



Association between Impulsivity, Obesity and Eating Disorders

Hagar Mostafa Mohammad Own, Abdelshafy Metwally Khashaba, Amira Mohamed Youssef, Dina Ahmed Seleem

Psychiatry Department, Faculty of Medicine, Zagazig University

Corresponding author: Hagar Mostafa Mohammad Own

Email: Kokotota76305@gmail.com

Abstract

Impulsivity towards food has been recognized as a potential factor leading to increased food intake in obesity. Patients suffering from binge eating disorder (BED) form a specific subgroup of obese people that might be characterized by increased impulsivity. These assumptions, although, have yet to be verified. Therefore, this review evaluates evidence for food-related impulsivity in obese people with and without BED and examines possible differences between both populations. More precisely, evidence for the two components of impulsivity is analyzed separately: evidence for reward sensitivity, specifically, the urge for appetitive stimuli and evidence for rash-spontaneous behaviour such as acting disinhibited with no regard for the consequences. There was little and conflicting evidence, however, concerning increased rash-spontaneous behaviour in obese people without BED, but consistent evidence of an increase in obese people with BED. All in all, the evidence supports the view that BED represents a specific phenotype of obesity with increased food-related impulsivity. Taking these specific deficits into account can enhance the effectiveness of weight reduction programmes and psychotherapy.

KeyWords: Impulsivity, Obesity, Eating Disorders.

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Introduction.

Impulsivity has been variously conceptualized, operationalized, and assessed. For the purpose of this review, we will utilize a more recently proposed model that incorporates five distinct dispositions for impulsive action (1-3). These dispositions include sensation seeking (i.e., the tendency to pursue novel or exciting stimuli), lack of planning (i.e., the tendency to engage in behaviors with limited advanced planning), lack of perseverance (i.e., limited capacity for maintaining focus when distracted), positive urgency (i.e., the tendency to engage in rash action in response to intense positive emotions), and negative urgency (i.e., the tendency to engage in rash action in response to intense negative emotions). Importantly, given

the approach by which this five-facet model was developed, other impulsivity-related constructs that have received attention in the eating disorder literature (e.g., novelty seeking, stimulus seeking, and attentional impulsiveness) can be readily subsumed within one or more of the identified dispositions. Among the measures that have been most commonly used to assess these constructs in the eating disorder literature are the Temperament and Character Inventory (4), the Behavioral Inhibition System/Behavioral Activation System (BIS/BAS) scales (5), the Sensation Seeking Scale (6), the Difficulties in Emotion Regulation Scale (7), and the UPPS Impulsive Behavior Scale (1).

[Association between Impulsivity & obesity](#)



Obesity has been strongly linked to impulsivity. Obese individuals are impaired at performing tasks that assess inhibitory control, tend to exhibit a higher food wanting than normal weight individuals (or a reduced food liking), and score higher on self-report instruments assessing trait impulsivity. The hypothesis that obesity may be characterized by a disequilibrium between cognitive control and reward sensitivity, which in turn produces impulsive food decisions, has also been supported by neuroimaging studies. Indeed, beyond brain circuits regulating hunger and satiety, different brain areas are involved in food consumption. Food activates brain reward circuitry including several limbic and cortical brain regions: among the others, the striatum, which is involved in food motivation, the amygdala, which processes the attentional salience of food, the orbitofrontal cortex and the anterior cingulate cortex, which represent the reward value of food. Moreover, food also activates several neurotransmitter systems, in particular the dopamine system, which modulates natural and artificial rewards and which has been associated with 'wanting' of food as opposed to 'liking' of food. Different brain regions involved in executive functions and cognitive control suppress the rewarding effects of food and are considered central for regulating unhealthy eating impulse. The dorsolateral prefrontal cortex, for instance, has been implicated in the control over food choices and the "top down" cognitive influence on satiation. (8)

Impulsivity & eating disorders

With regard to the first of the five dispositions, sensation seeking, results suggest that individuals with eating disorders characterized by binge eating and/or purging behaviors tend to display elevated sensation seeking, whereas those with restrictive eating

disorder presentations tend to display lower level (1, 9-11).

