



## Research Report

# Food cravings discriminate between anorexia and bulimia nervosa. Implications for “success” versus “failure” in dietary restriction

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## ABSTRACT

Food cravings are subjective, motivational states thought to induce binge eating among eating disorder patients. This study compared food cravings across eating disorders. Women ( $N = 135$ ) diagnosed with anorexia nervosa, restrictive (ANR) or binge-purging (ANBP) types, or bulimia nervosa, non-purging (BNNP) or purging (BNP) types completed measures of food cravings. Discriminant analysis yielded two statistically significant functions. The first function differentiated between all the four group pairs except ANBP and BNNP, with levels of various food-craving dimensions successively increasing for ANR, ANBP, BNNP, and BNP participants. The second function differentiated between ANBP and BNNP participants. Overall, the functions improved classification accuracy above chance level (44% fewer errors). The findings suggest that cravings are more strongly associated with loss of control over eating than with dietary restraint tendencies.

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Food cravings are prevalent in the general population and in patients with eating disorders. Generally defined as an all-consuming desire or strong yearning to eat, food cravings are of particular interest to researchers and clinicians because they are thought to induce binge eating. Formally proposed in the late 1970s, the *dietary restraint model* (e.g., Cooper, 1997; Fairburn & Cooper, 1993; Heatherton & Polivy, 1992; Vitousek, 1996) purports that individuals who chronically attempt to maintain strict dietary control are at high risk for becoming temporarily disinhibited in maintaining their control, which often results in a binge eating episode (Polivy & Herman, 1985; Ruderman, 1986; Schotte, Cools, & McNally, 1990). In other words, this model describes a self-fueling cycle in which temporary caloric restriction and homeostatic imbalances, which are common in individuals struggling with eating disorders, causes cravings to eat. Food cravings, in turn, can drive individuals to binge eat (Booth, Lewis, & Blair, 1990; Cepeda-Benito & Gleaves, 2001; Fairburn & Cooper, 1982).

Since its initial conceptualization, researchers have elaborated upon the dietary restraint model by examining the influence of mediating and moderating factors that predict binge eating, predominately in non-eating disordered samples (Fairburn, 1997; Wilson, 1999). The factors that often lead to binge eating include

breaches of dietary restraint and eating “forbidden” foods (Abraham & Beaumont, 1982), free time and being alone (Johnson, 1985; Pyle, Mitchell, & Eckert, 1981), viewing diet-related commercials and advertisements (Strauss, Kriepe, & Doyle, 1994; Warren, Strauss, Taska, & Sullivan, 2005) and strong emotional states (e.g., Cools, Schotte, & McNally, 1992; Cooper & Bowskill, 1986; Fairburn, 1997; Schotte et al., 1990; Wilson, 1999).

Research that investigates the relationships between food cravings and binge eating is necessary to understand the role of food cravings in the mechanisms that control appetite and eating in women with eating disorders. The scarce research done to this date with clinical samples has nonetheless yielded important findings. Bulik, Sullivan, Carter, McIntosh, and Joyce (1998) found that cue-exposure/response prevention interventions may reduce craving reactivity in bulimic patients. A few pilot investigations have shown that reductions in cue reactivity are associated with declines in binge eating (Jansen, 2001). In comparison to asymptomatic individuals, women with a history of anorexia nervosa who binged and purged were more likely to report “uncontrollable desires to eat certain foods or types of food” and “strong urges to eat a specific food” (Gendall, Sullivan, Joyce, & Bulik, 1997). Waters, Hill, and Waller (2001) found that experiencing “a strong urge or desire for a particular food” was followed by bingeing about 50% of the time. Similarly, Engelberg, Gauvin, and Steiger (2005) reported that whereas dietary restraint did not necessarily precede binge eating, elevated restraint preceded “strong” cravings and the probability of bingeing.

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Despite a body of research theorizing and supporting the role of food cravings in precipitating binge eating, other findings make drawing definite conclusions difficult. Several studies have downplayed the impact of dietary restraint in bingeing and purging (Cooper, Clark, & Fairburn, 1993; Heatherton & Polivy, 1992; Lowe et al., 1996; Lowe, Gleaves, & Murphy-Eberenz, 1998). Lowe et al. (1996) found that dieting intensity was not related to the severity of binge eating among individuals with bulimia. Moreover, although individuals with eating disorder symptoms report more intense and frequent cravings than asymptomatic individuals (Jarosz, Dobal, Wilson, & Schram, 2007), a very small proportion of food cravers may actually engage in binge eating (Gendall, Sullivan et al., 1997). Whereas Nederkoorn, Smulders, and Jansen (2000) found that cue-induced craving was correlated with food intake in a non-clinical sample, reductions in craving reactivity to food cues do not necessarily reduce binge eating in individuals with bulimia (Bulik et al., 1998).

Cepeda-Benito and Gleaves (2001) hypothesized that different methodologies across studies may explain why the data are conflicted with regard to the nature of the association between food cravings, dietary restraint, and binge eating. These authors noted that associations between dietary restraint and food craving were negative in samples of successful dieters and non-existing in samples made up of successful and unsuccessful dieters (e.g., Cohen, Sherwin, & Fleming, 1987; Harvey, Wing, & Mullen, 1993; Hill, Weaver, & Blundell, 1991). Conversely, studies that used unsuccessful dieters, or restrained eaters with high tendencies towards disinhibition of restraint, reported greater cravings and food intake in reaction to food cues and fasting than unrestrained eaters (e.g., Fedoroff, Polivy, & Herman, 1997; Tuomisto et al., 1999). That is, in the studies reviewed, positive associations between dietary restraint and food craving may have been defined to a larger extent by whether or not individuals breached their diets than by the intensity of their diets.

