

# Obesity and addiction: theories and concepts



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As a want-to-be conscious eater and as an individual susceptible to diabetes through a prevalent family history, I was intrigued by the article *Why One Cream Cake Leads To Another* published in *The Scientist*. It caught my eye to learn that maybe there was a scientific reason behind my cravings of Starbucks' Frappucinos and Insomnia's S'mores Deluxe cookies; and maybe there is a valid and researched explanation as to why, when experience of consuming these particular treats, even when "full", is it like a bitter sweet ending? Is this a minor case of a food craving? Is there some biochemical reason as to why one feels they must have much and must have it often? Can it be lack of discipline to keep these things a reoccurring part of my diet even when attempting to make my eating habits cleaner and more nutritious?

*Why One Cream Cake Leads To Another*, begins to answer these questions. A chronic high-fat diet is thought to desensitize the brain to the feeling of satisfaction that one normally gets from a meal, causing a person to overeat in order to achieve the same high again. Newer research however, suggests that this desensitization actually begins in the gut itself, where production of a satiety factor, which normally tells the brain to stop eating, becomes dialed down by the repeated intake of high-fat food. High-fat foods produce an endorphin response in the brain when they hit the taste buds; the gut also sends signals directly to the brain to control our feeding behavior.

Mice nourished via gastric feeding tubes, which bypass the mouth, exhibit a surge in dopamine—a neurotransmitter promoting reinforcement in the brain's reward circuitry—similar to that experienced by those eating normally. This dopamine surge occurs in response to feeding in both mice

and humans. But evidence suggests that dopamine signaling in the brain is deficient in obese people. Ivan de Araujo, a professor of psychiatry at the Yale School of Medicine, has now discovered that obese mice on a chronic high-fat diet also have a muted dopamine response when receiving fatty food via a direct tube to their stomachs.

To determine the nature of the dopamine-regulating signal emanating from the gut, Araujo and his team searched for possible candidates. “ When you look at animals chronically exposed to high-fat foods, you see high levels of almost every circulating factor—leptin, insulin, triglycerides, glucose, et cetera,” he said. But one class of signaling molecule is suppressed. Of these, Araujo’s primary candidate was oleoylethanolamide(OEA), food-intake modulators . Not only is the factor produced by intestinal cells in response to food, he said, but during chronic high-fat exposure, “ the suppression levels seemed to somehow match the suppression that we saw in dopamine release.”

It is not clear why a chronic high-fat diet suppresses the production of oleoylethanolamide. But once the vicious cycle starts, it is hard to break because the brain is receiving its information subconsciously, said Daniele Piomelli, a professor at the University of California, Irvine, and director of drug discovery and development at the Italian Institute of Technology in Genoa. “ We eat what we like, and we think we are conscious of what we like, but I think what others are indicating is that there is a deeper, darker side to liking—a side that we’re not aware of,” Piomelli said. “ Because it is an innate drive, you cannot control it.” Put another way, even if you could

trick your taste buds into enjoying low-fat yogurt, you're unlikely to trick your gut.

So if eating has much to do with biochemical and people dealing with obesity have a lack thereof, at what point is one addicted to food? Tuomisto, T; Hetherington, Mm; Morris, Mf; Tuomisto, Mt; Turjanmaa, V; Lappalainen, R. (1999) study was to examine similar affective, physiological, and behavioral variables in chocolate "addicts" and control subjects. Method: Sixteen addicts and 15 control subjects took part in two laboratory experiments in which their heart rate, salivation, and self-reported responses were measured. Results: In the presence of external chocolate cues, chocolate addicts were more aroused, reported greater cravings, experienced more negative affect, and also ate more chocolate than control subjects. Self-report measures on eating attitudes and behavior, body image, and depression confirmed that a relationship exists between "chocolate addiction" and problem eating. Chocolate addicts showed more aberrant eating behaviors and attitudes than controls, and were also significantly more depressed. Discussion: Chocolate addicts may be considered to be a parallel with addicts generally, because they differ from controls in craving for chocolate, eating behavior, and psychopathology (in respect of eating and affect).

