highly-palatable foods. No study has yet examined the relationship between pre-meal affect and intake among adolescent girls reporting LOC eating in the absence of a mood manipulation. The current study aims to add to a dearth of literature among children and adolescents by measuring eating behavior in response to self-reported negative affect among adolescents who endorse the presence of LOC eating. Our objective is to examine the associations between pre-meal state affect and total energy intake and intake of highly palatable foods in a sample of adolescent girls at risk for excess weight gain and BED.

Consistent with affect theory (Hawkins & Clement, 1984; Kenardy et al., 1996), we hypothesized that greater state negative affect prior to a laboratory test meal designed to facilitate disinhibited eating would be associated with greater total energy intake and greater intake of highly-palatable foods. Consistent with data suggesting that intake of palatable foods activates physiological reward pathways that reduce negative feelings (Adam & Epel, 2007), we expected that greater energy intake and greater intake of palatable foods would be associated with greater reductions in negative affect.

Method

Participants

Participants were adolescent girls ages 12–17 years who were recruited for participation in a randomized clinical trial examining the efficacy of group interventions for excess weight gain prevention (ClinicalTrials.gov ID: NCT00680979) at the Uniformed Services University of the Health Sciences (USUHS) and the National Institutes of Health (NIH) in Bethesda, Maryland. All participants were deemed at risk for excess weight gain by virtue of a body mass index (BMI, kg/m²) between the 75th and 97th percentiles and the report of at least one episode of LOC eating in the month prior to assessment. Individuals were excluded if they had a major medical condition (e.g., diabetes), current or lifetime diagnosis of an eating disorder (other than BED), a current severe psychiatric condition (e.g., major depressive disorder, and psychosis), were simultaneously participating in a structured weight loss program or psychotherapy, or were taking medications known to affect body weight or appetite. Additionally, participants were excluded if they were pregnant or had lost more than 5% of their body weight in the 3 months prior to assessment.

Adolescents were recruited through the NIH clinical trials website, local area community flyer postings, and direct mailings to homes within a 50-mile radius of Bethesda, Maryland. The study was approved by the USUHS and Eunice Kennedy Shriver National Institute of Child Health and Human Development institutional review boards. Parents provided written consent for study participation, and all girls provided written assent.

Procedure

Families participated in a preliminary screening visit at USUHS during which LOC eating was assessed. Participants were then seen at the NIH Mark O. Hatfield Clinical Research Center for a second

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