



Subtracting Addiction

the science behind addictive behaviors

by Bradley T. Wajda, D.O.

When you say the word “addiction,” most people think of any one of the numerous drugs commonly abused, and yet there are so many different types of addiction. Gambling, sex, eating, and even exercise are well-recognized addictions. Internet Use Disorder will soon be an official psychiatric diagnosis as an addiction.

So what constitutes “abuse,” and how is it different from “addiction/dependence?” Substance abuse is defined as a pattern of substance use leading to significant impairment or distress as represented by one (or more) of the following, occurring within a 12-month period:

- *Recurrent substance use resulting in a failure to fulfill major obligations at work, school, or home.*
- *Recurrent substance use in situations in which it is physically hazardous (such as driving an automobile or operating a machine).*
- *Recurrent substance-related legal problems.*
- *Continued substance use despite having continued social or interpersonal problems caused by the effects of the substance.*

Substance dependence is defined as a pattern of substance use leading to significant impairment or distress, as represented by three (or more) of the following, occurring any time in the same 12-month period:

- 1 *Tolerance: the need for increasing amounts of the substance to achieve the desired effect.*
- 2 *Withdrawal: a term referring to the feelings of discomfort, distress, and intense craving for a substance that occur when use of the substance is stopped.*
- 3 *The substance is taken in larger amounts or over a longer period than intended.*
- 4 *There are unsuccessful efforts to cut down or control substance use.*
- 5 *A great deal of time is spent in activities obtaining, using or recovering the substance.*
- 6 *Important social, occupational or recreational activities are given up or reduced because of substance use.*
- 7 *The substance use is continued despite having ongoing physical or psychological problems caused by the substance.*

Addiction created by any one of the different drugs and behaviors mentioned still results in these same symptoms of abuse and addiction. How is it that there can be so many drugs and behaviors readily distinguishable from each other, yet they can all result in the same cycle of craving, use, tolerance, and withdrawal?

The answer is the brain's reward circuitry. Growing evidence indicates that the "limbic" region of the brain is not only responsible for our moods, but also the positive emotional effects from both natural rewards, like friendship, as well as from behaviors prone to abuse and addiction. Specifically, all these addictions converge to increase dopamine. Dopamine plays a major role in motivation and reward. It surges before and during a pleasurable activity to make you want to repeat what you are doing. Pathways carrying dopamine connect the limbic system with areas responsible for memory. This combination can etch rewarding behaviors into the brain with strongly seductive memories to re-engage in the behavior.

Usually, there is balance – a baseline level of dopamine is maintained, which helps us to maintain a sense of wellbeing. When you engage in pleasurable activities that increase the release of dopamine in large amounts, or over an extended period, a problem is created.

The human body monitors millions of chemical interactions and blood levels. The brain's "thermostat" is set for a certain amount of dopamine to be present in order to allow for you to maintain your sense of wellbeing. Too much dopamine will result in the sensitivity of the dopamine receptors being turned down (called "down regulation") in order to mimic a normal level of dopamine. However, when you



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stop engaging in the addiction, the dopamine levels drop. This leaves you with desensitized receptors in the presence of a normal level of dopamine, which mimics a level of dopamine that is too low.

Here's an analogy: You're watching a movie on your TV when a commercial that is much louder than the movie comes on. You rush to turn the sound down. That is the excessive dopamine caused by the addiction causing the brain to desensitize the receptors. Unfortunately, when the movie comes back on, you can't hear it. This compares to the normal dopamine level but with desensitized receptors. This is what causes craving and addiction, especially when combined with those seductive memories that are tied to the brain's reward center.

Treatment based on understanding

this pathway is available, and includes currently available medications, investigational medications (not yet available to the public), and novel treatment such as transcranial magnetic stimulation (TMS). If you suspect that you may meet the criteria for abuse or addiction, it is imperative to seek an evaluation and treatment recommendations by a qualified health professional. 📺

During his 25 years practicing in the Central Valley, Dr. Bradley T. Wajda has amassed extensive experience in adult and child psychiatry, as well as comprehensive substance abuse treatment. His Fresno practice, Esano Health, represents his most recent endeavor to enhance the scope of mental health services available to the general public through a range of treatment options that are personalized to the needs of each individual.