

## Behavioral addiction

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**Behavioral addiction** is a form of addiction that involves a compulsion to repeatedly perform a rewarding non-drug-related behavior – sometimes called a ***natural reward*** – despite any negative consequences to the person's physical, mental, social, and/or financial well-being. Behavior persisting in spite of these consequences can be taken as a sign of addiction. The term "behavioral addiction" is not included in the new DSM-5 because, according to the authors, "there is insufficient peer-reviewed evidence to establish the diagnostic criteria and course descriptions needed to identify these behaviors as mental disorders." Nonetheless, research on the neuroscience of addiction has demonstrated  $\Delta$ FosB is the critical progenitor of behavioral and drug addictions, and that behavioral addictions arise from the same neural adaptations that induce drug addictions.

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### Biomolecular mechanisms

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$\Delta$ FosB, a gene transcription factor, has been identified as playing a critical role in the development of addictive states in both behavioral addictions and drug addictions.<sup>[9][10][11]</sup> Overexpression of  $\Delta$ FosB in the nucleus accumbens is necessary and sufficient for many of the neural adaptations seen in drug addiction; it has been implicated in addictions to alcohol, cannabinoids, cocaine, nicotine, phenylcyclidine, and substituted amphetamines as well as addictions to natural rewards such as sex,

exercise, and food. A recent study also demonstrated a cross-sensitization between drug reward (amphetamine) and a natural reward (sex) that was mediated by  $\Delta$ FosB.

Besides increased  $\Delta$ FosB expression in the nucleus accumbens, there are many other similarities in the neurobiology of behavior and drug addictions. One of the most important discoveries of addictions has been the drug based reinforcement and, even more important, reward based learning processes. Several structures of the brain are important in the conditioning process of behavior addiction. One of the major areas of study includes the region, called the amygdala, which involves emotional significance and associated learning. Research shows that dopaminergic projections from the ventral tegmental area facilitate a motivational or learned association to a specific behavior. The cycle that is created is considered the dopamine reward system.

Dopamine neurons take a role in the learning and sustaining of many acquired behaviors. Research specific to Parkinson's disease has led to identifying the intracellular signaling pathways that underlie the immediate actions of dopamine. The most common mechanism of dopamine is to create addictive properties along with certain behaviors. There are three stages to the dopamine reward system: bursts of dopamine, triggering of behavior, and further impact to the behavior. Once electronically signaled, possibly through the behavior, dopamine neurons let out a 'burst-fire' of elements to stimulate areas along fast transmitting pathways. The behavior response then perpetuates the striated neurons to further send stimuli. The fast firing of dopamine neurons can be monitored over time by evaluating the amount of extracellular concentrations of dopamine through micro dialysis and brain imaging. This monitoring can lead to a model in which one can see the multiplicity of triggering over a period of time.<sup>[18]</sup> Once the behavior is triggered, it is hard to work away from the dopamine reward system.

Behaviors like gambling have been linked to the newfound idea of the brain's capacity to predict rewards. The reward system can be triggered by early detectors of the behavior, and trigger dopamine neurons to begin stimulating behaviors. But in some cases, it can lead to many issues due to error, or reward-prediction errors. These errors can act as teaching signals to create a complex behavior task over time.

## **Diagnostic classification**

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Diagnostic models do not currently include the criteria necessary to identify behaviors as addictions in a clinical setting. Behavioral addictions has been proposed as a new class in DSM-5, but the only category included is gambling addiction. Internet gaming addiction is included in the appendix as a condition for further study.

Behavioral addiction, which is sometimes referred to as impulse control disorders, are increasingly recognized as treatable forms of addictions. The type of behaviors which some people have identified as being addictive include gambling, food, sex, viewing of pornography, use of computers, playing video games, use of the internet, work, exercise, spiritual obsession (as opposed to religious devotion), cutting, travel, and shopping.

When analyzing the addiction to food for example, a published study in 2009 from The Scripps Research Institute have shown for the first time that the same molecular mechanisms that drive people into drug addiction are behind the compulsion to overeat, pushing people into obesity. In this study, scientists focused on a particular receptor in the brain known to play an important role in vulnerability to drug addiction—the dopamine D2 receptor. The D2 receptor responds to dopamine, a neurotransmitter that is released in the brain by pleasurable experiences like food or sex or drugs like cocaine.

