



Short Communication

Stress and emotional eating: The mediating role of eating dysregulation



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ABSTRACT

This study examined whether the association between stress and emotional eating was mediated by eating dysregulation. Young adults ($N = 345$) reported their stress levels, eating dysregulation, and emotional eating. This study found that eating dysregulation mediated the association between stress and emotional eating. Experience of stress was related to individuals' poorer capability of being responsive to their internal signals of hunger and satiety, which in turn, was related to higher emotional eating. These findings suggest that practitioners could consider training individuals who eat in response to stress to be sensitive to their hunger and satiety cues.

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1. Introduction

Emotional eating refers to the tendency of overeating in response to negative emotion (Ganley, 1989). Emotional eating has important physical and psychological health implications. For example, emotional eating is related to higher weight status (Geliebter & Aversa, 2003), eating disorders (e.g., binge eating, bulimia nervosa; Allen, Byrne, La Puma, McLean, & Davis, 2008; Wardle, 1987), and depression (Ouwens, van Strien, & van Leeuwe, 2009). Given that emotional eating is associated with numerous psychological and health consequences, it is important to examine different factors that may lead to emotional eating.

Research on emotional eating has focused on the role of negative emotional arousal such as experience of stress in explaining overeating (e.g., Greeno & Wing, 1994). A recent qualitative study found that female college students believed that stress was the trigger of their emotional eating behaviors (Bennett, Greene, & Schwartz-Barcott, 2013). Both self-report and experimental studies also showed that greater stress levels were associated with greater amount of food consumption (see review Torres & Nowson, 2007). For instance, an experimental study found that emotional eaters who were led to believe that they were going to make a public speech (stress-induction) consumed greater amounts of high-fat foods than emotional eaters who were not induced with stress (Oliver, Wardle, & Gibson, 2000). Although the link between stress

and emotional eating has been well established, little research has focused on the underlying mechanisms that mediate such an association. We argued that one possible mediator between stress and emotional eating behaviors would be *eating dysregulation*, a construct that is theoretically related to both experience of stress and emotional eating (Kaplan & Kaplan, 1957).

Eating dysregulation refers to individuals' tendency of not being responsive or sensitive to internal cues of hunger and satiety to decide the amount to eat, thus relying on external factors to initiate and stop eating (e.g., Tan & Holub, 2011). According to Kaplan and Kaplan (1957), it is possible that intense emotional arousal, including heightened stress levels, causes individuals to become insensitive to their own hunger and satiety cues. It is further speculated that when individuals are confused between emotional arousal and hunger, they may mistake the arousal sensation as hunger cues that lead to overeating (Kaplan & Kaplan, 1957; van Strien & Ouwens, 2007). Supporting this notion, research indeed found that individuals reported greater hunger when they experienced greater stress levels (Groesz et al., 2012; Wallis & Hetherington, 2009). Further, research found that eating dysregulation was associated with emotional eating; individuals who were insensitive to their internal cues reported greater emotional eating (e.g., Goossens, Braet, & Decaluwe, 2007). If amplified stress levels leads individuals to engage in emotional eating, perhaps it is the inability to regulate their eating (e.g., insensitivity to internal cues of hunger and satiety, external eating) that explains this association. Thus, it is reasonable to hypothesize that experience of higher stress would be related to individuals' inability to regulate food intake, and subsequently, higher emotional eating. The proposed mediation model is presented in Fig. 1.

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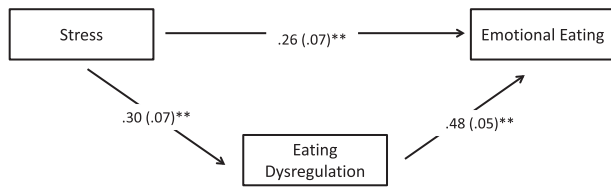


Fig. 1. Path model examining the mediating roles of eating dysregulation between experience of stress and emotional eating. Unstandardized coefficients are presented, with standard errors in the parentheses. ** $p < .01$.

2. Method

2.1. Participants and procedure

Participants were recruited from a university located in Wisconsin, USA. Participants completed a series of questionnaires and received one credit as part of the course requirements. After obtaining participants' informed consent, participants completed a series of questionnaires on computers. The final sample was 345 participants (227 females) with a mean age of 19.5 ($SD = 1.3$). Participants reported their weight in pounds and height in inches which were used to calculate their body mass index (BMI; kg/m^2). Participants' BMI ranged from 16.6 to 47.4 ($M = 23.9$, $SD = 4.3$). Most of the participants (67%) were normal weight (BMI score between 18.5 and 24.9), 4% were underweight (BMI score below 18.5), 20% were overweight (BMI score between 25.0 and 29.9), and 9% were obese (BMI score above 30.0). Ethnic composition for the current sample was Caucasians (84%), African Americans (4%), Asians (6%), Hispanics (2%), and Mixed/Other (4%).

