



## Food cravings, binge eating, and eating disorder psychopathology: Exploring the moderating roles of gender and race



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### ABSTRACT

**Objective:** To examine the moderating effects of gender and race on the relationships among food cravings, binge eating, and eating disorder psychopathology in a community sample.

**Methods:** Data were collected from a convenience sample of 320 adults (53% male; mean age  $28.5 \pm 8.2$  years; mean BMI  $27.1 \pm 5.2$  kg/m<sup>2</sup>; mean education  $15.1 \pm 2.2$  years; 64% white, 24% black, and 13% other race) participating in a cross-sectional study examining the interactions between stress, self-control and addiction. Participants completed a comprehensive assessment panel including a demographic questionnaire, the Food Craving Inventory, and Eating Disorder Examination Questionnaire. Data were analyzed using multiple logistic regression for binge eating behavior and multiple linear regression for eating disorder psychopathology.

**Results:** Overall, food cravings demonstrated significant main effects for binge eating behavior (adjusted OR = 2.65,  $p < .001$ ) and global eating disorder psychopathology ( $B = .47 \pm .09$ ,  $p < .001$ ). Females had a stronger relationship between food cravings and eating disorder psychopathology than males; there were no statistically significant differences by race.

**Conclusion:** These findings, based on a diverse sample recruited from the community, suggest that food cravings are associated with binge eating and eating disorder psychopathology and may represent an important target for interventions.

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### 1. Introduction

Food cravings are an intense and specific desire to consume a certain food or food type that is hard to resist. Food cravings are a commonly experienced phenomenon among the general population (Weingarten & Elston, 1991); however, frequent food cravings may lead to unwanted consumption of craved foods and trigger feelings of guilt and shame (Macdiarmid & Hetherington, 1995). Hence, food cravings may be associated with disordered eating and eating disorder psychopathology.

Food cravings are a frequently cited antecedent of binge eating (i.e., the consumption of an objectively large amount of food in a short period of time while feeling a loss of control (APA, 2013)) and correlate of eating disorder psychopathology. The Functional Analysis Model of Binge Eating posits that food cravings are a proximal antecedent of binge eating (McManus & Waller, 1995). Researchers have empirically demonstrated this theoretical relationship, finding that food cravings

are associated with bingeing in females with bulimia nervosa (Waters, Hill, & Waller, 2001) and females with binge eating disorder (Greeno, Wing, & Shiffman, 2000; Jarosz, Dobal, Wilson, & Schram, 2007; Mussell et al., 1996; Ng & Davis, 2013). Among a sample of college students, researchers found a relationship between increased food cravings and eating disorder psychopathology (Cepeda-Benito, Fernandez, & Moreno, 2003). Yet these studies have primarily focused on samples of females. Additionally, despite the importance of socio-cultural factors in people's food choices (Rozin, 1996), there is a paucity of studies that have examined potential socio-cultural moderators such as gender and race.

It has been reported that there are gender differences in eating disorder psychopathology and the type and amount of food cravings; however, there have been some conflicting results. Gender differences in food cravings and eating behaviors may result from numerous factors including psychological or physiological changes related to menstruation (Hormes & Timko, 2011; Zellner, Garriga-Trillo, Centeno, & Wadsworth, 2004), differences in nutrition awareness and knowledge (Parmenter, Waller, & Wardle, 2000), cultural influences, and differences in dietary and mood-regulating neurotransmitters (Kiefer,

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Rathmanner, & Kunze, 2005). While some researchers have found differences in the prevalence of general food cravings with cravings being more common in females than males (Cepeda-Benito et al., 2003; Lafay et al., 2001), others have found no differences (Burton, Smit, & Lightowler, 2007). Researchers have also examined differences in the type of foods craved, finding that females crave more sweets (Osman & Sobal, 2006; Pelchat, 1997; Rozin, Levine, & Stoess, 1991) and carbohydrates than males (Christensen & Pettijohn, 2001). Binge eating and eating disorder psychopathology are more common among females; however, a substantial amount of males experience binge eating and meet criteria for BED. The prevalence estimates for binge eating and BED (recurrent episodes of binge eating associated with marked distress and without regular compensatory behaviors (APA, 2013)), are approximately 4.9–11.2% and 3.6%, respectively, for females and 4.0–7.5% and 2.1%, respectively, for males (Hudson, Coit, Lalonde, & Pope, 2012; Hudson, Hiripi, Pope, & Kessler, 2007; Striegel, Bedrosian, Wang, & Schwartz, 2012). While researchers have found that there are few differences in distal antecedents (e.g., age at first overweight, age at first diet, weight cycling) of binge eating by gender (Barry, Grilo, & Masheb, 2002; Udo et al., 2013), only a few studies have examined gender differences of more proximal correlates of binge eating such as food cravings (Cepeda-Benito et al., 2003; Hormes & Timko, 2011; Imperatori, Innamorati, Tamburello, et al., 2013). In a recently published study comparing chocolate cravings in undergraduate, male chocolate cravers had significantly fewer symptoms of eating disorders compared to male non-cravers (Hormes, Orloff, & Timko, 2014). These results suggest the relationship between disordered eating and chocolate craving may be unique to females; however, it remains to be determined whether this is unique to chocolate or if this finding may generalize to other food types.

