Is Addiction a Brain Disease?

Physiological and Psychological Aspects of Addiction
with a Focus on Substance Abuse

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Thesis Statement:

Addiction is an all-encompassing “disease” of society, culture, sub-cultures, ignorance, violence, abuse, poverty, war, catastrophes, other pre-addiction causes such as depression and other mental health issues, and intoxicating substances that, over time, will change the brain physiology through neuroplasticity such that the neural pathways in the brain become ‘hard-wired” for addiction, *a machine that powers addiction*. Just as all these things can change and affect a person, the mind is yet flexible and able to change by virtue of the same processes while using the solutions.

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Abstract:

It is my contention that addiction is not simply a brain disease. The brain plays an extremely significant part in addiction and may even change to such a point that the addict never recovers, but there is always a way out and the solutions are there and waiting for a decision and action on the part of the addict. Environmental factors are usually what leads one into addiction. The brain can and will change accordingly. The brain is always changing, from birth to death and retains the capacity to do so throughout active addiction. This is a disease for which there is no cure. This is a disease created and supported by society. I will show that the focus needs to be on all aspects of an addict's life as it has been many of those aspects that has led to the active disease. The changes in the brain can yet change again and recovery is possible. There are solutions that can provide successful recovery as a lifelong process and some of them are described here.

I: Definition:

Is addiction a disease? Yes. Is addiction a "brain disease?" No. It is my contention that addiction is not a brain disease though addiction itself can rightly be referred to as a disease. Upon hearing the word "disease," my thoughts go immediately to images of microscopic bacteria and viruses and some of the visible symptoms from such, but what is a disease? "an impairment of the normal state of the living animal or plant body or one of its parts that interrupts or modifies the performance of the vital functions, is typically manifested by distinguishing signs and symptoms, and is a response to environmental factors (as malnutrition, industrial hazards, or climate), to specific infective agents (as worms, bacteria, or viruses), *to inherent defects of the organism* (as genetic anomalies), *or to combinations of these factors*" (Webster-1, 2014). Addiction certainly qualifies on these terms, but cannot be narrowly assigned to one of its manifesting agents such as the brain. That would be like saying that "Johnnie's blisters have chickenpox." Although evolutionary and genetic factors can influence a predisposition to addiction, addiction itself is an all-encompassing disease involving a variety of interchangeable causes most of which originate from an individual's environment. The brain is affected by this disease and becomes an important mechanism of the disease.

II: The Brain:

Because addiction can be observed manifesting biologically in the brain, many assume it must be a disease of the brain. If such a case were true, logic would follow that the subject is a victim of this disease and has no choice but to succumb to its symptoms of craving and substance abuse to the detriment of the victim (Satel, 2014). The onset of the brain dysfunction by no means should be underestimated as a powerful influence in ongoing, active addiction (Satel, 2014) (Dodes, 2009). Once established in the brain as a disorder, addictive symptoms can go a long way towards preventing recovery and can easily do so to the point of insuring an untimely death. Even though these biological changes can be capable of such destruction if left unchecked, focusing exclusively on this can tend to severely exclude other significant factors of causation and possibly prevent practical solutions for recovery from the addiction process (Satel, 2014).

Behaviors may be based in the biological functionality of certain parts of the brain, but when it comes to the decisions that dictate behavior, the sum is greater than its parts. The term "Property Dualism" seems applicable here because the physiological and

psychological, though being inseparable and intertwined, are essentially not the same thing (Satel, 2014). Thought and behavior may be utterly dependent upon the gray matter it originates from, but thoughts, behaviors, and choices cannot be predicted through observation of the gray matter itself (Satel, 2014) (Dodes, 2009). Observing the molecular components from a scrap of air will not enable you to predict which way the wind will blow.

III: Other Factors:

Decisions to use brain altering substances are born out of any number of affecting events from the subject's environment prior to the development of what is more appropriately termed a brain disorder (Satel, 2014) (Enoch, 2011). Genetic predispositions relating directly to brain function can also play a part and have been measureable though have not been cited as a primary cause. (Satel, 2014) (Enoch, 2011).

Negative stressors from the environment can be a precursor to addiction especially when occurring early in life (Enoch, 2011). Childhood neglect and abuse, found to be relatively common in this country, along with catastrophic events like hurricanes, tornados, earthquakes, auto accidents, war, etc. and with other influencing factors such as negative socioeconomic conditions, substance abuse in the family, a dysfunctional family, severe loss such as death of a loved one, or being part of a cultural group with inherent stressors are all things that can predate and set the stage for the onset of addiction (Enoch, 2011). All these things can serve to alter brain pathology to create a susceptibility or predisposition to addiction (Enoch, 2011).

