



Binge eating and binge drinking: An integrative review

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ABSTRACT

The primary goal of this review is to provide a framework for understanding two highly overlapping behaviors: binge eating and binge drinking. Research is presented that suggests binge eating and drinking behaviors may share several important features, including personality correlates such as neuroticism and urgency, as well as affective characteristics, such as elevated levels of negative affect. Additionally, the review describes common explanatory models, which are helpful in terms of their potential to link these common features to the functions of, or reasons why individuals engage in, binge eating and drinking behaviors. Implications for understanding potentially common etiological pathways and development of interventions designed to target multiple behaviors are discussed.

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1. Introduction

A binge is defined as a period of uncontrolled or excessive indulgence and is most commonly used to describe consumption of either food or alcohol. Recent estimates suggest that 16–25% of college-age women engage in binge-eating behaviors, 10% of whom binge eat on a weekly

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basis (Heatherton, Nichols, Mahamedi, & Keel, 1995; Lynch, Everingham, Dubitzky, Hartman, & Kasser, 2000; Schlundt & Johnson, 1990). Likewise, estimates suggest that upwards of 40% of college students engage in frequent, heavy episodic drinking behaviors (Johnston, O'Malley, & Bachman, 2000; Wechsler, Davenport, Dowdall, Moeykens, & Castillo, 1994). The prevalence of these behaviors is intensified by robust evidence indicating that bingeing behaviors frequently co-occur. For instance, rates of problematic alcohol use occur in up to 40% of women seeking treatment for eating disorders and are estimated to be even higher in community samples, particularly among college samples (Gadalla & Piran, 2007). These findings suggest that bingeing behaviors may manifest as a constellation of problems that span multiple diagnostic categories (e.g., Holderness, Brooks-Gunn, & Warren, 1994). Such findings warrant concern, as bingeing behaviors are associated with a number of untoward physical, academic, social, and professional consequences, including obesity, diabetes, hypertension, poor academic performance, psychosocial problems, antisocial behaviors, high-risk sexual behavior, and physical injury (Pi-Sunyer, 1991; Wechsler et al., 1994)—consequences of which are often compounded by co-occurring bingeing behaviors.

The primary goal of this integrative review is to examine common features and overlapping models of binge eating and binge drinking behaviors. First, we review the current research on common behavioral, personality, and affective features of bingeing behaviors. Second, we discuss conceptual models that may account for the common features of binge eating and binge drinking behaviors. Taken together, this review provides a rationale, and supporting empirical evidence, for examining binge eating and drinking behaviors within a common conceptual framework.

2. Binge eating and binge drinking: Definitions

2.1. Binge eating: Definition

Binge eating is defined as eating a larger amount of food than normal during a short period of time (within any two hour period) and, during this time, experiencing a loss of control over eating (APA, 1994). The revised fourth edition of the Diagnostic and Statistical Manual of Mental Disorders, (DSM-IV-R) includes binge eating as one criterion for bulimia nervosa (BN), which is also characterized by the use of inappropriate compensatory behaviors, such as self-induced vomiting, laxative use, or compulsive exercise (APA, 1994). Binge-eating disorder (BED), which is defined as engaging in frequent binge-eating episodes without the concomitant use of compensatory behaviors, is included in the category Eating Disorder Not Otherwise Specified (ED-NOS) and recognized in DSM-IV as a disorder in need of further study. Indeed, it is currently being considered as a distinct diagnosis for DSM-V in light of evidence that affected individuals experience considerable distress and functional impairment associated with frequent binge eating episodes (Striegel-Moore & Franko, 2008).

Recent estimates suggest that 16–25% of college-age women engage in at least occasional, subclinical binge-eating episodes (with or without compensatory behaviors), with about 10% of college women, endorsing bingeing on a weekly basis (Heatherton et al., 1995; Lynch et al., 2000; Schlundt & Johnson, 1990). Frequent binge eating is associated with a number of unhealthy psychological and physical correlates, such as depression, anxiety, substance abuse, obesity, diabetes, and hypertension (Pi-Sunyer, 1991). Unlike other forms of disordered eating, which are typically overrepresented among Caucasian women, BED has been documented at high frequencies among both males and females of various racial and ethnic backgrounds (e.g., Heatherton et al., 1995). For the purpose of this review, we will focus on binge eating episodes, as opposed to BED itself, since the nosology for BED is currently under review by the DSM-V committee. Focusing on binge eating episodes will allow us to capture a wider distribution of this harmful behavior, as opposed to focusing

on the current psychopathological definition, which is also likely to change as a result of DSM-V.

