Review of: "Science of Human Recognition-Behavioral Modeling-System"

David F Marks

Potential competing interests: No potential competing interests to declare.

Review of "Science of Human Recognition-Behavioral Modeling-System" by Yutaka Masuda

This interesting article covers a broad range of ideas that appear to be drawn from traditional Chinese and Japanese concepts in philosophy, health, and medicine. In one sense, the system is irrefutable from an outsider's perspective because it follows ancient traditions of thinking from another culture. To review the article as a scientific work, it is necessary to translate the system into a terminology/ontology that is familiar to this and other western scholars of the English-language literature of life sciences, including physiology, psychology, and medicine. The latter task is complex and, unfortunately, beyond the ability of this and, I suspect, other reviewer(s). However, as a person who has written about homeostasis as a psychological construct, it is possible to comment in a general way about the first two statements in the Abstract, as numbered in the following paragraphs.

1. *Human Self is an adaptation system to maintain homeostasis.*

This proposal is supported by a sizable body of literature suggesting that, in any conscious organism, all voluntary behaviour is intentional, purposeful, and driven by a homeostatic need for equilibrium (Marks, 2018). Within the general theory of homeostasis, the construction of the 'self', 'selfhood', and 'self-control' are particular examples. The requirement to delay gratification, control impulses, and modulate emotional expression are among the earliest demands placed on children, and many tasks throughout life ultimately depend on the mastery of self-control (Figure). "Self' and 'self-control' are 'umbrella constructs' that bridge different disciplines based on the idea that any conscious being needs to keep their behaviour within socially acceptable boundaries. Without going into great detail, it is thought that young children develop self-control skills over the first four years of life (e.g., Kochanska, Coy & Murray, 2001; Mischel, Shoda & Rodriguez, 1989)) and such skills are known to be predictive of future life outcomes and behaviours such as eating, smoking, sex, driving, academic performance, and noncompliance with medical regimens (Bogg & Roberts, 2004; Marks, 2018).

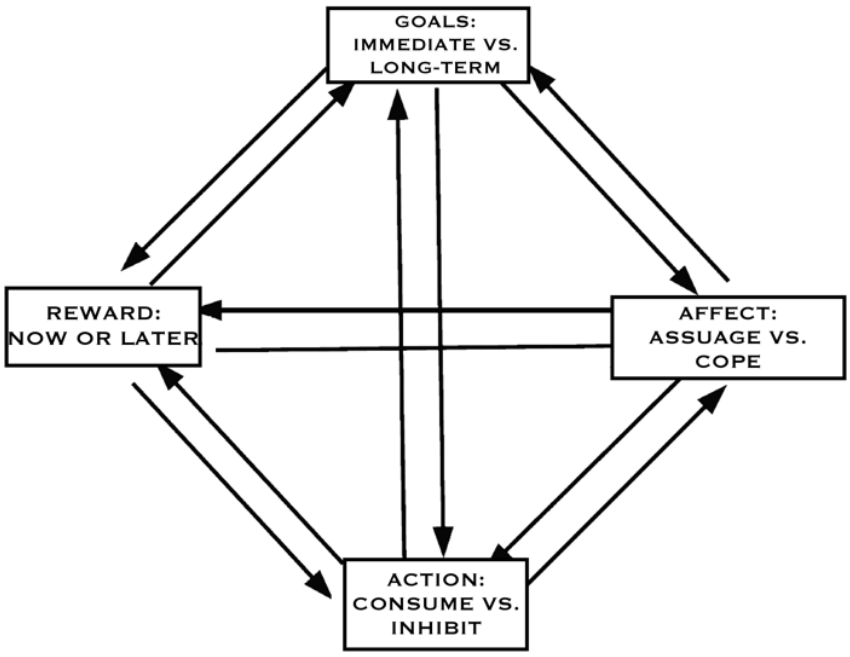

Figure: The homeostasis of self-control

The Figure shows a general homeostasis system for self-control. Goals (G) are in a hierarchy ranging from immediate to long-term. Action (A) can be consummatory (e.g., have another drink) or inhibited (don't have a drink). Reward (R) can be immediate (intoxication) or delayed (sobriety). Negative affect (N_a), such as feelings of anxiety, anger, or boredom, can be assuaged or coped with. Low self-control is mediated by the first of each of these values, and high self-control is mediated by the second. Resetting any process will have knock-on effects on other processes, so the decision to take one early 'reward' (in a casino, drink another double vodka and orange) may lead to other immediate goals (gamble at the roulette wheel) rather than longer-term goals that are risk averse (save money, go home, watch TV, take an 'early night').

It is indicated by the above analysis that self-control is a form of homeostasis in a system designed for the long-term protection of the self, in line with Yutaka Masuda's article.

2)The physical Self maintains physical homeostasis via the substantial modeling system, and the mental Self maintains mental homeostasis via the recognition-behavioral modeling system.

There is general support for both propositions. Analyses of the Central Nervous System (CNS) have explored new methods for discovering cortical and subcortical networks in the brain's anatomical connectivity, termed the 'connectome'. Edlow and his colleagues investigated the limbic and forebrain structures that form the 'Central Homeostatic Network' (e.g., Edlow et al., 2016). The Central Homeostatic Network (CHN) appears to play a major role in autonomic, respiratory, neuroendocrine, emotional, immune, and cognitive adaptations to external change. These forebrain structures include the limbic system close to the hypothalamus with strong mono- and/or oligo-synaptic connectivity to one another, and shared participation in homeostasis. Traditionally, the limbic system has been viewed as the substrate of 'emotion', but it also plays a key role in the regulation of homeostasis, and so the limbic system has been added to the central autonomic network of "flight, fight, or freeze". To put this in the simplest terms, the forebrain is involved in the homeostatic regulation

of both autonomic (Type I) and non-autonomic (Type II) human responses to disturbances of equilibrium.

That the forebrain evolved to control both types of homeostasis, inside the body and in outwardly directed behaviour, supports the contention that homeostasis is a unifying concept across Biology and Psychology, in line with the conclusions of Masuda.

It would be helpful in any future revision of this article if the author could integrate the terminology and models with the western scientific literature on psychological and physiological homeostasis. This would undoubtedly enhance the impact of the work, which covers a domain of topical interest.

References

Bogg T, & Roberts BW (2004). Conscientiousness and health behaviors: A meta-analysis. *Psychol Bull* 130:887–919.

Edlow, B. L., McNab, J. A., Witzel, T., & Kinney, H. C. (2016). The structural connectome of the human central homeostatic network. *Brain connectivity*, *6*(3), 187-200. doi: 10.1089/brain.2015.0378

Kochanska G, Coy KC, & Murray KT (2001). The development of self-regulation in the first four years of life. *Child Dev* 72:1091–1111.

Marks, D.F. (2018). A general theory of behaviour. Sage Publishing.

Mischel W, Shoda Y, & Rodriguez MI (1989). Delay of gratification in children. Science 244:933–938.