The Kids-Palatable Eating Motives Scale: Relation to BMI and binge eating traits

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ABSTRACT

Introduction: Despite high rates of obesity in adolescents, little is known about their individual motives for eating caloric foods for reasons unrelated to hunger. The goal of this study was to provide a preliminary validation of the "Kids Palatable Eating Motives Scale" (K-PEMS), a self-report survey designed to identify individual motives for eating tasty foods in adolescents. The study also sought to determine if any specific motive(s) can account for variance in BMI and binge-eating disorder (BED) traits which can exacerbate obesity.
Methods: BMIz and responses to the K-PEMS and the Children's Binge Eating Disorder Scale (C-BEDS) were obtained from inner-city low-income African American adolescents. Linear and logistic regressions were used to identify K-PEMS motives that were associated with greater BMIz and binge-eating traits.
Results: The K-PEMS identified eating tasty foods for Social, Conformity, Reward Enhancement, and Coping motives. Higher frequency of eating tasty foods for Social and Conformity motives and lower frequency of eating these foods for Reward Enhancement accounted for 39% of the variance in BMIz among the overweight and obese adolescents. In contrast, eating for Coping motives was related to a 3-fold increase in the amended provisional criteria for BED in children which occurred in 7% of this young minority sample.
Discussion: The K-PEMS can be used to identify adolescents' primary motives for eating tasty foods. These motives may provide early identification of obesity and binge-eating risk but more importantly, can be tailor-targeted to affect specific behavioral and/or cognitive changes to prevent these conditions in adulthood.

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1. Introduction

In the United States, 35% of the 12–19 year old adolescents have BMIs at the 85th percentile or higher (Ogden, Carroll, Kit, & Flegal, 2014). These percentages are even higher for African American adolescents, particularly from low income families living in southern states (CDC, 2012). A contributor to obesity among adults is binge-eating (Yanovski, 2003) which is characterized by consumption of an unusually large amount of food at one sitting with a sense of loss of control over the eating (APA, 2013). While low-income African American adolescents have been studied for negative health and developmental outcomes, such as violence, substance abuse, and school drop-out (Voisin, Neilands, & Hunnicutt, 2011), little is known about their risk of binge-eating (Cassidy et al., 2012). Given the high burden of obesity on African Americans and the link between binge-eating and obesity, it is imperative to investigate risk factors in minority adolescents if we are to attenuate the high rates of obesity in this group.

Towards this goal, the "Kids Palatable Eating Motives Scale" or K-PEMS was adapted from our adult version, the Palatable Eating Motives Scale (PEMS; Burgess, Turan, Lokken, Morse, & Boggiano, 2014). The K-PEMS identifies individual motivations for eating tasty foods and drinks for reasons other than to meet energy needs. These foods tend to contribute to overweight by being calorie-dense and highly palatable and are also known to trigger binge-eating (Astrup & Brand-Miller, 2012; Blundell & Finlayson, 2004; Witt & Lowe, 2014). The K-PEMS differs from other adolescent measures of eating behavior such as the Yale Food Addiction Scale for Children which identifies addictive-like eating of tasty foods (Gearhardt, Roberto, Seamans, Corbin, & Brownell, 2013) but not the motives behind eating these foods. It differs from the children's versions of the Eating in the Absence of Hunger Questionnaire and Emotional Eating Scale because these measure emotional and external factors of eating beyond satiety and when not hungry, and the urge to eat in response to specific emotions (Tanofsky-Kraff et al., 2007, 2008). Furthermore, they are not specific to highly palatable foods and measure antecedents to eat vs. motives for eating in order to bring about a specific outcome, i.e., "I keep eating because I am feeling sad" vs. "I eat these tasty foods to forget things that

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I am worrying about." The K-PEMS also assesses reasons other than emotions for eating palatable foods.

In this study we hypothesized that the K-PEMS would factor into the same motives for eating tasty foods as does the PEMS and that one or more of the K-PEMS motives would independently contribute to variance in BMIz and binge-eating traits in a young minority group at high-risk for obesity.

2. Materials and methods

2.1. Participants

$N = 73$ African American adolescents between 12 and 17 years of age (M = 14.7, SD = 0.9) from schools in Birmingham, Alabama participated as part of the "Coping with Violence Study" designed to understand the effects of violence exposure on the health of adolescents from lower-income families. The UAB Institutional Review Board for Human Use approved the study.

2.2. Measures

2.2.1. The Kids-Palatable Eating Motives Scale (K-PEMS)

The K-PEMS is comprised of 19 items that probe various motives for "eating tasty food and drinks". See Appendix A. The instructions include examples of tasty foods and drinks which were adopted from the Yale Food Addiction Scale (Gearhardt, Corbin, & Brownell, 2009). Motive scores for the K-PEMS were obtained by deriving the mean of the response scores across the motive's items using a 1–5 point scale.

