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Shared and unique mechanisms underlying binge eating disorder and addictive disorders

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HIGHLIGHTS

- Shared mechanisms may explain phenotypic overlap between “food addiction” and BED.
- Mechanisms unique to addictive disorders may contribute to addictive-like eating.
- Future research needed to examine the utility of “food addiction” is recommended.
- Addiction perspectives may inform novel interventions for disordered eating.

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ABSTRACT

Scientific interest in “food addiction” is growing, but the topic remains controversial. One critique of “food addiction” is its high degree of phenotypic overlap with binge eating disorder (BED). In order to examine associations between problematic eating behaviors, such as binge eating and “food addiction,” we propose the need to move past examining similarities and differences in symptomology. Instead, focusing on relevant mechanisms may more effectively determine whether “food addiction” contributes to disordered eating behavior for some individuals. This paper reviews the evidence for mechanisms that are shared (i.e., reward dysfunction, impulsivity) and unique for addiction (i.e., withdrawal, tolerance) and eating disorder (i.e., dietary restraint, shape/weight concern) frameworks. This review will provide a guiding framework to outline future areas of research needed to evaluate the validity of the “food addiction” model and to understand its potential contribution to disordered eating.

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1. Introduction

It has recently been proposed that “food addiction” may be a contributor to obesity and eating-related problems (Gearhardt, Corbin, & Brownell, 2009a,b). This hypothesis proposes that certain foods, such as those high in sugar and fat, may be capable of triggering an addictive response in individuals with vulnerable characteristics (e.g., reward dysfunction, impulsivity) (Gearhardt, Davis, Kuschner, & Brownell, 2011). Early evidence in animal and human studies suggests that high-fat, high-sugar foods may activate reward-related neural circuitry in a similar manner as drugs of abuse (Gearhardt et al., 2011a; Johnson & Kenny, 2010a). Additionally, behavioral indicators of substance-use disorders, such as loss of control and use despite negative consequences, have been observed in response to these foods (Gearhardt et al., 2009a; Ifland et al., 2009). Although many symptoms of addictive disorders are behavioral in nature (e.g., consuming more than intended, inability to cut down on consumption) (American Psychiatric Association, 2013) and behavioral circumstances may increase addictive potential (e.g., intermittent access, binge patterns of use) (Hwa et al., 2011; Koob & Le Moal, 2001), the “food addiction” perspective does not reflect a behavioral addiction or an “eating addiction.” Rather, akin to substance-use disorders, this framework posits an interaction between the addictive potential of high-fat, high-sugar foods, behavioral factors that may increase addictive responses (e.g., intermittent, binge consumption), and an individual’s propensity to develop an addiction (Ahmed, Guillem, & Vandaele, 2013; Davis & Carter, 2009; Gearhardt et al., 2009a; Gold, Frost-Pineda, & Jacobs, 2003; Ifland et al., 2015; Ifland et al., 2009).

The Yale Food Addiction Scale (YFAS) is currently the only validated measure to assess symptoms of “food addiction” (Gearhardt et al., 2009b). The YFAS is a 25-item self-report questionnaire that applies the diagnostic criteria for substance-use disorders to consumption of certain foods (see Table 1). The YFAS provides two scoring options: a symptom count (a sum of the seven diagnostic criteria) and a diagnostic threshold that reflects the criteria for a substance dependence diagnosis (the presence of three or more symptoms plus clinically significant impairment or distress). The YFAS has good internal consistency ranging from $\alpha = .76-.92$ (Meule & Gearhardt, 2014) and demonstrates convergent validity with measures of eating pathology (e.g., emotional eating, food craving) and incremental validity in predicting binge eating frequency above and beyond existing measures (for a review see Meule & Gearhardt, 2014). The YFAS has been used to assess “food addiction” in both community and treatment-seeking samples and has been translated to German, French, Spanish, and Italian (Granero et al., 2014; Meule & Gearhardt, 2014; Pursey, Stanwell, Gearhardt, Collins, & Burrows, 2014).

