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## The moderating role of negative urgency on the associations between affect, dietary restraint, and calorie intake: An experimental study



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### ABSTRACT

The present study tested the moderating role of negative urgency (NU), a personality trait characterized by a tendency to act impulsively in the face of emotional distress, on the associations between dietary restraint, affect, and calorie intake following a mood manipulation. Undergraduate women reported levels of NU and dietary restraint and underwent a failure task intended to induce a negative mood. Participants then completed mood ratings and a sham taste assessment task in which calorie intake was measured. NU enhanced the association between dietary restraint and calorie intake, such that participants who reported higher levels of dietary restraint consumed more calories, and this effect was strongest among participants who were high on NU. NU also enhanced the association between positive, but not negative, affect and calorie intake. Specifically, participants who were high on NU and reported lower positive affect consumed more calories than participants who were low on NU. These findings suggest that NU plays a synergistic role in increasing calorie intake among individuals who engage in dietary restraint or experience low positive affect.

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### 1. Introduction

Impulsivity, broadly defined as a tendency to think, control, and plan insufficiently, often results in maladaptive behavioral responses, including disordered eating behavior (Rosval et al., 2006). Indeed, considerable research has related impulsivity to binge eating (Hartmann, Czaja, Rief, & Hilbert, 2010; van Strien, Engels, Van Leeuwe, & Snoek, 2005); however, the operationalization of impulsivity has been inconsistent throughout the eating pathology literature (see Waxman, 2009 for review). In an attempt to clarify the various conceptions of impulsivity in the broader personality literature, Whiteside and Lynam (2001) provided evidence that omnibus measures of “impulsivity” are better characterized by a multi-factor model of moderately associated factors that all lead to rash action. Of these, negative urgency (NU), the tendency to act impulsively in the face of emotional distress, has been shown to have moderate to large associations with binge eating (Fischer, Smith, & Cyders, 2008). Individuals high on NU may be vulnerable to binge eat because they are more likely to partake in negatively reinforcing and avoidant coping behaviors under conditions of emotional distress (Fischer, Anderson, & Smith, 2004). However, the relation between NU and eating behaviors in the

context of emotional distress has not been demonstrated experimentally.

In addition to NU, dietary restraint and emotional distress have been implicated as risk factors for binge eating (Stice, 2001). Dietary restraint refers to the conscious effort to restrict calorie intake with the intent to lose or maintain weight and has been suggested to diminish cognitive resources necessary to retain self-control, subsequently increasing risk to binge eat (Muraven & Baumeister, 2000). Indeed laboratory demonstrations of binge eating behavior have documented increased calorie intake following cognitive tasks (Kahan, Polivy, & Herman, 2003) and negative mood inductions (Heatherton, Striepe, & Wittenberg, 1998; Tanofsky-Kraff, Wilfley, & Spurrell, 2000) among restrained eaters. However, controlled weight loss trials have prospectively documented decreased binge eating among individuals randomly assigned to low-calorie diets (Presnell & Stice, 2003; Reeves et al., 2001), suggesting that dietary restraint may actually be protective against eating pathology over time. These mixed findings complicate the understanding of how dietary restraint causally impacts binge eating behavior.

Furthermore, emotional distress, characterized by high levels of negative affect (e.g., anger, shame, and guilt) and low levels of positive affect (e.g., sadness, lethargy, and depression) is associated with both increased and decreased calorie intake (Greeno & Wing, 1994). A loss of appetite and decreased calorie intake are considered normal responses to stressful emotional stimuli (Kinzig, Hargrave, & Honors, 2008). However, some individuals respond paradoxically

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to emotional distress by increasing calorie intake, placing them at risk to binge eat (Bekker, van de Meerendonk, & Mollerus, 2004). It has been suggested that these individuals eat in an effort to cope with emotional distress as the positively reinforcing nature of palatable foods (Volkow & O'Brien, 2007) may provide both comfort and distraction from emotional distress (Bekker et al., 2004). In line with this evidence, research has documented both increased (Chua, Touyz, & Hill, 2004; Udo, Grilo, & Brownell, 2013) and decreased (Schachter, Goldman, & Gordon, 1968) calorie intake in response to high negative and low positive affect.

