



Palatable Eating Motives Scale in a college population: Distribution of scores and scores associated with greater BMI and binge-eating



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ABSTRACT

The main goal of this study was to provide distributive data for the Palatable Eating Motives Scale (PEMS) on a large ($N = 1947$) ethnically-diverse college student population along with motive scores characteristic of obesity and binge-eating severity. Students completed the PEMS, or a revised version of the PEMS, the Binge Eating Scale, and reported height and weight for a body mass index (BMI). The PEMS identified Coping, Reward Enhancement, Social, and Conformity motives for eating tasty but unhealthy foods for reasons other than hunger. The revised PEMS (included here) had better goodness-of-fit with the motives. Percentile rankings are presented for each of the motive scores. Separate Coping scores are presented for females and males given a modest effect size for females to score higher. Generally, scores on Coping, Reward Enhancement, Conformity, and a total PEMS score in the 70th percentile (those scoring higher than 70% of the sample) were associated with obesity and severe binge-eating. Unlike these motives, Social scores were the highest at each percentile rank but unassociated with BMI or binge-eating, reflecting the culturally-normative intake of these foods for social reasons. These distribution scores on PEMS motives in college students along with scores linked to higher BMI and binge-eating severity represent the first reported data of this type. Knowledge of these scores can be used to individualize and correspondingly improve current strategies aimed at preventing and treating obesity, binge-eating, maladaptive use of food to regulate internal and external pressures, and to improve overall nutritional health.

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1. Introduction

Tasty foods which include fast foods, “junk” foods, sweets, and snacks are often eaten for reasons other than hunger so it is not surprising that they contribute to weight gain and obesity (Bellisle, 2014; Lowe & Butryn, 2007). These foods also play a salient role in binge-eating (Dalton, Blundell, & Finlayson, 2013; Witt & Lowe, 2014). For some, these foods replace meals, a trend that can decrease overall nutrition (Ovaskainen et al., 2006). Knowing the motives for consuming these foods is key in treating obesity and binge-eating as well as in efforts to increase the nutritional value of one's diet. The Palatable Eating Motives Scale (PEMS) was developed precisely to uncover such motives (Burgess, Turan, Lokken, Morse, & Boggiano, 2014).

The PEMS identifies four persistent reasons for eating tasty foods outside of hunger: Coping, Reward Enhancement, Social, and Conformity motives (Boggiano et al., 2015a, 2015b). Among college students, eating more frequently for Coping is associated with increasing BMI independent of age, sex, ethnicity, binge-eating status, Yale Food

Addiction Scale scores, and the other PEMS motives (Boggiano et al., 2014; Burgess et al., 2014). Coping reflects eating tasty foods to cheer up from a bad mood, to deal with nervousness or depression, and to help forget about worries and problems. Also, among college students, eating palatable foods for Coping, Reward Enhancement, and Conformity, but not Social motives, is associated with more severe levels of binge-eating (Boggiano et al., 2014). However, these studies have provided only mean sample scores, which do not provide researchers or clinicians with insight into the relevance or significance of an individual's score on the motives.

Therefore, the aim of this study was to obtain a distribution of PEMS scores from a large, ethnically-diverse, college student population that could be used to better interpret a similarly-aged and educated adult's PEMS scores with regard to how common or uncommon is an individual's frequency of eating palatable foods for any of the four PEMS motives. College students are particularly vulnerable to rapid weight gain and unhealthier eating, and are at the typical age of onset for binge-eating disorder (BED; Gores, 2008; Hudson, Hiripi, Pope, & Kessler, 2007; Nikolaou, Hankey, & Lean, 2014). The results provide information as to how “normal” or uncommonly elevated motives scores are in young adults and what scores are associated with obesity and severe binge-eating status.

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2. Methods

2.1. Participant characteristics

N = 1947 undergraduates enrolled in Introduction to Psychology courses at The University of Alabama at Birmingham over 3½ years participated. 66% were female; the mean age was 18.9, SD = 1.4, 56% were non-Hispanic White, 27.8% African American, 7.3% Asian, and 8.9% “other”. The mean BMI was 24.9, SD = 5.6. Only those with a BMI ≥ 18 could participate. BMI was self-reported for 1811 participants and measured for the rest who took part in a separate study. Self-reported and lab-measured BMIs correlate highly in large college student samples with a similar ethnic distribution (Quick et al., 2014) and in a previous PEMS study (Boggiano et al., 2015a). In the present sample, 62.8% were healthy weight (BMI = 18–24.9), 22.8% overweight (BMI = 25–29.9), 11.8% obese (BMI = 30–39.9), and 2.6% severely obese (BMI ≥ 40). Binge-eating severity was determined with the Binge Eating Scale (Gormally, Black, Daston, & Rardin, 1982). The mean score was 10.3, SD = 7.4. Using conventional BES categories, 49.4% scored “none/low”, 34.3% “mild”, 13.1% “moderate”, and 3.2% “severe” in binge-eating severity. Females had a higher mean than males (11.4, SD = 7.5 vs. 8.4, SD = 6.8, $p < 0.001$). The study was approved by the UAB Institutional Review Board for Human Use.

