

A COMPARISON OF BINGE-EATING TRIGGERS BETWEEN NORMAL-WEIGHT
AND OVERWEIGHT INDIVIDUALS

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ABSTRACT

This study compared two well-established antecedents of binge eating (i.e., dietary restraint and negative affect) between normal-weight and overweight individuals. It was hypothesized that endorsement of dietary restraint and negative affect would differ between groups of overweight and normal-weight individuals, as well as differing within each group. Data from 163 undergraduate students (69% female, 53% Caucasian, 85% age 18-21 years) were categorized into an overweight or normal-weight group based upon BMI. Binge-eating antecedents were measured using the Restraint Questionnaire (Herman & Polivy, 1975) and the Binge Eating Adjective Checklist (Davis & Jamieson, 2005). Dietary restraint was significantly higher for the overweight group than for the normal-weight group, and negative affect was a significant predictor of binge eating for the overweight group, but not for the normal-weight group.

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CHAPTER I

INTRODUCTION

Overview

Binge eating is the act of consuming an abnormally large amount of food during a discrete period of time, accompanied by a sense of lack of control over the eating behavior (Marcus, Kalarchian, & Levine, 2005). Episodes of binge eating can be present in many psychological disorders. According to the *Diagnostic and Statistical Manual of Mental Disorders*, borderline personality disorder, major depressive disorder, and manic episodes can include symptoms of binge eating (4th ed., text rev.; *DSM-IV-TR*; American Psychiatric Association [APA], 2000).

Perhaps the occurrence of binge eating is most central within the eating disorders. With the restricting type of anorexia nervosa (AN) being the exception, binge-eating episodes may be evident in all of the eating disorders as described in the *DSM-IV-TR* (APA, 2000). Binge eating is a hallmark symptom of bulimia nervosa (BN) and is present in roughly one third of individuals with anorexia nervosa (Fairburn, 1995).

Recurrent and severe binge-eating episodes in the absence of compensatory weight-control behaviors have led to proposals for the inclusion of binge eating as a disorder, not just a symptom, in the *DSM*. Binge eating disorder (BED) is a new disorder proposed for the fifth edition of the *DSM* (APA, 2010). BED currently is listed as an area in need of further research in Appendix B of the current edition of the *DSM-IV-TR* (APA, 2000). Binge-eating episodes in BED are not accompanied by inappropriate compensatory methods, and this is how BED is differentiated from bulimia nervosa (APA, 2000).

Correlates of binge eating include obesity, negative affect, and dietary restraint.

The purpose of this study was to examine negative affect and dietary restraint as antecedents that act to trigger episodes of binge eating. These antecedents were compared between normal-weight and overweight individuals who binge eat. The introduction will define binge eating and provide related epidemiological information across the eating disorder spectrum. A brief background on overweight and obese weight statuses will be presented. A review of the literature concerning binge eating will be provided in detail. This review will include comparisons of binge eating in different weight groups and will conclude with an examination of the most recognized antecedents of binge eating.

Definition and Characteristics of Binge Eating

Many people engage in occasional overeating such as at Thanksgiving. A distinct definition of binge eating must exist in order to avoid applying diagnostic labels to nonclinical behaviors. Currently, empirical consensus defines an episode of binge eating based upon two guidelines: (a) overeating in a discrete period of time and (b) perceived loss of control at the time of eating (Wolfe, Wood Baker, Smith, & Kelly-Weeder, 2009). These two key criteria for identifying a binge-eating episode aid in differentiating binge eating from nonclinical overeating, which does not include a perceived lack of control over eating (Walsh, 1993).

The criteria for the proposed binge eating disorder also include the aforementioned features of binge eating. Additionally, to qualify for a diagnosis of the disorder, an individual must exhibit binge eating at least twice a week for 6 months (APA, 2000). Further, binge-eating episodes must be associated with at least three of the

following: (a) eating more quickly than one normally would; (b) eating until feeling uncomfortably satiated; (c) eating large amounts of food despite the absence of physical hunger; and (d) feelings of guilt, disgust, or despair with oneself after eating (APA, 2000).

Researchers interested in the characteristics of binge-eating behaviors have examined energy consumption (i.e., calories) during binges, food selection, and locations and time frames in which binge eating occurs. Concerning the time frame for a binge, Rossiter, Agras, Telch, and Bruce (1992) found that binge-eating episodes lasted an average of 39 minutes. In studies illustrating descriptive features of binge-eating episodes, estimates of the frequency of binge episodes have differed. For example, Rossiter et al. (1992) found that individuals with nonpurging bulimia had approximately six episodes of binge eating per week, and Greeno, Wing, and Shiffman (2000) found, among those with BED, binge-eating episodes occurred an average of nine times per week.

The amount of energy consumed, measured in kilocalories (kcal), during binge episodes has been compared across different populations. For example, Engel et al. (2009) compared binge-eating behaviors among obese individuals who met criteria for BED with binge-eating behaviors of nonBED normal-weight and obese individuals. These researchers found that obese individuals with BED consumed more kcal during a binge episode than nonBED normal-weight and obese individuals. In similar comparisons, other researchers also have found higher kcal consumption among obese BED individuals than in their nonBED obese counterparts (Cooke, Guss, Kissileff, Devlin, & Walsh, 1997; Raymond, Bartholome, Lee, Peterson, & Raatz, 2007). Studies attempting to quantify the amount of kcal consumed during a binge have reported varying results. In studies of nonpurging women who binge eat, the average amount of energy

consumed was 602 kcal for overweight binge eaters (Rossiter et al., 1992) and approximately 1200 kcal per binge episode for normal-weight binge eaters (Grilo, Shiffman, & Carter-Campbell, 1994). Hadigan, LaChaussée, Walsh, and Kissileff (1992), in their study of individuals with BN, found that the mean caloric content of binge meals was nearly 2100 kcals.

Studies on binge eating also have looked at characteristics such as food selection. Cooke et al. (1997) found that obese participants with BED consumed more meat during binge meals than did their obese nonBED counterparts. Studies also have compared food choice across different days. In studies that examined the characteristics of days in which binge eating occurred as compared to days in which binge eating did not occur, findings indicated that protein and fiber consumption was significantly lower on binge days (Rossiter et al., 1992) and that caloric intake was significantly lower on days preceding a binge (Timmerman, 1998).

Locations and social situations have been examined in descriptive studies of binge eating (e.g., Greeno et al., 2000; Grilo et al., 1994). The results of such studies indicated that binge eating occurred most frequently when participants were alone or at home (Greeno et al., 2000; Grilo et al., 1994).

Prevalence

The prevalence of binge eating differs across diagnostic categories and across specific populations. Results of a national survey on eating disorders indicated that the lifetime prevalence of AN, BN, and BED are 0.6%, 1.0%, and 2.8%, respectively (Hudson, Hiripi, Pope, & Kessler, 2007). Pull (2004), in a review of the literature, reported the prevalence of BED as occurring in 1% to 3% of the general population, and

Spitzer et al. (1991) reported the prevalence of BED as occurring in approximately 2% of the general population. A more recent study by Grucza, Przybeck, and Cloninger (2007) found a larger sample-based prevalence of 6.6% for BED. Lifetime prevalence of subthreshold binge eating (i.e., binge eating that does not meet diagnostic criteria) is reported at 1.2% (Hudson et al., 2007).