Further, in a meta-analytic review of impulsivity facets in relation to bulimic symptoms, sensation seeking was found to demonstrate a significant effect size (12). Regarding the second and third dispositions, lack of planning and lack of perseverance, respectively, existing findings have been mixed. Some research suggests that those with bulimic spectrum disorders show no differences from controls in terms of these constructs (11). Studies that have examined concurrent and prospective associations between these constructs and eating disorder symptoms have also had inconsistent findings (12-15). However, in a meta-analytic review, both constructs were found to be associated with bulimic symptoms, although the effect size was larger for lack of planning than lack of perseverance (12). These findings thus suggest that a lack of forethought preceding action, as well as difficulties in remaining focused when distracted, may be associated with eating disorder psychopathology, although further research is needed given the mixed nature of the existing results. (16)

The final two dispositions, positive urgency and negative urgency, are constructs that have received the most recent attention in the eating disorder literature, particularly the latter. These emotion-based tendencies for rash action are of particular relevance to eating disorder psychopathology, given that individuals with eating disorders often exhibit elevated negative emotionality (e.g., in the form of high negative affectivity, co-occurring affective disorders, and greater tendencies toward neuroticism) (9,17-19). Further, given extensive evidence suggesting that certain affective states (elevated negative affect in particular) commonly precipitate eating disorder behaviors across the eating disorder psychopathology spectrum (20,21), there is clear

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relevance in understanding how the predisposition for behaving impulsively in the face of intense affective experiences may relate to eating disorders. In general, positive urgency has received less attention in the eating disorder literature than negative urgency, likely due in part to the more highly elaborated role of negative emotionality in relation to eating disorder symptoms. In contrast, positive urgency has received more theoretical and empirical attention in relation to other forms of psychopathology involving maladaptive behaviors (e.g., substance use disorders and pathological gambling) (3). However, an extensive and growing literature supports the association between negative urgency and eating disorder symptoms. Specifically, a variety of studies have found negative urgency to be elevated in various eating disorder samples versus control groups (10, 22-24), and strong associations have been found between measures of negative urgency and eating disorder symptoms in a variety of samples, both concurrently and prospectively (24-29). Importantly, evidence suggests that of the five impulsivity dispositions, negative urgency is by far the mostly strongly related to eating disorder symptoms (12). Further, contrasting with evidence for other impulsivity facets as described above, existing findings suggest relatively few differences in levels of negative urgency across the spectrum of eating disorder psychopathology, with the exception of preliminary evidence suggesting greater levels in anorexia nervosa binge/purge type versus restricting type. (30)

There are several possible explanations for the apparent association between impulsivity and eating disorders. Preexisting personality characteristics may increase the risk of developing eating disorder psychopathology (i.e., predispositional model), eating disorder symptoms may have an impact on personality

(i.e., complication model), or other factors may affect functioning in both areas. Alternatively, the relationship between impulsivity and eating disorders may be conceptualized non-prospectively. For instance, there may be a bidirectional causal influence between impulsive dispositions and eating disorder symptoms (i.e., pathoplasticity model). Although there have been some longitudinal studies of the relationship between impulsivity and eating disorders, additional prospective studies that test these various models will help to clarify the nature of these associations. Additionally, further studies are needed to identify mediators and moderators of the relationship between impulsivity and eating disorders. Specifically, there are likely other variables that may interact with facets of impulsivity in relation to their contribution to eating disorders. Identifying such moderators would allow for better prediction of those most at risk for specific eating disorder symptoms, and identifying the mechanisms underlying the association between impulsivity and eating disorders may help to clarify potential targets for treatment. Finally, additional research is needed to clarify the role that impulsive dispositions may play in predicting or moderating outcomes of eating disorder treatment. (16)

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Clinical implications & consideration

Given the extensive empirical literature suggesting the relevance of the various facets of impulsivity in relation to eating disorder psychopathology, there are clear implications for the treatment of eating disorders. Of note, impulsivity as a distinct construct is typically not a specific or direct target of treatments for eating disorders, although impulsivity-related constructs are receiving increased attention in theoretical models of eating disorder psychopathology. This is likely due in part to the lack of any inclusion of impulsivity as a distinct symptom in the



diagnostic criteria of eating disorders, although the construct of loss of control within the definition of binge eating has some conceptual overlap. Instead, impulsivity is generally conceptualized as a broad and potentially fixed personality trait or dispositional characteristic underlying and contributing to the occurrence of certain eating disorder behaviors. Thus, we focus our discussion here on the role of impulsivity in eating disorders in relation to conceptualizing eating disorder onset/maintenance, as well as considerations for the treatment of eating disorders.(16)