2.2. Binge drinking: Definition

Binge drinking is defined as consuming consecutive alcoholic beverages in a limited period of time on one or more occasions within the past six months (Courtney & Polich, 2009). Although definitions vary widely with regard to how many alcoholic drinks constitute a binge, the most commonly-used definitions specify consuming five or more drinks per drinking episode for men and four or more drinks for women (e.g., Naimi et al., 2003; Wechsler, Dowdall, Maenner, Gledhill-Hoyt, & Lee, 1998; Wechsler & Nelson, 2001). Binge drinking has been most commonly used to describe the alcohol-use pattern of college students. Estimates suggest that upwards of 40% of college students engage in frequent binge-drinking episodes (Johnston et al., 2000; Wechsler et al., 1994). However, there is evidence to suggest that both young and older adults who are not enrolled in college also engage in binge drinking (e.g., Dawson, Grant, Stinson, & Chou, 2004). Binge drinking has significant associations with a range of negative outcomes, such as poor academic performance, psychosocial problems, antisocial behaviors, high-risk sexual behavior, and physical injury (Wechsler et al., 1994). Recently, the National Institute on Alcohol Abuse and Alcoholism (NIAAA) proposed the following definition of a binge episode: "A binge is a pattern of drinking alcohol that brings Blood Alcohol Concentration (BAC) to 0.08 g/dl or above. This pattern typically corresponds to consuming five or more drinks (male), or four or more drinks (female), in approximately two hours." (NIAAA, 2004, p. 3). While binge drinking is not included in the diagnostic criteria for alcohol abuse or dependence, estimates suggest that about one-third of college students who engage in frequent binge drinking meet criteria for alcohol abuse, and to a lesser extent, dependence (Wechsler et al., 1994). Interestingly, when asked to define a binge, college students define it as 6 drinks in a row for men and 5 more women, on average one drink above the standard definition (Wechsler & Kuo, 2000).

3. Common features of binge eating and binge drinking

The primary goal of this section is to provide a rationale for examining binge eating and binge drinking behaviors within the same conceptual framework. First, research will be reviewed that suggests binge eating and drinking behaviors may share several important features, including (a) behavioral features, such as repetitive engagement in the behavior despite evidence of impairment associated with it; (b) personality correlates such as neuroticism; and (c) affective characteristics, such as elevated levels of negative affect. Then, we will review common explanatory models, which may be helpful in linking these common features to the functions of, or reasons why individuals engage in, binge eating and drinking behaviors.

3.1. Common behavioral features

Binge eating and binge drinking behaviors share several common features. Both behaviors typically have their onset in late adolescence and young adulthood and occur at high frequency among college-aged youth (e.g., Heatherton et al., 1995; Wechsler et al., 1994). Both behaviors are thought to be shared among individuals in the same peer networks (e.g., Crandall, 1998; Parra et al., 2007; Reifman, Watson, & McCourt, 2006). In addition, binge eating and drinking behaviors have frequently been characterized as "addictive" to capture the repetitive and uncontrollable nature of the behavior even in the presence of negative social, academic, physical, and occupational consequences. Binge eating and drinking behaviors are characterized by preoccupation with, and by definition, excessive consumption of, the substance. A recent study of 80 women with BED

found that 93% met addiction criteria with regard to their eating behaviors (Cassin & Von Ranson, 2007). The criteria were based on Goodman's (1990) model of addiction, which includes the recurrent failure to control the behavior and continuation of the behavior despite significant negative consequences.

3.2. Common negative consequences

There is evidence to suggest that individuals who engage in binge eating experience significant negative consequences that are directly related to their eating behaviors, including numerous physical problems associated with being overweight (Striegel-Moore & Franko, 2008), poor academic performance (Yanover & Thompson, 2008a, b), and even financial problems due to excessive spending on food (Pettersen, Rosenvinge, & Ytterhus, 2008). Similarly, negative consequences associated with binge drinking include physical injuries, poor academic performance, and risky sexual behaviors (Courtney & Polich, 2009; Jackson, 2008). The persistence of binge eating and binge drinking behaviors despite such notable impairment represents a defining and common feature of unhealthy bingeing behaviors.

