**////Title: Measuring our Motivation for Physical Activity and Sedentary Behaviour**

**////Stand-first**:

Our daily lives involve periods fluctuating between physical activity and sedentary behaviour, but few studies have researched what motivates us to take on these states from one moment to another. Dr Matthew Stults-Kolehmainen at Yale-New Haven Hospital and Columbia University in the USA, has analysed research from a range of scientific fields to assess the role of urges, cravings, wants and desires on our motivation for physical activity, exercise and sedentarism. He has developed a model to explain how these factors interact, as well as a tool to measure the subjective feeling of these states.

**////Body text:**

Since the time of the ancient Greeks, we have been questioning what motivates human bodily movement. Why do we choose to undertake physical tasks or decide to become sedentary? The philosopher Aristotle believed that our muscular movement is motivated by a combination of practical reasoning and impulsive desire. Over the last century, behavioural psychologists have made significant strides forward in understanding how best to encourage physical movement to promote a healthy lifestyle. Often their focus has been on cognitive factors, which may overemphasise our ability to make logical decisions and underplay the role of emotional factors, such as our moods and feelings.

There has been a recent emergence of theories suggesting that our impulsive urges and desires play a stronger role than previously thought in motivating physical activity. These factors are frequently short-lived and are often described as being affectively charged. In other words, one often feels physical or mental tension when experiencing these states, which may instigate a target behaviour, such as exercise. Dr Matthew Stults-Kolehmainen, an Exercise Physiologist at Yale-New Haven Hospital in the USA, along with his colleagues at Yale and Columbia Universities, recently undertook analyses of studies across a number of fields to evaluate, synthesise and expand on the current theories surrounding the motivation of movement.

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Dr Stults’s review of existing theories highlighted two main models which take into account both cognitive and emotional drivers of behaviour. The first is the Affect and Health Behavior Framework, which incorporates the role of desire and cravings in relation to positive reinforcement. The model proposes that the positive feelings experienced during or after exercise solidify people’s desire to initiate the action again, providing some explanation as to the source of their motivation. However, the authors of this model concede that physical activity does not typically elicit a strong positive response when compared to the pleasure derived from things like food, sex or drugs, for example.

The second theory Dr Stults emphasised is the Affective-Reflective Theory which specifically focuses on balancing cognitive and emotional factors in relation to exercise activity. It theorises that movement is related to the interaction between two different systems. The first involves a spontaneous emotional response, which may be positive or negative, resulting in an impulse, whereas the second system is more deliberative and creates an action plan. The combined interplay between the two systems is what results in the initiation of physically active or sedentary behaviours.

Dr Stults argues that whilst these two theories provide more balanced explanations, they do not take into account whether our impulses are something that we can consciously feel. For instance, do humans have urges or even cravings to move and be active, and if so, under what conditions would these occur?

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To answer this question, Dr Stults turned to evidence garnered from other scientific fields.

An area with relevant crossover is motor control, where the concept of desire for movement has been described simply as ‘want’ and is believed to originate in a specific area of our brains. Importantly, a ‘want’ for activity occurs when preparing or considering to move, but with sufficient intensity, it becomes an urge, directly propelling muscular movement.

In the field of medicine, there has also been research into urges, such as the mechanisms behind addiction, including addiction to exercise. If we look at clinical populations, we can see examples of disorders where people have intense and troubling urges to move, such as restless legs syndrome. Often in these conditions, relief is only experienced once the movement is completed. While certainly abnormal, it may be the case that humans have a basic drive to move, also felt as tension with prolonged sedentarism, but relieved when muscles are worked, which aligns with theories around negative reinforcement. Dr Stults has even looked to the field of music psychology, where the act of ‘grooving’ describes a positive urge to dance and move in response to a beat or rhythm.

The existing research on desires, urges, wants or cravings for physical activity indicates that such motivation does not operate independently, but also in conjunction with such states for rest or sedentary behaviour. This leads to the question of ‘how do these states relate to each other?’

Dr Stults and his colleagues developed the Wants and Aversions for Neuromuscular Tasks model, known as the WANT model, to describe the interaction between these affectively charged motivation states. The model contains dimensions describing the motivation for the acts of moving versus resting, which vary in strength and operate asynchronously. For example, an urge or craving for activity is considered to be much stronger than a desire. Furthermore, according to this model, urges to move may overlap with an urge or desire to rest. For example, if we won a sporting competition, we would want to celebrate our win but at the same time, could be feeling extremely tired and in need of respite.

The WANT model also describes motivation states as having an approach versus avoidance orientation. In other words, unlike previous models, this new framework incorporates the act of not wanting to do something, which might be termed an aversion or dread. An example of this is freezing in the face of danger, in which the individual would be experiencing a high level of dread for both movement and rest at the same time. Overall, this model explains how desires and urges exist both alongside and in contrast to aversion and dread, whilst taking into account the influence of our emotions.

Dr Stults believes the WANT model can be used to explain psycho-motor phenomena associated with a variety of conditions, such as depression, hyperactivity or mindfulness. It may also predict future behaviour and provide testable hypotheses.

His most recent focus has been to create a simple tool that measures our affectively charged motivation states for both activity and sedentary behaviour. He developed the Cravings for Rest and Volitional Energy Expenditure scale, also known as the CRAVE, and completed five phases of testing at Yale University Medical School to demonstrate its validity as a measurement tool.

Each phase of the scale development tested a different hypothesis. The first hypothesis was that our motivations in relation to movement are measurable. The second was that our desire for activity is separate from our desire to be sedentary. The third was that these desires are transitory and may alter rapidly. The fourth hypothesis focused on how our states may change in response to physical stimuli, such as strong exercise, whilst the fifth suggested that our motivations are distinct from psychosomatic sensations such as fatigue and calmness.

The five studies involved testing with over 1,000 participants. The findings demonstrated that the CRAVE scale has strong validity and also supports the theory behind the WANT model. With maximal exercise, desires to move precipitously decline, and with prolonged sitting, they gradually rise. A particularly interesting and unexpected finding was that desire for movement was greater across all of the studies than the desire to be sedentary.

Dr Stults hopes that the CRAVE scale will be a useful tool for researchers and clinicians alike. He believes the next phase of research should investigate whether promoting our desires for movement, perhaps by making exercise more enjoyable, whilst resisting our urges and desires to be sedentary will help to encourage physical activity and subsequently improve health.

This SciPod is a summary of the papers ‘Measurement of Motivation States for Physical Activity and Sedentary Behavior: Development and Validation of the CRAVE Scale’, DOI: <https://doi.org/10.3389/fpsyg.2021.568286>, and ‘Motivation States for Physical Activity and Sedentary Behavior: Desire, Urge, Wanting, and Craving’, DOI: <https://doi.org/10.3389/fpsyg.2020.568390>, both published in Frontiers in Psychology.

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