One prevalent subset of influencing, environmental factors are those that can result in a feeling of helplessness based on affecting factors unique to the individual (Dodes, 2009). Prior development peculiar to an individual may cause negative, emotional reactions to specific stressors resulting in feelings such as guilt, shame, anger, or humiliation (Dodes, 2009). Thinking they are powerless to alleviate these feelings, the individual will turn to drugs to regain their control over these emotions (Dodes, 2009).

IV: Decisions:

Furthermore, the fact that countless addicts make a decision to abstain and seek treatment and with many achieving success for the rest of their lives, cognitive decision making is shown to override and go on to change and alleviate the disorder (Satel, 2014).

The biological condition of the brain that would be or is that of an addict and has been termed as a "brain disease" has never, at least not to my knowledge, shown a measureable pathology leading to remission. The power to make decisions may be severely inhibited in the throes of active substance abuse, but that power yet remains (Satel, 2014).

Other mitigating influences, on addiction, are all too often cited as motivating factors in the decision to stop and seek help. Social, health, financial, and other circumstantial consequences will be expressed by any given subject as the reason/s they have stopped using and sought help (Satel, 2014) (Perring, 2011). The court may have ordered this person into a recovery situation and program where some can actually find continued success beyond that situation.

The addict was first drawn in by the temptation of the pleasure provided by the drug or from any number of affecting factors from their environment and made a decision to use it and some control over use is exerted, but with continued use, the addict will place more value in the drug than their family, home, and employment along with other obligations and responsibilities (Satel, 2014).

V: Neuroplasticity:

Through neuroplasticity (Webster-2, 2014) changes to neural pathways will have begun and rewards associated with the aforementioned life components will begin to be associated with the drug (Satel, 2014) (Dodes, 2009) (Niehaus, 2009). Drugs may be able to affect the brain by causing changes in the cellular structure of neurons in the brain such that the brain becomes essentially "wired" for addiction, but neuroplasticity is evident in much more than this. Neuroplasticity is at work in the human brain across the lifetime of an individual while the way they interact with their environment becomes a determinate in the relatively unique changes with unique combinations in the development of their particular brain structure (Karatoreos, 2013). Certainly this can set up a biological predisposition for addiction where adding the substance means full blown, active and progressive addiction, but that is, by no means, something "carved in stone." Experience, knowledge, and interaction outside that of contributors to addiction can affect this same underlying process and change the neuropathology that was once addiction manifest in the brain (Karatoreos, 2013).

As the addict's using progresses, changes in the brain will definitely begin to play a significant part (Niehaus, 2009) (Satel, 2014) (Dodes, 2009). With the drug, the addict can numb the cognitive and emotional consequences of continued and increasing use while cravings and withdrawal symptoms can develop from within the brain and further influence decisions to continue using the drug (Satel, 2014). Does this condition of the brain effect an irresistible compulsion to use again? As of yet, research has not sufficiently described voluntary verses involuntary action as it could relate to a compulsion to use drugs (Perring, 2011). Where would the former end and the latter begin?

The neurotransmitter dopamine is affected by the drugs. Dopamine is central to the reward pathways of the brain that drive us to repeat life sustaining acts as pleasurable experiences. The drug will take over the dopamine processes and replace learned signals of survival behavior with use of the drug (Niehaus, 2009) (Enoch, 2011). The drugs of abuse enhance and alter synaptic transmission of dopamine and can affect long-term, reward memory thereby contributing to addiction (Niehaus, 2009) (Enoch, 2011). Therefor the addict's brain structure and functionality is changing such that use of the drug is equivalent to food, sex, rewarding relationships, earning money from employment, etc. (Niehaus, 2009) (Satel, 2014).

VI: Consequences and Changes:

An extreme desire and perceived need for the drug is experienced by the user. An area of the brain called the ventral tegmentum is implicated in the expression of this influence to many other parts of the brain where reward, motivation, planning, and decision making take place (Satel, 2014). Neuroscientists call this "Salience." Having been affected, the prefrontal cortex, the area involved in decision making and inhibition, will then affect other areas involved with behavior (Satel, 2014).