Binge eating can be seen in specific populations, such as among college students. Saules et al. (2009) studied what was then termed *binge eating symptom* (i.e., binge eating behavior that is accompanied with a perceived lack of control over the eating behavior) among college students in the United States. These researchers found a binge-eating prevalence rate of 5% for this group. The occurrence of binge eating also can be found among obese individuals (Stunkard, 1959), including those people who are seeking treatment for weight control (Spitzer et al., 1991). According to Spitzer et al. (1991), approximately 29% of their treatment-seeking obese participants met criteria for BED. In a review of the literature, the frequency of BED in obese women who were treatment-seeking was reported as occurring in 23% to 46% of women (de Zwaan & Mitchell, 1992).

Demographics

Age. In epidemiological studies of binge eating, the age of onset for this behavior seems to differ across the eating disorder spectrum. In a study of BN, Keski-Rahkonen et al. (2009) reported the highest incidence of the disorder in ages 16 to 20 years. In a review of epidemiological studies on eating disorders, Hoek and van Hoeken (2003) reported that, for women, 20 to 24 years of age was the age range most at risk for BN. Regarding BED, research findings indicated that the typical age of onset for this disorder

was in early adulthood at approximately 24 years of age for women (Mussell et al., 1995) and at age 25 years across a sample of both men and women (Spurrell, Wilfley, Tanofsky, & Brownell, 1997). These findings suggest that binge eating is of particular concern for young adults.

Race. Previous research findings suggest that eating disorders affect Caucasian women more than any other group (e.g., Striegel-Moore et al., 2003). More recent research suggests that racial differences may exist among specific eating disorders. Results of an epidemiological study of eating disorders indicated that AN was present proportionally more often in Caucasian individuals than in any other racial group (Hudson et al., 2007). Conversely, BN presented proportionally more often in Hispanic groups than in Caucasian groups (Hudson et al., 2007). Racial differences appear to be less evident in BED. Franko et al. (2011) found that the frequency of binge-eating episodes was similar for African American, Caucasian, and Hispanic individuals with BED. Examinations of racial differences in binge eating also have included obesity as a factor. According to one study, African American women with BED were significantly more likely to meet criteria for obesity than are Caucasian women with BED (Pike, Dohm, Striegel-Moore, Wilfley, & Fairburn, 2001).

Sex. Research concerning the prevalence of eating disorders also has compared the sexes. In one study of eating disorder prevalence, Hudson et al. (2007) found the lifetime prevalence rate of AN, BN, and BED to be significantly higher for women than for men. This same study found that men and women were similar in lifetime prevalence of any binge eating. These results suggest that sex differences may exist when binge-eating symptomatology meets diagnostic criteria.

Studies focusing only on diagnostic-level binge eating also have compared the sexes. Striegel-Moore et al. (2009) found more women than men who met diagnostic criteria for BED. Investigations of sex differences in BED have looked at specific populations, such as college students and those seeking treatment. Saules et al. (2009) examined binge eating among a sample of college students and found that probable BED was present significantly more often in college women (6.1%) than in college men (2.7%). Other researchers who focused on college students identified 8.4% of college women as meeting the diagnostic criteria for BED (Napolitano & Himes, 2011). Barry, Grilo, and Masheb (2002), in a study concerning weight status in treatment-seeking individuals with BED, found that treatment-seeking men with BED were significantly more likely to be obese than treatment-seeking women with BED.

Weight Classifications

Weight was the central focus of early research regarding binge eating. Stunkard (1959) first described binge eating in his study of eating patterns in the obese. Patterns of overeating were identified, and these episodes often occurred after a specific precipitating event and had dissociative qualities about them (Stunkard, 1959). A collection of studies on binge eating now exists decades after Stunkard's pioneering study. For example, Telch, Agras, and Rossiter (1988) found an association between binge eating and adiposity. These researchers found a positive correlation between the two factors, indicating that the severity of binge eating increases as the degree of obesity increases. Brownell and Wadden (1992) also looked at the relationship between binge eating and weight status. These researchers found that binge eating in the absence of compensatory weight-control methods may lead individuals toward obesity.

With weight status being so prominent in binge-eating research, parameters for weight classifications should be defined. Weight status is calculated most often using body mass index (BMI). BMI (Keys, Fidanza, Karvonen, Kimura, & Taylor, 1972) is estimated by dividing an individual's weight in kilograms by his or her height in meters squared (Flegal, Carroll, Kit, & Ogden, 2012). The BMI score is then used to determine weight status. People are classified as overweight if BMI equals or exceeds a score of 25 (Flegal et al., 2012). The overweight category contains a subcategory called *obese*. An individual is classified as obese if BMI is greater than or equals a score of 30 (Flegal et al., 2012). In the United States, nearly one third of adult men and women are classified as obese (Flegal et al., 2012).

Being overweight or obese can exacerbate the morbidity of certain health conditions. Type 2 diabetes, hypertension, and coronary heart disease are just a few of the associated diseases that can worsen as BMI increases (U.S. Department of Health and Human Services, 1998). Psychological risks also have been included in obesity studies. For example, in a study of the psychological correlates of obesity, nearly one half of the participants met diagnostic criteria for an anxiety or depressive disorder (Tuthill, Slawik, O'Rahilly, & Finer, 2006). Johnston, Johnson, McLeod, and Johnston (2004) reported that obese women had increased odds of a past major depressive episode as compared to normal-weight women. Fitzgibbon, Stolley, and Kirschenbaum (1993) and Friedman and Brownell (1995) found more psychological distress among obese individuals who were seeking weight-related treatment than their nontreatment-seeking obese counterparts.

Correlates of Binge Eating

Although exact causation has yet to be identified, various correlates of binge eating have been studied. Sexual abuse (e.g., Striegel-Moore, Dohm, Pike, Wilfley, & Fairburn, 2002), low social support from peers (Stice, Presnell, & Spangler, 2002), stress (e.g., Harrington, Crowther, Payne Henrickson, & Mickelson, 2006), and body dissatisfaction (e.g., Stice et al., 2002) comprise just a few of an increasing list of factors implicated in binge eating.

In the literature concerning the correlates of binge eating, major focal points have included weight status (e.g., Goldschmidt et al., 2011; Hsu et al., 2002; Striegel-Moore, Wilson, Wilfley, Elder, & Brownell, 1998; Stunkard & Allison, 2003), dietary restraint (e.g., F. Johnson & Wardle, 2005; Polivy & Herman, 1999; Williams, Spencer, & Edelmann, 1987), and negative affect (e.g., Greeno et al., 2000; Grilo et al., 1994; Stein et al., 2007; Stickney, Miltenberger, & Wolff, 1999). The following sections will explore binge eating across different weight statuses, followed by an examination of dieting behaviors and negative affective states as triggers to binge-eating episodes.

Weight status and binge eating. As mentioned previously, binge eating was described first by Stunkard (1959) in a case study of obese individuals. Following this study, several investigations on binge eating have included comparisons between normal-weight and overweight individuals (e.g., Barry, Grilo, & Masheb, 2003; Goldschmidt et al., 2011), and it appears that the degree of weight and the severity of binge eating are positively correlated (Telch et al., 1988). For example, Hudson et al. (2007) found that people with BED were significantly more likely than those people without any eating disorder to have BMI equal to or greater than 40.

Other studies have examined the prevalence of specific weight statuses in people with BED. In a community-based study on the prevalence of BED, researchers found that 70% of their participants with BED had BMI greater than 30 (Grucza et al., 2007). Mussell et al. (1995), in a similar comparison, reported that more than 96% of their BED sample was overweight; more than two thirds of this group was obese.

BMI also has been compared in BED studies across different participant samples, such as in groups of treatment-seeking individuals (e.g., Spitzer et al., 1993). In one multisite study on binge eating, Spitzer et al. (1993) found that the highest prevalence of BED was in participants in weight-control programs when compared to nonpatient community samples or college student samples. These researchers also found that BED participants in weight-control programs had higher BMI than their nonBED counterparts.