Similarly, Stice, Cooper, Schoeller, Tappe, and Lowe (2007) noted recently that scores on dietary restraint scales do not correlate with objective indicators of “moderate- to long-term dietary restriction,” and that increases in dietary restriction over moderate (6 weeks) to long (up to 3 years) periods have been found to decrease binge eating in controlled studies (e.g., Burton & Stice, 2006; Stice, Shaw, Burton, & Wade, 2006). That is, the relationship between dietary restraint and loss of control over eating appears to be moderated by whether or not the individual is a successful dieter (i.e., able to maintain moderate- to long-term caloric restriction).

The present study tested the hypothesis that food cravings are highly prevalent in individuals known to have high tendencies to temporarily restrain their diets but lose control and binge eat, whereas individuals who are successful dieters and restrict their caloric intake over long periods are unlikely to experience cravings. The overarching goal of this study was to examine whether food cravings can differentiate women who desire to restrict their caloric intake but who differ with regard to their tendency to engage in bingeing. Using discriminatory factor analysis (DFA), our goal was to determine whether scale scores from the Food Craving Questionnaire-Trait (Cepeda-Benito, Gleaves, Williams, & Erath, 2000) could differentiate between women diagnosed with anorexia nervosa (AN), both restrictive (ANR) and bingeing/purging type (ANBP), and bulimia nervosa, purging (BNP) and non-purging type (BNNP). It was predicted that individuals diagnosed with BNP and BNNP (who by definition binge eat) would report more intense food cravings than individuals who by definition do not binge eat (ANR). Given that some individuals diagnosed with ANBP may engage in bingeing and/or purging, but not necessarily both, we anticipated that ANBP individuals would report greater levels of food craving (and binge eating) than ANR

participants, but lower levels of craving (and binge eating) than BNP patients. A directional hypothesis regarding how cravings would differ between BNP and BNNP based on likelihood of bingeing was not readily apparent. However, to the extent that the presence of purging behavior may be an indicator of greater psychopathology and bingeing intensity (Gleaves, Williamson, & Barker, 1993; Tobin, Griffing, & Griffing, 1997), we ventured to predict that BNP would report greater cravings than BNNP participants.

## Methods

### Participants

Participants were selected from a sample of 177 adolescent and adult females in treatment at outpatient eating disorder clinics located in different cities and regions across Spain (Albacete, Ciudad Real, Granada, Malaga, Madrid, Seville, and Valencia). All participants were volunteers without any expectation of compensation for their contribution. Using confirmatory factor analysis, data from all 177 participants were used in a previous investigation of the factor structure of the FCQ-T and the FCQ-S (see Moreno, Rodríguez, Fernandez, Tamez, & Cepeda-Benito, 2008). The present study analyzed data from a subset of this sample to test a different research question. The present sample is comprised 136 women in the sample with an eating disorder diagnosis of ANR, ANBP, BNNP, or BNP. Ages for the present sample ranged from 12 to 44 ( $M = 20.7$ ;  $S.D. = 5.44$ ).

### Measures

#### *Food Craving Questionnaire-Trait (FCQ-T; Cepeda-Benito, Gleaves, Fernandez, Vila, & Reynoso, 2000)*

This instrument was created consistent with the theory that food cravings can arise from and be expressed as both physiologically and psychologically mediated processes (Weingarten & Elston, 1990). Using confirmatory factor analyses (CFA), the FCQ-T has yielded excellent fit indices for a nine-factor solution (e.g., Moreno et al., 2008). The nine-factor-derived scales of the FCQ-T measure cravings experienced as or associated with: (1) *positive reinforcement*; (2) *negative reinforcement*; (3) *cue-dependent eating*; (4) *feelings of hunger*; (5) *preoccupation with food*; (6) *intentions to eat*; (7) *lack of control*; (8) *negative affect*; (9) *guilty feelings*.

The FCQ-T instructs participants to indicate how frequently each statement “would be true for you in general” using a six-point scale that ranges from 1 (*never or not applicable*) to 6 (*always*). Full-scale and factor-scale totals can be calculated by simply adding the corresponding item scores. In the present sample, the overall  $\alpha$  for the FCQ-T was .96, and factor scales provided respectable alphas for eight of the scales (.76–.95), with one of the scales (negative reinforcement) showing lesser reliability,  $\alpha = .57$ .

#### *Body Image Assessment (BIA; Williamson, Gleaves, Watkins, & Schlundt, 1993)*

The BIA utilizes nine silhouettes ranging from very thin to very large. Rather than printing each silhouette on a separate card, all silhouettes were reproduced on one page, as done by Williams, Gleaves, Cepeda-Benito, Erath, and Cororve (2001). The instrument’s instructions read, “Select the card that most accurately depicts your current body size, as you perceive it to be” and then, “Select the card that most accurately depicts the body size that you would most prefer”. The first question generates a rating of current body size (CBS) and the second ideal body size (IBS). Williams et al. (2001) reported good test–retest reliability for one-page version for current and ideal body size and good concurrent validity with the card administration format of the BIA. These authors found that body difference (BD) scores (or BIA minus CBS scores) obtained

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