3.3. Common personality and affective features

Binge eating and drinking behaviors are associated with common personality traits and affective profiles. Although a wide array of personality traits have been examined as potential determinants of either binge eating or binge drinking, fewer traits have been associated with both behaviors. Elevated levels of neuroticism, or the tendency to experience negative affect (Costa & McCrae, 1980), as well as negative affect in the form of depression (e.g., Godart et al., 2007; Pearlstein, 2002; Swendsen et al., 2000) and anxiety (e.g., Kendler, MacLean, Neale, & Kessler, 1991; Kushner, Abrams, & Borchadt, 2000; Swendsen et al., 2000) have been consistently identified among individuals who engage in binge eating (e.g., Bulik, Sullivan, & Kendler, 2002; Davis & Jamieson, 2005; Stickney, Miltenberger, & Wolf, 1999) and binge drinking (e.g., Christiansen, Vik, & Jarkow, 2002; Kuntsche, von Fischer, & Gmel, 2008). With regard to eating, neuroticism may best be conceptualized as a correlate of unhealthy eating behaviors in general, as opposed to binge eating in particular. Neuroticism has been robustly linked to restriction, bingeing and purging, and other forms of disordered eating (e.g., Baker, Mazzeo, & Kendler, 2007; Connolly, Riegar, & Caterson, 2007; Fischer & Smith, 2008; Stice, 2002).

Impulsivity has also been examined as personality correlate of individuals who engage in binge eating (e.g., Carlson et al., 2010; Vitousek & Manke, 1994; Wonderlich & Mitchell, 1997) and/or drinking behaviors (e.g., Goudriaan, Grekin, & Sher, 2007; Magid, MacLean, & Colder, 2007; Marcuzinski, Combs, & Fillmore, 2007). Recent work suggests that impulsivity may best be conceptualized as a multidimensional trait consisting of several unique, but related, personality constructs such as urgency, sensation seeking, lack of planning and lack of persistence (Whiteside & Lynam, 2001). Studies have found that elevated levels of urgency, or the tendency to act rashly when in distress, may represent a common personality feature among individuals who engage in binge eating and/or drinking behaviors (Fischer, Anderson, & Smith, 2004; Fischer, Smith, & Cyders, 2008). Urgency has been described as an emotional component that links impulsive behaviors to negative emotions (e.g., Fischer et al., 2004). The important—and potentially unique—role of urgency in bingeing behaviors suggests that bingeing may be conceptualized as a rash response to the elevated levels of negative affect.

Recent evidence suggests that individuals who experience both elevated levels of negative affect and tendencies to act impulsively may be particularly at risk for *comorbid* eating and alcohol use problems (Rush, Becker, & Curry, 2009; Fischer, Smith, Annus, & Hendricks, 2007). These findings underscore the role of negative affect and impulsivity as personality correlates of binge eating and

drinking behaviors and suggest that, together, these traits may serve as common risk factors for different types of bingeing behaviors.

3.4. Common clinical features and co-morbidity

Further evidence of the common features of binge eating and drinking comes from robust data documenting high rates of comorbidity among eating disorders and alcohol abuse and dependence (Franko et al., 2005; for reviews, see Grilo, Sinha, & O'Malley, 2002; Holderness et al., 1994). Research in clinical samples has found that between 19 and 37% of women in treatment for eating disorders also met criteria for alcohol abuse (Braun, Sunday, & Halmi, 1994; Brewerton, Lydiard, Herzog, & Brotman, 1995; Bushnell, Wells, McKenzie, & Hornblow, 1994; Goldbloom, Naranjo, Bremner, & Hicks, 1992), compared with 2–5% of women in the general population of roughly the same age (Grant et al., 2005). Moreover, Gadalla and Piran (2007) found that the rate of alcohol dependence was nearly twice as high among women at risk for eating disorders, compared to women who were not at risk. Comorbidity rates are particularly elevated among individuals who engage in binge eating behaviors (8–41%), compared to individuals with anorexia nervosa (AN) or primarily restrictive eating behaviors (2–10%) (Dunn, Larimer, & Neighbors, 2002; Gadalla & Piran, 2007; Holderness et al., 1994; Luce, Engler, & Crowther, 2007). The comorbidity between eating disorders and problem drinking is a significant risk factor for mortality (Keel et al., 2003; Harris & Barraclough, 1998) and a predictor of longer time to recovery among individuals with eating disorders (Franko et al., 2005), which underscores its clinical significance.