Perhaps to examine differences among individuals belonging to the same weight class, studies have looked at characteristics of obese populations with and without BED. Fitzgibbon et al. (1993) found that individuals who sought weight-related treatment evidenced more binge eating and psychopathology than their nontreatment-seeking counterparts. Hsu et al. (2002) compared binge eating in a population of individuals seeking bypass surgery for weight treatment. These researchers found that pregastric bypass surgery patients who met criteria for BED diagnosis had greater eating disturbances and body shape concerns than did nonBED patients. In another comparison of those with BED and those without, Striegel-Moore et al. (1998) found that obese individuals with BED had lower self-esteem, greater sadness, and more stress than their nonBED obese counterparts.

Although research data suggest that BED is more common in overweight individuals, binge eating and BED are not exclusive to this group. A few studies on binge eating disorder have included normal-weight participants (e.g., Barry et al., 2003; Goldschmidt et al., 2011; Grilo et al., 1994). Perhaps illustrating differences in the frequency of BED in weight-specific groups, Barry et al. (2003) compared the frequency of obese and normal-weight participants with BED. The findings of this study indicated that the obese BED group had nearly twice as many participants than the nonobese BED group. Similarly, the results of a study by Goldschmidt et al. (2011) indicated that the group of obese BED participants included almost twice as many people as the normal-weight BED group.

In addition to frequency, comparison studies of BED in overweight and normal-weight groups also have examined psychopathology. Goldschmidt et al. (2011) compared normal-weight individuals with BED to their obese counterparts. Normal-weight participants reported having more feelings of distress about their binge eating (Goldschmidt et al., 2011). Barry et al. (2003) found a similar degree of body dissatisfaction for normal-weight BED and obese BED individuals. Eating disturbances also have been examined in normal-weight and overweight groups with BED. Goldschmidt et al. (2011) found that normal-weight participants reported more frequent use of both healthy and unhealthy methods to control their weight than obese participants. This study found that the two groups were similar in binge-eating frequency.

Although the bulk of research on binge eating has focused on the occurrence of this behavior in overweight and obese populations, a subset of binge eaters falls into the normal-weight category. Research findings (e.g., Goldschmidt et al., 2011) suggest that

normal-weight binge eaters may differ from their obese counterparts on some variables. Studies also have shown that binge eating in the absence of compensatory weight-control methods is related to weight gain or larger weight status, and this puts this group at risk for developing obesity (e.g., Brownell & Wadden, 1992). More research on BED in normal-weight individuals is warranted. For example, it is unknown whether the triggering antecedent conditions for a binge-eating episode are similar for groups with different weight statuses. Dietary restraint and negative affect have been identified as major antecedents for binge eating, however, these conditions have not been compared between normal-weight and overweight individuals.

Dietary restraint. Dieting behaviors have been implicated in the development and maintenance of binge eating. To explain eating behaviors in the obese, Nisbett (1972) developed the theory of set point. Nisbett (1972) proposed that every individual has an ideal set point (i.e., weight) that is biologically determined by the number of fat cells in the body. Individuals with excess fat cells are physiologically predetermined to be overweight or obese and, therefore, must eat considerable amounts of food to maintain this weight. Nisbett (1972) further suggests that an individual can be overweight by society's standards, yet underweight based upon his or her body's predetermined set point by restricting food intake. According to this theory, such an individual will engage in overeating behaviors to counteract the starvation-like state of being below one's set point.

Expanding upon Nisbett's (1972) work, Herman and Mack (1975) developed restraint theory to explain the effects of dieting behaviors on overeating and binge eating in normal-weight groups as well as in obese populations. Restraint theory has been

supported and expanded upon by Herman and colleagues (Herman & Mack, 1975; Herman & Polivy, 1975; Hibscher & Herman, 1977), as well as by others in the field (e.g., Ruderman, 1986). According to restraint theory, overeating is predicted by dieting, not by obesity as previously thought (Nisbett, 1972; Schachter, 1971). This theory suggests that a continuum of dieting behaviors exists. At one end of the continuum are restrained eaters (i.e., chronic dieters), and at the opposite end are unrestrained eaters, who are individuals who give little thought to dieting or food restriction (Ruderman & Christensen, 1983).

To explore differences between restrained eaters and unrestrained eaters, Herman and Mack (1975) asked participants to sample ice cream after being presented with a preload of zero, one, or two milkshakes. Participants also answered questions concerning levels of dietary restraint. Researchers found that individuals who had a preload of two milkshakes as well as high levels of dietary restraint ate more ice cream; conversely, participants who had lower levels of dietary restraint and a preload of zero milkshakes consumed less ice cream. The eating pattern found in this study has been named counter-regulation (Polivy & Herman, 1985).

Counter-regulation occurs when a dieter's restraint is disinhibited (Ruderman 1986). In highly restrained eaters, self-imposed rules and restrictions about eating are followed until an external event or dietary disinhibitor temporarily weakens self-control (Stunkard, 1980). Proponents of restraint theory suggest that restrained eaters perceive eating in a dichotomous manner (Ruderman, 1986); eating becomes an all-or-none phenomenon. Once dieting is disrupted, such as with a high calorie preload, restraint is disinhibited, and overeating is triggered (Polivy & Herman, 1985).

Nisbett's (1972) and Herman and Mack's (1975) theories paved the way for further research concerning the relationship between dieting and binge eating. For example, Abraham and Beumont (1982) found a positive relationship between eating disorder severity and degree of dieting behaviors. Brody, Walsh, and Devlin (1994) found that individuals with BED reported devoting more time in their lives to dieting than did those without BED. Concerning the onset of dieting behaviors in those with BED, Spitzer et al. (1993) found that binge eating occurred before the onset of significant dieting (i.e., dieting that resulted in a loss of at least 10 lbs.) in 48% of participants, with 37% reporting that dieting occurred first. These results suggest that the path from dieting to binge eating may be multidirectional. In a review of the literature, Schmidt (2000) found differences between those who binge first and those who diet first, such as the presence of more psychiatric and interpersonal disturbances in the binge-first group. Researchers also have identified a subgroup of restrained eaters, consisting of individuals who successfully maintain a low weight and who do not exhibit counter-regulation behaviors (Tuschl, 1990). This suggests that individuals who restrict food intake may not be a homogenous group.

More recent research on binge eating has focused on individuals with BED and the relationship of dietary restraint to BED symptomatology. In an investigation of the dimensions of BED, Stice et al. (2001) applied a dual pathway model to binge eating, in which dietary restraint and negative affect were identified as subtypes of binge eating. This model was demonstrated in a previous study on the dimensions of binge eating in individuals with BN (Stice & Agras, 1999). Using this dual pathway model, Stice et al. (2001) identified these same subtypes in women with BED, with nearly twice as many

women belonging to the dietary subtype than to the negative affect subtype. Interestingly, Masheb and Grilo (2000) found that only about one third of participants with BED reported dietary restraint. This discrepancy could suggest that factors other than dietary restraint contribute to triggering binge-eating episodes.

Negative affect. Negative emotional states (i.e., negative affect) comprise another class of antecedent conditions implicated in binge eating. Abraham and Beumont (1982) found that 91% of participants reported feelings of tension occurring before episodes of binge eating, and 34% of these participants reported that binge eating offered relief from anxiety. Laessle, Kittl, Fichter, and Pirke (1988) found that negative self-evaluation, particularly about body weight and shape, positively correlated with depression in anorexic and bulimic patients. In an examination of emotional states in episodes of binge eating, Davis and Jamieson (2005) found that negative affect was significantly reduced in participants during and after binge episodes when compared to the degree of negative affect reported prior to episodes of binge eating.