2.2.2. The Children's Binge Eating Disorder Scale (C-BEDS)

The C-BEDS is a 7-item interviewer-administered survey intended to screen children under the age of 13 for binge-eating disorder (BED; Shapiro et al., 2007). It was used here as a self-report questionnaire so that it could be easily interpreted and because of its brevity given that it was part of a lengthy battery of questionnaires. The C-BEDS yields a "provisional criteria for BED" (Marcus & Kalarchian, 2003) and an "amended provisional criteria for BED" depending on the items endorsed (Shapiro et al., 2007). In order to obtain a continuous variable for regression analysis on the K-PEMS motives, a "Risky Eating" variable was created from the sum of "yes" responses to the dichotomized C-BEDS items (see Table 2 footnote).

2.2.3. Body mass index (BMI)

BMI was calculated with the formula: kg/m^2 from body weight and height obtained in the laboratory by trained researcher assistants. BMI percentiles and BMIz values were also obtained (CDC, 2000). BMIz was used as a continuous variable for all statistical analyses except where BMI percentiles were categorized for descriptive purposes as underweight, healthy weight, overweight, and obese (Barlow & Committee, 2007).

2.3. Procedures

The adolescents completed the K-PEMS and C-BEDS via an audio-computer-assisted self-interviewing program which allowed each adolescent the opportunity to answer questions privately. BMI was obtained at the end of the interview.

2.4. Statistical analyses

Factor analysis of the K-PEMS used Principal Components Analysis with Varimax Kaiser Normalization rotation and eigenvalues >1. Cronbach's alpha assessed internal reliability of each factor (or motive). ANOVA assessed effects of sex on motive scores. Linear regressions assessed independent associations between the K-PEMS motives and BMIz and Risky Eating. Due to the overall low number of participants,

Risky Eating was regressed on each K-PEMS motive in separate regressions. Binary logistic regressions tested associations between each of the K-PEMS motives and the C-BEDS amended provisional criteria for BED. All regressions controlled for age, sex, and BMIz. Alpha was set at 0.05 for significance.

3. Results

3.1. Factor structure and inter-item reliability of the K-PEMS motives

PCA yielded the same four factors as the adult PEMS version: Social, Coping, Reward Enhancement, and Conformity motives. Each motive had acceptable internal reliability (Cronbach's $\alpha = 0.90$ to 0.64). The items comprising each factor were also the same as the PEMS and are noted in Appendix A.

3.2. Demographics, BMI, and K-PEMS motive scores

Females comprised 52% and males 48% of the sample. Their mean BMIz was 0.84, SD = 1.1 and mean BMI percentile was 71.4, SD = 27.1. Mean BMIz and BMI percentiles did not differ between females and males. Mean scores on the K-PEMS motives ranged from "Never/ Almost never" to "Some of the time". Mean motive scores were 2.06, SD = 0.30 for Social; 1.43, SD = 0.7 for Coping; 1.90, SD = 1.0 for Reward Enhancement; and 1.20, SD = 0.3 for Conformity. Sex differences were observed only for Coping as females ate tasty foods more frequently than males: M = 1.67, SD = 0.9 vs. M = 1.19, SD = 0.3; $p < 0.01$, respectively.

3.3. Associations between K-PEMS motives and BMIz

As shown in Table 1, greater frequency of eating tasty foods for Social motives was associated with higher BMIz independent of the other K-PEMS motives, age, sex, and Risky Eating. When only the overweight/ obese participants were analyzed, greater frequency of eating tasty foods for Conformity and a lower frequency of eating tasty foods for

Table 1
Regression models of the Kids-Palatable Eating Motives Scale (K-PEMS) motives with BMIz as the dependent variable using all participants ($N = 73$) and participants divided by BMI percentile category.

Dependent variable	BMIz			
	β	t	p	R^2
All participants (N = 73)				
Independent variables				
Social motive	0.29	2.06	0.04*	
Coping motive	0.02	0.13	0.90	
Reward Enhancement motive	−0.27	−1.71	0.09	
Conformity motive	−0.19	−1.32	0.19	0.13
Underweight & healthy (N = 44)				
Independent variables				
Social motive	0.25	1.38	0.18	
Coping motive	−0.16	−0.68	0.50	
Reward Enhancement motive	−0.18	−0.92	0.36	
Conformity motive	−0.13	−0.62	0.54	0.1
Overweight & obese (N = 29)				
Independent variables				
Social motive	0.53	2.00	0.06	
Coping motive	0.17	0.60	0.55	
Reward Enhancement motive	−0.88	−2.70	0.01*	
Conformity motive	0.53	2.50	0.02*	0.39

The models controlled for age, sex, and Risky Eating as independent variables; they were not significant.

* Significant independent variables, p < 0.05.