Examining the relationship between dietary restraint and binge eating: Differential effects of major and minor stressors

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ABSTRACT

This study sought to examine the complex interactive impact of major stress and minor stressors on the relation between dietary restraint and binge eating. Participants were 497 undergraduate females who completed an online questionnaire that included measures of binge eating (modified version of the bulimia scale of the Eating Disorder Inventory-2; EDI-2), major life stressors (the Social Readjustment Rating Scale; SRRS), minor stressors (Daily Stress Inventory; DSI), and dietary restraint (Restraint Scale; RS). A hierarchal linear regression revealed a significant three-way interaction among dietary restraint, life event stress, and daily stress that accounted for a significant proportion of the variance in binge eating above and beyond all main effects and two-way interactions. Findings suggested that the interactive relationship among dietary restraint and daily stress is present only under conditions of high life event stress. Overall, the relationship between dietary restraint and binge eating appears to be quite complex and dependent upon differential levels of daily and life event stressors.

1. Introduction

Binge eating is an essential component of the diagnostic criteria for both bulimia nervosa and binge eating disorder and has been shown to be associated with other psychiatric symptomatology (e.g., depression; Crow, Zander, Crosby, & Mitchell, 1996; Paxton & Diggens, 1997). Thus, understanding factors that impact binge eating will not only add to the literature on disordered eating, but may also improve our understanding of other psychological disorders as well.

Extant cross-sectional and longitudinal data indicate that dietary restraint is a significant predictor of binge eating (Jacobi, Hayward, de Zwaan, Kraemer, & Agras, 2004; Polivy, Heatherton, & Herman, 1988; Stice & Agras, 1998; Stice, 2001). Several hypotheses have been put forth regarding these predictive associations. For example, researchers have hypothesized that dietary restraint leads to binge eating through physiological deprivation, i.e., decreased caloric intake leads to binge eating in the body's defense of its weight set-point (Nisbett, 1972). Alternatively, because dieting is a cognitively mediated activity (i.e., making a decision not to eat even when hungry), researchers have theorized that dieters engage in binge eating when their cognitive control is temporarily disrupted (Polivy & Herman, 1985; Ruderman, 1986). This phenomenon has been termed the "abstinence violation effect" (Marlatt & George, 1984) and is proposed to occur when small violations in cognitive restraint over eating are interpreted as failure to maintain control and thus, the individual forgoes all control and binge eats. Finally, investigators have recently argued that dietary restraint represents an "intent" to diet rather than actual caloric restriction (Stice, Fisher, & Lowe, 2004; Stice, Cooper, Schoeller, Tappe, & Lowe, 2007). These later theories posit that individuals who have a desire to diet are at increased risk for binge eating even in the absence of actual decreased caloric intake, as a general preoccupation with food and/or tendency towards overconsumption is associated with high levels of both dietary restraint and binge eating (Stice, Martinez, Presnell, & Groesz, 2006)

Regardless of the exact explanatory mechanisms, dietary restraint has been established as a clear and important risk factor for the development of binge eating. Likewise, stress has been theorized to be a potent risk factor for binge eating (Crowther, Snaftner, Bonifazi, & Shepherd, 2001; Hansel & Wittrock, 1997; Wolff, Crosby, Roberts, & Wittrock, 2000). Stress is a multi-dimensional construct that has been defined in terms of daily hassles (e.g., forgetting one's keys) as well as major life events (e.g., divorce). Importantly, both forms of stress have been associated with binge eating. Individuals with bulimia nervosa and binge eating disorder have been found to experience a significantly greater number of stressful major life events prior to the onset of their eating disorder (Pike et al., 2006; Rojo, Conesa, Bermudez, & Livianos, 2006; Welch, Doll, & Fairburn, 1997). In addition, daily stress has been associated with binge eating in clinical and sub-clinical samples of binge eating women (Crowther et al., 2001; Freeman & Gil, 2004; Smyth et al., 2007; Wolff et al., 2000). For example, a recent ecological momentary assessment study reported

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higher levels of daily stress on binge days versus non-binge days and increasing levels of stress immediately prior to binge episodes in women with bulimia nervosa (Smyth et al., 2007). High levels of daily stress are also related to overeating behavior in nonclinical samples (Greeno & Wing, 1994; Michaud et al., 1990).

Interestingly, one of the most robust predictors of stress-induced overeating is the presence of high levels of dietary restraint. Both laboratory and naturalistic studies demonstrate that restrained eaters tend to increase their food intake as a result of stress, whereas unrestrained eaters are either unaffected by stress or eat less (Cools, Schotte, & McNally, 1992; Greeno & Wing, 1994; Heatherton, Herman, & Polivy, 1991; Wardle, Steptoe, Oliver, & Lipsey, 2000). These findings clearly suggest that stress and restraint interact to influence eating behavior. Stress–restraint interactions have also been reported in the animal literature; the combination of caloric restriction and stress increases the consumption of palatable (i.e., high fat) food in female rats as compared to either dietary restriction or stress alone (Hagan et al., 2002). These animal findings provide additional support for the presence of interactions between dietary restraint and stress that may be present in humans as well.

