

# **Ships at Sea: Exploring the Mysteries of Self and Consciousness**

December 29, 2021



The Ship of Theseus, an ancient thought experiment, raises the question of whether a ship that has had all of its parts repaired and replaced is really the same ship the crew started out with—or, as the generally accepted answer proposes, a new ship conveniently referred to by the same name.

This thought experiment is designed to challenge our day-to-day assumptions about the permanence of identity, not just in relation to seafaring vessels but also to our own sense of self. After all, a person's abilities and beliefs can change radically over a lifetime. Moreover, on a purely physical level, many of the cells that made "you" in your infancy have died and been replaced over time, creating a kind of chimera of the old and new that is "you."

The common claim that all the cells in our bodies are replaced every 7 years may be a bit of an exaggeration, but as stem cell biologist Jonas Frisé (Karolinska Institutet) has found, our cells do seem to differ considerably in how quickly they die and are replaced. Frisé's research suggests that the cells lining our intestines, for example, are replaced roughly every 5 days. Yet he found that some of the neurons in our brains remain with us from birth, although we may continue to generate a certain number

of new brain cells into adulthood through a process known as neurogenesis.

Various traditions throughout human history have grappled with the question of how humans can maintain a stable sense of self in the face of such constant change. A central concept of Buddhist tradition, for example, is the idea of non-self. Similar to the Ship of Theseus paradox, the concept of non-self proposes that humans, like all things, change so much from moment to moment and year to year that no irreducible, permanent self can be said to exist. Instead of a person, there is a process.

Over the past century or so, psychological scientists have entered the fray, exploring the myriad ways in which self-awareness and self-control influence the highs and lows of human experience, from religious trance to post-traumatic stress disorder. Even before researchers began inspecting the mysteries of consciousness under controlled laboratory conditions, humans were experimenting with the sense of self through rituals designed to create mystical experiences of altered consciousness, such as meditation and the use of psychoactive drugs like ayahuasca, wrote Ann Taves (University of California, Santa Barbara) in a [2020 article in \*Perspectives on Psychological Science\*](#).

Central to each of these experiences, Taves wrote, is ego dissolution, whether experienced in a house of worship or under the influence of a psychedelic at a music festival. Through this process, the perceived boundaries between the self, other people, and the world may seem to disappear, often resulting in a feeling of profound unity.

Viewing mystical experiences through the lens of ego dissolution allows these seemingly anomalous events to be better integrated into our broader understanding of human psychology, Taves continued.

#### **Related content from this issue:**

- [The Grand Challenges of Psychological Science](#): APS members share what they perceive to be the biggest challenges to the field.
- [On the Right Side of Being Wrong](#): Researchers are embracing a new culture of transparency.
- [Fully Credited](#): A new model of “contributorship” addresses the marginalization of early-career researchers in scientific publications.
- [Up-and-Coming Voices](#): Previews of emerging research on methodology and research practices

“Researchers have generally converged on a distinction between two levels of self: a basic sense of self, referred to as the ‘minimal,’ ‘core,’ or ‘embodied’ self, that emerges in conjunction with low-level bodily processes ... and a more elaborated sense of self, often referred to as the ‘narrative self,’ constituted through high-level reflective processes involving introspection and autobiographical memory,” she explained.

Ego dissolution has been found to influence both levels of self-awareness, Taves wrote, which can lead to feelings of becoming “one with the universe”—or, for those in the throes of a bad trip or psychotic episode, feelings of existential terror that one has ceased to exist at all.

In a 2017 study, for example, Jared R. Lindhal (Brown University) and colleagues interviewed 60 experienced meditators familiar with Theravāda, Zen, and Tibetan Buddhist meditation traditions and clinical mindfulness practices. The meditators, nearly half of whom had logged more than 10,000 hours meditating, reported experiencing altered states of consciousness through the practice—some blissful, some neutral, and some distressing. These included changes in their narrative sense of self and self-world boundaries, as well as their sense of physical embodiment, agency, and ownership over their body.

The measures psychological scientists have long used to generate self-reports of such experiences—namely, the Mysticism Scale and Mystical Experiences Questionnaire, which focus on feelings of timelessness, tranquil awe, and sacred revelation—can overlook the parallels between positively and negatively valenced alterations in humans' sense of self, Taves wrote. This can hinder comparisons between experiences individuals perceive as pleasant or even enlightening, such as lucid dreaming or the sense of reliving a past life, and more terrifying events such as sleep paralysis or perceived demonic possession.

