



## The effect of academic stress and attachment stress on stress-eaters and stress-undereaters



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### ABSTRACT

It is well established that stress is related to changes in eating patterns. Some individuals are more likely to increase their overall food intake under conditions of stress, whereas others are more likely to consume less food when stressed. Attachment style has been linked to disordered eating and eating disorders; however, comparisons of eating behaviors under attachment versus other types of stress have yet to be explored. The present laboratory study examined the eating patterns in self-identified stress-undereaters and stress-eaters under various types of stress. More specifically, the study examined the effects of academic and attachment stress on calorie, carbohydrate and sugar consumption within these two groups. Under the guise of critiquing student films, university students viewed either one of two stress-inducing videos (academic stress or attachment stress, both designed to be emotionally arousing) or a control video (designed to be emotionally neutral), and their food intake was recorded. Results demonstrated that the video manipulations were effective in inducing stress. Differential patterns of eating were noted based on group and stress condition. Specifically, stress-undereaters ate fewer calories, carbohydrates and sugars than stress-eaters in the academic stress condition, but not in the attachment stress or control condition. Findings suggest that specific types of stressors may influence eating behaviors differently.

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It is well established that a relationship exists between stress and changes in both food choice and food intake (Adam & Epel, 2007; Greeno & Wing, 1994; Torres & Nowson, 2007). In terms of food choice, the literature suggests that individuals demonstrate a shift toward more “unhealthy” food options when stressed. In particular, people tend to increase their intake of highly palatable, snack-type foods when stressed (O'Connor, Jones, Conner, McMillan, & Ferguson, 2008; Oliver & Wardle, 1999; Wansink, Cheney, & Chan, 2003; Zellner et al., 2006). For example, stress has been associated with increased consumption of sweet (Kandiah, Yake, Meyer, & Jones, 2006), salty (Wardle, Steptoe, Oliver, & Lipsey, 2000) and high fat food options (Kandiah et al.,

2006; Wansink et al., 2003), whereas individuals tend to report a decrease in their consumption of more meal-type foods (i.e., meats, fruits, vegetables) under conditions of stress (Oliver & Wardle, 1999; Wansink et al., 2003; Zellner et al., 2006).

Research has also linked stress to changes in food intake. Many studies have demonstrated that stress has a bidirectional effect on food intake, whereby some individuals increase and others decrease their food consumption when stressed (Epel et al., 2004; Kandiah et al., 2006; Kandiah, Yake, & Willett, 2008; Oliver & Wardle, 1999; Wallis & Hetherington, 2009). Some studies have found that almost equal proportions of individuals increase versus decrease their food intake under stress, with approximately half of the sample reporting eating less and approximately half of the sample eating more under stress than they would otherwise (Oliver & Wardle, 1999; Stone & Brownell, 1994; Wallis & Hetherington, 2009). Other studies, however, have reported different distributions of food intake changes under stress, with some finding

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roughly twice as many participants increased their food intake relative to those who decreased their food intake (Kandiah et al., 2006; 2008). These differences in findings may reflect differences in the sample populations or type of stressor.

Previous research has considered eating in response to a variety of stressors, yet few studies have considered whether individuals' eating responses vary depending on the stressor. Stress is defined in the literature as a disturbance to one's "physiological homeostasis or psychological well-being" (National Research Council, 2008, p. 2). Within the literature stress has been defined, differentiated and manipulated in a wide variety of ways. Common methods for inducing stress in a laboratory setting include inducing a high cognitive load on the participants (Lattimore, 2001; Wallis & Hetherington, 2004, 2009), or having the participants recall a recent stressful event (Sinha, Catapano, & O'Malley, 1999). Stress has also been defined to include mood manipulation through viewing a mildly distressing video (Grunberg & Straub, 1992) and through physical threat, such as fear of an impending shock (Heatheron, Herman, & Polivy, 1991; Herman & Polivy, 1975). The present study focused on two stressors: attachment stress, that is emotional stress that arises from anxiety related to an individual's relationship with their primary caregiver(s), and academic stress, that is a psychological stress that arises from the anticipation of evaluation, and in this case, in the context of academics. Videos related to each of these types of stress were created for the purpose of the present study in order to induce stress in participants. In addition, an emotionally neutral video about travel was also created, and used as a control.

Attachment refers to an internal schema of relating to the world, which is developed through repeated early interactions with primary caregivers (e.g., mother) (Bowlby, 1980). Securely attached individuals internalize a sense of safety and trust in others, which allows them to self-soothe in times of distress (van den Boom, 1994). Since attachment influences one's perception of and interactions with their environment (Shorey & Snyder, 2006), it is likely an important factor to consider in relation to the stress-eating relationship.

