
AN ANALYSIS OF ADDICTION MODELS

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DOI : <https://www.doi.org/10.56726/IRJMETS45310>

ABSTRACT

Our research paper explores various models to explain addiction which is a rising epidemic in our world. Our investigation involved consulting online secondary sources, professors, and doctors to gather information on the nature of addiction. The closure provided by each model varies - one may explain the process of addiction, one may explain its causes, and one may explain intervention. The three we will be analyzing are the Disease Model of Addiction, the Psychopathological Model of Addiction, and the Psychoanalytical Model of Addiction. The Disease Model of Addiction provides an explanation for addiction at a biological level and gives a more quantitative approach to understanding addiction. The Psychopathological model focuses on one of the core causes for addiction- bad mental health. It helps us understand and identify the core dysfunctions which lead to addiction, thereby connecting greatly to the psychoanalytical model. The Psychoanalytical model focuses on therapeutic interventions using self reflection on one's own motives, in order to tackle addiction through self awareness and emotional regulation. At the end of this paper, we analyzed if some aspects of a particular model better explain addiction than the other models, and we found a combination of the models best explained addictive nature.

I. INTRODUCTION

"Addiction is an inability to stop using a substance or engaging in a behavior even though it may cause psychological or physical harm." (Peckham, n.d.)

The number of drug overdose deaths has increased by 16% from 2020 to 2021 (Understanding the Opioid Overdose Epidemic | Opioids, n.d.). The access to drugs is increasing, leaving us in an opioid crisis. Learning how to prevent this and intervene is an important factor in reducing the number of lives taken by addiction. It is important to explore this disease to raise awareness about its severe and explicitly overlooked harm on a biological and psychological level. In fact, to better understand the cause of addiction and its modus operandi, various professionals in the field of biology and psychology have developed several models. Some of these models include the Disease Model of Addiction, the Psychopathological Model of Addiction, and the Psychoanalytical Model of Addiction. This paper will analyze each model and examine if one has an explanatory advantage over the other.

I. METHODOLOGY

Our methodology consisted of a research component and a consultation component.

1. Research

We performed a qualitative review of different secondary data sources.

2. Consultation

In order to gain a better insight into addiction we consulted Professor Manuel Diaz-Rios (Director of Neuroscience) from Bowdoin University and Dr. Param Kulhara (Psychiatrist).

Biological Mechanism Of Addiction

At large, the process of addiction can be thoroughly explained at a biological level. Although it is commonly believed that addiction is a psychologically created construct, the process involves many molecular mechanisms that make the desire for substance uncontrollable.

Now, the process of acquiring an addiction lies fundamentally at the receptors in the brain. Receptors are proteins to which ligands, or other molecules, attach to. In the brain, the three major receptors are Mu, Kappa, and Delta. In this research paper, a stronger emphasis will be placed on the Mu receptor due to its abundant presence in key regions of the brain. However, it is important to note that opioids bind to all three of these receptors, not just Mu.

When the ligand binds to the receptor, a complex is formed. The strength of this complex is determined by the strength of the chemical bond between the ligand and the receptor. Of course, the stronger the bond, the greater is the affinity between the two entities, and hence the greater the potency of the drug. However, to better understand the mechanism of potency, it is important to discuss the dissociation constant (kD). This constant operationalizes the cases in which at least half of the receptors are occupied by ligands (in this case, the molecules of drugs). To put this information into perspective, let's take the example of Fentanyl, which is a synthetic opioid. This drug is incredibly potent, up to 100 times more than morphine. So, when talking about the kD of Fentanyl, it will be comparatively lower than that of Morphine. The simple explanation is that it will require a much lower concentration than morphine to occupy at least half of the available receptors. This also explains why its potency is much higher.

Now, the efficacy of a drug is the effect it has after it binds to its receptor. In other words, it is the effectiveness of the drug. In most cases, there is a positive correlation between potency and efficacy, but of course, it is not always the case. In the case of opioids, the fact that they don't operate through ion channels or active potential is what makes them more efficient in reducing pain. Rather, they bind to G-proteins, causing the protein to change its shape, triggering a cascade reaction. This affects the ability of other receptors that do have pores, which is what makes opioids such effective analgesics.