Although negative affect is evident in binge eating, researchers have yet to agree on the nature of the association between these factors. As a result, many models have been created in attempts to explain this relationship. For example, Strober and Katz (1987) concluded from their review of the literature that eating disorders may result from affective disorders, especially in adolescents. The presence of an affective disorder, such as depression, along with dissatisfaction about one's physique or appearance, may predispose an individual to engage in disordered eating behaviors (Strober & Katz, 1987). In another explanation, Polivy and Herman (1993) proposed that depression is a potential

product of the effects of nutritional deficits on neurotransmitters. These nutritional deficits arise from patterns of disordered eating.

A different relationship between negative affect and binge eating, proposed by Heatherton and Baumeister (1991), is escape theory. Escape theory suggests that binge eating functions as an attempt to escape from awareness of aversive emotions. This theory posits that binge-eating individuals place high standards upon themselves. When the high standards are not achieved, these individuals view themselves negatively. Binge eating serves to narrow the cognitive focus in that moment onto the eating behavior, which deflects self-awareness from the feelings of being inadequate (Heatherton & Baumeister, 1991). Thus, binge eating may serve as a form of affect regulation.

Affect regulation appears in the literature as a central theory used to explain binge eating. For example, Munsch, Meyer, Quartier, and Wilhelm (2012) examined the course of moods in binge-eating individuals in a naturalistic setting. These researchers found that participants gave higher ratings to negative moods on days in which binge eating occurred than on nonbinge days. In a study of negative emotionality among binge-eating overweight women, Henderson and Huon (2002) found that women who reported higher levels of negative affect had more severe symptoms of binge eating than women who reported lower levels of negative affect. In a similar examination of affect and BED, Stein et al. (2007) recruited a sample of overweight women who met *DSM-IV-TR* criteria for BED. At specific times of the day across a 7-day period, participants answered questions regarding eating and affect. Researchers found that participants reported mood to be significantly more negative at times prior to binge eating than at times that did not proceed to binge eating (Stein et al., 2007). Hilbert and Tuschen-Caffier (2007)

suggested that binge eating occurs in the presence of negative moods but that binge eating does not, however, lead to an improvement in these emotions.

The role that affectivity plays in binge-eating behaviors has been examined in specific groups, such as in adolescents and young adults. A study by Napolitano and Himes (2011) compared the correlates of binge eating among female college students. Researchers found that participants who met diagnostic criteria for BED reported negative affect as a trigger for binge eating significantly more often than those who did not meet criteria. In an investigation of the predictive factors of binge eating, Stice, Killen, Hayward, and Taylor (1998) examined eating pathology among adolescent girls. Dietary restraint and negative affect both predicted the onset of binge eating (Stice et al., 1998). Interestingly, these researchers found that dietary restraint, but not negative affect, predicted the onset of purgative behaviors. This could suggest that the negative affect model of binge eating is a more appropriate explanation for the behavior in BED rather than in BN. These results further illustrate the need for continued investigations into binge eating and the associated antecedent conditions.

Dual pathway model. Dietary restraint and negative affect appear to be paramount among the theories of binge-eating antecedents. More recently, researchers have suggested a more integrative approach to binge eating, in which dietary restraint and negative affect may interact to trigger the onset of binges; this approach is in contrast to previous notions that these two precursors are separate and distinct elements of the same behavior. The dual pathway model (Stice, 1994) was proposed as a multivariate explanation of binge eating in bulimia nervosa. This model suggests that dieting behaviors contribute to feelings of dysphoria, and binge eating serves to alleviate this

negative emotional state (Stice et al., 1998). Binge eating, according to the dual pathway approach, can be triggered by negative affect, dietary restraint, or by the presence of both negative affect and dietary restraint.

Other researchers have further investigated the presence of both negative affect and dietary restraint (e.g., Chen, McCloskey, & Keenan, 2009; Gagnon-Girouard et al., 2010; Goldschmidt et al., 2008). In a study of eating disorders in a population of female psychiatric inpatients, Grilo (2004) examined the dual pathway model by grouping participants into a dietary subtype and a dietary-negative affect subtype. Grilo (2004) found that more participants in the dietary-negative affect group reported binge eating than those participants in the dietary group. Goldschmidt et al. (2008) also examined the presence of both dietary restraint and negative affect in samples of children and adolescents. Participants were grouped into a dietary restraint subtype or a dietary restraint/negative affect subtype based upon the results of eating pathology assessments. When comparing the characteristics of these two subgroups, researchers reported that participants belonging to the dietary restraint/negative affect subtype had higher BMIs than those in the dietary restraint subtype. It is well established that binge-eating severity is positively correlated with weight (Telch et al., 1988), and the findings from Goldschmidt et al. (2008) could suggest that negative affect serves as the link between binge eating and higher weight status.

Summary and Hypotheses

Binge eating is a behavior that is evident across the eating disorder spectrum, and this behavior is defined by distinct periods of overeating in which a loss of control over the eating behavior is perceived (e.g., Wolfe et al., 2009). Severe and pervasive

occurrences of this behavior, in the absence of other eating disorders, have led to proposals for a new psychological disorder called binge eating disorder (APA, 2012). Binge eating has been associated with increased risks for certain psychological and physiological conditions, such as anxiety and mood disorders (J. G. Johnson, Spitzer, & Williams, 2001), alcohol dependence (Bulik, Sullivan, & Kendler, 2002), and significant metabolic changes (Taylor, Hubbard, & Anderson, 1999). Binge eating has been estimated as affecting as much as 7% of the general population (Grucza et al., 2007) and about 5% of college students (Saules et al., 2009).

Dietary restraint (Herman & Polivy, 1975), negative affect (Heatherton & Baumeister, 1991), and weight status (Telch et al., 1988) have been identified as prominent correlates of binge eating. Specifically, dietary restraint and negative affect have been identified as triggers to binge-eating episodes. Binge eating has been theorized to result from dietary disinhibition among restrained eaters (e.g., Polivy & Herman, 1985) or from attempts to escape from negative emotions (e.g., Heatherton & Baumeister, 1991). Weight and binge eating have been demonstrated to positively correlate (Telch et al., 1988), with weight increasing as the severity of binge eating increases.

These correlates of binge eating have been compared across different diagnostic categories, such as BN (e.g., Stice, Nemeroff, & Shaw, 1996) and BED (e.g., Stein et al., 2007), and significant differences between these groups for these correlates have been found. Studies comparing binge eating and weight status between BN and BED populations have shown that BMI differs significantly between these two groups, with individuals with BN having a significantly lower BMI than those with BED (Barry et al., 2003). Comparisons of these groups on dietary restraint and negative affect have shown

that individuals with BN endorse dietary restraint more often than do individuals with BED (Barry et al., 2003). The implication of these findings could be that dietary restraint has a greater association in triggering binge eating among normal-weight individuals than in overweight individuals.

Studies have shown that negative affect and dietary restraint may work together, producing a combined effect that triggers binge eating (e.g., Stice, Shaw, & Nemeroff, 1998). Interestingly, significantly higher BMI has been found when negative affect and dietary restraint are both present than when these antecedents present alone (e.g., Goldschmidt et al., 2008). This finding may further illustrate the differences between normal-weight and overweight binge eaters. Negative affect and dietary restraint both have been found to predict binge eating, whereas only dietary restraint has been found to predict compensatory weight-control behaviors (Stice et al., 1998). This could suggest that negative affect has a greater association in triggering binge eating among overweight individuals than normal-weight individuals.