Importantly, most studies that have examined the interactive effects of restraint and stress on binge eating in humans have been conducted in the laboratory and have focused on the isolated effect of a specific stressor (e.g., watching a stressful video, attempting unsolvable puzzles, giving a speech) on eating behavior. Given that the presence of high levels of life event and daily stress appear to be important for binge eating (e.g., Welch et al., 1997; Wolff et al., 2000), it is necessary to examine interactive relationships using multiple measures of stress that assess both major life event as well as daily hassle stress. Understanding how these different forms of stress are related to binge eating when considered together can help us to develop and refine theories of how stress might impact binge eating.

Given the above, the aim of the present study was to examine the effects of different forms of stress on the relationship between dietary restraint and binge eating. Measures of both daily stressors (e.g., minor traffic violation) and major life event stressors (e.g., change in career) were used in order to examine the differential effects of stress as moderators of dietary restraint/binge eating associations. It was hypothesized that dietary restraint/binge eating associations would be strongest in individuals with high levels of daily or major life event stress. In addition, this study sought to explore more complex, three-way interactions between dietary restraint, daily stress, and life event stress on binge eating behaviors. Many individuals experience both high levels of daily stress and life event stress, and the combination of these forms of stress with restrained eating may be especially "risky" for binge eating.

2. Materials and methods

2.1. Participants

497 undergraduate women (age range: 17–27, $M = 19.5$ years, $SD = .47$) from a large Midwestern university. Participants enrolled in the study from a volunteer research pool. Subjects completed the assessments online using a web-based assessment program and received course credit for their participation.

2.2. Measures

2.2.1. Binge eating

The Bulimia subscale of the Eating Disorder Inventory-2 (EDI-2; Garner, Olmstead, Marion, & Polivy, 1983; Garner, 1991) was used to assess binge eating behaviors. This subscale consists of seven items and primarily focuses on the inclination to think about and/or engage in binge eating behaviors. Since this study was interested in binge eating rather than compensatory behaviors, one item pertaining to compensatory behaviors (i.e., "I have the thought of trying to vomit in order to lose weight") was removed before calculating the final score. The psychometric properties of EDI-2 Bulimia scale are excellent (Raciti & Norcross, 1987; Vanderheyden & Boland, 1987). High correlations (e.g., $r = .72$) between the bulimia subscale of the EDI-2 and the EAT-26 Bulimia and Food Preoccupation Scale have been observed (Garner, 1991). Furthermore, the EDI-2 has been shown to display good convergent and discriminat validity in female college students (Bardone-Cone & Boyd, 2007). The internal consistency of the EDI-2 scale in the current study was adequate (alpha = .75), and was the same regardless of the omission of the item pertaining to compensatory behaviors.

2.2.2. Restraint

Dietary restraint was measured with the Restraint Scale (Herman & Polivy, 1980). The Restraint Scale is a 10-item self-report questionnaire that assesses dieting behavior. Overall, this measure has been shown to have high internal consistency with alphas ranging from .79 (Johnson, Lake, & Mahan, 1984) to .86 (Ruderman & Christensen, 1983). Internal consistency calculated for the current study is excellent (alpha = .81). Concurrent validity of the Restraint Scale is also well-established, as this measure correlates as expected with other dietary restraint scales (e.g., Dutch Restrained Eating Scale: $r = .59$; Laessle, Tuschl, Kotthaus, & Pirke, 1989).

2.2.3. Stress

The Social Readjustment Rating Scale (SRRS; Holmes & Rahe, 1967) was used to assess levels of major life event stress. This scale examines stress as an external force that can be caused by both positive (e.g., gaining a promotion at work) and negative events (e.g., loss of a family member). Respondents endorse whether or not they have experienced any of the 43 life events presented in the measure within the past year. Items on the measure are given a value ranging from 11 to 100 based on the severity of the event. More stressful life events were given a higher score (e.g., death of a spouse = 100) and events that are found to be less stressful are given a lower score (e.g., vacation = 13). A total score that sums the values of all life events endorsed in the past year was used in analyses. In a psychometric study of the SRRS, internal consistency was acceptable (alpha = .72), and a very high correlation ($r = .97$) between the SRRS and the Schedule of Recent Events was reported (Lei & Skinner, 1980).

Minor stress was assessed using the Daily Stress Inventory (DSI; Brantley, Waggoner, Jones, & Rappaport, 1987). The Daily Stress Inventory is a 58-item, self-report questionnaire in which participants endorse whether they have experienced minor stressors within the past 24 h. Items include minor stressors such as dealing with a rude person, having car trouble, or dealing with bad weather. Participants rate all stressors as present or absent. Stressors that have been present in the past 24 h are then rated on their perceived stressfulness on a 7-point Likert-type scale (1 = "occurred, but was not stressful"; 7 = "caused me to panic"). A total score is calculated by averaging all of the impact ratings to provide a measure of the overall perception of the stressfulness of the past day. Construct validity for the average score has been established through high correlations between the DSI and the frequency and intensity scales of the Hassles Scale (Kanner, Coyne, Schaefer, & Lazarus, 1981; Brantley et al., 1987). Internal consistency was excellent for the DSI in this study (alpha = .90).

3. Results

Descriptive statistics and Pearson correlations for restraint, daily stress, major life event stress, and binge eating are presented in Table 1. As expected, significant positive relationships were observed between restraint, daily stress, major life stress, and binge eating. However, the association between daily stress and binge eating was