Appetite 78 (2014) 139–146

Contents lists available at ScienceDirect

Appetite

journal homepage: www.elsevier.com/locate/appet

Research report

Surgency and negative affectivity, but not effortful control, are uniquely associated with obesogenic eating behaviors among low-income preschoolers ☆

Christy Y.Y. Leung [a], Julie C. Lumeng [a,b,c], Niko A. Kaciroti [a,d], Yu Pu Chen [a,d], Katherine Rosenblum [a,e], Alison L. Miller [a,f,*]

[a] Center for Human Growth and Development, University of Michigan, Ann Arbor, MI, USA
[b] Department of Pediatrics and Communicable Diseases, University of Michigan, Ann Arbor, MI, USA
[c] Department of Environmental Health Sciences, School of Public Health, University of Michigan, Ann Arbor, MI, USA
[d] Department of Biostatistics, School of Public Health, University of Michigan, Ann Arbor, MI, USA
[e] Department of Psychiatry, University of Michigan, Ann Arbor, MI, USA
[f] Department of Health Behavior and Health Education, School of Public Health, University of Michigan, Ann Arbor, MI, USA

ARTICLE INFO

Article history:
Received 25 September 2013
Received in revised form 21 March 2014
Accepted 24 March 2014
Available online 28 March 2014

Keywords:
Surgency
Negative affectivity
Effortful control
Eating behaviors
Preschoolers

ABSTRACT

Despite increased attention to the role of temperament in children's obesogenic eating behaviors, there is a paucity of research examining whether different dimensions of temperament may be differentially associated with specific eating behaviors among preschool-age children. The purpose of the current study was to examine whether three temperament dimensions (surgency, negative affectivity, and effortful control) were uniquely associated with six obesogenic eating behaviors (caregiver-reported food responsiveness, enjoyment of food, emotional overeating, satiety responsiveness, and tantrums over food; and observed eating in the absence of hunger) among low-income preschool-age children, covarying home environment quality. Results showed that temperament dimensions were differentially associated with different eating behaviors. Specifically, preschoolers with higher surgency were more likely to overeat in response to external cues, have frequent desire to eat, derive pleasure from food, and eat in the absence of hunger. In contrast, preschoolers with higher negative affectivity were more likely to have tantrums over being denied food and less likely to eat in the absence of hunger. Effortful control was not uniquely associated with obesogenic eating behavior. Findings remained significant even when home chaos was accounted for, suggesting that child surgency and negative affectivity are important to consider, independent of home environment. Results are discussed with regard to theoretical implications for the study of childhood obesity and for applied prevention implications.

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Introduction

Child obesity represents a significant public health concern in the United States. Low-income children are particularly at risk; nearly one in three low-income preschool-age children are overweight or obese (Center for Disease Control and Prevention, 2011). Obesogenic eating behaviors such as frequent desire to eat, external eating (i.e., eating in response to external, as opposed to internal cues), emotional overeating, eating beyond satiety and persistent tantrums over food have been consistently implicated in the development of childhood overweight or obesity (Agras, Hammer, McNicholas, & Kraemer, 2004; Braet et al., 2008; Jahnke & Warschburger, 2012). From a prevention perspective, it is important to consider factors that may contribute to children's obesogenic eating behaviors in order to develop strategies to address these eating behaviors early in development. Individual differences in children's eating behaviors, such as eating in the absence of hunger emerge as early as the preschool years (Fisher & Birch, 2002). Thus, preschool is an important developmental period for examining factors that may contribute to obesogenic eating behaviors.

Temperament has been suggested as a factor that may in part determine why some children are more likely than others to exhibit obesogenic eating behaviors (Anzman-Frasca, Stifter, & Birch, 2012; Bergmeier, Skouteris, Horwood, Hooley, & Richardson, 2013; Haycraft, Farrow, Meyer, Powell, & Blissett, 2011). Aspects of temperament that have been specifically proposed as potential influences on eating behaviors include impulsivity (Braet, Claus, Verbeken, & Vlierberghe, 2007; Silveira et al., 2012) and extraversion (Vollrath, Stene-Larsen, Tonstad, Rothbart, & Hampson, 2012); negative emotionality

☆ *Funding:* All phases of this study were supported by NIH grant #RC1DK086376.
* Corresponding author.
E-mail address: alimill@umich.edu (A.L. Miller).

http://dx.doi.org/10.1016/j.appet.2014.03.025
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(Anzman-Frasca et al., 2012; Haycraft et al., 2011; Vollrath et al., 2012); and self-regulation, or effortful control (Anzman-Frasca et al., 2012; Pieper & Laugero, 2013). Rothbart describes these three broad dimensions of temperament as surgency, negative affectivity, and effortful control, and conceptualizes them as reflecting individual indifferences in reactivity and self-regulation that are biologically based and relatively stable across contexts (Rothbart, Ahadi, & Evans, 2000). Despite increased attention to the role of temperament, the pathways from each dimension of temperament to obesogenic eating behaviors among preschool-age children are not well-understood (Bergmeier et al., 2013). Moreover, no study has examined whether different dimensions of temperament may be differentially associated with specific eating behaviors in early childhood. Understanding the association of different dimensions of temperament with obesogenic eating behaviors could allow tailoring of interventions to children particularly at risk. Thus, the aim of the current study was to examine whether three temperament dimensions – surgency, negative affectivity, and effortful control – were uniquely associated with six obesogenic eating behaviors in a sample of low-income preschool-age children, covarying home environment.

