

# Different addictions, the same behaviour. A physiological explanation and a preventive proposal.

## Abstract

Addictive behaviours have common symptoms due to the physiological basis of these kinds of disorders. In this article a brief review of the physiological mechanisms of addictive behaviours is shown. There is also a preventive proposal in order to avoid lack of personal balance that could lead into addictive behaviours. It is related to our self-discovery and the ability to serve or help other human beings.

Volume 7 Issue 1 - 2022

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**Received:** November 23, 2022 | **Published:** December 30, 2022

## Introduction

What is a typical behaviour of a person suffering an addiction? Disorders due to addictive behaviour are typified by World Health Organization (WHO).<sup>1</sup> The symptoms include a persistent pattern of repetitive behaviour, a lack of control over that behaviour, an increasing of the priority to the addiction source (even when it implies a serious interference in other life interests and daily activities) or ignoring the negative consequences, such as family conflicts or poor scholastic performance, among others.

An impaired control over the behaviour is a clear symptom. Addicts almost always underestimate the amount of time they have spent in those situations. A high frequency in demanding the addictive substance or situation, getting annoyed when he or she is asked to stop doing something... It used to be a sign of alarm for the family. Alcohol, heroin, THC, gambling... are very common addiction sources. Of course there are different effects in the brain, depending on the substance or the repetitive action that provokes the addiction, but we can observe common symptoms. One of them, very important, is the fact that behaviours inhibit the executive functions in the frontal lobe. It explains why it is so hard to reason properly and the recognition of the problem by the individual. In more serious cases other symptoms appear, such as insomnia, anxiety or depression...

We will consider that these symptoms are not a manifestation of another medical condition, and are not due to the effects of a substance or medication on the central nervous system, including withdrawal effects. In this brief report we will also consider no comorbidity and cases in which medication is not required.

## How does rewarding/motivating system work?

Dopamine is a catecholamine, a neurotransmitter related to satisfaction, pleasure and motivation. Even though dopamine is related to the motor system through the substantia nigra (SN), the brain sector that is specially relevant at this point is the ventral tegmental area (VTA). This area produces dopamine with mainly three different eferences or dopaminergic pathways: tuberoinfundibular (linking the hypothalamus with the hypophysis), mesocortical (linking the VTA with the prefrontal cortex) and mesolimbic (linking VTA with the limbic system and the nucleus accumbens).

The mesocortical pathway is in charge of informing the prefrontal cortex in order to make a conscious decision about repeating or avoiding an action. It is the role of executive functions, the motivations of reinforcing behaviour or not. But the mesolimbic pathway is related to the feelings of pleasure. The prefrontal cortex makes a decision taking into account the mesolimbic pathway. In this process, the hippocampus (memory) and the amygdala (fear, anger...) are involved too and they are also contributing to the decision making by the prefrontal cortex.<sup>2</sup>

Obviously we all like to repeat pleasant sensations, rather than avoiding them. It is an evolutive survival strategy. But the most interesting thing is that the mesolimbic pathway is always the same, there is no difference among possible dopaminergic triggers. A trigger could be an icecream, a coffee, chatting with a friend, learning something new, having sex or a heroin dose. And no matter how quick the trigger works, whether it is a video game or making a sculpture. Only the intensity of the stimulus makes the difference, but not the tract itself. The dopaminergic receptors are the same. The video game seems to be more intense than making the sculpture, in the short term. And we will need a more intense stimulus to get the same reward due to habituation phenomenon.<sup>3</sup>

When the homeostatic balance among pathways is disrupted or broken down (specially mesocortical and mesolimbic) in a period of time that provokes a behavioural change, we find out that the brain has possibly fallen down into an addictive pattern, attaching more importance to the mesolimbic pathway rather than mesocortical one. Addiction is served when the executive functions get out of the equation.

Rats in the laboratory were stimulated with electrodes in the nucleus accumbens in a Skinner box, arranged in such a manner that they could stimulate themselves by pressing a lever. Some rats stopped eating or drinking and died.<sup>4</sup> This is the power of the process.

These findings were the starting point for Skinner's operant conditioning, Watson's behaviorism or Cognitive Psychology as a global framework.

## Prevention, the best therapy

Once we have understood a little about the motivating and rewarding mechanisms, it is time to consider how to avoid risky behaviours. First of all, we must take into account that our brain is

unique. There is no brain like ours, never was and never will. Never again the same connections, the same exposure to the environment, the same epigenetic factors, the same genetic information... If the physiological substrate is unique, we are also unique from a psychological point of view.

We are exceptionally unique in every single way: body, affectivity, intelligence and will. Our body makes us good at playing a certain instrument or due to it we are not able to practice a certain sport. It is a clear conditioning factor in our lives. As it is the way we perceive the environment and how we deal with people through our affectivity. Our intelligence also makes us special. Nor other Beethoven has appeared in History, neither another Einstein. The way we think makes us creative, good at science or literature. We also find persevering people and others just give up when difficulties arrive.

A deep part of ourselves is our background, which is the material things we live with, our job, our family, our society. Is not the same to be born in Japan, Germany, Kenia or Argentina, to have possibilities of learning in a school, the native language we speak, the friends we have, the family we are in... These aspects are not accidental in us, but a part of us.

We can get the best of the people and the people can get the best of us. Is not an utilitarian perspective neither just a reason to live. This is not Frankl's logotherapy, but something further. It is a self-discovery. If our lives not only have a reason, but also a value, everything gets a higher dimension.

If we want to avoid the risk of addictive situations we can boost our skills in other human beings by finding the way in which we can serve others in the best possible way. We can be better as human beings by behaving in this way. It implies we must know ourselves, our strengths and weaknesses, our limitations and our special skills, accepting what we are, having a right perception of ourselves in order to improve our self-esteem. What can we contribute to others? What makes us so special that the world will miss something if we are not on it? What discovery, invention, bridge, building, song, painting or book is yet to come because of us? How many lives will be different because of us? Individualism (the opposite of this proposal) and sentimentality (lack of balance in the affective dimension) lead us to break the psychological balance, sooner or later.

It possibly sounds like a philosophical or anthropological perspective, but it has extraordinary consequences and it is deeply linked to the physiological mechanisms already exposed. The homeostatic balance can be found through this basis. If we have value and we recognize it, we take care about ourselves in all our personal

dimensions. We can serve in a better way to others only if we improve personally. We will be able to persist in trying to do something better in spite of the difficulties, conquering ourselves through a behaviour that establishes neural tracts involving the dopaminergic pathways. We can develop the executive functions of the frontal lobe, strengthening these neural tracts. That is why good habits (and avoiding the bad ones) are so important.

The pleasure of doing something will not be the only reason for doing it due to this behaviour will develop our temperance. We will have a fortress to face the difficulties with confidence. We will be able to judge prudently people or situations, recognizing if they are for good or bad. It means, is the way I am facing these situations good or bad for keeping on growing psychologically in our personal balance? And looking for this balance we will like to learn something new, to meet people and face new challenging situations.

## Conclusion

The best therapy is not needing therapy, that is, prevention. And there is no better way to prevent addictions than growing in personal balance. Behavioral addictions frequently appear when there is something missing in that personal balance or it is just broken by tiny but persistent events. Too many times we think these events are not important or we consider we can control them whenever we want.

There are a lot of things we can do for the students, teenagers, children, adults, and families. We just have to accompany others, showing the beauty of their lives and the beauty of existence and the little tiny details that make every single day a time for a new discovery, a time for a new beginning.

## Conflicts of interest

The author declares that there is no conflict of interest.

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