

# Cues and Cravings: How Science Can Help You Break the Link

by Rita Milios

One of the most mysterious and challenging aspects of addiction is how it encourages a person to continue engaging in self-destructive behavior, even if they have decided that they no longer want to.

Addiction has been described in many ways—as a disease, a compulsion, a character deficit, and a learned behavior resulting in poor decision-making and bad habits. Yet, even after being viewed through all these different lenses, the mechanism behind the compulsion, the bad habits, or the poor choices is yet to be clearly understood, and because of this, addiction remains stubbornly resistant to treatment. But science may be inching closer to the truth that can help set addicts free from the grip of whatever their addiction is.

## Addiction as a Learned Behavior

A recent and compelling theory of addiction explains it as a learned behavior that emerges in response to several different types of “learning systems” hardwired into our brains. Actually, the learning circuits that make a person more susceptible to addiction are not intended for this purpose. For addiction to develop, there must exist either a flaw in the circuitry or the presence of other contributing factors that tip the scale in an unintended direction. Nonetheless, one “learns” to engage in addictive behavior by incorporating one or more of three human learning strategies:

- Learning by association (also called *classical conditioning*)
- Learning from trial and error and the resulting consequences—whether reward or punishment is received (this is called *operant conditioning*)
- Learning by watching and copying the behaviors of others (*social learning*)

All three of these types of learning are closely associated with the “reward” center of the brain and the chemicals that are produced there. Science has long associated the brain chemical dopamine with pleasure, but recent research and brain imaging techniques reveal a much more complex and, for addicts, challenging mosaic of contributing factors.

Science is now shedding light on the connection between the dopamine reward response and the cues and cravings that can, perhaps more easily than anything else, undermine a recovering person’s efforts to follow through on their intentions and desires to abstain from substance use.

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## Cues and Cravings From Your Brain's Perspective

As any addict can attest, cues and cravings often go together. The sound of ice dropping into a glass can trigger an alcoholic's urge for a drink. The sight of a lighter or matchbook can elicit a desire for a (regular or marijuana) cigarette. Socializing with using friends increases the likelihood of relapse—but *but why?*

It turns out that one major way the brain processes and stores information is through association. In addiction, the substance being consumed becomes associated with reward and pleasure by way of the brain's dopamine reward response system.

Unfortunately, not only is the substance that is being consumed linked to and associated with the brain's reward response, but so is all the "extraneous" data that is present during the episode of patterning, such as environmental and emotional cues (the clinking ice, a cigarette lighter, etc.). Over time, if such environmental and emotional cues are repeatedly linked with substance use, the associations (cues) themselves begin to trigger a dopamine response on their own.

This response, and dopamine release, occurs even if the original link (the substance) has been removed. And not only that, once the brain's reward center has learned to expect reward, it responds with an even greater dopamine release based just on the anticipation of a forthcoming reward. All these factors make it hard for the decision-making part of the brain to override the feeling of urgency, or craving, for substance use that is triggered by a cue.

The above description deals mainly with ways in which the brain's learning system of classical conditioning can trigger cravings for substances. Operant conditioning, or reward-based conditioning, can occur when one discovers that a drink or a substance can provide a positive effect, such as relaxation or relief from emotional pain. Through social learning, a person might come to view substance use as acceptable if they see friends or family regularly using. So, in some ways, the brain's own wiring system works against the goal of recovery. Fortunately, this is not the whole story. Knowledge about the very mechanisms that make it harder to resist substance use can also give you ammunition to help you to resist it.

## Overcome the Brain *Habits* Associated with Cravings and Addictions

Cravings are increasingly viewed as having their origins in brain habits. These repetitive behaviors, which often become subconscious and self-perpetuating, are the result of associative brain linkages. In a study published in the *Journal of Abnormal Psychology* in 1988, author Roy Wise concluded that cigarette cravings resulted from a psychological habit originating in the brain, and that the brain mechanisms of positive and negative reinforcement (operant conditioning) played a role as well.

We all know that habits are hard to break—some more than others. And the mosaic of other contributing factors that affect addiction, including genetic, environmental, and psychological factors, cannot be overcome by changing habits alone. But the process for eliminating a habit (called extinction—another concept from learning theory) can be helpful.

**Here are some ways to use it:**

- ***Unlink associations and environmental cues.*** Just as repeated pairing of substance use with certain actions sets up an association that becomes a cue or trigger, the repeated experience of engaging in the conditioned action while *not* pairing it with substance use can, over time, de-link the associative cues and weaken the resulting craving.
- ***Accept the natural consequences of your actions.*** Often addicts find friends and family who will be “enablers” and make it easier for them to continue using. By disengaging from enabling relationships, you can begin to learn—by reward and punishment—which behaviors will support your recovery and which will not.
- ***Use mindfulness to strengthen your brain’s decision-making center.*** Cues, cravings, and habits are sustained by subconscious, “mindless” automatic responses. Become “mindful” and really notice what you are doing—and how your actions support or undermine your long-term goals. This is one of the best ways to break any non-productive habit, including giving in to cues and cravings. Numerous studies have shown that, with repeated practice, it is possible to rewire your brain’s habit-making circuitry so that it ceases to support your vulnerabilities and supports your strengths and goals instead.