Though “food addiction” is receiving increased attention, the topic remains controversial (Avena, Gearhardt, Gold, Wang, & Potenza,

2012; Corsica & Pelchat, 2010; Corwin & Hayes, 2014; Ziauddeen & Fletcher, 2013). This model posits that certain foods are addictive akin to substance-use disorders; however, there have been few studies examining which foods or ingredients in foods may have addictive potential (Corwin & Hayes, 2014; Ziauddeen & Fletcher, 2013). While initial evidence in animals and humans suggest that high-fat, high-sugar foods are most associated with behavioral indicators of “food addiction” (Avena, Rada, & Hoebel, 2008; Johnson & Kenny, 2010a; Schulte, Avena, & Gearhardt, 2015), identifying the potentially addictive agent in these foods is a critical next step in this line of research. Additionally, it has been suggested that “food addiction” cannot account for obesity, as only a relatively small percentage of obese individuals meet for YFAS diagnosis (Corwin & Hayes, 2014; Ziauddeen, Farooqi, & Fletcher, 2012). Thus, there have been conflicting findings in neuroimaging studies examining whether neural circuits implicated in addiction are also relevant to obesity (Corwin & Hayes, 2014; Ziauddeen et al., 2012). However, obesity is a multi-faceted condition that can result from a complex combination of a number of potential genetic and environmental factors, including for example, physical inactivity, medication side effects, and sleep problems, in addition to excessive food intake (Grilo & Pogue-Geile, 1991; Keith et al., 2006; Marcus & Wildes, 2009; Wright & Aronne, 2012). Although “food addiction” is more prevalent in participants with obesity (Flint et al., 2014), it has been observed in a range of weight classes (Gearhardt et al., 2009b) and may explain a unique phenotype of problematic eating behavior. Thus, obesity should not be used as a proxy for “food addiction” in future behavioral and neuroimaging studies.

Another important critique is the substantial phenotypic overlap between binge eating disorder (BED) and definitions of “food addiction.” Both BED and addiction are marked by loss of control over consumption, continued excess use despite negative consequences, and repeated, failed attempts to cut down on consumption (Gold et al., 2003). As a result of these similarities, measures of binge eating and “food addiction” (YFAS) are often highly correlated, both reflecting and resulting in the difficulty of evaluating and disentangling potential shared and unique aspects of these different constructs. For example, data from these types of measures cannot readily be placed in the same statistical model due to multi-collinearity concerns (Gearhardt, Rizk, & Treat, 2014).¹ YFAS “food addiction” and BED commonly co-occur, although these constructs do not completely overlap. In samples of individuals with BED, the frequency of “food addiction” ranges from 42% to 57% and “food addiction” symptoms predict the frequency of binge eating episodes above and beyond measures of eating pathology and depression (Gearhardt, White, Masheb, & Grilo, 2013; Gearhardt et al., 2012). Individuals who meet the criteria for both BED and “food addiction” exhibit more frequent binge eating episodes, intense cravings, and depressive symptoms than those with only BED (Davis & Carter, 2009; Gearhardt et al., 2012). Among individuals who meet the criteria for YFAS “food addiction,” the frequency of BED ranges from 27% to 30% (Davis et al., 2011; Gearhardt, Boswell, & White, 2014). Notably, in community studies with diverse weight groups, individuals categorized with “food addiction,” but not BED, report significant levels of impairment and distress, such as depressive symptoms, impulsivity, and negative affect (Gearhardt, Boswell, & White, 2014). However, by focusing primarily on the psychometric and phenotypic overlap of “food addiction” and BED, it is challenging to evaluate whether an addictive process

Table 1
YFAS symptoms based on DSM-IV criteria for substance dependence.

- (1) Substance taken in larger amount and for longer period than intended
- (2) Persistent desire or repeated unsuccessful attempt to quit
- (3) Much time/activity to obtain, use, recover
- (4) Important social, occupational, or recreational activities given up or reduced
- (5) Use continues despite knowledge of adverse consequences (e.g. failure to fulfill role obligation, use when physically hazardous)
- (6) Tolerance (marked increase in amount; marked decrease in effect)
- (7) Characteristic withdrawal symptoms; substance taken to relieve withdrawal

¹ For example, a recent study by (Gearhardt, Rizk, et al., 2014) found that YFAS and Binge Eating Scale scores were correlated at .751.

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