



# An investigation of two dimensions of impulsivity as predictors of loss-of-control eating severity and frequency



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## ARTICLE INFO

### Article history:

Received 17 March 2017

Received in revised form

2 June 2017

Accepted 6 June 2017

Available online 7 June 2017

### Keywords:

Loss-of-control eating

Negative urgency

Response inhibition

## ABSTRACT

Loss-of-control (LOC) eating episodes represent one form of dysregulated eating common to full- and sub-threshold eating disorders. Extensive evidence suggests that impulsivity, particularly in the context of negative affect and/or depression, may play an important etiological role in the development and maintenance of LOC eating. However, most prior studies have considered LOC eating as a dichotomous rather than dimensional construct, and few studies have considered the interaction of multiple dimensions of impulsivity while also accounting for the role of depressive symptoms. The present study examined the independent and interacting effects of two facets of impulsivity—response inhibition and negative urgency—on LOC eating episode severity and frequency among college women ( $N = 102$ ). Depressive symptom severity was included as a covariate. Results indicated that greater negative urgency was associated with greater LOC severity; this effect was moderated by response inhibition, such that the effect of urgency was particularly pronounced for individuals with higher response inhibition capacity. Negative urgency was the only significant predictor of LOC frequency. Depression had no significant effect on either LOC severity or frequency ( $ps \geq 0.16$ ). Results support the importance of considering multiple facets of impulsivity in predicting LOC eating behavior, and further indicate that factors influencing subjective severity and frequency of LOC may be distinct.

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## 1. Introduction

Binge eating is a core characteristic of bulimic-spectrum eating disorders, including binge eating disorder (BED), bulimia nervosa (BN), and anorexia nervosa-binge/purge subtype (AN-BP), and may also occur in an even larger group of individuals with subthreshold eating pathology (Fitzgibbon, Sánchez-Johnsen, & Martinovich, 2003). Binge eating behavior affects millions of individuals in the United States (Hudson, Hiripi, Pope, & Kessler, 2007) and recurrent binge eating is associated with increased psychosocial impairment and elevated risk for medical comorbidity and elevated body mass (Bulik, Sullivan, & Kendler, 2002; Kessler et al., 2013; Stice, Presnell, Shaw, & Rohde, 2005). Binge eating is characterized by 1) a sense of loss of control over one's eating (LOC, or the subjective sense of being unable to control the amount of food that one consumes), and 2) the consumption of an objectively large amount of food in a distinct period of time (American Psychiatric Association, 2013).

Despite the presence of two criteria, recent research implicates LOC as the more clinically relevant construct; for instance, females with BED have been found to characterize binge-eating primarily by their experience of LOC during the eating episode, regardless of the amount of food consumed (Colles, Dixon, & O'Brien, 2008; Telch, Pratt, & Niego, 1998). Similarly, a cross-sectional study conducted among individuals with and without clinically diagnosed binge eating identified LOC as the characteristic most closely associated with higher psychological distress and poor clinical outcome; individuals who endorsed LOC-related distress reported greater depression, appearance disturbance, and decreased quality of life (Colles et al., 2008).

Additional evidence suggests that severity of eating-related psychopathology and other comorbid psychopathology is similar among those who experience only subjective binge episodes (SBEs, involving LOC but relatively small amounts of food) relative to individuals who experience objectively large episodes (OBEs, involving LOC combined with consumption of an objectively large amount of food; Brownstone et al., 2013; Fitzsimmons-Craft et al., 2014; Palavras, Hay, Lujic, & Claudino, 2015), and that severity of LOC experienced during a binge is a better marker of clinical

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impairment (Blomquist et al., 2014; Colles et al., 2008; Latner, Hildebrandt, Rosewall, Chisholm, & Hayashi, 2007; Vannucci et al., 2013). Taken together, this evidence suggests that LOC eating warrants additional attention as a clinical factor highly relevant to binge eating and associated pathology. Prevention and treatment of disorders characterized by LOC eating require a deeper understanding of specific risk for such problems. The present paper conceptualizes LOC as a marker of eating pathology relevant to binge eating and seeks to identify associated risk factors. Specifically, we will examine the interaction between two dimensions of impulsivity—those of negative urgency and response inhibition—as risk factors for LOC eating. Because these factors may be particularly likely to promote LOC eating in the context of negative emotions, the relationship between negative affect and LOC eating is also discussed here briefly.

### 1.1. Negative affect and LOC eating

Extensive research suggests that presence of persistent negative affect or depressive symptoms may predict development and maintenance of LOC eating behavior among girls in adolescence and emerging adulthood (Goldschmidt, Wall, Zhang, Loth, & Neumark-Sztainer, 2016; Pearson, Zapolski, & Smith, 2015; Stice, 2001), and that negative affective states may increase the likelihood that an individual with disordered eating will experience a binge episode (Berg et al., 2013, 2015; Haedt-Matt & Keel, 2011). Importantly, negative affect does not appear to be associated with binge size, and again implicates LOC as the clinical marker of dysfunction in binge eating (Brownstone et al., 2013).