With regard to implications for the onset and/or maintenance of an eating disorder, understanding the potential contribution of impulsive dispositions may have utility. Many theoretical models of the etiology and maintenance of eating disorder psychopathology address the functionality of or factors motivating the occurrence of eating disorder symptoms. Specifically, such models provide theories for the motivations underlying engagement in eating disorder behaviors, such as weight and shape concerns (31), escape from aversive self-awareness (32), and desire to avoid emotional experiences (33). Given the relevance of understanding these motivations, there is potential utility in considering the role of impulsivity, particularly in combination with other factors. For instance, those individuals who display stronger impulsive dispositions may be more likely to engage in binge/purge behaviors due to their generally higher levels of disinhibition. Consistent with the construct of negative urgency, it may also be that individuals who frequently experience intense negative affect and possess impulsive dispositions are those most likely to develop bulimic-type symptoms. In contrast, those with less impulsive dispositions may be less likely to engage in such behaviors. Further, in light of evidence that

crossover between diagnoses is common in eating disorders (e.g., from anorexia nervosa, restricting type to anorexia nervosa, binge eating/purging type) (34), considering the role of impulsivity in the symptom changes underlying these diagnostic shifts over time may be useful. Finally, in terms of the separate facets of impulsivity described above, the specific role of these facets in the maintenance of eating disorder symptoms is of relevance. For instance, a limited capacity for planning may contribute to the disorganized pattern of eating that is seen in some individuals with eating disorders, which may promote binge eating secondary to prolonged periods of restriction. Similarly, as noted above, a tendency to lose behavioral control in response to either intense positive or negative affect (positive urgency and negative urgency, respectively) may contribute to an increased likelihood of eating disorder behaviors due to general disinhibition and/or the desire to engage in a behavior to modify the emotional state. (16)

With regard to treatment selection, as noted previously, a variety of treatment types have been applied in eating disorders. Given the diverse nature of treatments that have been used across the spectrum of eating disorder psychopathology, we address considerations related to the relationship between impulsivity and eating disorders that would be broadly relevant, independent of treatment type. First, similar to their potential role in the onset and maintenance of eating disorders, certain facets of impulsivity may impact various processes in treatment. For instance, in interventions that require patients to monitor and plan their eating (e.g., Enhanced Cognitive Behavior Therapy (35) and Integrative Cognitive-Affective Therapy (36), individuals who have a propensity for exhibiting a limited capacity for planning or perseverance may find this approach particularly



challenging, requiring additional attention in this area. Further, those patients who are higher in negative urgency and tend to be most likely to engage in eating disorder behaviors when they are emotionally distressed might benefit from treatment approaches that address the intensity of negative affective experiences, ways of regulating negative affective experiences, and/or methods for tolerating negative affective experiences. Additionally, individuals who are higher in sensation seeking may be more prone to seek out or participate in activities that are associated with greater risk of precipitating or triggering eating disorder behaviors, perhaps necessitating greater attention to modifying relevant situational or environmental cues (16)

A second impulsivity-related implication for eating disorder treatment is the co-occurrence of other psychiatric disorders or maladaptive behaviors. Diagnostic co-occurrence between eating disorders and various other forms of psychopathology is common (18,19), and the presence of impulsive dispositions may be of relevance, particularly when the co-occurring disorders or behaviors are also impulsive in nature (e.g., substance use disorders and self-injurious behavior). This is particularly important to note given the potential for poorer treatment outcome and general prognosis among those with multi-impulsive presentations. In such cases, there may be benefit in considering a broader approach to treatment. Specifically, in addition to addressing the primary symptoms of the eating disorder, there may be utility in concurrently addressing other impulsive behaviors and the potentially common underlying mechanisms and/or precipitants (e.g., eating disorder behaviors and other impulsive behaviors functioning similarly as methods of coping with negative emotions or being similarly precipitated by interpersonal stressors). A broader approach such as this would allow for the targeting of

factors and mechanisms contributing to the co-occurring impulsive behaviors, in addition to the more specific symptoms of the eating disorder.

Finally, much of the present discussion has focused on the role of impulsivity in bulimic-spectrum disorders, which involve eating disorder behaviors that are generally considered to be more impulsive in nature (i.e., binge eating and purging). While those individuals with more restrictive eating disorder presentations (e.g., restricting type anorexia nervosa) may typically display lower levels of certain impulsive dispositions, evidence suggests that the crossover from restricting eating disorder presentations to bulimic-type disorders is common. As such, there may be utility in monitoring facets of impulsivity across the course of treatment in those with initially restrictive presentations. If impulsivity is found to increase over time, perhaps concurrent with a decrease in the rigid and constrained nature of the disorder as an individual responds to treatment, this may be an indication of potential risk for the development of eating disorder behaviors such as binge eating and purging that had not previously been present. (16).