Reward Pathway:

The reward pathway is the process by which we comprehend why addiction occurs. Fundamentally, opioids turn on the reward pathway in the brain. The reward pathway is what gives our feeling the sense of pleasure, which is why it's associated with getting "addicted" to the "feeling of euphoria". This pathway involves the mesolimbic system which includes the parts of the limbic system. The most important structures are the Ventral Tegmental Area (VTA) and the Nucleus Accumbens.

This pathway has 2 ways by which the reward system can activate:

- 1) The direct dopamine dependent pathway is where opioids directly bind to the receptors, which causes an increased amount of receptors to be created. This creates an increased tolerance to opioids, leading you to take more to feel the same effect!
- 2) The indirect dopamine independent pathway involves GABA cells, which are the number 1 inhibitors in your brain, helping keep connections controlled. When you use opioids, they bind to the proteins in GABA cells and shut them down. This causes disinhibition which turns on the reward pathway and enhances its effects.

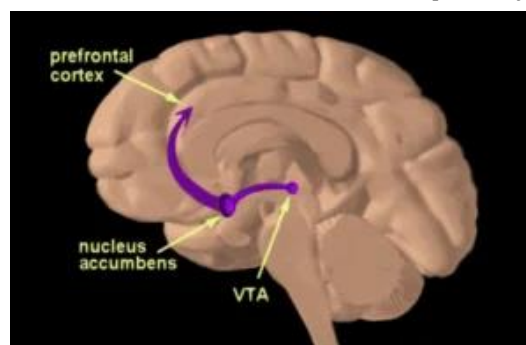


Image: Brain Basics: Reward System, n.d.

Models Of Addiction

a. Disease Model of Addiction

The disease model of addiction is a biologically based explanation of addiction. This model treats addiction as a neurological disease and heavily emphasizes on the saying "Once an addict, always an addict". (Addiction Disease Model Of Addiction And Recovery Implications, n.d.)

This model categorizes the process of addiction into three stages as follows:

1. Intoxication: This refers to taking the drug, or intoxicating yourself with substance
2. Withdrawal: This refers to the negative effects of not taking the drug. Examples include sweating and nausea.

3. Anticipation: This refers to eventually taking the drug after a prolonged period of abstinence.

Although these above three stages are interconnected in a chronological manner, they are controlled by different parts of the brain and hence different neurotransmitters. These areas are as follows:

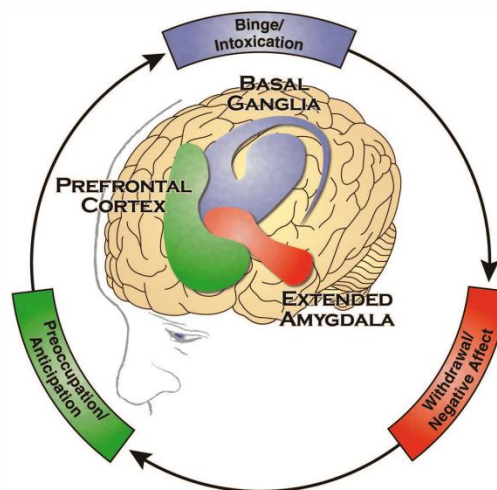
1. Basal Ganglia: This region is the reward center of the brain. Therefore, it is the prime location for the formation of habits. In the case of drug use, the reward circuit gets overstimulated by the “high”, and gradually desensitizes with prolonged and frequent usage (which is what makes drugs so addictive).

2. Extended Amygdala: This region is responsible for the withdrawal symptoms. As previously mentioned, these symptoms include sweating, nausea, etc. Unlike the basal ganglia, this circuit gets increasingly sensitive with prolonged drug use. This explains why individuals get trapped in a toxic cycle of drug use. That is, they would like to terminate their usage, but they would rather continue the usage than facing the difficulties of withdrawal symptoms. In this case, psychiatrists perform substitution therapy, in which a less potent drug than already in use is given to the patient to relieve their symptoms in a manner that is less harmful.

3. Prefrontal Cortex: This region is responsible for thinking and reasoning. Drug addicts constantly and continually shift from the circuit in this region to the other two circuits, causing them to choose to take drugs with very little control.

(The Brain Disease Model of Addiction, n.d.)

This model gives an excellent biological insight into drug addiction, and can help with medical interventions accordingly.



