The Brain and Addiction Examined

By Jim Rachels

A long time ago addiction was seen as a moral failing more than anything else, a weakness inside the person who was addicted. People believed that addiction was something that was able to be overcome with sheer willpower alone. Through the years and after much research we now know this not to be true.

Many people that are stuck in active addiction are actively trying to recreate the feeling of that first intense rush they got when first using the drug. This is something that no addict is ever able to do. So initially we are simply trying to recreate this but as our addiction progresses along we are now just taking it to try to feel "normal".

The brain is the part of the body responsible for becoming addicted to drugs, alcohol or other addictive behaviors such as gambling, sex or overeating. Addiction affects every aspect of the brain and leads to dysfunctional behaviors. Alcohol abuse can kill many brain cells and actually shrink your brain to some degree.

Let's talk about how our brain functions. When it comes to addiction one of the first things to talk about is dopamine. The main part of the brain that is mostly affected by addiction is the reward center of the brain. It affects the "feel good" chemical dopamine and its release. The unregulated release of this chemical sometimes being too much or sometimes being too little can cause addictive behaviors in someone. When you have too little dopamine released, you need to use more of the drug of your choice or act out compulsively. So addiction whether directly or indirectly affects the dopamine system.

Dopamine is released whenever we do something rewarding. This could be anything from eating, sex or drugs. They all have some type of reward response. That is what keeps us coming back to these activities time and time again. It is only natural to have these responses. But for the addict, our brains respond differently. This is part of our natural reward system. This is meant to help us remember the things that are good for us as when we do these activities we are rewarded with a bit of dopamine.

When someone tries a drug or alcohol for the first time they get a sense of euphoria. Which is different than any natural reward your brain would typically release. Dopamine is released for such things as food and sex. Endorphins which are the body's natural opioids are also released. The release of both endorphins and dopamine feeds the brain's pleasure center. Chronic use can lead the brain to eventually slow down the production of these chemicals. This is because you are giving the brain things to cause more things like dopamine to be released so the brain feels it no longer needs to produce these chemicals since you are continually giving the brain the chemicals through your drug or alcohol abuse. Than if you were to try and quit your brain would go into a state of withdrawal as it is

used to you providing the dopamine with drugs, alcohol or your addictive behaviors and now you are not providing the brain with that.

Here are three parts of the brain that are involved with addictive behaviors in the brain. There is the basal ganglia, the amygdala, and the pre-frontal cortex.

Let's start with the Amygdala. The Amygdala is something we actually share with lower-functioning invertebrates. One of its primary functions is to keep us alive from immediate threats. This is the system in the brain that will identify threats and will make you react without even thinking about it. It's a process we're not totally in control of but it is extremely important for our survival. Something else that takes place is when something happens such as something causing you to fear your brain takes a snapshot of what is happening to remember the exact situation so the next time this same thing happens our brain will react quicker especially when some type of threat is present.

The Amygdala is also what tells your brain that you need something or you feel like you're going to die during active addiction. Your Amygdala also takes a snapshot of what's going on. So if you were listening to s specific song while doing a certain drug your brain will remember that. And if the Amygdala is constantly triggered this leads to a much larger chance of relapse. So many times just the smell of something or hearing a song can trigger us.

Then there is the Basal Ganglia. This is the part of the brain that has been identified as the "pleasure center." This is the part of the brain that will light up with endorphins and dopamine when the brain perceives that we have done something rewarding. Another function of the Basal Ganglia is that it reinforces experiences we find pleasurable and things we perceive will make our survival easier. Another thing it does is when an experience is better than normal you get a bigger release of dopamine. This then leads to the Basal Ganglia communicating with the Amygdala which leads the Amygdala to believe we should try to do more of whatever is increasing the dopamine release in our brains, and do it as much as possible. This in turn can lead to addictive behaviors.

The next part we will be discussing is the pre-frontal cortex. According to Mentalhelp.net: "The prefrontal cortex enables us to make rational, sound decisions. It also helps us to override impulsive urges. If acted upon, these impulses and urges can cause us to act without thinking." Your pre-frontal cortex isn't fully formed until after the age of 25. And many addicts started their drug use well before the age of 25. This in turn sometimes leads to impulsivity control issues since the pre-frontal cortex was not fully formed yet. This is why it is so important that

children don't use drugs, especially during the time that the pre-frontal cortex is still developing. This can have long-term consequences.

If you were to take a group of people and give them drugs only a tiny percentage would become addicted. So what is it that happens in our brains that makes one person get addicted and the other doesn't?

Something that might have an impact on you developing an addiction is genetics. Many addicts have a family history of addiction. Not only does genetics play a role in you developing an addiction or not it also plays a part in how bad someone's withdrawal symptoms are.

The environment someone grows up in also has a lot to do with someone and their potential risk for addiction. This can be for reasons such as children just growing up around liquor. Drinking might be something normal in someone's house so they grow up with a different point of view on alcohol versus someone who grows up in a household where no one drinks. For people who grow up with no drinking in the house, this is not something that they get accustomed to being around. For someone who grew up with drinking around the house, they might find it to be more acceptable to drink. They will also base the amount they start drinking by basing it off of what they learn. If the people drinking in the house are always getting drunk there is a chance that the young ones in the house will also drink until they get drunk once they start drinking. They are just going along with what they learned from the people around them growing up.

So how long does it take the brain to heal from the damage done by addiction? Neuroplasticity has a lot to do with your brain healing. Neuroplasticity is the ability of the brain to change throughout one's life. The Oxford dictionary defines neuroplasticity as the ability of the brain to form and reorganize synaptic connections, especially in response to learning or experience or following injury. Keep in mind everyone will have varying recovery times as recovery time has to do with how long someone was using, the amounts they used and what age they started using. You can also promote neuroplasticity with Cognitive Behavioral Therapy or CBT.

There are some parts of the brain where addiction has done irreparable harm and damage that cannot be repaired. But on the other hand, there are other parts of the brain that can still have the ability to change through life experiences. Through this those parts of the brain can come back to full functionality once that person stops using drugs or alcohol.

There are also some simple things you can do to assist the brain with the process of healing itself. Exercise is a great way to help with this process. Especially cardiovascular exercise has been shown to really help

with this. Another thing that can help is eating right and getting the proper nutrition daily. Eating a lot of fruits and vegetables and staying away from processed foods can help with this process. Some say this process can start as early as a week or two after the person has stopped using drugs or alcohol. But also keep in mind that all regions of the brain have their own recovery time and some parts of the brain take longer than others to heal.