Inconsistencies in prior research investigating the effects of dietary restraint and emotional distress on binge eating behavior may be partially attributable to unique individual differences that influence eating behavior. NU may serve as a determinant of risk for binge eating behavior following emotionally distressing events, leading individuals high on NU, who engage in dietary restraint or experience emotional distress, to increase, rather than decrease calorie intake. Emerging evidence indicates that NU prospectively enhances risk for binge eating among restrained eaters (Emery, King, Fischer, & Davis, 2013), suggesting that individuals who characteristically have lower average levels of self-control may be particularly vulnerable to the self-control depleting effects of dietary restraint. Furthermore, because impulsive individuals tend to direct attention towards reward stimuli (Hou et al., 2011), the reinforcing nature of palatable foods (Volkow & O'Brien, 2007) coupled with their accessibility (Brownell & Horgen, 2004) may make food intake an attractive choice for mood regulation. Thus, individuals high on NU may be particularly likely to engage in an easily accessible and effective, albeit maladaptive, behavior, such as increased calorie intake, when confronted with emotional distress.

Accordingly, the present study aimed to investigate how NU, dietary restraint, and affect interact to alter calorie intake among individuals experiencing emotional distress. The first aim of the study was to test the moderating effect of NU on the association between dietary restraint and calorie intake following experimentally manipulated affect. The second aim of the study was to determine whether NU enhanced the association between experimentally manipulated affect and subsequent calorie intake. We hypothesized that NU would enhance the effects of dietary restraint, high negative affect, and low positive affect on calorie intake.

## 2. Methods

### 2.1. Participants

Participants were 136 undergraduate women between the ages of 18 and 25 from a large university in the Northwest United States who were compensated for participation with course credit in their lower level psychology courses. Although data on race and ethnicity were not collected due to a software error, other studies sampling from the same population were comprised of approximately 60% Caucasian and 30% Asian or Pacific Islander with the remaining 10% comprising other races.

Because the present study was intended as a preliminary investigation to experimentally demonstrate how NU interacts with dietary restraint and affect to increase calorie intake, recruitment was restricted to a non-clinical sample to prevent pathological eating behavior from confounding the results and to exclude influential outliers from distorting our findings. Participants were screened using the Eating Disorder Examination Questionnaire (Fairburn & Beglin, 1994). Individuals were excluded from participation if they reported clinically significant levels of eating pathology (Mond et al., 2008). Four individuals were deemed ineligible for the study per this screening criterion and were excluded from study procedures.

### 2.2. Measures

#### 2.2.1. Negative urgency

NU was assessed using the 12-item NU subscale of the UPPS-P Impulsive Behavior Scale (Whiteside & Lynam, 2001), which measures the tendency to act impulsively in the face of emotional distress. A mean of these items was calculated with higher values indicating higher levels of NU ( $\alpha = .88$ ).

#### 2.2.2. Dietary restraint

Current dietary restraint was assessed using 21-items from the Restraint subscale of the Three-Factor Eating Questionnaire (Stunkard & Messick, 1985). Each item was assigned a binary code and summed per the scoring criteria with higher scores indicating higher levels of dietary restraint ( $\alpha = .83$ ).

#### 2.2.3. Positive and negative affect

Current mood ratings following the mood manipulation were assessed using the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988), a 20-item scale evenly subdivided into two subscales with one measuring positive affect and the other measuring negative affect. The items from each affect scale were averaged with higher scores indicating either greater positive ( $\alpha = .91$ ) or negative ( $\alpha = .84$ ) affect.

#### 2.2.4. Calorie intake

All food items were weighed prior to and following the taste assessment procedures to determine the total amount of food consumed (in grams). For each food item, the amount of calories per gram was calculated based on the nutritional information provided by the manufacturers. The total amount of food consumed was then multiplied by the amount of calories per gram to obtain the total number of calories consumed.

#### 2.2.5. Appetite

Participants reported whether they felt as though they had an appetite at the time of the study.

### 2.3. Procedure

The experimental design was adopted from the methodological approaches utilized in similar research (Heatherington et al., 1998; Tanofsky-Kraff et al., 2000). To decrease the likelihood of demand characteristics and evaluation apprehension, the first phase of the study was described as an investigation of the effects of dieting behaviors on binary-spatial logic and the second phase was explained as an investigation of the relation between mood and taste perception.

#### 2.3.1. Phase 1: mood manipulation

Participants were randomly assigned to participate in either the control ( $n = 23$ , 18%) or experimental ( $n = 105$ , 82%) condition. Participants first completed a battery of questionnaires using a computer-based survey and then underwent the procedures for either the control or experimental conditions. Both conditions utilized a commercially available puzzle called Spin-Out®. Although the puzzle can be solved in less than one minute with practice, it often takes 30 min or more for a beginner to complete. The experimenter strategically showed each of the participants the basic moves of the game to suggest that it could be solved simply and quickly.

**2.3.1.1. Control condition.** The control condition was intended to produce a neutral mood that could serve as a comparison to determine whether the manipulation successfully increased negative affect in the experimental condition. Participants in the control

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