As has been shown, differences exist between normal-weight and overweight binge-eating individuals. Differences also exist between individuals who endorse dietary restraint and those who endorse negative affect. Investigations of these differences in binge-eating antecedents across different weight statuses, however, are limited in the current state of the binge-eating literature. Accordingly, the purpose of the current study was to examine dietary restraint and negative affect as antecedent conditions of binge eating and to compare these factors between groups of normal-weight and overweight individuals.

The following hypotheses were presented:

1. Binge-eating antecedents would differ between overweight and normal-weight individuals who binge eat. Specifically, overweight individuals who binge eat would have higher negative affect scores than normal-weight individuals who binge eat. Normal-weight individuals who binge eat would have higher dietary restraint scores than overweight-binge eaters.
2. Binge-eating antecedents would differ within the weight groups.
 - a. Among overweight individuals, negative affect would be a better predictor of binge eating than dietary restraint.
 - b. Among normal-weight individuals, dietary restraint would be a better predictor of binge eating than negative affect.
3. Three exploratory analyses were conducted, but no specific hypotheses were proposed.
 - a. Participants who met the proposed criteria for BED, assuming that a large sample size was acquired, would be examined across weight status, dietary restraint, and negative affect. This BED group would be subcategorized into a normal-weight group and an overweight group. These two groups would be examined for differences in scores for dietary restraint and negative affect.
 - b. The dual pathway model would be examined for all 163 participants divided into the two weight groups. The degree of both dietary

restraint and negative affect would be used to predict binge eating in the normal-weight and overweight groups.

- c. For all of the participants, BMIs, negative affect, dietary restraint, and various interactions all would be examined in predicting binge eating.

CHAPTER II

METHOD

Participants

For this study, participants consisted of a sample of 163 university undergraduate students attending Middle Tennessee State University. Participants were recruited through the university's psychology research pool and provided their written, voluntary consent. Of the total 163 participants, 85 were Caucasian (53%). The number of participants identifying as African American was 53 (33%), and the number who identified as Other was 23 (14%). Two participants did not provide their race. The number of female participants was 112 (69%), and the number of male participants was 51 (31%). When examining age, 139 (85%) participants were between the ages of 18 and 21 years, and 24 (15%) participants were over the age of 21 years.

Compensation for participation was provided in the form of course credit or extra credit that was applied to the psychology class in which each participant was enrolled. The Institutional Review Board Approval Letter is found in Appendix A.

Measures

Demographics. The age, sex, and race/ethnicity for each participant were obtained. Ages of the participants were reported in clusters of age ranges (e.g., "18-21"). Participants reported their race/ethnicity by selecting one of three categories (i.e., "Caucasian," "African American," or "Other").

Body mass index. Body mass index (BMI; Keys et al., 1972) is calculated by dividing each participant's weight in kilograms by height in meters squared (Flegal et al., 2012). BMI scores were used to classify participants as either normal weight (i.e., BMI <

25) or overweight (i.e., $\text{BMI} \geq 25$). Each participant provided a self-report of his or her current height and weight. Previous research has shown that self-reported height and weight are accurate assessments of these constructs (Craig & Adams, 2009; Masheb & Grilo, 2001; McCabe, McFarlane, Polivy, & Olmsted, 2001). For this study, the formula for BMI was modified to fit with the survey. On the survey, participants reported their weight in pounds and their height in feet and inches. BMI was calculated by multiplying weight in pounds times a factor of 703, and then dividing this value by height in inches squared (Bray, 2003).

The Binge Scale. The Binge Scale (Hawkins & Clement, 1980) is a 10-item self-report measure created to assess binge eating among individuals with bulimia nervosa. The first item serves to identify individuals who binge eat (i.e., “Do you ever binge eat?”), and this item is not included in the total score. The remaining nine items are used to quantify and measure the severity of binge eating. Questions (e.g., “How often do you binge eat?”) are presented with varying answer choices, and participants are instructed to select the choice that is most descriptive of the last time binge eating occurred. Participants were directed on the survey to choose only one answer for each question. The summation of scores for items 2 through 10 yields the overall Binge Scale score.

The sample on which the Binge Scale was standardized consisted of 365 college undergraduate students (255 women and 110 men) and a clinical population of 26 overweight college women. The Binge Scale originally consisted of 19 items. The 10 items that demonstrated acceptable internal consistency (i.e., Cronbach’s $\alpha = .68$) were retained from the pilot study (Hawkins & Clement, 1980). Good test-retest

reliability after 1 month ($r = .88$) was found in the pilot study (Hawkins & Clement, 1980).

For the purposes of the current study, modifications were made to the Binge Scale. Among the instructions for the Binge Scale, descriptions were provided of what constitutes a binge-eating episode (i.e., “Sometimes people eat an unusually large amount of food at one time, such as within a 2-hour period, and feel like they have no control over their eating.”) and what constitutes an episode of overeating (i.e., “Overeating occurs when you eat more food than you know you should or than you normally would eat.”). Participants who indicated on the first item that they binge eat were instructed to complete the Binge Scale based upon a time in which they binge ate. Participants who indicated on the first item that they do not binge eat were prompted to complete the Binge Scale based upon a time in which they overate. Three items were added to the Binge Scale to identify participants who meet the criteria for BED based upon the proposed *DSM 5* (APA, 2010) definition of this disorder. The modified Binge Scale consists of a total of 14 items, but only the original nine items from the Binge Scale were summed to create an overall score. For this study, Cronbach’s coefficient alpha for the original nine items was .78.

Binge Eating Adjective Checklist (BEAC). The Binge Eating Adjective Checklist (Davis & Jamieson, 2005) is a retrospective measure that assesses emotional and somatic symptoms during a binge-eating episode. This measure consists of seven scales (i.e., Negative Affect, Self-criticism, Apathy, Positive Affect, Arousal, Fatigue, and Hunger) and encompasses 103 adjectives, with each scale containing adjectives that typify the construct being measured within that scale.

For the purposes of this study, only the Negative Affect scale was used. The negative affect scale consists of 31 adjectives (e.g., “angry,” “disappointed,” “frustrated”) that characterize negative emotional states. Adjectives are presented in alphabetical order spanning across three columns. Participants were instructed to check as many adjectives that are applicable to how they typically felt immediately before a binge-eating or overeating episode. Items are coded using a dichotomous scale (i.e., 0 = not checked; 1 = checked). Scoring this scale is accomplished by calculating the total number of items checked. The items endorsed most by participants in the pilot study included “depressed,” “lonely,” and “frustrated.”

The BEAC was normed on a sample of 405 women who had a previous or current eating disorder diagnosis based on the *DSM-III-R* (Davis & Jamieson, 2005). In the pilot study, the BEAC correlated significantly with the Beck Depression Inventory (BDI). The BEAC showed good internal consistency ($K-R\ 20 = .95$) and good test-retest reliability ($r = .81$) in the pilot study (Davis & Jamieson, 2005). Each scale of the BEAC was designed to be internally and temporally consistent. The Negative Affect scale showed good internal consistency ($K-R\ 20 = .93$) and 1 week to 3 week test-retest reliability ($r = .78$) in the pilot study (Davis & Jamieson, 2005). For the current study, Cronbach’s coefficient alpha was .90.

Restraint Questionnaire. The Restraint Questionnaire (Herman & Polivy, 1975) is an 11-item measure designed to evaluate dieting and weight control behaviors and attitudes. The questionnaire consists of two subscales (i.e., Diet and Weight History subscale; Concern with Food and Eating subscale) addressing different aspects of restraint. Items in the Restraint Questionnaire have varying formats. Some items require

Likert-type scale answers (e.g., *rarely; sometimes; usually; always*), and participants select the degree that is most applicable to them. Other items require participants to write-in their responses (e.g., “What is your maximum weight gain within a week?”). Scoring procedures vary based upon the format of the item.