The consequences of neglecting all the things that were once important in their lives begin to accumulate. The family is angry, the employer is about to terminate their position, friends stay away, the bills are not getting paid, and any number of other detrimental circumstances. The enticement of the drug continues, but now the addict faces a dilemma of drug verses survival. The value once placed in the drug comes into check and decisions can be made to stop using the drug, hence, what might have been a progressing disease of the brain can be thwarted by the addict through decision making

and in spite of the strong, biological influences of a dysfunctional brain (Satel, 2014) (Dodes, 2009).

It should be noted that results from many surveys have shown that quitting drugs has been the choice of a majority of the subjects in reasonably representative sample studies involving hundreds and thousands of subjects (Satel, 2014). Within these groups, active addiction has proven relatively short lived with post-active symptoms of their addictions disappearing over time and to the degree that there were no more symptoms (Satel, 2014).

VII: Misdiagnosis:

Defining addiction as a brain disease has gone a long way towards drawing attention to the subject and gaining increased support and funding for research and treatment, but has tended to narrow the focus away from this all-encompassing process and more towards the biological (Satel, 2014) (Dodes, 2009). One aspect of narrowed focus is that many researchers and medical professionals have based their interpretations of addiction on the patients they happen to see most often that are more advanced, hard cases where such cases are assumed to be representative of the entire addict population (Satel, 2014). The result produces a stigma about addicts and can decrease the quality and effectiveness of treatment overall (Satel, 2014).

VIII: Solutions:

It has been through my own extensive experience and observation that treatment for addiction today most often promotes ongoing, 12 step recovery through Alcoholics Anonymous and Narcotics Anonymous. As the brain had become dysfunctional through the manifestation of active addiction, so it is healed by way of decision making leading to positive action often resulting in successful, lifelong abstention from the offending drugs of abuse. It is often said that the drug and/or alcohol abuse of the addict is merely a symptom of the real, underlying problems. The substance abuse may change the brain, but cognitive realizations of abstract concepts such as spirituality, powerlessness, humility, acceptance, willingness, honesty, empathy, surrender, and open mindedness enable behavioral changes as they are applied to one's life and put into action. Such realizations have proven to be better "brain changers" than drugs in countless recovering addicts.

A typical addict will start out having nothing, unemployed, homeless, perhaps no one such as friends or family that is willing to help or some level of help in that area. How do they get started on recovery from addiction? Ideally, they will begin with a treatment center. Depending on the severity and length of their addiction, there are treatment settings that can last anywhere from a couple of weeks to many months. Many of these facilities are free and maybe they receive subsidies from local or federal government. There will be a way to get into one in most cases. Once there, they can learn about the things they will need to do in their new life in recovery. It is not typically a very good idea to use one of the religious based treatment centers. For most people, this will not give them a real solution and they will be highly subject to relapse somewhere down the road.

If a treatment center is not an option, there are homeless shelters. Homeless shelters can be bad places for someone first starting out in recovery because there can tend to be a lot of available exposure to other people in active addiction. Typically, the homeless shelter is not going to provide anything in the way of a recovery program for addicts and alcoholics with the exception of possible recovery (AA or NA) meetings that happen there. Rescue missions are not necessarily very good either because their agenda is religion and access to 12 step recovery may not be allowed, the person will spend their time working for them, taking religious classes and going to many church services then, eventually, put out on the street with a head full of religion and nowhere to go unless they want to live the rest of their life in the rescue mission working for them which some of them would allow. To be in either one of the two, above facilities a person will really need to want their recovery and find their way into the 12 step meetings of AA or NA.

There are halfway houses with various levels of accommodations and all usually have strict rules to live by while in there. Quite often, these facilities will have an agenda including 12 step recovery combined with much effort spent seeking employment. These places can be forgiving of the rent they are going to charge for a while, but the person will need to hurry and get an income in place as there will be a time limit of some sort for that. Some areas have many such places and others do not. The larger cities will have some that will be the wrong ones to go to because our person will find themselves trapped in a work camp making very little money and not really saving anything to get out. Some of the halfway houses can be very kind and with large subsidies from charities and the government, a person may actually have time to find a job.

There are independent, “clean houses” which can be very helpful, but beware of the ones who are only after government money and do not really care about the people who are staying there. Some of those places can get pretty bad such as all the way to the house members all being on drugs. Pick a good one or move on somewhere else.