Maunder and Hunter (2001) proposed an attachment model developed from a biopsychosocial perspective to explain how the relationship between a child and their caregiver can later affect the child's stress-response in adulthood (Maunder & Hunter, 2001). Their model describes how attachment insecurity can lead to increased risk for illness through increased vulnerability to stress, increased reliance on external affect regulation, and alternative methods of seeking help. In support of this view, animal and human studies alike have demonstrated that attachment is a key factor involved in the physiological response to stress (i.e., Lui et al., 1997; Powers, Pietromonaco, Gunlicks, & Sayer, 2006; Spangler & Schieche, 1998), eating behavior, and food choice (Koskina & Giovazolias, 2010; Troisi & Gabriel, 2014; Wilkinson, Rowe, Bishop, & Brunsrom, 2010). In fact, a laboratory study of eating behavior observed that individuals who received an anxious attachment prime ate significantly more than individuals who received a secure attachment prime (Wilkinson, Rowe, & Heath, 2013).

Academic stress (or test anxiety) refers to the stress associated with the academic environment, writing tests, performing difficult cognitive tasks, or being evaluated (Beggs, Shields, & Janiszewski Goodin, 2011). This stressor was utilized in the current study due to its relevance in undergraduate samples (Ross, Niebling, & Heckert, 1999) and the fact that it has been shown to be an effective stressor in studies examining stress and eating. For instance, Pollard, Steptoe, Canaan, Davies, and Wardle (1995) compared a control group (not taking exams) to an exam-stress group just prior to their examination period. Stress measures and dietary

assessments were made in both groups during a baseline period to provide within-group comparisons. The exam-stress group reported significant increases in perceived stress at the exam sessions compared to their baseline sessions and participants with high trait anxiety showed significant increases in their caloric intake. In a later study, using a within-subject design, Costarelli and Patsai (2012), showed that female students reported significantly higher anxiety and disordered eating attitudes during examination compared to a control period. Furthermore, Feld and Shusterman (2015) found that students experience both increased physical and psychological stress and a change in their eating habits while in an academic environment.

## 1. Objectives

The present study sought to examine the impact of two types of stressors on food intake and food choice in a controlled experimental setting. The primary objective of the study was to compare the ways in which two distinct stressors, academic stress and attachment stress, might influence eating behaviors in two stress-eating populations: stress-undereaters and stress-eaters. Although it was predicted that stress-eaters would increase their intake in the face of stress, while stress-undereaters would decrease their intake, the present study was exploratory in examining the ways in which the two distinct stressors, academic stress and attachment stress, might influence eating behaviors in these stress-eating populations.

## 2. Materials & methods

### 2.1. Participants

Participants included 167 female university students between the ages of 17 and 42 ( $M = 20$  years old,  $SD = 3.21$ ) who self-identified as being either a stress-undereater or a stress-eater. Those who reported "eating the same" under stress were excluded from the analysis (14.1%,  $n = 29$ ). Participants were excluded from the present study if they: reported a history of an eating disorder (2.4%,  $n = 4$ ), were pregnant or nursing (1.2%,  $n = 2$ ), reported being "very full" or "full" upon arrival to the study session (12.4%,  $n = 20$ ), or if they guessed the true nature of the study before it was revealed to them (17.7%,  $n = 25$ ). *T*-tests revealed that these participants excluded for guessing the true nature of the study did not differ from the remainder of the sample in terms of nutrient consumption or state anxiety score. In total, 51 participants (30%) from the original sample were excluded from the present analyses, leaving 116 usable cases. All participants provided written consent to participate after they were debriefed about the true nature of the study.

### 2.2. Measures

#### 2.2.1. Body measurements

Participants' waist-to-hip ratios (WHR) were calculated, as described by Klein et al., (2007). This was done with a flexible measuring tape. Participants' BMIs were calculated by measuring their weight in kilograms and dividing it by their height in meters, squared. This was done with a flexible measuring tape and a digital bathroom scale. On average, participants weighed 65.81 kg ( $SD = 13.22$ ) and were 166.61 cm tall ( $SD = 7.16$ ). The average body mass index (BMI) was 24.11 ( $SD = 4.89$ ).

#### 2.2.2. State-trait anxiety inventory (STAI; Spielberger, Gorsuch, & Lushene, 1970)

The STAI is a self-report measure comprised of two subscales

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