Dimensions of children's obesogenic eating behavior

Despite a lack of a conceptual framework or classification system to identify children's eating behaviors in the literature, based on previous findings, various dimensions of eating behaviors have been implicated in the development of childhood obesity. Food responsiveness measures food consumption in response to external cues such as the presence of good-tasting versus less-good-tasting food consumed in standard conditions (Wardle, Guthrie, Sanderson, & Rapoport, 2001). Enjoyment of food captures appetitive drive, desire to eat, and general interest in eating (Wardle et al., 2001). Emotional overeating refers to the tendency to seek immediate comfort through excessive eating in response to emotional arousal (Epel, Lapidus, McEwen, & Brownell, 2001). Satiety responsiveness reflects ability to recognize internal satiety cues and reduce food intake to compensate for a preload of foods. Eating in the absence of hunger assesses food consumption beyond satiety in the presence of palatable foods (Birch, Fisher, & Davison, 2003; Fisher & Birch, 2002). Tantrums over food refer to persistent tantrums over being denied food (Agras et al., 2004). In the present study, a multi-method approach was used to assess these six eating behaviors, which included caregiver-reported food responsiveness, enjoyment of food, emotional overeating, satiety responsiveness, and tantrums over food; and observed eating in the absence of hunger.

Dimensions of child temperament: surgency, negative affectivity, effortful control

Surgency is an "approach" dimension of temperament characterized not only by impulsivity, but also intense pleasure seeking, high activity level and low levels of shyness (Rothbart & Putnam, 2002). Surgency may increase individuals' susceptibility to obesogenic eating (Burton et al., 2011) because it may reflect a high appetitive drive and a tendency to seek pleasure from eating even in the absence of hunger. Some evidence in support of this view comes from studies of impulsivity, an aspect of surgency. Regardless of their socioeconomic status, adults and adolescents with heightened impulsivity were more likely to eat palatable foods and more inclined to satisfy their momentary craving for foods (Guerrieri et al., 2007; Hetherington, 2007; Ouwens, van Strien, & van Leeuwe, 2009). Increased impulsivity also contributed to failure to lose weight or maintain healthy weight over time in obese children, possibly due to impulsive overeating (Nederkoorn, Jansen, Mulkens, & Jansen, 2007). Most studies have typically focused on impulsivity but neglected other aspects of surgency such as a need for high-intensity pleasure-seeking, a high activity level and a short latency in approaching novelty. These surgency characteristics suggest high approach motivation, low shyness and high appetitive drive (Burton et al., 2011; Rothbart, Ahadi, Hershey, & Fisher, 2001). Shyness, which is negatively related to surgent temperament, has been positively associated with reluctance to sample new foods (Pliner & Loewen, 1997). In contrast, children who are more surgent may experience eating as a highly rewarding, pleasurable activity and engage in obesogenic eating behaviors. The few studies that have examined surgency in relation to eating behavior were of older children, and also assessed only a single aspect of eating behavior (van den Berg et al., 2011; Vollrath et al., 2012). In the current study, low-income preschoolers with higher surgency were expected to engage in more eating behaviors that are specifically conceptualized as reflecting appetitive drive, including food responsiveness, enjoyment of food and eating in the absence of hunger.

The negative affectivity dimension of temperament, which is characterized by mood instability, angry reactivity and dysregulated negative emotions (Shields & Cicchetti, 1997), may be associated with the use of obesogenic eating behaviors as a self-soothing strategy in response to emotional stress (Epel et al., 2001). A recent study showed that children with loss of control in eating were more likely to use maladaptive emotion regulation strategies in response to anxiety or anger; they were also prone to external and emotional eating (Czaja, Rief, & Hilbert, 2009). Nonetheless, associations between negative affectivity and dysregulated eating behaviors have been documented primarily among adults and adolescents (Epel et al., 2001). In children, findings are more mixed. Emotionally negative temperament traits including anger and frustration were positively associated with tantrums over being denied food in preschool-age children (Agras et al., 2004). In other studies of preschool- and school-age children, a more emotionally negative temperament was associated with both more emotional overeating as well as more food avoidant eating behaviors such as emotional undereating, food fussiness, satiety responsiveness, slowness in eating and less enjoyment of food (Haycraft et al., 2011). Thus, the associations between negative affectivity and obesogenic eating behaviors in children are relatively inconsistent. Based on the prior literature, we had two competing hypotheses. First, based on the literature that individuals who experience stress and negative emotions tend to increase their food intake (Groesz et al., 2012; Yeomans & Coughlan, 2009), we hypothesized that children who experience intense negative emotions and have difficulty regulating such emotions may seek immediate comfort through excessive eating. The alternative hypothesis is that, based on the literature that children with more emotional temperaments tend to show food avoidant eating behaviors (Haycraft et al., 2011), children with greater negative affectivity may not eat excessively. In summary, low-income preschoolers with higher negative affectivity were expected to engage in more or less obesogenic eating behaviors and the present study sought to test these competing hypotheses.

Effortful control is a temperament dimension indicated by the capacity to refrain from a desired or dominant behavior, while also maintaining attention on a task and resisting distraction (Rothbart & Putnam, 2002). A number of studies have implicated various aspects of effortful control in the development of overweight and obesity among children with different racial/ethnic and socioeconomic backgrounds. For example, children with less self-regulatory competence had higher body mass index (BMI) *z*-scores and more rapid weight gain from age 3 to 12 years (Francis & Susman, 2009). Children who showed limited ability to delay gratification at age 4 years were more likely to become overweight at age 11 years (Seeyave et al., 2009). Yet these studies did not examine the associations between effortful control and obesogenic eating behaviors. Preschool- and school-age children with higher inhibitory control have been found to have greater ability to self-regulate energy

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