



## DOPAMINE AND MOTIVATION. ADD AND ADHD

“Motivation is transforming a rewarding stimulus into a stimulus that commands attention, induces approach and cause it to be sought out.” This is regulated through the mesocorticolimbic projection by dopamine and to a lesser extent noradrenaline. Simplified this is the brain stem to cortex nerve pathways that modulates motivation.

Addiction is a dysregulation of this system. But apart from addiction what about other less severe dysregulation of this system. A well-functioning natural system has good homeostasis.

It is the dysregulation of this system that is a core characteristic of ADD and ADHD. The person with ADD has little motivation to do anything. They know they should but do not. We all suffer from low motivation at times such as when tired or after a few drinks.

If the system is too up regulated, then the person may become addicted. It is unusual to have a child with ADHD, (hyper), who is not addicted to computer games. They can play for hours or even days often severely delaying sleep. When there is a strong incentive or stimulus, usually of the visual kind that is constantly changing, the motivational pathways become over stimulated in susceptible people. (Poker machines) Addictive behaviour is when these pathways are over activated by stimuli that results in negative outcomes.

Ideally our motivational pathways will always be activated to the right level resulting in optimal behaviour for all circumstances. An impossible hope.

It is helpful to view poor behaviour from the perspective of poorly regulated motivation. Motivational dysregulation is one of the features of ADD and ADHD. Once you know what people with ADD/ADHD behave like it is an easy condition to diagnose but hard to describe. This is like trying to describe the difference between a cat and a dog, easy but hard to define. Dysregulation is why paradoxical behaviour i.e., no motivation for schoolwork, domestic work, organisation, social situations also occurs with the intense focused striving of people with ADHD. This intense focus can be negative such as with an addiction to visual computer games or be a positive with intense commitment and energy. Unfortunately, this focus can be to the detriment of other aspects of their lives.

Dopamine is central to motivation. Stimulants, especially methylphenidate have the effect of modulating dopamine. It can increase dopamine, thus improving motivation. Also, via negative feedback to the basal ganglion will reduce over stimulation.

That is why methylphenidate can both help ADD, with low dopamine and low motivation and then modulate inappropriately high dopamine and ADHD.

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