The questionnaire was standardized on a sample of 42 female university students. The Restraint Questionnaire yielded substantial internal consistency (coefficient alpha = .75) in the pilot study (Herman & Polivy, 1975). The Diet and Weight History subscale and the Concern with Food and Eating subscale each showed acceptable internal consistency, .68 and .62, respectively, and these subscales were shown to correlate with each other (Herman & Polivy, 1975). For the current study, Cronbach’s coefficient alpha for the entire questionnaire was .46. Cronbach’s coefficient alpha for the Diet and Weight History subscale and the Concern with Food and Eating subscale were .25 and .75, respectively.

Diagnostic question. Participants were asked an author-constructed question regarding whether they had been diagnosed with an eating disorder in the past year. If participants answered *yes*, they were asked to provide the name of the disorder.

Procedure

The assessment procedure involved administering the survey to participants in small groups. Participants first were provided with an informed consent document (Appendix B), which they signed and returned to the test administrators. Participants then completed a battery of measures that were issued only after consent forms were collected. These measures were presented as a single survey, and all items in this survey were in the self-report format. The survey began by asking participants to report

demographic information. Next, participants were instructed to answer questions from the Binge Scale (Hawkins & Clement, 1980), followed by the Negative Affect Scale of the BEAC (Davis & Jamieson, 2005) and the Restraint Questionnaire (Herman & Polivy, 1975). The survey concluded with a question regarding eating-disorder diagnoses. Each participant returned the survey by placing it in an envelope. Consent forms and assessments were stored separately in order to protect participant confidentiality. After completion of the assessment, participants received a debriefing form (Appendix C) to keep for their own records.

CHAPTER III

RESULTS

Descriptive Statistics

Out of the total sample of 163 participants, the average BMI was 24.40. Using BMI scores to categorize participants as overweight or normal weight, 109 participants (67%) were normal weight, and 54 (33%) were overweight. Demographic variables were compared using chi-square tests. As seen in Table 1, there were no significant differences between the overweight and normal-weight groups based on sex, age, and race.

Concerning binge eating, 63 participants (39%) reported that they binge eat, and they were classified as the binge-eating group. Participants who indicated that they do not binge eat, and were asked to respond to questions on the survey regarding a time in which they overate, were classified as the nonbinge-eating group. The nonbinge-eating group consisted of 100 participants (61%). As seen in Table 1, there were no significant differences between the binge-eating group and the nonbinge-eating group based upon sex and age. There was, however, a significant difference between the binge-eating and nonbinge-eating groups based upon race. As can be seen in Table 1, 15 (65%) of those belonging to the “Other” group reported that they binge eat. Although this was the smallest racial group ($n = 23$), nearly twice as many participants in this group reported binge eating than those who reported that they did not binge.

Table 1

Comparison of Demographic Characteristics between Weight Groups and between the Presence and Absence of Binge Eating

Characteristic	Normal Weight (<i>n</i> = 109)		Overweight (<i>n</i> = 54)		$\chi^2(df)$	<i>p</i>
	<i>n</i>	%	<i>n</i>	%		
Age (years)					2.05(1)	.152
18-21	96	69	43	31		
> 21	13	54	11	46		
Race					3.97(2)	.138
Caucasian	61	72	24	28		
African American	30	57	23	43		
Other	17	74	6	26		
Sex					.00(1)	.970
Female	75	67	37	33		
Male	34	67	17	33		
Characteristic	Binge Eating (<i>n</i> = 63)		Nonbinge Eating (<i>n</i> = 100)		$\chi^2(df)$	<i>p</i>
	<i>n</i>	%	<i>n</i>	%		
Age (years)					1.53(1)	.216
18-21	51	37	88	63		
> 21	12	50	12	50		
Race					9.30(2)	.010*
Caucasian	26	31	59	69		
African American	22	42	31	58		
Other	15	65	8	35		
Sex					.06(1)	.805
Female	44	39	68	61		
Male	19	37	32	63		

**p* < .05.

Zero-order correlations were used to examine the associations among binge-eating severity, as measured by the Binge Scale, BMI, dietary restraint, and negative affect. As can be seen in Table 2, the association of BMI with negative affect was not significant. All other associations were significant.

Hypothesis Testing

Two independent samples *t* tests were used to compare differences in binge-eating antecedents (i.e., negative affect and dietary restraint) for binge-eating individuals in the overweight and normal-weight groups. As seen in Table 3, there was no significant difference between these weight groups for negative affect scores. For dietary restraint, however, scores were significantly higher for the overweight group than for the normal-weight group.

The association between binge eating, as measured dichotomously, and its correlates (i.e., negative affect and dietary restraint) was examined using zero-order correlations. For these analyses, all 163 participants were divided into the overweight and the normal-weight groups. As seen in Table 4, negative affect and dietary restraint were significantly associated with binge eating for the overweight group. Dunn and Clark's (1969) *z* transformations determined that neither condition was a significantly better predictor than the other for the overweight group, $z = -1.22, p > .05$.

When examining the association between binge eating and its correlates for the normal-weight group, Table 4 shows that dietary restraint was significantly associated with binge eating. Negative affect, however, was not significantly associated with binge eating. Dunn and Clark's (1969) *z* transformations determined that neither of these

Table 2

Summary of Zero-Order Correlations for the Association of Binge-Eating Symptoms with BMI, Dietary Restraint, and Negative Affect

Variable	1	2	3	4
1. BES	—			
2. BMI	.26**	—		
3. Dietary restraint	.54***	.51***	—	
4. Negative affect	.53***	.09	.31***	—

Note. BES = Binge-eating symptoms; BMI = Body mass index. Binge-eating symptoms were measured using the Binge Scale.

* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 3

Summary of t Tests for Comparing Dietary Restraint and Negative Affect between Normal-Weight and Overweight Individuals who Binge Eat

Antecedent Condition	Normal Weight (<i>n</i> = 43)		Overweight (<i>n</i> = 20)		<i>df</i>	<i>t</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Dietary restraint	16.09	11.39	27.74	9.46	44.17	4.26***
Negative affect	7.23	6.29	10.50	8.56	28.94	1.53

Note. Due to unequal sample size, the Satterthwaite method was used to establish *t* values.

****p* < .001.

Table 4

Summary of Zero-Order Correlations for the Association of Binge Eating with Dietary Restraint and Negative Affect

Variable	1	2	3
1. Binge eating	—	.31*	.47***
2. Dietary restraint	.20*	—	.45***
3. Negative affect	.16	.25**	—

Note. Correlations for overweight participants ($n = 54$) are presented above the diagonal, and correlations for normal-weight participants ($n = 109$) are presented below the diagonal.

* $p < .05$. ** $p < .01$. *** $p < .001$.

conditions was better than the other at predicting binge eating for the normal-weight group, $z = .34, p > .05$.

Exploratory Analyses

Due to a small sample size of participants who met the proposed criteria for BED ($n = 5$), analyses comparing the antecedent conditions between normal-weight and overweight individuals with BED were not performed. To examine the dual-pathway model (i.e., that the presence of both negative affect and dietary restraint are better predictors of binge eating than either condition alone) two multiple logistic regressions were used. All 163 participants were divided into the two weight groups. For the overweight group, the presence of both dietary restraint and negative affect were used to predict binge eating. The overall regression model was significant in predicting binge eating for this weight group, $\chi^2(2, N = 54) = 13.41, p = .001$. As seen in Table 5, the presence of negative affect, but not dietary restraint, was a significant predictor of binge eating for overweight individuals.