Importantly, only a subset of individuals who experience depressive symptoms go on to develop full-syndrome eating disorders or sub-threshold binge eating behavior (Hudson et al., 2007; Strine et al., 2008). Depressive symptoms and negative affect may therefore promote risk for but are not sufficient for the development of binge eating characterized by LOC. It is therefore important to examine other factors which may act in combination with depressive symptoms to promote such eating behavior.

### 1.2. Impulsivity, response inhibition, and LOC eating

One mechanism that may act in combination with or independently of negative affect is that of impulsivity. The construct of impulsivity is multifaceted, but is generally characterized by a tendency to act in a rash or spontaneous manner (Whiteside, Lynam, Miller, & Reynolds, 2005). Certain dimensions of impulsivity have been implicated as contributing factors for binge eating and more specifically, LOC eating (Hartmann, Czaja, Rief, & Hilbert, 2010; Hartmann, Rief, & Hilbert, 2013; Rosval et al., 2006; Waxman, 2009; Wu, Hartmann, Skunde, Herzog, & Friederich, 2013), with particular recent attention given to certain neuropsychological constructs such as response inhibition, or the ability to inhibit a learned response to a known stimulus. With regard to eating disorders, response inhibition could theoretically influence the ability of an individual to prevent or stop a binge eating episode once the urge to eat has already been initiated; those with poorer response inhibition would be less likely to inhibit this prepotent response and in turn engage in binge eating characterized by LOC. Indeed, individuals with bulimic-spectrum disorders exhibit poorer response inhibition than either healthy-weight or obese individuals with no eating pathology (Manasse et al., 2016; Schag, Schönleber, Teufel, Zipfel, & Giel, 2013; Svaldi, Naumann, Trentowska, & Schmitz, 2014; Wu, Hartmann, et al., 2013). However, some studies have also found weak or non-significant relationships between inhibition and the presence of binge eating (Claes, Nederkoorn, Vandereycken, Guerrieri, & Vertommen, 2006;

Svaldi, Naumann, Biehl, & Schmitz, 2015), or found that deficits are specific to patients with BN but not BED (Wu, Giel, et al., 2013).

Further study is required to elucidate the relationship between response inhibition and binge eating. For example, the conditions under which response inhibition might attenuate or worsen binge eating remain uncertain. Investigation of potential moderating variables is therefore necessary. Further, most previous studies examined the relationship between response inhibition and binge eating through comparison of eating disorder patients versus healthy controls (Wu, Hartmann, et al., 2013), preventing examination of a continuous relationship between inhibition deficits and clinical severity. Finally, it is still unclear whether response inhibition deficits serve as a premorbid risk factor for binge eating or develop concurrently with repeated episodes of loss-of-control eating. This study will attempt to investigate the potential linear relationship between inhibition and loss-of-control eating severity, and will examine its effect in combination with negative urgency, discussed next.

### 1.3. Combined influence of negative affect and response inhibition

Response inhibition deficits may also have a particularly pronounced effect when individuals exhibit personality characteristics such as negative urgency (impulsive behavior occurring specifically in the context of negative affect; Cyders & Smith, 2008). Indeed, when compared to healthy controls, adolescents with LOC eating exhibited poorer response inhibition (as measured by a stop-signal task) but only after following a negative mood task (Hartmann et al., 2013). Pearson, Wonderlich, and Smith (2015) proposed a “trait-based” pathway model in which negative urgency increases the likelihood that an individual will utilize maladaptive behaviors to cope with uncomfortable emotions and therefore be at increased risk for the development of eating pathology. In this model, depletion in self-control during negative emotional states is the primary driver of the relationship between urgency and binge eating. Therefore, despite a desire to prevent a binge episode from occurring, the impulsive urge to eat overpowers one's inhibitions and leads to both initiation of binge eating and the concurrent LOC experience.

Based on this proposed model, individuals who are high in negative urgency and also exhibit deficits in response inhibition may be at greatest risk for developing binge eating and experiencing LOC, since they may be at greatest risk for impulsive action under negative affective states and have a poor ability to stop this action once initiated. Thus, although evidence supports the role of negative urgency in LOC eating (Fischer, Smith, & Cyders, 2008; Racine et al., 2013, 2015), few studies have examined the roles of general cognitive control and negative urgency concurrently.

### 1.4. LOC as a dimensional construct

A vast majority of the existing literature, including much of that described above, has considered binge eating as a dichotomous construct (i.e., either present or absent). For example, LOC eating has also frequently been characterized by subjective report of presence or absence of binge episodes—both OBEs and SBES—using measures such as the Eating Disorder Examination (EDE; Fairburn, 2008; Stice, Telch, & Rizvi, 2000). Commonly, studies compare individuals with a cardinal pathological characteristic (i.e., patients with clinically severe eating pathology) are compared to those presumed to be “absent” of such a characteristic (i.e., those in a nonclinical, healthy control group), or frequency of OBEs is examined in association with severity of other psychological variables assessed. Dimensional measures of subjective LOC eating are noticeably less prevalent in the literature, but emerging evidence suggests that the LOC experienced during both objectively large

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