3.5. Summary

The evidence reviewed in this section suggests that binge eating and binge drinking behaviors share several behavioral, personality, and affective features. These common features serve to highlight a potential phenomenological and etiological overlap between these behaviors, which in turn may reflect a common etiology. The next section reviews functional models of bingeing behaviors seeking to explain its common features.

4. Common explanatory models of binge eating and binge drinking

Existing research has examined why some individuals repeatedly engage in bingeing behaviors. This research has drawn on theories ranging from social psychology to neurobiology in attempt to develop models that clarify why and in what contexts individuals may engage in excessive eating and drinking. At the heart of each model is the assumption that bingeing behaviors serve some function—either implicit or explicit—for the individual and that function influences the persistence, or maintenance, of the behavior. This section will highlight several key models that reveal compelling parallels with regard to the potential functions of binge eating and binge drinking.

4.1. Basic functional model

Individuals may engage in bingeing behaviors for a variety of reasons. Nock and Prinstein (2004; 2005) developed and validated a four-factor model that attempts to explain why individuals engage in non-suicidal self-injury (NSSI) by organizing different ways in which self-injury may be reinforced. The model proposes two dichotomous dimensions. The first dimension refers to whether the behavior serves an automatic or social function. Automatic, or internal, functions refer mainly to the management of emotional states, while social functions refer to behaviors that are reinforced due to the effects they have on the individual's interpersonal sphere. The second dimension refers to whether the self-harming behavior increases or decreases the presence of a particular stimulus. More specifically, behaviors that are followed by an *increase* in a particular emotional state are said to have positive

functions, while behaviors that are followed by the reduction (or removal) of an unfavorable emotional or interpersonal stimulus are said to have negative functions.

The automatic negative function of binge behaviors has been most frequently implicated in explaining why individuals engage in binge eating and/or binge drinking behaviors. The behaviors have been hypothesized to help individuals cope with or regulate high levels of negative affect. This phenomenon has been referred to by several labels, including emotion or affect regulation (e.g., Agras & Telch, 1998; Mizes, 1985; Sherwood, Crowther, Wills, & Ben-Porath, 2000), self-medication (e.g., Suh, Ruffins, Robins, Albanese, & Khantzian, 2008), and coping motives (e.g., Cooper (Cooper, 1994; Cooper et al., 1995; Cooper, Russell, & George, 1988)). Indeed, the automatic negative function of binge behaviors is consistent with theories of binge eating and binge drinking that have attempted to explain the relationship between negative affect and each of these binge behaviors. For example, **Heatherton and Baumeister's (1991)** escape theory of binge eating posits that, under conditions of distress, binge eating allows individuals to shift their attention from their distress to a concrete stimulus in the form of food. Similarly, **Conger (1956)** theorized that drinking behaviors help individuals manage negative emotions that arise in stressful situations. The functional theories, and the potentially automatic, negative function of binge behaviors in particular, have been buttressed by experimental research, which has found that binge eating behaviors *increase* following negative mood inductions (e.g., Cools, Schotte, & McNally, 1992; Mauler, Hamm, Weike, & Tuschen-Caffier, 2006). Thus, functional models may help explain not only *why* individuals engage in binge behaviors (i.e., to relieve negative affect), but they may also hold promise in affording prediction of *when* individuals will engage in these behaviors (i.e., in situations where negative affect is likely to occur).

4.2. Motivational model

Research examining motivations for eating and drinking behaviors have focused primarily on the antecedents of binge eating and drinking, theorizing that certain needs or desires cause an individual to engage in binge behaviors. These needs, in turn, will determine the unique antecedents and consequences of binge behaviors (Cooper, 1994). Cooper (1994); Cooper et al., 1995) developed and validated a four-factor model to account for the different motives, or needs, that drive drinking behaviors. In line with the **Nock and Prinstein (2004, 2005)**, Cooper et al. (1995) hypothesized that individuals may be motivated to drink to regulate both positive and negative emotions, which were referred to as enhancement and coping motives, respectively. In this model, the lack of a positive or elevated negative emotional state is conceptualized as the antecedent that serves to promote drinking behavior. Coping motives were significantly associated with elevated levels of negative emotions and expectations that alcohol could help improve mood. Importantly, only the drinking-to-cope motive was significantly associated with drinking-related negative consequences.