Researchers have demonstrated that binge eating and BED are found in certain racial (e.g., black) and ethnic (e.g., Latino) groups at comparable rates relative to non-Latino whites (Marques, Alegria, Becker, et al., 2011; Smith, Marcus, Lewis, Fitzgibbon, & Schreiner, 1998); however, there is a paucity of research that examines models of disordered eating that account for race. While it has been reported that disordered eating is a cultural-bound syndrome (Brown, Cachelin, & Dohm, 2009; Keel & Klump, 2003), we are just beginning to understand differences and similarities in correlates and symptomatology among diverse groups. Of the studies that have been conducted, differences have been found between blacks and whites in terms of binge eating correlates such as depression (Napolitano & Himes, 2011), BMI (Franko, Thompson-Brenner, Thompson, et al., 2012), and eating disorder features such as dietary restraint, history of eating disorders, and eating disorder psychopathology (Pike, Dohm, Striegel-Moore, Wilfley, & Fairburn, 2014). Others have found that among black and white women with BED, there are no differences in mental, physical, and parental and family characteristics (Hrabosky, Masheb, White, & Grilo, 2007). There is also evidence that Hispanics have greater eating restraint, concerns, and psychopathology compared to blacks (Hrabosky et al., 2007) and whites (Franko et al., 2012). Given that obesity disproportionately impacts blacks (Ogden, Carroll, Kit, & Flegal, 2014) and binge eating is associated with increased BMI (De Zwaan, 2001; Pike et al., 2014), further understanding of differences in associated correlates is necessary to create relevant interventions for these populations.

There are close connections between socio-cultural factors and eating behavior (Rozin, 1996), yet we do not know the role that socio-cultural factors (e.g., gender and race) play in our understanding of the relationship between food cravings and disordered eating: much of our understanding of these relationships is gender and race-specific. The current study builds upon prior research by exploring the potential moderating roles of gender and race in the relationships between food cravings, binge eating, and eating disorder psychopathology in a sample of adult volunteers from the community. In this study, we extend the literature by including a more comprehensive

examination of cravings for different types of food including sweets, carbohydrates/starches, high fat and fast-food fats and by examining the role of race.

## 2. Methods

### 2.1. Participants

The participants for this study were recruited as part of a larger consortium project and part of a human subject core that included a set of interdisciplinary studies with the overall goal of examining the mechanisms underlying stress, self-control, and addictive behaviors (<http://medicine.yale.edu/stress/about/>). The consortium used common measures across studies to form an integrated dataset that was used in this study. We recruited participants using advertisements soliciting interest in research on general health in local newspapers and flyers at community centers and churches in New Haven, Connecticut. Inclusion criteria were that participants were 18–50 years of age and able to read English at the sixth grade level. Exclusion criteria were pregnancy, dependence on any drug other than nicotine, use of prescribed medications for any psychiatric disorders, and medical conditions that would preclude participation in the study. Due to a low number of underweight individuals in this sample ( $n = 4$ ), participants with a BMI < 18.5 kg/m<sup>2</sup> were excluded from analysis.

Three hundred and twenty adults were included in this study with a mean age of 28.53 years ( $SD = 8.21$ ), mean BMI of 27.14 kg/m<sup>2</sup> ( $SD = 5.18$ ). A little more than half of the sample (53.4%) was male. The majority of the sample (63.7%) identified as White, 23.8% as Black, and 12.5% as “other”. The mean education level of the sample was 15.06 ( $SD = 2.19$ ) years with 48.1% with college or more education, 37.8% with partial college, and 13.4% with high school or less education.

### 2.2. Procedures

The larger parent study was reviewed and approved by the Yale University Institutional Review Board. All study procedures were conducted at the Yale Stress Center. Eligibility was determined using an initial screening over the telephone or in person. Next, eligible participants met with a research assistant for a 2-hour intake session to obtain informed consent and begin assessments. Following the intake session, participants completed a comprehensive assessment battery of self-report questionnaires over three to four sessions. Participants were compensated \$20 for each assessment session.

### 2.3. Measures

#### 2.3.1. Demographics/BMI

A demographic data form designed for this study was used to collect data on age, gender, race, and educational attainment. A research nurse or trained research staff member measured each participant's height and weight following a standard procedure using a physician's scale and height rod. BMI was calculated from the measured heights and weights.

#### 2.3.2. Food cravings

Food cravings, defined as an intense desire to consume a particular food (or food type) that is difficult to resist, were measured using the Food Craving Inventory (FCI) (White, Whisenhunt, Williamson, Greenway, & Netemeyer, 2002). The FCI is a 28-item self-report measure that assesses general and specific types of food cravings. Participants are asked to rate how often each food was craved over the past month using a 5-point Likert scale ranging from ranging from 1 (never) to 5 (always/almost every day). Four subscales measure specific types of food cravings: high fat foods (fried chicken, sausage, gravy, fried fish, bacon, cornbread, hot dogs, steak), complex carbohydrates/starches (rolls, pancakes/waffles, biscuits, sandwich bread, rice, baked

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