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Research report

Psychometric properties of a new questionnaire to assess eating in the absence of hunger in children and adolescents

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Abstract

Background: Eating in the absence of hunger (EAH), studied in the context of laboratory paradigms, has been associated with obesity and is predictive of excess weight gain in children. However, no easily administered questionnaire exists to assess for EAH in children.
Objective: We developed an Eating in the Absence of Hunger Questionnaire to be administered to children and adolescents (EAH-C) and examined psychometric properties of the measure.
Design: Two-hundred and twenty-six obese (BMI $\geq$ 95th percentile for age and sex, $n = 73$) and non-obese (BMI $<$ 95th percentile, $n = 153$) youth (mean age $\pm$ S.D., 14.4 $\pm$ 2.5 y) completed the EAH-C and measures of loss of control and emotional eating, and general psychopathology. Temporal stability was assessed in a subset of participants.
Results: Factor analysis generated three subscales for the EAH-C: Negative Affect, External Eating, and Fatigue/Boredom. Internal consistency for all subscales was established (Cronbach's alphas: 0.80–0.88). The EAH-C subscales had good convergent validity with emotional eating and loss of control episodes (p's < 0.01). Obese children reported higher Negative Affect subscale scores than non-obese children ($p \leq 0.05$). All three subscales were positively correlated with measures of general psychopathology. Intra-class correlation coefficients revealed temporal stability for all subscales (ranging from 0.65 to 0.70, p's < 0.01). We conclude that the EAH-C had internally consistent subscales with good convergent validity and temporal stability, but may have limited discriminant validity. Further investigations examining the EAH-C in relation to laboratory feeding studies are required to determine whether reported EAH is related to actual energy intake or to the development of excess weight gain. Published by Elsevier Ltd.

Keywords: Eating in the absence of hunger; Obesity; Overweight; Emotional and external eating; Children and adolescents

Introduction

Satiety cues that arise from the gastrointestinal tract are believed to be important in the initiation and termination of eating based upon physiological hunger (Druce & Bloom, 2006). However, because environmental and internal events that are not related to physiological hunger can also trigger eating, children may start to eat, or continue eating, in the absence of physiological hunger. Eating when not physiologically hungry may contribute to excess body weight (Shunk & Birch, 2004).

Eating in the absence of hunger (EAH) was first measured directly among preschool children by determining a child's actual *ad libitum* energy intake after the child had consumed a meal and reported that he or she was full (Fisher & Birch, 2002). Using a similar paradigm in a middle childhood sample, Moens and Braet found that obese boys ate more in the absence of hunger compared to non-obese boys. By contrast, non-obese girls were more likely to eat in the absence of hunger than obese girls (Moens & Braet, 2007). Another study examined 5-y-old boys and girls categorized as high versus low risk for obesity based on maternal pre-pregnancy weight status (Faith et al.,

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2006). EAH was higher among high-risk, compared to low-risk, boys, although no differences were found among girls. In a recent study of 879 Hispanic boys and girls, EAH was suggested to be a heritable trait and was positively associated with obesity and fasting levels of insulin and leptin (Fisher et al., 2007).

In a series of longitudinal studies making use of the same laboratory paradigm, EAH was found to be a stable trait (Birch, Fisher, & Davison, 2003; Fisher & Birch, 2002) and girls of two obese parents had higher levels of and larger increases in EAH over time (Francis, Ventura, Marini, & Birch, 2007). Although Fisher and colleagues did not find EAH to predict weight gain among Hispanic boys and girls, another study (Shunk & Birch, 2004) did find that EAH was predictive of increased weight gain in Caucasian girls ages 5–9 y. Although there are limited data on the prevalence of EAH in children, Moens and Braet reported that almost two-thirds of their sample engaged in EAH, and data suggest that EAH increases with age (Birch et al., 2003).