More recently, Cooper (**Jackson, Cooper, Mintz & Albino, 2003**) developed a measure to assess a four-factor model of eating behaviors that included coping, social, compliance, and pleasure motives. Although binge eating was associated with each of the four motives for eating, it demonstrated relatively stronger associations with the coping motives subscale. Thus, drinking and eating that is motivated by a desire to avoid negative emotions (i.e., coping motives) appears to demonstrate stronger links to binge behaviors compared to other types of motives. Studies assessing coping or motives for engaging in binge behaviors have found that individuals who engage in binge eating (e.g., **Koff & Sangani, 1997; Lee, Greening, & Stoppelbein, 2007**) or binge drinking (**Armeli, Todd, & Mohr, 2005; Cooper, 1994**) endorse more avoidant coping styles in general, as compared to those who do not binge.

More recent research using experience sampling methodologies in the form of daily diaries, or ecological momentary assessment (EMA), has examined associations between mood and binge behaviors in naturalistic settings. EMA collects information about a target behavior(s) and relevant experiences, including antecedents and consequences, as they occur naturally during the day. As such, temporal relationships can be established between mood and binge behaviors which can, in turn, offer insight into potential functions of these behaviors. Indeed, studies using EMA support the notion that binge eating (**Engelberg, Steiger, Gauvin, & Wonderlich, 2007; Greeno, Wing & Shiffman, 2000; Hilbert & Tuschen-Caffier, 2007; Smyth et al., 2007; Stickney et al., 1999; Wegner et al., 2002**) and alcohol use (**Mohr et al., 2005; Swendsen et al., 2000**) behaviors are preceded by negative affect. An EMA-based study of heavy drinkers revealed that higher levels of self-reported vigor, an index of alcohol-induced stimulation, and urge to drink after consuming the first two drinks of a drinking episode predicted heavier drinking within that episode. However, negative mood post-drink was not associated with alcohol consumption within that episode (**Ray et al., 2010**). Models that can integrate baseline (i.e., pre-consumption) affective states and the pharmacological mood-altering (i.e., post-consumption) effects of alcohol are needed to fully account for the contribution of affect to alcohol use.

The motivational models suggest that individuals may engage in binge behaviors for a variety of reasons. The above research examined individual differences in motivations to determine the relationship between particular motivations and levels of binge behaviors. However, it is likely to be the case that each individual may engage in binge behaviors for different reasons at different times. The particular motive driving eating, however, should shape the nature of the eating behaviors. Thus, in addition to individual differences in binge motivations, within-person differences in binge motives should not only exist; they should also help predict *when* a particular individual might engage in excessive eating or alcohol use.

Research examining coping styles and/or motives for engaging in binge behaviors has focused primarily on drinking behaviors, where the results are considerably mixed (**Carney, Armeli, Tennen, Affleck, & O'Neil, 2000; Todd, Armeli, Tennen, Carney, & Affleck, 2003**). Drinking motives and personality variables have been found to predict individual differences in *average* levels of consumption (e.g., **Cooper et al., 1995; Cooper, Russell, Skinner, Frone, & Mudar, 1992; Evans & Dunn, 1995; Windle & Windle, 1996**), drinking-related problems (**Armeli et al., 2005; Cooper et al., 1995; Read, Wood, Kahler, Maddock, & Palfai, 2003**) and stressful life events (**Armeli et al., 2005**). However, studies examining within-person relationships between drinking motives and drinking behaviors have often failed to produce the expected findings: drinking to avoid negative emotions does not appear to predict increased drinking behaviors in response to self-reported stressors (**Armeli et al., 2005**). Thus, although coping motives appear to be correlated with problem drinking, self-reported motives for drinking do not seem to reliably predict *when* individuals will engage in drinking behaviors.