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Health Risks of Obesity with Comorbid Eating Disorders

Individuals with obesity and comorbid eating disorders are at high risk of several medical and psychosocial complications. A study with 152 treatment-seeking individuals with obesity found that those with binge eating disorder had higher BMIs, more severe levels of depression and obsessive-compulsive symptoms, and stronger feelings of inadequacy and inferiority than those without binge eating disorder (37). Similarly, bariatric surgery candidates with comorbid binge eating disorder had significantly more mood and anxiety disorders than bariatric surgery candidates without binge eating disorder (27% versus 5% for mood disorders, and 27% versus



8% for anxiety disorders, respectively) **(38)**. Indeed, 40% of bariatric surgery candidates with comorbid binge eating disorder had a mood or anxiety disorder, with some participants having both a mood and an anxiety disorder **(38)**. Similarly, gastric bypass surgery candidates with binge eating disorder had more disordered eating attitudes and behaviors, as well as worse physical, emotional and social quality of life, than gastric bypass surgery candidates without binge eating disorder **(39)**. Not only is binge eating in individuals with obesity associated with poor mental health and poor quality of life, but binge eating can also hinder weight loss in individuals with morbid obesity. For instance, a systematic review found that individuals submitted to bariatric surgery that had clinically significant binge eating before and after the surgery had worse weight loss outcomes than those without pre-surgical binge eating, or than those who stopped binge eating after the surgery **(40)**. The occurrence of obesity in individuals with eating disorders is also associated with greater mental health complications. For instance, individuals with eating disorders that had had obesity at any stage in their lives had higher eating disorder severity and greater general psychopathology than those with eating disorders that had never had obesity **(41)**. Finally, obesity with comorbid binge eating can be functionally detrimental. For example, individuals with obesity and comorbid binge eating had greater work-related impairment in productivity than those with obesity only, or binge eating only, or than those of normal weight without binge eating **(42)**. Thus, individuals with obesity and comorbid eating disorders are at higher risk of medical and psychosocial complications than individuals with only one or the other condition. However, the most appropriate treatment approaches for individuals experiencing these combined

conditions is a controversial topic amongst healthcare professionals.

• The Potential Benefits and Harms of Dieting to Lose Weight

There are often theoretical and clinical debates amongst healthcare professionals regarding the most appropriate treatment approaches for individuals with obesity and comorbid eating disorders. The most controversial aspect of this debate relates to potential benefits and harms of dieting to lose weight. Healthcare professionals specializing in obesity often recommend dieting to their patients or clients with overweight or obesity, encouraging them to reduce and then maintain a healthy weight. Conversely, healthcare professionals specializing in eating disorders, especially those working mainly with individuals with anorexia nervosa and bulimia nervosa, are often concerned about the use of diets driven by idealization of thinness **(43)**.

The negative perception that some healthcare professionals may sustain regarding dieting is understandable when one considers that strict dieting is often a core symptom of eating disorders such as anorexia nervosa and bulimia nervosa **(44)**. For example, the trans-diagnostic cognitive-behavioral model of eating disorders, which is used to guide the “gold standard” treatment for binge eating disorder and bulimia nervosa, namely cognitive behavior therapy—enhanced (CBT-E), shows strict dieting as a central behavioral component in the maintenance of eating disorders **(44)**. Furthermore, concerns regarding dieting are derived from studies that found relationships between dieting and eating disorder symptoms **(45-47)**. A classic study in this field, namely the Keys’ study, found that young healthy men submitted to prolonged periods of semi-starvation experienced symptoms that were similar to those experienced by people with



eating disorders, such as preoccupation with food, binge eating, distress and depression **(45)**. Additionally, literature reviews of studies including clinical and non-clinical samples suggest that cognitive restraint can make dieters vulnerable to disinhibition and consequent binge eating **(46)**, and that dietary restriction can lead to binge eating, emotional alterations, distractibility and preoccupation with food and eating **(47)**. Notwithstanding that dieting can be associated with these negative consequences, one literature review concluded that some dietary restriction (i.e., the consumption of certain foods in moderation) may be necessary for individuals with obesity or for those at risk of developing weight-related health problems in order to reduce the health consequences of overweight **(47)**.

