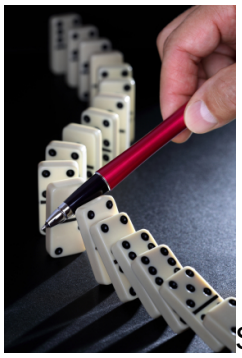

Search the Internet or type in "falling dominoes" on YouTube and you will be deluged with opportunities to watch videos, often set to music, of vast numbers of colorful rectangles knocking one another over. These productions are extravagant examples of the original "domino effect." They show domino tiles arranged in both straight lines and intricate patterns, each tile balanced on a narrow end with its rear flat facing the front flat of the next. As long as the distances between the tiles are shorter than their length, once the first domino is toppled, all the rest must fall. Or more accurately, all the rest *usually* fall; once in a while a chain reaction jams, the audience sighs, and the videographer cuts to dominoes that *are* falling.

The middle and last dominoes in these arrangements fall because they are subject to laws of nature. Physics and gravity may not yield the results observers expect every time, but their influence is there. The laws of nature take no time off. People with addiction are also subject to laws of nature. Life sciences show more variation than physical sciences, and outcomes derived from the biology of behavior, psychoactive substances, and the brain are less uniform than outcomes derived from physics and gravity. Nevertheless, behavioral outcomes of some situations are highly predictable. And sadly, lots of well-intentioned people who want to recover from addiction act as though the laws of nature do not apply to them.

Typically these are individuals who obtained help for their addiction from treatment centers and/or Twelve-Step programs. Many began recovery with great enthusiasm. They enjoyed time off of alcohol and other drugs and restored order in their lives. But then, to their surprise and indignation, they found themselves not just using their drug(s) again but using out of control. When they say, "I was only going to have one or two!" or "I really thought I could control it!" they reveal their lack of understanding of the laws of nature that govern addiction and recovery—or their lack of willingness to live in accordance with those laws. Some individuals repeat this many times.

While it's counter to the traditional belief that humans are "rational animals," neuroscience shows that not all human behavior arises from the self-aware cerebral cortex. Rather, much behavior is driven by deeper structures such as the brain stem and limbic system, which are more instinctual or "primitive." Have you ever flirted, for example, before you realized you were attracted to someone? Addictive behavior is driven by these deeper brain structures and can proceed not only without the consent of the thinking person but also despite the opposition of the thinking person.

When a person in pursuit of recovery takes "just one" of their drug and progresses to active addiction, scientists call it "drug-induced reinstatement" of addictive behavior. In primitive parts of the brain, researchers have identified some of the nervous system dominoes that bump one another to make this happen. They include the neurotransmitter glutamate and a circuit that

connects parts of the brain called ventral pallidum, nucleus accumbens, and medial prefrontal cortex. We might expect the "thinking" part of the circuit, the medial prefrontal cortex, would resist a relapse. Unfortunately, addiction distorts a person's ability to assign values and weigh consequences to such an extent that more drug intake is the overriding priority.

Creators of the web videos described above want lots of dominoes to *fall*; how long the arrangements *stand* is not their interest. But do you suppose they ever tip over the first domino and expect nothing else will happen?

You can read more about addiction and the brain at:

National Insititute on Drug Abuse

National Center for Biotechnolgy Information

American Journal of Psychiatry

NCADD Friends & Family FAQ

The NCADD Addiction Medicine Update provides NCADD Affiliates and the public with authoritative information and commentary on specific medical and scientific topics pertaining to addiction and recovery.