2.2. Measures

2.2.1. Stress

Participants completed the 14-item Global Measure of Perceived Stress (Cohen, Kamarck, & Mermelstein, 1983) to measure their stress levels. Participants provided ratings on how often they find their lives unpredictable, uncontrollable, and overloaded during the last month. For example, one item reads "In the last month, how often have you been upset because of something that happened unexpectedly?". Another item reads "In the last month, how often have you felt that you were unable to control the important things in your life?". Participants rated the items on a scale ranging from 0 (*never*) to 4 (*very often*). All 14 items were averaged to form a composite, with higher scores reflecting higher levels of stress. For the current study, the reliability of this measure was satisfactory, with Cronbach's $\alpha = .83$.

2.2.2. Eating dysregulation

Participants' self-regulation abilities in eating was measured using an 8-item scale adapted and modified from a previous study with young children (Tan & Holub, 2011). As an example, the item "my child knows how much food s/he should eat until full" was modified to "I know how much food I should eat until full". Items included: (1) I know how much food I should eat until full, (2) I stop eating when I am full, (3) I know when I should stop eating, (4) If I am full, I will not eat snacks, (5) I eat even when I am not hungry (reversed), (6) If I am full, I will not get more foods, (7) I know when I am full, and (8) I eat even when I am already full (reversed). Participants rated the items on a scale ranging from 1 (*disagree*) to 5 (*agree*). All items were averaged to create a composite. For interpretation purposes, the composite score was reversed so that higher scores reflected greater eating dysregulation. The reliability of this measure was satisfactory, with Cronbach's $\alpha = .79$.

2.2.3. Emotional eating

Participants completed the 13-item emotional eating subscale of the Dutch Eating Behavior Questionnaire (DEBQ; van Strien, Fritjers, Bergers, & Defares, 1986) to measure emotional eating behaviors. One example item reads "Do you have a desire to eat when you are emotionally upset?". Participants rated the items on a scale ranging from 1 (*never*) to 5 (*very often*). All items were averaged to create a composite, with higher scores reflecting greater emotional eating behaviors. The reliability of this measure was satisfactory, with Cronbach's $\alpha = .94$.

3. Results

3.1. Descriptive statistics and correlational analyses

Table 1 presents the means, standard deviations, and correlations among the study variables. Gender differences with independent t -tests revealed that females reported higher stress and engaged in more emotional eating. Males, in contrast, had higher BMI compared to females. Results showed that higher stress levels were associated with higher eating dysregulation and higher emotional eating. Furthermore, higher eating dysregulation was related to higher emotional eating. However, BMI was not significantly associated with other study variables.

3.2. Mediation analysis

The proposed mediation hypothesis was examined with a path model (see Fig. 1) implemented with the PROCESS SPSS Macro (Hayes, 2012). Participants' gender was included as a covariate. Because BMI was found not significantly related to other variables, it was not included in the model. Significance of the mediation effects were examined through indirect effects with bootstrapped (samples = 5000) standard errors and bias corrected 95% confidence intervals. Confirming the hypothesis, results also showed that the indirect effect of stress on emotional eating through emotion dysregulation was significant, $b_{\text{indirect}} = .15$, $SE = .04$, $CI_{95} = .07-.23$, $p < .001$. Specifically, the model showed that experience of higher stress was related to higher eating dysregulation, which in turn, was related to greater engagement of emotional eating. It is noteworthy that stress was still significantly related to emotional eating when eating dysregulation was considered simultaneously in the model.

3.3. Supplemental analyses

In order to examine the possibility that gender may moderate the mediating effect of eating dysregulation between stress and emotional eating, two path models were fitted separately for males and females. The paths were then constrained to be equivalent for males and females. Imposing the constraints did not lead to a significant decrease in model fit, suggesting that gender did not moderate the mediation effect of eating dysregulation between stress and

Table 1
Means, standard deviations, and correlations among study variables.

	1	2	3	4
1. Emotional eating	–			
2. Stress	.31**	–		
3. Eating dysregulation	.49**	.23**	–	
4. BMI	-.01	.02	.01	–
Males M (SD)	1.99 (.75)	2.82 (.51)	3.87 (.70)	24.95 (4.05)
Females M (SD)	2.47 (.74)	3.01 (.50)	3.74 (.68)	23.70 (4.27)
t -values	-5.72**	-3.33**	1.65	2.63**

** $p < .01$.

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