A very good solution can be an Oxford House (refer to oxfordhouse.org). There are hundreds, maybe thousands of them all over the country. The Oxford House model is sometimes referred to as a “three-quarter house” because there is much more freedom there as opposed to a halfway house. The houses are independently run on a democratic basis among the members, pay their own bills from a house bank account, hold business meetings and larger, area meetings, promote 12 step recovery by requiring it, have rules about staying clean and sober and members are subject to drug and alcohol tests at any given moment. From there, the person can begin entry into the local recovery community and begin a program of recovery as suggested by AA and NA. They will live in a house with other recovering addicts and ideally there will be support from other members to help in learning about recovery and motivation to do so. These places will typically allow for about a month to find a job or otherwise come up with some sort of income. That can be flexible to some degree depending on the performance of the member. There is an interview process at the individual house where the existing members will ultimately vote as to whether the applicant is going to get in.

There are other possible avenues of recovery from addiction that I will not go into with this paper. Some of them can be effective to some degree and many of them might be a bad idea.

IX: Desire:

An addict or alcoholic will need to really want the recovery they seek if they are going to be successful. If they do not want it, they will eventually drop out of the things they need to do to have successful recovery and relapse. Another set-up for failure is when an addict (“addict” being all inclusive) begins with everything they need to do until they get back on their feet again, think they are in control of things, grow away from their program of recovery, and eventually relapse. If their “heart’s not in it” and they just don’t get it, they are doomed to relapse.

The hardest part can be in the beginning months. The brain has not yet changed, their situations can be hard to deal with, and they will not yet have the comforts of life that they are seeking. They may carry a stigma with them and possibly a bad record of

employment and with the law. The challenges of the beginning could seem overwhelming and relapse can be tempting. This is the time when most of them will fail. Becoming part of the recovery community and being there a lot is especially important at that time and there they will find the support to get them through.

The recovery process is something that will be with them the rest of their life. There is no cure. As time progresses, they will be able to change their lives to a point where the happiness and joy they were seeking with drugs comes from living in recovery. Quality of life will improve and they will become successful in their recovery while living productive lives.

Once they have reached a level of accomplishment, helping other addicts can be part of their recovery. The once homeless and destitute addict becomes the "Sponsor" and a new one becomes the "Sponsee." One addict helping another is a significant part of the program that works better than any professional agency or doctor.

The Ninth Step Promises:

If we are painstaking about this phase of our development, we will be amazed before we are half way through.

We are going to know a new freedom and a new happiness.

We will not regret the past nor wish to shut the door on it.

We will comprehend the word serenity and we will know peace.

No matter how far down the scale we have gone, we will see how our experience can benefit others.

That feeling of uselessness and self-pity will disappear.

We will lose interest in selfish things and gain interest in our fellows.

Self-seeking will slip away.

Our whole attitude and outlook upon life will change.

Fear of people and of economic insecurity will leave us.

We will intuitively know how to handle situations which used to baffle us.

We will suddenly realize that God is doing for us what we could not do for ourselves.

Are these extravagant promises? We think not. They are being fulfilled among us—sometimes quickly, sometimes slowly. They will always materialize if we work for them.

3rd ed. Big Book pg. 83 & 84

X: Conclusion:

If addiction is to be successfully treated, open mindedness is not only required from the addict, but also from the medical community along with the community at large. The brain is like addiction's engine giving it the power to manifest in an individual's life. That engine is fueled by influences in the individual's environment as it moves towards ultimate destruction. The opportunity to change course is always there. Active addiction began with a decision and it can end with one.

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Webster-1. (2014, October 9). *Definition of Disease*. Retrieved from The Merriam-Webster Online Dictionary: http://www.merriam-webster.com/dictionary/disease

Webster-2. (2014, October 15). *Definition of Neuroplasticity*. Retrieved from The Merriam-Webster Online Dictionary: http://www.merriam-webster.com/dictionary/neuroplasticity

Notes:

Webster-1, 2014	Used on Page 1	**I: Definition:** c
Webster-2, 2014	Used on Page 4	**V: Neuroplasticity:** a
Dodes, 2009	Used on Page 1	**II: The Brain:** a
	Used on Page 2	**II: The Brain:** b
	Used on Page 3	**III: Other Factors:** b, c
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	Used on Page 5	**V: Neuroplasticity:** c, d
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Niehaus, 2009	Used on Pages 4, 5	**V: Neuroplasticity:** a, c, d
Perring, 2011	Used on Page 4	**IV: Decisions:** b
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Satel, 2014	Used on Pages 2, 3	**II: The Brain:** a, b
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	Used on Page 6	**VI: Consequences and Changes:** a, b,
	Used on Page 7	d
		VII: Misdiagnosis: a, b