One reason for the inconsistent findings may be the difficulties of accurately capturing functions of behaviors using self-report. First, there is evidence that individuals' ability to accurately recall the occurrence and relations between stressors, affect, and coping strategies even after only several days is tenuous at best (**Ptacek, Smith, Espe, & Raffety, 1994; Shiffman, 2000; Shiffman et al., 1997**). Although daily monitoring of these relations may reduce recall errors, it still relies on the assumption that individuals are able to both discern and accurately report on the reasons why they engage in binge behaviors. This assumption may be especially problematic among individuals at risk for engaging in binge behaviors due to evidence suggesting that they often have difficulty identifying, labeling, and communicating their emotional experiences (**Loas, Fremaux, Otmani, Lecercle, & Delahousse, 1997; Stewart, Zvolensky, & Eifert, 2002; van Strien & Ouwens, 2007; Zackheim, 2007**). If, in fact,

emotional avoidance is a common function of bingeing behaviors, it may be the case that individuals who engage in these behaviors to facilitate avoidance may also be engaging in other avoidance processes, such as cognitive avoidance, which may limit awareness of antecedent emotional states. Even EMA procedures, which undeniably reflect the current “gold standard” for examining the functions of behaviors, cannot circumvent these limitations because they rely on self-reports of mood states and coping motives.

4.3. Expectancies model

While the motivational model focuses primarily on antecedents to bingeing behaviors, a closely related line of work suggests the beliefs about the effects, or consequences, of food or alcohol consumption may determine the form and frequency of these behaviors. Expectancies are hypothesized to reflect an individual's learning history with regard to the consequences of certain behaviors. Expectations that certain behaviors will lead to increased rewards and/or minimal punishment are thought to influence the expression of the behavior. Expectations that binge eating or drinking may alleviate negative emotions and/or contribute to positive social outcomes are thought to increase the likelihood that an individual will engage in bingeing behaviors. Research has demonstrated associations between negative reinforcement expectancies and unhealthy eating (Hohlstein, Smith, & Atlas, 1998; Smith, Simmons, Flory, Annus, & Hill, 2007) and alcohol use (e.g., Jones, Corbin, & Fromme, 2001; Moss & Albery, 2009; Wood, Sher, & Strathman, 1996).

It remains unclear whether expectancies constitute a cause or consequence of repeated use of such behaviors, particularly for the purposes of managing negative affect. It may be that negative reinforcement expectancies develop *after* an individual experiences relief from negative affect when engaging in the behavior. A recent study sought to examine the extent to which negative reinforcement expectancies may be conceptualized as a unique risk factor for BN above and beyond the role of difficulties regulating emotions (Hayaki, 2009). The results indicated that negative reinforcement expectancies contributed to BN symptoms even after controlling for individual differences in emotion regulation skills. Similarly, there is evidence to suggest that expectancies predict the onset of alcohol problems in adolescence (Goldman, Brown, Christiansen, & Smith, 1991) and that changes in expectancies contribute to changes in alcohol use in experimental studies (Fischer et al., 2004). Thus, expectations may be a necessary, but insufficient, component of bingeing behaviors.

Expectancies may contribute indirectly to engagement in unhealthy eating and alcohol-use behaviors by influencing the motives behind bingeing. Williams and Clark (1998) found that expectancies predicted reasons for drinking but did not contribute directly to the prediction of binge drinking or alcohol consumption. A similar pattern emerged in a recent longitudinal study of drinking, in which drinking to cope directly predicted alcohol use yet alcohol expectancies did not (Schuckit et al., 2010). Additional research suggests that expectancies may moderate the relationship between personality traits (e.g., urgency; Fischer, Smith, Anderson, & Flory, 2003; Fischer & Smith, 2008) and affect (Armeli, Dehart, Tennen, Todd, & Affleck, 2007) and bingeing behaviors. Individuals who are high on trait urgency may be more likely to engage in bingeing behaviors under conditions of elevated negative affect if they think that bingeing will help relieve or reduce negative affect. In this respect, and in contrast to the motivational models, eating and alcohol expectancies are perhaps best conceptualized as individual difference variables that influence one's overall use of food and alcohol.