The term "soft addiction" was coined by Judith Sewell Wright to describe activities, moods or ways of being, avoidances, and things—edible and consumable but which do not pose a grave health disease risk—rather, they have the most effect on personal time and productivity. These behaviors were profiled in a 2007 ABC News story titled Bad Habits.

On August 15, 2011 the American Society of Addiction Medicine (ASAM) issued a public statement defining all addiction in terms of brain changes. "Addiction is a primary, chronic disease of brain reward, motivation, memory and related circuitry."

The following excerpts are taken from the FAQs:

The new ASAM definition makes a departure from equating addiction with just substance dependence, by describing how addiction is also related to behaviors that are rewarding. This is the first time that ASAM has taken an official position that addiction is not solely "substance dependence." This definition says that addiction is about functioning and brain circuitry and how the structure and function of the brains of persons with addiction

differ from the structure and function of the brains of persons who do not have addiction. It talks about reward circuitry in the brain and related circuitry, but the emphasis is not on the external rewards that act on the reward system. Food and sexual behaviors and gambling behaviors can be associated with the "pathological pursuit of rewards" described in this new definition of addiction.

We all have the brain reward circuitry that makes food and sex rewarding. In fact, this is a survival mechanism. In a healthy brain, these rewards have feedback mechanisms for satiety or 'enough.' In someone with addiction, the circuitry becomes dysfunctional such that the message to the individual becomes 'more', which leads to the pathological pursuit of rewards and/or relief through the use of substances and behaviors. So, anyone who has addiction is vulnerable to food and sex addiction.

Since ASAM released its statement, and shortly before its release, additional new studies have come out on Internet addiction. They reveal the same fundamental brain changes seen in other addicts of drugs. Another 2011 study found that the risk of Internet addiction in men was about three times more than women. Researchers noted, Internet addiction is a psychosocial disorder and its characteristics are as follows: tolerance, withdrawal symptoms, affective disorders, and problems in social relations. Internet usage creates psychological, social, school and/or work difficulties in a person's life. Eighteen percent of study participants were considered to be pathological Internet users, whose excessive use of the Internet was causing academic, social, and interpersonal problems. Excessive Internet use may create a heightened level of psychological arousal, resulting in little sleep, failure to eat for long periods, and limited physical activity, possibly leading to the user experiencing physical and mental health problems such as depression, OCD, low family relationships and anxiety.

### **DSM or "Impulse control disorder"**

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There is disagreement as to the exact nature of behavioral addiction or dependency. However, the biopsychosocial model is generally accepted in scientific fields as the most comprehensive model for addiction. Historically, addiction has been defined with regard solely to psychoactive substances (for example alcohol, tobacco and other drugs) which cross the blood-brain barrier once ingested, temporarily altering the chemical milieu of the brain. However, "studies on phenomenology, family history, and response to

treatment suggest that intermittent explosive disorder, kleptomania, problem gambling, pyromania, and trichotillomania may be related to mood disorders, alcohol and psychoactive substance abuse, and anxiety disorders (especially obsessive-compulsive disorder).

In the case of pathological gambling, for example, the American Psychiatric Association has previously classified the condition as an impulse control disorder and not an addiction. However, the 5th edition includes it in the addictions section and not the impulse control group.

## Research

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It is estimated that at least 90% of Americans have at least one form of soft addiction in their lives. Nadine Kaslow, professor of psychology and behavioral sciences at Emory University in Atlanta, has commented on the issue, saying that while it is healthy to relieve stress with behaviors like drinking coffee and watching television, when they become habitual they become problematic to one's health and happiness.

Psychologist Kimberly Young, director of the Center for Online Addiction, has addressed Internet addiction as one of the most common types of soft addictions. Young has likened excessive Internet use to pathological gambling. Texting or similar repetitive behaviors may also be considered as soft addictions.

Research around addictions and social media sites has been growing. The Retrevo company recently came out with research suggesting that there is an obsessiveness to the way people are checking their pages.

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