Note Card Information: (from abstracts)

Dodes, 2009	"Psychodynamic understanding of addiction has advanced greatly in the recent decades. At the same time, there has been a tendency in both popular and academic discussions of addiction to overlook its psychological explanation in favour of a neurobiological view. In this paper I will summarize the understanding of the psychological nature of addiction I have described over the past 20 years, as well as the current state of neurobiological knowledge of addictive behaviour and define where each is clinically applicable. Addictive behaviour can be shown to nearly always be a purely psychological symptom, a type of psychological compulsion. Neurobiological factors can be shown to be operative in impulsive and conditioned behaviours which are also, confusingly, called 'addictions'. The fact that very different clinical entities share the same name has contributed to the ongoing misunderstanding between psychological and neurobiological views. A blurring of the differences between human psychology and behaviour in lower animals has also contributed to the problem, leading some neurobiological researchers to mistakenly generalize conclusions about human addictive behaviour from animal models."
Enoch, 2011	**Rationale:** Genetic and environmental influences on the development of alcohol and drug dependence are equally important. Exposure to early life stress, that is unfortunately common in the general population, has been shown to predict a wide range of psychopathology, including addiction. **Objective:** This review will look at the characteristics of early life stress that may be specific predictors for adolescent and adult alcohol and drug dependence and will focus on studies in humans, non-human primates and rodents.

Karatoreos, 2013	**Findings:** Stressors in the environment can have long lasting effects on development, depending upon the stage of life at which they are experienced. As such, adverse childhood experiences can alter resilience of individuals, making it more difficult for them to respond normally to adverse situations in adulthood, but the brain maintains the capacity to reenter a more plastic state where such effects can be mitigated. **Conclusions:** The brain regulates responses that allow for adaptation to challenges in the environment. The capacity of the brain and body to withstand challenges to stability can be considered as "resilience". While adverse childhood experiences can have long-term negative consequences, under the right circumstances, the brain can re-enter plastic states, and negative outcomes may be mitigated, even later in life.
Niehaus, 2009	"Addiction is a chronic illness characterized by compulsive drug seeking and use, despite the continued presence of negative personal health and social consequences.1 How does addiction develop? A prevailing hypothesis suggested by similarities to models of synaptic plasticity is that addiction occurs because drugs of abuse are able to take control of normal brain reward circuits that provide reinforcement of behaviors related to survival (eg food, water and sex). While natural rewards activate the reward circuit until the survival-related behavior is learned,2 drugs of abuse continue to stimulate the circuit upon repeated exposures." "In this review, we focus on rapid, relatively short-term changes in properties such as neuronal firing rate and synaptic plasticity, induced by drugs of abuse in brain regions relevant to reward and reinforcement. We will then extrapolate these findings to later phases of addiction and discuss potential therapeutic targets."
Perring, 2011	"Given the well-confirmed evidence that addicts can modulate their behaviour in response to rewards, punishments and context, it is clear that according to normal definitions of compulsivity the behaviour of addicts is not typically compulsive, suggesting that neuroscientists are making an error in their interpretation of data. Since philosophers have expertise in making distinctions between different kinds of action and categorising them as free, weak-willed and compulsive, we will achieve a better interpretation of the neuroscience of addiction when taking this philosophical work into account. Conversely, given the status of science in the modern world, philosophers have to grapple with the latest neuroscientific discoveries and show the compatibility of their philosophical theories with the data for their approaches to maintain credibility."

Satel, 2014	"The notion that addiction is a "brain disease" has become widespread and rarely challenged. The brain-disease model implies erroneously that the brain is necessarily the most important and useful level of analysis for understanding and treating addiction. This paper will explain the limits of over-medicalizing – while acknowledging a legitimate place for medication in the therapeutic repertoire – and why a broader perspective on the problems of the addicted person is essential to understanding addiction and to providing optimal care. In short, the brain-disease model obscures the dimension of choice in addiction, the capacity to respond to incentives, and also the essential fact people use drugs for reasons (as consistent with a self-medication hypothesis). The latter becomes obvious when patients become abstinent yet still struggle to assume rewarding lives in the realm of work and relationships. Thankfully, addicts can choose to recover and are not helpless victims of their own "hijacked brains."