The Brain Disease Model of Addiction, n.d.

b. Psychopathology Model of Addiction

The psychopathology model states that there is a high correlation for individuals with mental health disorders to self medicate, which can eventually lead to substance abuse. It also covers core psychopathological dysfunctions that can lead to this:

- 1) Identity dysfunction, where one either finds it difficult to differentiate between themselves and others. This leads to having an anti-ambivalent or hyper-ambivalent identity (which includes contradictory aspects of oneself persisting extremely disconnectedly vs extremely cohesively)
- 2) Comprehension dysfunction, where there’s impairment in one’s ability to differentiate and integrate thoughts, reflect or plan.
- 3) An imbalance Negative emotions (NE) including negative core emotional feelings, lack of positive basic emotional feelings and higher order negative emotional feelings
- 4) A dysregulation in action-regulation (AR), including dysregulated behaviors that are harmful/damaging, maladaptive behaviors that result from inadequate evaluation of surroundings and restrained behaviors.
- 5) Lacking social skills including basic social autonomy and the ability to participate in /promote socio-relational projects.

(Ferrero et al., 2016)

Other ways to identify these dysfunctions include looking at whether one deviates from the social norm, one has distress/negative emotions that can even spread, and whether one has suicidal thoughts. (Cuncic, 2022)

An interesting thing to consider is that while these disorders can lead to substance abuse, substance abuse can also increase their prevalence.

The use of the psychoanalytical model, which is the next section of this paper, can help combat both factors.

c. Psychoanalytical Model of Addiction

Psychoanalysis is a therapeutic method of reflection on one's own motives, desires and thoughts that may be consciously or unconsciously subdued by the individual. This method of reflection allows the individual to analyze their own thoughts without allowing any "mental filters" alter the way they perceive them. This enables one to be completely aware of their unfiltered thoughts and feelings, and instead of repressing them or feeling a sense of shame, they can learn to embrace them while also learning how to control such thoughts and feelings on a day-to-day basis. Integrating the methodology of psychoanalysis of one's thoughts and feelings inevitably ends with the acceptance of the mental state one might be in, which is the first step to gaining improved mental health.

This model is very important in the therapeutic intervention of people with addiction, specifically those who are abusing substances. When it comes to substance abuse, it is usually considered a destructive method to avoid negative feelings such as anxiety, depression, low self-esteem etc. The usage of the concept of "defense" plays a vital role in the management of such negative thoughts and feelings, whether an individual justifies their use of substances in order to combat them or simply denies their addiction. The psychoanalytical model through therapy can train such an individual to exit their phase of denial or discard their justification of their substance abuse in order to accept their condition for what it is and gain resilience through the process.

Through the perspective of an addict who is abusing substances, the substances they use can give them a sense of comfort and can be viewed as an "escape" to a false reality where they do not have to face the struggles they normally face, such as negative emotions and thoughts. When an individual starts to abuse, it initially provides a sense of euphoria which eventually snowballs into emotional dependency. Instead of using substances as an escape, it becomes a tool to regulate their existing mood and emotions in order to obtain some form of emotional stability. The psychoanalytical take on addiction is viewed as a method of "self regulation" (Heshmat, 2014). Through this we can say that any individual who may be experiencing chronic negative emotions use substances in an unhealthy manner in order to regulate such emotions, essentially it is a coping mechanism.

Rehabilitation for recovering addicts in the form of therapy uses the psychoanalytical approach in order to encourage patients to reflect on their own reasons and motives for abusing substances. By enabling them to challenge and tackle their emotions in a healthier manner, the dependence on substances can be reduced through such therapeutic interventions.

Socio-psychological Understanding of Addiction

Although addiction is physiological at a micro level, it has certain socio-psychological aspects as well. These aspects not only account for starting addiction, but also overcoming it. When it comes to starting an addiction towards something, the first question that arises is "who is most susceptible?". In the case of drug addiction, there is a wide range of people that are prone to addiction. This includes "thrill seekers" who enjoy the dangers and "high" of drug use as well as overly stressed individuals who treat drug usage as an escape.

The next question that arises is, "how can addiction be tackled?". For this, there are also a variety of approaches, but the journey is long, painful, and sometimes unsuccessful. However, the outcome of an attempt at recovery is largely dependent on the severity of addiction and the support system available to the individual.