Although there are some important concerns regarding the safety of dieting, the relationship between dieting and binge eating is not clear-cut and needs to be further examined. For instance, a study with 166 patients with bulimia nervosa at admission for residential treatment found that a significant proportion of them (43%) were *not* currently dieting to lose weight or to avoid weight gain **(48)**. Additionally, this study also found that those who were dieting to lose weight reported lower binge eating frequency in comparison to non-dieters **(48)**. In line with this, a literature review of studies on different levels of dietary restraint, and retrospective and prospective studies examining the effects of dieting on eating behavior, did not find consistent evidence supporting the view that medically supervised dietary restriction exacerbates binge eating disorder **(49)**. It is possible that other factors besides dieting need to be present in order to increase the risk for eating disorder behaviors. For example, a prospective study with a population-based sample of 1827 adolescents and young adults

and a 10-year follow-up period, found that symptoms of depression and low self-esteem in dieters were important elements increasing the risk of binge eating **(50)**. Moreover, a narrative review concluded that while dieting may contribute to eating disorders, other factors mediate this relationship, namely a family history of eating disorders, mood disorders, problems with substance/alcohol use, personality characteristics, problematic family interactions, and biological vulnerability **(51)**. Finally, a systematic review showed that clinically supervised severe energy restriction to treat obesity—as in that used with total meal replacement diets such as very low energy diets—mostly did not cause binge eating, and even reduced binge eating in those with pre-treatment binge eating behaviors **(52)**. These findings are in line with a previous literature review which showed that moderate dietary energy restriction in combination with behavioral weight loss therapy does not seem to induce binge eating in overweight adults without pre-treatment binge eating, and can reduce binge eating in those with pre-treatment binge eating behaviors **(53)**. Taken together, these findings suggest that the relationship between dieting and binge eating may be significantly influenced by several other variables, e.g., degree of psychological support and medical need for weight loss. Notably, the young men in the Key's experiment (see above) were not in medical need of weight loss. Whilst they considered themselves extremely well supervised from a medical perspective **(45)**, psychological effects were less well understood and they would go to great lengths to avoid the shame of dismissal from the trial and the stigma of being a "cheater" when they had broken the diet **(48)**. The complexity of the relationship between dieting to lose weight and eating disorder behaviors and weight stigma potentially contributes to



disagreements amongst healthcare professionals regarding the most appropriate treatment approaches for individuals with obesity and comorbid eating disorders.

• **Treatments for Obesity with Comorbid Eating Disorders**

While some scientific studies have examined the effects of combining obesity treatments with eating disorder treatments (54-56), most of the current treatment programs for obesity or eating disorders still target only one or the other condition. For example, CBT-E is suitable for use in binge eating disorder, however, it does not encourage weight loss for those with overweight or obesity and comorbid binge eating disorder (44), nor does it result in substantial weight loss (57,58). In the same way, a recent systematic review and meta-analysis on the effectiveness of treatments for binge eating disorder found that therapist-led CBT induced greater reduction of binge eating frequency in comparison to behavioral weight loss therapy; however, greater body weight reduction was achieved with behavioral weight loss therapy in comparison to CBT (58). According to this systematic review, at the end of treatment, participants submitted to CBT reduced BMI by an average of 0.41 kg/m² (which is not clinically significant), whereas participants submitted to behavioral weight loss therapy reduced BMI by an average of 2.2 kg/m² (which is clinically significant) (58). Furthermore, another review of treatments for binge eating disorder concluded that weight loss treatments should be offered only to individuals with obesity that do not engage in binge eating (59). This contrasts with a study which found that behavioral weight loss therapy, although not designed to thoroughly address eating disorder psychopathology, concomitantly reduced binge eating and body weight in individuals with obesity and comorbid binge eating disorder (57). Additionally, a systematic review and meta-analyses found a lack of treatments aiming to

simultaneously assist weight management and reduce eating disorder behaviors in individuals with obesity and comorbid bulimia nervosa (60). According to that systematic review and meta-analysis, it is necessary to develop and test integrated treatments for obesity with bulimia nervosa due to the rise in prevalence of individuals with obesity and comorbid bulimia nervosa (60). In line with this, we have been involved with the development of a new integrated treatment, named HAPIFED (a Healthy Approach to weight management and Food in Eating Disorders), which aims to simultaneously aid weight management (i.e., via a moderate to slow rate of weight loss) and to reduce eating disorder behaviors in individuals with obesity and comorbid eating disorders (61). The feasibility and acceptability of this intervention was shown in a pilot study that used 20 sessions of group multidisciplinary therapy (61), and this treatment is currently under examination in a randomized controlled trial comparing 30 sessions of group therapy of either HAPIFED or CBT-E (62). Moreover, the effectiveness of HAPIFED in “real world” clinics is also currently being investigated (63).

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