Given the high prevalence of obesity (Ogden et al., 2006), and promising findings that young children may be trained to better regulate food intake (Johnson, 2000), it would be useful for providers working with children to have a readily available tool for assessing EAH. Although some feeding studies have examined child energy intake in relation to parental eating practices (Tanofsky-Kraff, Haynos, Kotler, Yanovski, & Yanovski, 2007), none has explored the immediate factors that may prompt EAH such as children's emotions or environmental cues. Lastly, the EAH feeding paradigm does not offer insight regarding whether some children may continue to eat past satiation during a meal, a situation that might be distinct from the conditions under which a child may initiate eating when not hungry.

We, therefore, aimed to develop a self-report questionnaire to assess pediatric EAH in response to purported precipitants. Although a number of validated measures that assess eating in response to emotional and/or external cues are available in the literature (Tanofsky-Kraff, Theim, et al., 2007; van Strien, Frijters, Bergers, & Defares, 1986; van Strien & Oosterveld, 2007; Wardle, Guthrie, Sanderson, & Rapoport, 2001), none query specifically about eating when not hungry. The parent-reported Child Eating Behavior Questionnaire (Wardle et al., 2001) ''food responsiveness'' scale includes one item that may assess EAH (''even if my child is full up, s/he finds room to eat her/his favorite food''), however none of the other items on any scale is specific to eating when not hungry. Based on literature that suggests both emotional and external cues serve as potential triggers for overeating (van Strien, Schippers, & Cox, 1995), we chose to examine each of these constructs in a new questionnaire to assess EAH in children: the EAH-C questionnaire. Emotional eating has been defined as ''eating in response to a range of negative emotions such as anxiety, depression, anger, and loneliness to cope with negative affect'' (p. 439) (Faith, Allison, & Geliebter, 1997). Eating in response to negative emotions is reportedly common among children (Tanofsky-Kraff, Theim, et al., 2007), especially those who are obese (Shapiro et al., 2007), and has been linked to loss of control eating (Shapiro et al., 2007; Tanofsky-Kraff, Theim, et al., 2007). Eating in response to external factors, such as the sight, smell, or taste of food, or whether other people are eating, has been less explored. A limited number of feeding studies suggest that children eat more when they have been exposed to food that tastes good (Birch, Johnson, Jones, & Peters, 1993) or when served large portion sizes (Fisher, Rolls, & Birch, 2003; Rolls, Engell, & Birch, 2000). In one study, a composite score including both emotional and external eating was associated with the odds of EAH, as measured by a laboratory feeding paradigm, in boys and girls (Moens & Braet, 2007).

We hypothesized that a factor analysis of the EAH-C would generate internally consistent scales that would demonstrate good temporal stability. We also posited that the emotional and external EAH-C scales would demonstrate good convergent validity with loss of control eating and emotional eating. Lastly, based upon the literature suggesting an association between EAH and overweight, we hypothesized that obese children would report higher scores on the EAH-C scales than non-obese participants.

Methods

Participants

Children and adolescents (32% obese and 68% non-obese), participating in non-intervention, metabolic studies at the National Institutes of Health (NIH) participated in the study. Sample demographics are presented in Table 1. Recruitment from the vicinity surrounding Bethesda, MD has been described elsewhere (Tanofsky-Kraff et al., 2004). None of these children was taking medication that might impact body weight, and none was undergoing weight-loss treatment. All were aware that they would not receive weight-loss or other treatment as part of the study protocol. Participants had no significant medical disease, and each child had normal hepatic, renal, and thyroid function. Children provided written assent and parents gave written consent for participation in the protocol. This study was approved by the National Institute of Child Health and Human Development Institutional Review Board, NIH.

Procedure

Participants completed assessments during an outpatient visit. For the purpose of determining temporal stability, questionnaires were administered a second time in a convenience sample of children who returned to the NIH for another visit.

Questionnaires

The Eating in the Absence of Hunger Questionnaire for Children and Adolescents (EAH-C) is a 14-item measure designed to assess the frequency of precipitants to eating when one is not hungry in 6–19-y-old youth. The wording and items in the EAH-C were developed based upon the clinical experience of the authors. During the initial administration of the measure, no participants reported difficulty with understanding the instruc-