The first approach is sending an individual to a "de-addiction center". Here, the person is simply admitted and goes "cold turkey", and they are left to manage with the withdrawal symptoms. This approach is considered unethical and non-reputable in the psychiatric community for quite apparent reasons. Hence, there are other methods of helping addicted individuals. One such method is harm reduction, where the amount of drug that the individual was previously taking is minimized, but still administered, to reduce the harm done to their bodies while tackling withdrawal as well. Gradually, the quantity of drug administered is gradually reduced,

helping the individual come out of addiction in a slightly more comfortable manner. Another method as briefly mentioned previously, is substitution therapy. This is when a less potent drug is given as a substitute for the drug that was previously being taken by the individual. This reduces the harm done to their bodies and aims to reduce the intensity of the “high” experienced, providing a starting point to overcome addiction.

These methods followed by psychiatric professionals link closely to the principles of the psychological models of addiction, showing their relevance and utility in practice.

II. ANALYSIS OF THE MODELS

The main advantageous application of the psychological models is their ability to decipher the root cause of addiction. That is, the psychological state of the individual as well as a plethora of other subjective factors. They also help us understand how addiction can impact your psychological state as well, creating a negative chain effect. This model also provides insights on symptoms of addiction that cannot be physiologically measured, but based solely on psychological aspects. This creates a different point of view or alternate explanations for substance abuse symptoms. However, these models are not biologically based.

Although we can create various sound and conclusive statements with these models, there is a heavy amount of correlational observation being carried out. This reduces the overall objectivity of the model. However, this is a substantial advantage of this model as it allows psychiatrists to tailor their intervention plan to specific patients. Both psychological models of addiction are generalizable in terms of the overall structure and approach to interventions. For example, the methodology that allows individuals to gain self awareness and learn emotional regulation. However, the procedure will not be standardized for all individuals who seek psychoanalytic intervention, as many contributing factors such as socio-economic background, varying mental disorders, severity of the addiction and overall personality could influence the method in which a psychologist chooses to go about the intervention.

The disease model is more empirically based with a clearer foundation. This allows us to understand the mechanism of addiction and how it develops more clearly. That is why this is accepted more widely. Another advantage is that it is applicable to multiple types of addiction, for example, alcoholism. Although the disease model provides extensive empiricism, a certain amount of subjective factor accountability is required when analyzing drug addiction. This is because addiction extends beyond a biological disease; it is also socio-cultural. Examples of these subjective factors are economic status and personality as discussed previously.

Furthermore, this model fails to create a plan for preventing addiction. It only directs psychiatrists in the management of addiction once it has embarked.

III. CONCLUSION

Hence, the question arises as to which model of addiction is more applicable and useful in managing addiction. After thorough analysis, it has become evident that both should be used to an extent to aptly intervene in addiction. In fact, using them in a holistic manner would have the greatest positive impact on individuals. That is, psychological models identify the cause and the disease models dictate apt medication by creating an understanding of the biological process behind addiction. Further, addiction as a disease is not confined to a single label. That is, different individuals may require more attention on one aspect than the other. Therefore, conclusively, a skillful intertwining of both models would provide greater management and treatment of addiction.

ACKNOWLEDGEMENT

Firstly, we would like to express our sincere gratitude to Dr. Manuel Diaz Rios, Professor and Director of Neuroscience program, Bowdoin University, for his invaluable guidance and support during the initial stages of our research process. His expertise and deep knowledge in the field of addiction biology have been instrumental in helping us understand the intricate biological mechanisms’ underlying addiction. His mentorship and insightful discussions have significantly enriched our research paper and expanded our understanding of this complex topic. We are truly fortunate to have had the privilege of working with Dr. Diaz Rios, and his contributions have been indispensable to the successful completion of this research. We also wish to extend our heartfelt appreciation to Dr. Param Kulhara for his unparalleled contributions to our research endeavors. His insightful guidance and thoughtful inputs on our research question were vital in shaping the

direction of our study. Furthermore, we are deeply grateful for his generous assistance in reviewing our research paper after its completion, which resulted in significant improvements. His expertise as a psychiatrist added a unique and valuable perspective to our work, and his willingness to share his knowledge and insights was truly commendable. His support and mentorship have been instrumental in enhancing the quality of our research, and we are deeply grateful to have had the privilege of working with him.

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