

Review of: "A Cognitive Investigation of the Zen Meditation through the Lens of Thousand-Brain Intelligence and the Cerebral Reward System"

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Potential competing interests: No potential competing interests to declare.

This article could clearly be an interesting read for both an audience interested in contemplative practice and readers from a cognitive neuroscience background. I applaud the author for their ambition to advance the understanding of meditation based on contemporary neuroscientific theory. I see a number of areas that could be improved, though:

The initial historical reflection on the evolution of Zen meditation is interesting, but it is not always clear why these details are necessary in the context of the current research endeavour. I felt that more focus could be placed on past scientific work aimed at establishing a (neuro)scientific understanding of the processes and mechanisms underpinning meditation practices. Currently, the manuscript appears not firmly grounded in existing literature - can you add more reflection on past empirical work, for instance, on studies examining neural activation linked to meditation? This is even more important considering that the paper sets out to demystify meditative practice.

The manuscript appears somewhat undecided whether it wants to take a narration-based essayistic stance or a scientific approach (i.e., develop rigorous and testable research questions based on empirical findings). If a scientific approach is taken, the presented evidence and literature should be more elaborated, and more rigour would be needed in the presented arguments.

This becomes especially apparent in the two sections drawing parallels between biopsychological/neuroscientific research and buddhistic principles:

(1) The description of the Hawkins theory is too vague and superficial in my view. This is exemplified by statements like "many of our human concepts are inherently rooted in the cerebral cortex," which by any neuroscientist will be perceived as a proposition so obvious that it does not even need to be mentioned. Similarly, the observation that knowledge is subserved by a distributed and plastic network of cortical regions is nothing new, albeit the author implying this to some extent. Crucially, what seems to be missing is a rationale why explaining Zen meditation using cortical columns and reference frames (as postulated by Hawkins) is superior to using alternative neuroscientific concepts. One avenue to improve this would potentially be to contrast the 1000 brains account to explain meditative experience with other broad theoretical notions of brain functioning, e.g., modularity, semantic networks, parallel distributed processing.

(2) Similar issues as in (1) are also found in the second theoretical section, in which the article links the experience of bliss to the brain's reward system, specifically to dopaminergic transmission in the ventral striatum/nucleus accumbens.

This is clearly an interesting idea, but unfortunately, there are some rather speculative claims on how bliss (which should be seen as a mental affective state from a cognitive neuroscience perspective) “moves” along the body, which will not withstand scientific scrutiny, given that subjective experience is fundamentally a cortical process. In light of the scientific framing of the article, I would also not advise including the notion of chakras without critical reflection. What is also problematic, in my view, is that the article equates the experience of pleasure with dopamine levels, which does not align with the contemporary, nuanced understanding of the role of dopamine in reward and motivation. Further, the idea that addictive behaviours are generally linked to dopaminergic hypo-functioning is questionable. I encourage the author to employ the term “addiction” more carefully and not use it in connection with everyday (non-pathological) reward-seeking behaviours. I also did not fully understand the notion of “attractor networks,” which appears central to the reasoning in this section - I suggest adding more explanation here, especially with regard to the rather speculative claim of general, habitual dopamine suppression, which is disinhibited by meditation.

To conclude, I want to reiterate that I commend the author’s effort to construe a scientific foundation for contemplative practice. While the manuscript has merits with regard to originality, from a neuroscientific perspective, I felt that it lacks a little depth and rigour at the moment.