Great Debates in Nutrition

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The concept of "food addiction" helps inform the understanding of overeating and obesity: Debate Consensus

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ABSTRACT

There is an ongoing scientific debate about whether unhealthy, highly processed foods are addictive and whether this contributes to overeating and obesity. Through this debate series, we identified numerous points of consensus, including that *1*) addictive-like eating exists, *2*) mechanisms implicated in substance-related and addictive disorders contribute to overeating and obesity, and *3*) food industry practices are also a key contributor to this phenomenon. We also agree that obesity, a multifaceted condition, is not synonymous with addictive-like eating and that further research is needed to clarify the understanding of addictive-like eating. Disagreements remain regarding the strength of evidence that highly processed foods are addictive, the appropriate framework for conceptualizing addictive-like eating, and the societal implications of identifying unhealthy, highly processed foods as addictive. Finally, we highlight future research needed to address existing gaps in the scientific literature that underlie continuing controversies, most notably the need for scientific consensus about what measures should be used to evaluate whether highly processed foods are addictive. *Am J Clin Nutr* 2021;00:1–3.

Keywords: food addiction, obesity, overeating, processed, behavioral addiction

Narrative Summary

The contribution of an addictive process to the rising rates of global obesity is a topic of increasing scientific interest, as well as controversy. The opportunity to engage in a debate on its merits led to the identification of a number of areas of agreement (see **Box 1**). However, continuing controversies still exist (see **Box 2**), many of which are driven by differences in how the concept of addiction should be operationalized, the role of the food in triggering addictive behavior, and uncertainties about the impact of an addictive framework on enacting beneficial change. Although the current debate reflects our personal perspectives, we hope that it will provide a roadmap for future research (see **Box 3**) to progress scientific understanding of the role of addictive-like behaviors in overeating and obesity, and the identification of novel treatment and policy approaches to encourage healthier eating behaviors and improve public health.

The authors agree that obesity is a multifaceted condition in which no single cause or solution exists. However, there is consensus that an addictive-like eating phenotype exists, marked by diminished control over consumption, strong cravings, overconsumption despite negative consequences, and repeated failed attempts to control intake. This phenotype is more likely to occur in individuals with obesity but is not synonymous with obesity. Mechanisms implicated in substance-related and addictive disorders (e.g., reward dysfunction, executive control impairment) clearly contribute to overeating and obesity. We agree that additional research is needed to understand the boundaries of addictive-like eating with existing conditions (e.g., binge eating disorder, atypical depression) and that the Yale Food Addiction Scale provides a useful tool to operationalize addictive-like eating. Industry practices that foster a food environment dominated by unhealthy, energy-dense, highly processed foods are likely the biggest external contributor to addictive-like overeating and obesity. Interventions to address obesity typically target energy intake and/or energy expenditure. Nevertheless, we agree that environmentally focused policies that aim to improve the dietary quality of the food environment will be key.

With regard to continuing controversies, ANG highlights the evidence that highly processed foods composed primarily of high concentrations of refined carbohydrates and fats are a

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This article series is designed as an Oxford-style debate. As such, participants are required to argue pro and con positions, even when that opinion might differ from their own. The views expressed in this debate do not necessarily reflect the opinion of the participants, *The American Journal of Clinical Nutrition*, or the American Society for Nutrition.

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Box 1:

Points of Agreement

- Eating behavior that is consistent with an addictive phenotype exists.
- The attributes of the food, individual differences, and the behavioral patterns of consumption contribute to addictive-like eating.
- Obesity is a heterogeneous disorder; addictive-like eating behavior is of clinical relevance for a subgroup of people with obesity.
- Addictive-like eating behaviors do not occur solely in individuals with obesity, but the prevalence of these behaviors is higher in people with obesity.
- The Yale Food Addiction Scale is a useful questionnaire to assess addictive-like eating behavior.
- Mechanisms implicated in substance-related and addictive disorders (e.g., reward functioning, executive control) play an important role in overeating.
- Food industry practices are a major contributor to rising rates of addictive-like eating and obesity. However, other industries contribute to obesity, for instance media companies that promote screen time (which can contribute to lower physical activity). Addressing obesity requires a multifaceted approach that targets a variety of contributing factors.
- The food industry should aim to improve the dietary quality of foods and stop targeting vulnerable populations (e.g., children) for the marketing of unhealthy highly processed foods.
- An environmentally focused, public health perspective will be key in reducing both addictive-like eating and obesity.

Box 2:

Continuing Controversies

- Highly processed foods and addictive potential.
  - ANG: Highly processed foods are more effective at engaging reward-related neural systems and more likely to be consumed in an addictive manner than minimally processed foods. High concentrations of rapidly absorbed carbohydrates (high glycemic index) and fat underlie the addictive nature of these highly processed foods, which is further enhanced by salt and other flavor additives.
  - JH: Evidence that specific food ingredients are key determinants of addictive-like eating behavior is lacking. Highly processed foods are not comparable to legal/illegal drugs, which act via specific and direct mechanisms. Most people consume highly processed foods on a daily basis without experiencing drug-related effects.
- The application of the framework based on the Diagnostic and Statistical Manual of Mental Disorders, Edition 5 (DSM-5) category "Substance-related and addictive disorders."
  - ANG applies a substance-focused framework to the diagnostic and conceptual understanding of addictive-like eating, which considers highly processed foods an addictive substance.
  - JH emphasizes the behavioral factors over the role of the food and proposes a potential classification within addictive disorders (i.e., eating addiction, uncontrolled eating or overeating disorder).
- Labeling unhealthy highly processed foods as addictive, industry culpability, and promotion of environmentally focused public health initiatives.
  - ANG: Misclassifying addictive substances as nonaddictive (e.g., tobacco, oxycodone) limits the ability to place safeguards (e.g., through governmental regulations) on industry practices and misinforms the public—a concern that also applies to addictive foods.
  - JH: Applying an addiction label to highly processed foods increases confusion and provides the industry with an opportunity to avoid culpability and distracts from environmental policies that would more effectively change their current practices. Efforts to prevent obesity should focus on environmental prevention (e.g., ban soft drinks and sweets in schools).

Box 3:

Research Agenda to Resolve Debate

- Develop a scientific consensus about what criteria should be used to evaluate whether a substance or behavior is addictive, including highly processed foods.
- Determine how the intake (e.g., quantity, absorption, metabolism) of different food components (e.g., refined carbohydrates, fat, food additives) and their combinations contribute to addictive-like eating behaviors.
- Evaluate the daily dietary stability/variation in food intake on a medium-term basis of people classified as showing addictive-like eating.
- Explore the physiology and biochemistry of how different food components (and their combinations) impact the brain (especially after repeated exposure and during developmentally critical periods).
- Identify the chemical structures and other properties of food underlying addictive-like eating.
- Investigate the interaction of neurophysiological pathways underlying appetite and weight regulation with

mechanisms implicated in substance-related and addictive disorders (e.g., reward functioning, inhibitory control).
- Analyze the genetic correlations between addictive-like overeating and anthropometric traits (e.g., percentage fat mass, BMI) and distinct substance-related and addictive disorders.
- Evaluate the contribution of withdrawal and tolerance processes to addictive-like eating and obesity in humans.
- Conduct longitudinal studies (especially those that begin early in development) to understand how addictive-like eating develops and progresses over time.
- Disentangle the phenotypic overlap of addictive-like eating with eating disorders, depression, intentional weight loss, and obesity using large, nationally representative samples.
- Examine the utility and risks of assessing addictive-like eating as a predictor of treatment outcomes for obesity and disordered eating.
- Develop empirically supported treatments designed to specifically address addictive-like eating behavior.
- Determine whether successful treatment of addictive-like eating behavior impacts energy intake and body weight.
- Assess the impact of framing highly processed foods as addictive on the presence of weight stigma and support for policies that aim to improve the food environment (e.g., marketing restrictions, taxation).

key factor in the development of addictive-like eating behavior. JH, in contrast, states that there is insufficient evidence that specific food types (or ingredients in these foods) are addictive. Both authors agree that addictive-like eating results from an interplay of food attributes, individual risk factors, and behavioral patterns of consumption. However, differential emphasis is placed on these factors (particularly the contribution of highly processed food compared with behavioral patterns), which leads to disagreements about the appropriate framework for conceptualizing addictive-like eating. ANG believes that the identification of unhealthy highly processed foods as addictive facilitates policies to change the food environment and increases industry culpability, whereas JH is concerned that this approach will be manipulated by the industry to sow confusion and avoid meaningful change in light of unsolved scientific issues.

Further evaluation of the extent to which, and the mechanisms whereby, foods differ in their ability to trigger addictive-like eating is key to resolving controversies. Because exposure to unhealthy highly processed food occurs very early in development, longitudinal studies that assess addictive-like eating over the life course would be beneficial. Clinically, further characterization and differentiation of addictive-like eating from other eating disorders and mental disorders as a whole are crucial for its recognition as a mental disorder in diagnostic classifications. The evaluation of addictive-like eating as a predictor of treatment outcomes is warranted. There is also need to assess whether the development of novel empirically supported treatments and prevention strategies to target addictive mechanisms impacts obesity prevalence rates. Experimental studies that evaluate the effect of adopting an addictive framework on important outcomes, like policies to improve the food environment, are also important.

The most challenging, but arguably most important, component of our research agenda is the need to develop a scientific consensus about what indicators should be used to evaluate whether a substance or behavior is addictive. Through technological advances, novel and highly reinforcing substances (including highly processed foods) and activities (e.g., social media) are constantly being developed and marketed to the public. Through this debate, the authors realized that the use of different benchmarks to evaluate addictive potential (e.g., the presence of behavioral indicators, the identification of chemical agents with a direct effect on the central nervous system) has contributed to disagreement. The field has long debated what criteria should be used to identify an addictive substance or behavior and this issue is not easily resolved. On the one hand, the lack of a scientific consensus on how addictive potential should be evaluated increases the likelihood of misclassifying addictive substances or behaviors as nonaddictive and impedes effective strategies for public health mitigation. On the other hand, overstretching the addiction concept without clear scientific justification poses risks for people and societies, such as stigmatization and unwarranted medicalization of human behaviors. Thus, the development of scientific agreement about the benchmarks that should be used to evaluate addictive potential would be important for resolving the question posed in the title of this debate.

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