Importantly, despite compelling parallels with regard to the role of expectancies in binge eating and binge drinking, there is evidence that expectancies are behavior-specific. For example, in a study comparing eating and alcohol expectancies among women with bulimia nervosa (BN), with and without comorbid alcohol-use disorders (AUDs), and

control women, expectations that eating reduces negative affect, alleviates boredom and other positive expectancies differentiated women in both BN groups from healthy controls (Bruce, Mansour, & Steiger, 2009). Moreover, the women with BN and comorbid AUDs endorsed significantly more positive alcohol-related expectancies, including expectancies that alcohol enhances social and physical pleasure and reduces tension. Fischer et al. (2004) found that, although positive eating and alcohol expectancies predicted unhealthy eating and alcohol-use behaviors, respectively, expectancies of affect relief following eating were not correlated with positive alcohol expectancies. Thus, although eating and drinking behaviors demonstrate similar patterns with regard to the role of expectancies in the development and maintenance of bingeing behaviors, behavior-specific learning may drive the development of such expectancies.

4.4. Craving model

Emerging research has focused on potential common neurobiological mechanisms underlying binge eating and binge drinking. Although the operational definition of craving has been debated over the years, craving is inherently a subjective experience, best described as a state of desire or wanting (Monti et al., 2004). Patients trying to abstain from alcohol or drugs often describe craving as an unpleasant state that challenges their commitment to abstinence and is often associated with relapse (e.g., Oslin, Cary, Slaymaker, Colleran, & Blow, 2009). In fact, while in a craving state, individuals frequently show impaired cognitive processing. For example, craving has been shown to increase reaction time (Sayette, Loewenstein, Kirchner, & Travis, 1994) and interfere with cognitive resource allocation (Sayette & Hufford, 1994). Further, while craving, individuals often overestimate the duration and intensity of their own future urges (Sayette et al., 2005). This is consistent with Marlatt's conceptualization of cravings as ocean waves that gradually build, peak, and then subside (Marlatt, 1994). In this way, craving for food and alcohol can be viewed within the functional models described above, where engaging in bingeing behaviors is performed to end the unpleasant state of craving (negative, automatic function).

Importantly, craving has been shown to impair working memory, which is a cognitive process that relates to effective decision making (Bechara & Martin, 2004). Imagery is emerging as an important variable in the study of craving. The work of Kavanagh and colleagues suggests that imagery across sensory channels is critical to the experience of craving (Kavanagh, Andrade, & May, 2005). For example, recent studies have shown that guided imaginal exposure reliably elicits craving across a range of substances, including food (May, Andrade, Panabokke, & Kavanagh, 2004; Smeets, Roefs, & Jansen, 2009). This line of work makes a case for intensive thoughts forming a “gateway” to episodes of craving and convincing data are presented across substances of abuse as well as food. Clearly, identifying the psychological and neurobiological underpinnings of craving has vast implications for addiction etiology and treatment, and perhaps also for the study of food as an addiction.

One of the distinct advantages of the craving approach to studying eating and drinking behavior is the connection between the craving phenotype and underlying neurobiology and genetics. For example, behavioral genetic studies have found that the long allele of the dopamine D₄ receptor (DRD4) gene was associated with greater craving for alcohol (Hutchison, McGeary, et al., 2002; Mackillop et al., 2007), for cigarettes (Hutchison, LaChance, et al., 2002), and for food (Sobik, Hutchinson, & Craighead, 2005). Similarly, brain imaging studies employing a craving approach (e.g., presentation of alcohol or food cues as behavioral probes during brain scanning sessions) have been used to examine alcohol use (Filbey, Claus, et al., 2008; Filbey, Ray, et al., 2008) and eating behaviors (Lowe, van Steenburgh, Ochner, & Colleta, 2009; Rolls & McCabe, 2007). Although in its infancy, this area of research has highlighted the involvement of mesocorticolimbic brain

structures in response to alcohol cues (and possibly food cues), which will help elucidate the neural basis of the shared phenomenology between binge eating and drinking behaviors presented in this review.

4.5. Summary

This section reviewed several models that have been proposed to explain why individuals repeatedly engage in behaviors that contribute to a variety of negative psychological, physical and psychosocial outcomes. These models highlight the predominance of automatic, negative functions in bingeing behaviors. In doing so, they also provide further support for viewing binge eating and binge drinking within a common conceptual framework. Indeed, strong evidence suggests that binge eating and binge drinking may function—either implicitly or explicitly—to facilitate avoidance of or delay negative affective and/or physiological states.