A similar analysis was used for the normal-weight group to predict binge eating from the presence of both antecedent conditions. The overall regression model for this group was not significant, $\chi^2(2, N = 109) = 5.61, p = .060$.

As a final exploratory analysis, an interaction model was used to explore the relationship of binge eating with BMI, dietary restraint, and negative affect for all 163 participants. A multiple logistic regression was used to predict binge eating from these variables, as well as from the interaction of BMI with negative affect and from the interaction of BMI with dietary restraint. Although the overall interaction model was significant, $\chi^2(5, N = 163) = 22.20, p = .001$, further examination showed that only the

Table 5

Summary of Multiple Logistic Regressions in Predicting Binge Eating for Normal-Weight and Overweight Individuals

Predictor	Normal Weight (<i>n</i> = 109)				Wald statistic	<i>p</i>
	<i>B</i>	<i>SE</i>	<i>OR</i>	95% CI		
Dietary restraint	.04	.02	1.04	[1.00, 1.10]	2.69	.101
Negative affect	.04	.04	1.04	[.97, 1.12]	1.38	.240
	Overweight (<i>n</i> = 54)					
	<i>B</i>	<i>SE</i>	<i>OR</i>	95% CI		
Dietary restraint	.03	.04	1.03	[.96, 1.11]	.67	.41
Negative affect	.17	.07	1.19	[1.03, 1.37]	5.72	.02*

Note. CI = confidence interval for odds ratio (*OR*).

* *p* < .05.

interaction of BMI with negative affect, as seen in Table 6, was a significant predictor of binge eating for all of the participants.

Table 6

Summary of Multiple Logistic Regression in Predicting Binge Eating for All Participants

Predictor	<i>B</i>	<i>SE</i>	<i>OR</i>	95% CI	Wald statistic	<i>p</i>
Dietary restraint	.01	.10	1.01	[.84, 1.23]	.02	.899
Negative affect	-.38	.22	.68	[.45, 1.04]	3.13	.077
BMI	-.17	.11	.84	[.68, 1.04]	2.61	.106
BMI x dietary restraint	.00	.00	1.00	[.99, 1.01]	.06	.800
BMI x negative affect	.02	.01	1.02	[1.00, 1.04]	4.22	.040*

Note. CI = confidence interval for odds ratio (*OR*).

* $p < .05$.

CHAPTER IV

DISCUSSION

Much research exists on various factors associated with binge eating, including antecedent conditions associated with this behavior. Two well-established antecedents of binge eating are dietary restraint (e.g., Herman & Polivy, 1975) and negative affect (Heatherton & Baumeister, 1991). Research on binge eating also has examined the relationship between binge eating and weight status (e.g., Telch et al., 1988), suggesting a positive correlation between these factors. The existing research, however, is limited when examining antecedents of this behavior across different weight groups (Barry et al., 2003), and no study has directly compared the association of binge eating to these factors. The purpose of the current study was to compare two well-established antecedent conditions of binge eating (i.e., negative affect and dietary restraint) in an overweight group and a normal-weight group.

It was hypothesized that among those who binge eat, overweight individuals would endorse negative affect more often than normal-weight individuals. Further, normal-weight, binge-eating individuals were expected to endorse dietary restraint more often than overweight individuals. Upon examining negative affect, there was no significant difference between the two weight groups, and this finding is in contrast to the hypothesis. This suggests that overweight and normal-weight individuals who binge eat experience similar amounts of negative emotions prior to binge-eating episodes. Binge eating, therefore, may be linked with negative affect, regardless of one's weight.

Upon examining dietary restraint, however, the overweight group had significantly higher scores than the normal-weight group for this antecedent. This

finding is in contrast to the hypothesis and suggests that overweight individuals who binge eat engage in more dietary restraint than do normal-weight individuals who binge eat. Currently, no study has directly examined the relationship of dietary restraint with BMI. Barry et al. (2003) indirectly compared these factors by examining BMI in groups with BN and BED, in which BN was associated with normal BMI, and BED was associated with overweight BMI. These researchers then examined dietary restraint and negative affect in the BN and BED groups and found a significantly lower BMI and greater endorsement of dietary restraint in the BN group than in the BED group, which is in contrast to the current study's findings. The group differences in the endorsement of dietary restraint between these two studies may be due to the presence of BN in the Barry et al. (2003) study. It is possible that binge eating in the presence of purgative behaviors is associated more with dietary restraint than is binge eating alone. These contrasting findings highlight the need for further research in this area.

The results of the current study could suggest that, among those who binge eat, overweight individuals engage in more dieting and restrictive behaviors than do normal-weight, binge-eating individuals. Those who are overweight may feel more distressed about their weight than do normal-weight individuals, thus engaging in more repeated and failed attempts at restricting their diets.

It also was hypothesized that negative affect and dietary restraint would differ within each weight group. It was proposed that dietary restraint would be a better predictor of binge eating than negative affect for the normal-weight group. Only dietary restraint was a significant predictor of binge eating for this group, and this is consistent with previous research, as well as with the hypothesis of the current study. Regarding the

overweight group, it was proposed that negative affect would be a better predictor of binge eating than dietary restraint. Upon examination, both negative affect and dietary restraint were significant predictors of binge eating for the overweight group. Further examination showed that neither antecedent condition was better than the other at predicting binge eating for either group. Previous research has shown that dietary restraint is a better predictor for binge eating among those with normal BMI (Barry et al., 2003). The results of the current study, therefore, call attention to the need for further research into the association of BMI with dietary restraint, particularly in those with overweight BMI.

The dual-pathway model proposes that the presence of both dietary restraint and negative affect are better predictors of binge eating than either antecedent condition alone. The presence of negative affect and dietary restraint were not significant predictors of binge eating for the normal-weight group. For the overweight group, however, the presence of negative affect, but not dietary restraint, was a significant predictor of binge eating. Previous research has shown that the presence of both negative affect and dietary restraint are predictors of binge eating (Stice et al., 1998) and that BMI is significantly higher when these two antecedents are present than when either condition presents alone (Goldschmidt et al., 2008). The finding of the current study could suggest that negative affect is associated more in triggering binge eating among overweight individuals than in normal-weight individuals.

Interestingly, when interactions among variables were explored, the interaction of negative affect with BMI was a significant predictor of binge eating, even when controlling for the other variables. This supports the previous finding of this study and

suggests that negative affect plays a role in binge eating when BMI is considered.

Specifically, it seems as though negative affect's association with binge eating is stronger among overweight individuals than among those who are normal weight, and this is consistent with previous research (Telch et al., 1988).

Several limitations of this study should be considered. Use of a convenience sample, as well as the sample size itself ($N = 163$), may limit the applicability of these results to the general population. Further, the sample was acquired through a psychology research pool, which may limit generalizability. Demographic limitations also should be noted. For example, on the survey, participants were asked to record their race as "Caucasian," "African American," or "Other." The "Other" group limits application of these results to many ethnic and racial groups. Therefore, future studies on this topic should control for cultural differences. Additionally, data were collected in a mixed-sex environment. Some participants, female participants in particular, may have felt uncomfortable reporting their true weight on the questionnaire while in the company of members of the opposite sex.

Another limitation to this study involves how constructs were defined on the survey. Although a clinical definition of binge eating was provided on the survey, the item that identified binge eating was based upon participants responses of either "yes" or "no" regarding if they binge eat. Participants may not have read or understood the clinical definition that accompanied this question. Further, because binge eating was studied only as a symptom and not as a syndrome, it is not known if these findings will generalize to those with BED.

The nature of the survey itself is another limitation. The survey was self-report, and the accuracy of self-reported items, such as weight, is questionable. A related issue is that the survey was retrospective; participants were asked to respond to items based upon the last time that they binge ate or overate, and these retrospective responses may not be accurate representations of participants' behaviors. The retrospective nature of the survey is complicated by the fact that it is unknown when the last time a binge-eating episode occurred.