According to Corwin and Grigson (2009), food addiction is a pervasive, yet controversial, topic that has gained recent attention in both lay media and the scientific literature. The goal of this series of articles is to use a combination of preclinical and clinical data to determine whether foods, like drugs of abuse, can be addictive, the conditions under which the addiction

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develops, and the underlying neurophysiological substrates. Operational definitions of addiction that have been used in the treatment of human disorders and to guide research in both humans and animals are presented, and an overview of the symposium articles is provided. We propose that specific foods, especially those that are rich in fat and/or sugar, are capable of promoting “addiction”-like behavior and neuronal change under certain conditions. That is, these foods, although highly palatable, are not addictive per se but become so following a restriction/binge pattern of consumption. Such consummatory patterns have been associated with increased risk for comorbid conditions such as obesity, early weight gain, depression, anxiety, and substance abuse as well as with relapse and treatment challenges. The topic of food addiction bears study, therefore, to develop fresh approaches to clinical intervention and to advance our understanding of basic mechanisms involved in loss of control.

Ifland JR1, Preuss HG, Marcus MT, Rourke KM, Taylor WC, Burau K, Jacobs WS, Kadish W, Manso G. (2009), study found the following: Overeating in industrial societies is a significant problem, linked to an increasing incidence of overweight and obesity, and the resultant adverse health consequences. We advance the hypothesis that a possible explanation for overeating is that processed foods with high concentrations of sugar and other refined sweeteners, refined carbohydrates, fat, salt, and caffeine are addictive substances. Therefore, many people lose control over their ability to regulate their consumption of such foods. The loss of control over these foods could account for the global epidemic of obesity and other metabolic disorders. We assert that overeating can be described as an addiction to refined foods that

conforms to the DSM-IV criteria for substance use disorders. To examine the hypothesis, we relied on experience with self-identified refined foods addicts, as well as critical reading of the literature on obesity, eating behavior, and drug addiction. Reports by self-identified food addicts illustrate behaviors that conform to the 7 DSM-IV criteria for substance use disorders. The literature also supports use of the DSM-IV criteria to describe overeating as a substance use disorder. The observational and empirical data strengthen the hypothesis that certain refined food consumption behaviors meet the criteria for substance use disorders, not unlike tobacco and alcohol. This hypothesis could lead to a new diagnostic category, as well as therapeutic approaches to changing overeating behaviors.

In drug addiction, the transition from casual drug use to dependence has been linked to a shift away from positive reinforcement and toward negative reinforcement. That is, drugs ultimately are relied on to prevent or relieve negative states that otherwise result from abstinence (e. g., withdrawal) or from adverse environmental circumstances (e. g., stress). Recent work has suggested that this “dark side” shift also is a key in the development of food addiction. Initially, palatable food consumption has both positively reinforcing, pleasurable effects and negatively reinforcing, “comforting” effects that can acutely normalize organism responses to stress. Repeated, intermittent intake of palatable food may instead amplify brain stress circuitry and downregulate brain reward pathways such that continued intake becomes obligatory to prevent negative emotional states via negative reinforcement. Stress, anxiety and depressed mood have shown high comorbidity with and the potential to trigger bouts of addiction-like eating

behavior in humans. Animal models indicate that repeated, intermittent access to palatable foods can lead to emotional and somatic signs of withdrawal when the food is no longer available, tolerance and dampening of brain reward circuitry, compulsive seeking of palatable food despite potentially aversive consequences, and relapse to palatable food-seeking in response to anxiogenic-like stimuli. The neurocircuitry identified to date in the “dark” side of food addiction qualitatively resembles that associated with drug and alcohol dependence. The present review summarizes Bart Hoebel’s groundbreaking conceptual and empirical contributions to understanding the role of the “dark side” in food addiction along with related work of those that have followed him. (Parylak SL1, Koob GF, Zorrilla EP. 2011)

So what stands to question, after all this secondary data analysis, is this just another way of demonizing fat? Is food addiction a fact or is it fiction; an excuse built on “monuments of nothingness?” Must one really hope for another scientific revelation, to overcome bad eating habits? Though many factors go into the food we intake, how much, how often, and how we will or will not obtain enjoyment from it, there are also non-chemical factors. Such as, keep an open and level head about yourself when searching for a food high, it can mean more than your current weight or health, it can mean your life.