

Zak's Definition of Addiction: ES.S10: Drugs and the Brain, 2013-03-04

Addiction is continued use of a substance despite harms that outweigh the benefits, with a lack of control over substance use.

A person may also be addicted to a behavior instead of a substance, such as gambling addiction.¹

Harms can be:

Physical

Psychological

Social

Monetary

Lack of control can manifest as:

Broken promises to oneself, e.g. "I will only have two beers tonight"

Broken promises to others, e.g. "I will not be late to work again"

Feeling helpless, e.g. "I could not possibly go for a week without it"

Lying, including lying to doctors, to family, or to oneself. Lying about substance use, about level of control, about level of harm, or about level of benefit from the substance.

The following factors are *not* part of the definition of addiction:

Tolerance – Tolerance is the need for increasingly large doses of the drug to reach the same effect. Many non-addictive drugs cause tolerance, such as Benadryl (diphenhydramine).² Drug addiction can exist without tolerance, and in fact drug addiction is sometimes accompanied by the opposite of tolerance, sensitization.³

Withdrawal – Withdrawal is the name for unpleasant symptoms that arise when you reduce the dose or discontinue drug use. Many non-addictive drugs cause withdrawal, including glucocorticoid steroids such as dexamethasone and blood pressure medications. In fact, dexamethasone withdrawal can be fatal. Drug addiction can exist without withdrawal. Crack cocaine addicts almost universally can abstain from drug use for a whole day without bothersome withdrawal.^{4,5}

Dependence – Dependence means that you would experience withdrawal if you tried to stop. Thus, dependence is almost a synonym for withdrawal, and as such it is orthogonal to addiction. Unfortunately, many others use the word dependence as a synonym for addiction, which is just awful in my opinion.

Lack of control may be *obscured by denial*, so it is very hard to draw the line between addicts and near-addicts.

Diagnosing addiction is very hard because of:

Lying

Uncertain harms from the substance

Uncertain benefits from the substance

Preexisting problems, which are not due to the substance

All of these uncertainties make denial very easy. However, it is sometimes possible to overcome all this uncertainty. The key is to have a rational and unbiased observer evaluate the substance use, harms, benefits, and control.

Despite all this uncertainty about diagnosis, it is important to keep two things in mind: First, full-blown addicts cannot plausibly remain in denial or fool their doctors and family. Second, borderline addicts or near-addicts should be careful. They are walking a fine line, and they need to be watched, guided, and cautioned.

Footnotes:

1. There is an ongoing debate about exactly which behaviors may qualify as addiction. Gambling is widely (though not universally) recognized as a true addiction. Food and sex addiction are somewhat less accepted. Some very controversial behaviors that do not constitute addiction in my opinion include video games, pornography, and internet use in general. It is also important to keep in mind the distinction between addiction and other compulsive behaviors, such as OCD, which is qualitatively different and has different underlying brain circuitry.
2. Diphenhydramine addiction is possible but extremely rare. There is a case report of a woman who took 1,500 mg per day of diphenhydramine. For reference, Benadryl tablets are 25 mg each, and one tablet can make most adults feel sleepy. (PMID: 18308811)
3. In sensitization, the same dose of drug causes increased effects. Classical stimulants such as cocaine and amphetamine are most commonly linked to sensitization. Classical stimulants can lead to 2-fold sensitization. However, these same drugs lead to tolerance if the dosing schedule is changed. Once daily IV administration of cocaine is almost guaranteed to induce strong sensitization, whereas more frequent dosing induces weaker sensitization, and very frequent dosing induces tolerance.
4. Crack cocaine, like all classical stimulants, causes a very bad *crash*. Note that crash is not the same as withdrawal. Stimulant crash is a constellation of unpleasant symptoms that occur as the stimulant is wearing off, when you are still half-high. Stimulant crash is usually characterized by hyperactivity, anxiety, insomnia, and extreme drug craving. (In contrast, stimulant withdrawal is characterized by sluggishness and fatigue.) Stimulant crash is partially caused by the drug itself, but after long stimulant binges it is often exacerbated by sleep deprivation, malnutrition, and dehydration. The best treatment for a stimulant crash is sedatives, including dopamine antagonists such as antipsychotics. (In contrast, antipsychotics will make stimulant withdrawal worse. Stimulant withdrawal is best treated with non-addictive stimulants such as bupropion, a.k.a. Wellbutrin.)
5. Notice that classical stimulants, especially cocaine, provide the classic counter-example to both tolerance and withdrawal. Cocaine is unquestionably very addictive, but some addicts do not display tolerance or withdrawal. Cocaine is also a prime example of how drug addicts *like* the drug less but *want* the drug more. In contrast, heroin fits the popular misconception of an addictive drug much better. Heroin causes extreme tolerance (often 50-fold) and very unpleasant withdrawal. Also, heroin keeps providing quite a bit of pleasure even after addiction takes hold, because as an opioid agonist it directly stimulates the liking circuitry of the brain. Cocaine is purely dopaminergic and thus primarily stimulates wanting.

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