2.2. The Palatable Eating Motives Scale (PEMS) and revised PEMS

The PEMS is a self-report 20-item questionnaire that assesses the frequency with which participants consume tasty foods and drinks for Coping, Reward Enhancement, Conformity, and Social motives with a 5-choice response range. Scores for each motive are calculated from the mean of the response values comprising each motive. A PEMS total score is the sum of these mean scores and reflects general intake of tasty foods for non-metabolic reasons. N = 1215 participants completed the original version of the PEMS which had 4 vs. 5 items for the Coping motive (Burgess et al., 2014). The remaining participants responded to a revised version (see Appendix A), which includes a new item that loads on the Coping motive. Principal Component Analysis on the present sample yielded the same four motives for the original and revised questionnaires. Conformity Factor Analyses (with Mplus) yielded a four-factor model with acceptable-to-good fit to the data: χ^2 (df = 146, N = 1215) = 1083.10, $p < 0.001$; RMSEA = 0.073 (90% CI = 0.069, 0.077); CFI = 0.91; TLI = 0.89. The four-factor model provided even better goodness-to-fit for the revised PEMS: χ^2 (164, 732) = 510.23, $p < 0.001$; RMSEA = 0.054 (90% CI = 0.048, 0.059); CFI = 0.93; TLI = 0.91.

2.3. Statistical analyses

ANOVA assessed sex or ethnicity differences on PEMS motive scores. Cohen's d estimated effect sizes. Percentile ranks of the motives and PEMS total scores were obtained from SPSS descriptive frequency data in 10 percentile point increments. ANOVA and Tukey posthoc tests determined if mean PEMS motives scores differed between each of the BMI and BES categories.

3. Results

3.1. Palatable Eating Motives Scale (PEMS) scores

The mean motive score for Coping was 1.87, SD = 0.87; for Reward Enhancement 2.04, SD = 0.85; for Social 2.32, SD = 0.89; for Conformity 1.38, SD = 0.52; and for the PEMS total score 7.63, SD = 2.30. Females scored higher than males only on the Coping motive (1.99, SD = 0.89 vs. 1.67, SD = 0.78; $p < 0.001$; $d = 0.38$). However, males score higher on the Reward Enhancement (2.10, SD = 0.86 vs 2.01, SD = 0.84, $p < 0.05$; $d = 0.10$), and Conformity motive (1.47, SD = 0.60 vs. 1.34,

SD = 0.46, $p < 0.001$; $d = 0.25$). Mean Social scores did not differ between males and females (2.39, SD = 0.94; 2.32, SD = 0.88, respectively), but were significantly higher than the mean scores of the other PEMS motives for both sexes ($p < 0.001$).

3.2. Palatable Eating Motives Scale (PEMS) percentiles

Table 1 displays the percentile ranks for the PEMS motives and total score for this student population. Percentile ranks for Coping are listed for females and males separately because of the modest effect size ($d = 0.38$). The ranks indicate that the distribution of PEMS motive scores is skewed towards the lower scores, especially for the Conformity motive and to a lesser degree for both Coping and Reward Enhancement. The difference in motive scores between percentile increments was typically 0.20, which should permit sufficient discrimination as it represents a change in response on at least one item of a motive to the next higher frequency response.

3.3. Characteristic PEMS motive scores for BMI and BES categories

As shown in Table 2, the PEMS total and motive scores, except for Conformity, increased with increasing BMI. However, only mean Coping scores differed significantly between BMI categories; they were higher for severely obese vs. overweight and healthy-weight groups ($p < 0.01$) and were higher for obese vs. overweight ($p < 0.01$) and healthy-weight groups ($p < 0.05$). In addition, the aforementioned higher Social motive scores compared to the other motives was also true for all BMI categories ($p < 0.05$). PEMS total scores differed only between the healthy and obese students ($p < 0.05$).

As also shown in Table 2, mean scores for the Coping, Reward Enhancement, Conformity motives and PEMS total score increased with increasing binge-eating severity and differed significantly between each of the four BES categories. Social motive scores differed only between the none/low vs. the other binge-eating categories. Although increasing BMI with increasing BES scores suggests that increasing PEMS scores may be mediated by BMI, a linear regression (not shown) found BES scores to be positively associated with the three motive scores independent of BMI.

4. Discussion

The aim of this study was to obtain distributive data for the PEMS for an undergraduate student population. This is provided here in the form of percentile rankings for the four PEMS motive and total score. An important finding was that despite the limited variance in responses to each item for a response scale that ranged from 1 to 5, there was a statistical difference in the frequency with which undergraduate females and males eat tasty food for three of the four PEMS motives. Females eat these foods more often than males as a means of coping with negative situations or feelings (Coping motive), while males more often consume these foods to enhance positive situations or the hedonic properties of foods (Reward Enhancement motive) and to fit in or to be liked (Conformity motive). Regarding ethnicity, while the sample was mostly White, 28% were African American and, among the female group, 31% were African American. This allowed for comparisons between ethnic groups and the finding that mean PEMS motive scores did not differ between groups. Hence, the percentile rank scores are likely to generalize to young adults of various ethnicities in the U.S.

The Social motive was the most frequently endorsed of the motives for eating tasty foods and was not associated with obesity or binge-eating. This is congruent with the normative custom of pairing highly palatable foods with social gatherings, especially among college students (Pelletier, Graham, & Laska, 2014). Hence, the Social motive should typically yield higher scores than eating for Coping, Reward Enhancement, or Conformity, all of which may be less healthy reasons

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