Despite its limitations, this study was the first to directly compare dietary restraint and negative affect among groups of overweight and normal weight binge-eating individuals, and the findings of this study have implications for future research. Most studies on BED have focused on overweight groups. Differences in binge eating are apparent when the behavior is compared across different BMI groups. The differences found in this study emphasize the value in separating overweight and normal-weight individuals into distinct groups, as these groups do not appear to be homogenous. Future research is warranted in examining differences in overweight and normal-weight individuals who binge eat, specifically among noncollege samples and among those with BED.

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Appendices

APPENDIX A

Middle Tennessee State University Institutional Review Board Approval Letter



November 20, 2012

LaToya Favre
Department of Psychology
LRF2m@mtmail.mtsu.edu

Protocol Title: "A Comparison of Binge-Eating Triggers between Normal-Weight and Overweight individuals"

Protocol Number: **13-124**

Dear Investigator(s),

The MTSU Institutional Review Board, or a representative of the IRB, has reviewed the research proposal identified above. The MTSU IRB or its representative has determined that the study poses minimal risk to participants and qualifies for an expedited review under 45 CFR 46.110 Category 7.

Approval is granted for one (1) year from the date of this letter for 400 participants pending you receive approval from the participating school districts and school principals.

According to MTSU Policy, a researcher is defined as anyone who works with data or has contact with participants. Anyone meeting this definition needs to be listed on the protocol and needs to provide a certificate of training to the Office of Compliance. **If you add researchers to an approved project, please forward an updated list of researchers and their certificates of training to the Office of Compliance before they begin to work on the project.** Any change to the protocol must be submitted to the IRB before implementing this change.

Please note that any unanticipated harms to participants or adverse events must be reported to the Office of Compliance at (615) 494-8918.

You will need to submit an end-of-project form to the Office of Compliance upon completion of your research located on the IRB website. Complete research means that you have finished collecting and analyzing data. **Should you not finish your research within the one (1) year period, you must submit a Progress Report and request a continuation prior to the expiration date.** Please allow time for review and requested revisions. Your study expires **November 21, 2013**.

Also, all research materials must be retained by the PI or faculty advisor (if the PI is a student) for at least three (3) years after study completion. Should you have any questions or need additional information, please do not hesitate to contact me.

Sincerely,

William H. Leggett
Department of Sociology and Anthropology
Middle Tennessee State University
Murfreesboro, TN
37132

Appendix B

Middle Tennessee State University Institutional Review Board Informed Consent Document for Research

Middle Tennessee State University Institutional Review Board
Informed Consent Document for Research

MTSU
IRB Approved
Date: 11/20/2012

Principal Investigator: LaToya Favre
Study Title: Patterns of Overeating and Weight Status
Institution: Middle Tennessee State University

Name of participant: _____ Age: _____

The following information is provided to inform you about the research project and your participation in it. Please read this form carefully and feel free to ask any questions you may have about this study and the information given below. You will be given an opportunity to ask questions, and your questions will be answered. Also, you will be given a copy of this consent form.

Your participation in this research study is voluntary. You are also free to withdraw from this study at any time. In the event new information becomes available that may affect the risks or benefits associated with this research study or your willingness to participate in it, you will be notified so that you can make an informed decision whether or not to continue your participation in this study.

For additional information about giving consent or your rights as a participant in this study, please feel free to contact the MTSU Office of Compliance at (615) 494-8918.

1. Purpose of the study:

You are being asked to participate in a research study because few studies have explored differences in the triggers of overeating and binge eating in overweight and normal-weight individuals. This study attempts to identify differences in these triggers for different weight groups.

2. Description of procedures to be followed and approximate duration of the study:

You are being asked to participate in this study by completing an anonymous survey. This survey will ask about your weight and about your eating patterns (e.g., such as triggers for binge eating or overeating; feelings when you are binge eating). This survey should take less than 30 minutes to complete.

3. Expected costs:

There are no expected costs to you for participating in this study.

4. Description of the discomforts, inconveniences, and/or risks that can be reasonably expected as a result of participation in this study:

Some participants may feel embarrassed or uncomfortable while answering some questions about eating patterns and triggers of overeating.

5. Compensation in case of study-related injury:

Not applicable

6. Anticipated benefits from this study:

a) The potential benefits to science and humankind that may result from this study are that we will have a better understanding about the differences in the eating behaviors of normal-weight and overweight individuals. Learning about these differences may help in the development of treatments for binge eating that are tailored specifically to certain weight groups.

b) The potential benefit to you from this study is gaining a better understanding about research.

7. Alternative treatments available:

Not applicable

**Middle Tennessee State University Institutional Review Board
Informed Consent Document for Research**

MTSU
IRB Approved
Date: 11/20/2012

8. Compensation for participation:

You will receive one research credit for your participation.

9. Circumstances under which the Principal Investigator may withdraw you from study participation:

Not applicable

10. What happens if you choose to withdraw from study participation:

Although we hope that you will participate in this study, you reserve the right to decline to participate. If you begin filling out the survey and decide that you no longer wish to participate, you may stop where you are. If you do not wish to fill out certain sections or answer specific questions on the survey, you may skip these. We hope that you will participate in this study and complete the entire survey. If you decide to no longer continue participating in the study, you may turn in your blank or incomplete survey at the end of the study with the other participants.

11. Contact Information:

If you should have any questions about this research study or possible injury, please feel free to contact LaToya Favre at LRF2M@mtmail.mtsu.edu or my Faculty Advisor, Mary Ellen Fromuth, Ph.D., at (615) 898-2548, MaryEllen.Fromuth@mtsu.edu.

12. Confidentiality:

All efforts, within reason, will be made to keep the personal information in your research record private, but total privacy cannot be promised. Your information may be shared with MTSU or the government, such as the Middle Tennessee State University Institutional Review Board, Federal Government Office for Human Research Protections, if you or someone else is in danger or if we are required to do so by law.

13. STATEMENT BY PERSON AGREEING TO PARTICIPATE IN THIS STUDY:

I have read this informed consent document, and the material contained in it has been explained to me verbally. I understand each part of the document, all my questions have been answered, and I freely and voluntarily choose to participate in this study.

Date

Signature of patient/volunteer

Consent obtained by:

Date

Signature

LaToya Favre, B.S.
Printed Name and Title

Appendix C

Debriefing Information

Debriefing Form

Please keep this form for your own records.

Patterns of overeating have been the topic of numerous studies. More recent research has examined circumstances that trigger overeating episodes. Patterns of overeating appear to differ between normal-weight and overweight people, yet little research has compared the triggers of overeating between these groups. Exploring the differences in binge eating in these two weight groups may pave the way for more successful interventions targeted at the specific needs of each group.

If you experienced distress as a result of this study or if you or someone you know needs to talk to someone about binge eating or other eating disorders, professional counselors are available to help at the following:

On campus: Counseling Services

Keathley University Center, Room 329
(615) 898-2670

Off campus: The Renfrew Center of Tennessee (fee based)

Brentwood, TN
1-800-736-3739

National Eating Disorder Association

Information and Referral Helpline
1-800-931-2237

If you have any questions about your participation in this study, please feel free to contact LaToya Favre (LRF2M@mtmail.mtsu.edu) or my supervisor Mary Ellen Fromuth, Ph.D. (MaryEllen.Fromuth@mtsu.edu). If you have questions about your rights as a participant, you may contact Middle Tennessee State University's Institutional Review Board (compliance@mtsu.edu).

Thank you for your participation in this study.

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