5. Conclusions

The primary purpose of this review was to identify the common features of binge eating and binge drinking as well as overlapping conceptual models of these behaviors. In doing so, this review seeks to provide a rationale for viewing these behaviors within a common conceptual framework. Regarding the common features of binge eating and binge drinking, this review highlights the role of personality traits, namely neuroticism and urgency, which may function as common dispositional features among individuals who engage in bingeing behaviors. Moreover, eating and drinking behaviors performed in the service of reducing negative affective and/or physiological states appear to be strongly linked to both bingeing behaviors and elevated levels of neuroticism and urgency.

Clinically, research has highlighted elevated rates of comorbidity among eating disorders and alcohol abuse and several reviews of this research have proposed models that help explain the comorbidity (e.g., Holderness et al., 1994; Wolfe & Maisto, 2000). This work has identified potentially common etiological pathways for binge eating and binge drinking and has supported the role of personality traits as common risk factors for binge eating and drinking. However, research focusing on comorbidity has also been limited in several ways. In particular, the focus on individuals who present with comorbid eating and alcohol or substance use disorders limits the sample of investigation to a small subset of individuals who tend to demonstrate more severe forms of bingeing behaviors (Krahn et al., 2005) and may be more at risk for other forms of Axis I and Axis II psychopathology (Ram et al., 2008). In contrast, this review sought to elucidate similarities in the phenomenology of binge eating and binge drinking even when they do not co-occur within an individual and when research is not restricted to clinical samples.

Indeed, clarifying the common features and functions of bingeing behaviors may have important implications for understanding common etiological pathways for these behaviors. Elucidating such pathways, however, will require further research that can effectively integrate different methods and levels of analyses. For example, it remains unclear whether and how personality traits interact with cravings to potentially reinforce bingeing behaviors. It may be the case that individuals who experience elevated levels of negative affect experience cravings as more distressing and thus are at increased risk for developing persistent patterns of bingeing to alleviate cravings. Future research should examine how personality traits interact with motivations, expectations, and cravings to contribute to the development and maintenance of food and alcohol binges. In other words, integrative approaches are clearly needed to address such complex behaviors.

In summary, the findings of this review suggest that a common etiological pathway for bingeing behaviors may be rooted in shared personality traits, namely elevated levels of neuroticism and urgency.

Individuals who experience elevated levels of these traits are both more likely to experience negative emotions and to experience more difficulty regulating these emotions. As a result, they are at risk for engaging in behaviors that function to provide relief from these unpleasant affective states. The particular form of the behavior is likely influenced by environmental and sociocultural factors, which may shape an individual's expectations for how a particular behavior—binge eating or binge drinking—may offer relief from negative emotional states. The extent to which such expectations contribute to repeated engagement in these behaviors may be influenced by neurobiological responses to food and alcohol. These responses may, in turn, enhance or even underlie the reinforcing nature of these behaviors, hence promoting and maintaining their occurrence.

As a caveat to these findings, it is important to consider the heterogeneity among individuals who engage in binge eating and binge drinking behaviors. The common framework put forth in this review likely only captures a subset of these individuals and reveals a common pathway into these behaviors. Notably, non-overlapping paths into binge eating and binge drinking (e.g., low level of response to alcohol, Schuckit et al., 2010) have also been identified. Nonetheless, the individuals identified in this review as having a common pathway into binge eating and binge drinking may be most at risk for the untoward consequences of bingeing behaviors and at increased risk of comorbidity among these behaviors. To that end, intervention strategies aimed at improving affect regulation skills may be effective in ameliorating bingeing behaviors.

In conclusion, although there are multiple pathways into binge eating and binge drinking, this review sought to identify commonalities that may help account for the shared features and high co-occurrence of these behaviors. In doing so, neuroticism and urgency appear to (a) highlight the common features and mechanistic pathways into bingeing behaviors; (b) provide support for conceptual models that can account for both behaviors simultaneously; and (c) identify intervention targets that may prevent these behaviors from escalating to levels of clinical impairment. Limitations notwithstanding, this review provides a useful framework for understanding these highly overlapping behaviors that is based on common features and explanatory models.

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Both authors contributed to the literature search, writing and editing of this paper. Caitlin Ferriter wrote the first draft of the paper and Laura Ray contributed the section on cravings and edited the entire manuscript. The final version of the manuscript was read and approved by both authors.

Conflict of interest

Both authors declare that they have no conflicts of interest.

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