Historically, researchers have also tended to privilege altered states of consciousness associated with religious traditions over those that occur in other contexts, Taves noted. This can create an artificial divide between “authentic” experiences of “divine reality” emerging from religious practices and less formalized mystical experiences, which are often characterized as separate phenomena despite likely emerging from the same interactions between culture, the self, and the brain.

“It is clear that experiences elicited by the use of psychedelics and other practices can lead to transformative mental ‘resets’ and new ways of seeing things under supportive conditions,” Taves wrote. Psilocybin mushrooms, for example, have received significant attention recently for their potential, when used in a clinical setting, to assist in treating severe depression and other mental health conditions. “A framework that includes a wide range of alterations in sense of self ... promises to help us better understand the mechanisms through which experiences are represented and differentiated.”

## Controlling consciousness

In addition to changing our perspective on the self, research suggests that mindfulness practices can improve our ability to self-regulate emotion and attention and our interoception, or body awareness.

“Our model suggests that mindfulness decreases the threshold of conscious access by supporting attention,” wrote Charles Verdonk (French Armed Forces Biomedical Research Institute) and colleagues in a [2020 article in \*Perspectives on Psychological Science\*](#). “Mindfulness, therefore, facilitates the conscious processing of information that comes from within (body awareness and self-awareness) and outside the body (world awareness).”

This process allows individuals to more effectively filter out thoughts and feelings that aren't relevant to their goals, the authors continued, and may strengthen the ability to engage nonjudgmentally with irrelevant information that does rise to conscious awareness.

The researchers examined these processes through a review of 29 articles involving event-related

potential (ERP) studies of mindfulness. The studies involved a total of 1,185 participants ages 17 to 80 who engaged in some form of mindfulness—from regular meditation to weekly 10-minute mindfulness interventions. In each case, electroencephalography was used to observe variances in electrical activity in the brain related to information processing based on exposure to mindfulness practices. These ERPs, which occurred 100 to 600 ms after participants were exposed to a stimulus, included the following:

- ERN (error negativity, which peaks about 100 ms post-stimulus) is thought to reflect a comparison between the intended and actual performance of an action. If the two do not match, this is then followed by Pe (error positivity; 200–500 ms post-stimulus), which is thought to reflect error awareness and is stronger when an error rises from unconscious to conscious awareness. About a third of studies found a link between mindfulness and increased ERN and Pe, but most found no evidence of a relationship.
- N2 (200–350 ms post-stimulus) is associated with conflict monitoring (noticing discrepancies between expectations and reality) and the inhibition of planned responses. On average, this ERP was stronger in participants who were more dispositionally mindful, had more experience with meditation, or had completed a mindfulness intervention.
- P300. This was the most commonly studied ERP, Verdonk and colleagues noted, and can be broken down into several parts.
- P3a (roughly 250–280 ms post-stimulus) is thought to reflect automatic, unconscious attention to information. This ERP was found to be lower when participants were meditating than when they allowed their minds to wander.
- If a stimulus rises to conscious perception, P3a is followed by P3b (300–500 ms post-stimulus). Across studies that measured this ERP, mindfulness interventions were associated with a greater P3b amplitude in response to relevant stimuli and a lower P3b amplitude in response to irrelevant stimuli, indicating that more mindful participants paid more attention to relevant stimuli and less attention to irrelevant stimuli.
- Finally, the no-go P3 (300–600 ms post-stimulus), which reflects response inhibition, was found to be stronger in relation to mindfulness.
- LPP (late positive potential; 400–600 ms post-stimulus) overlaps with P3b and is used in research on emotional arousal. It tends to be stronger in response to images perceived as positive or negative in comparison to neutral images. Findings on LPP and mindfulness were mixed. Studies on dispositional mindfulness, meditation experience, and longer-term mindfulness interventions seemed to suggest an association between mindfulness practices and decreased LPP amplitude, indicating decreased emotional reactivity. Experiments that provided a brief mindfulness intervention in the lab before participants viewed emotional stimuli, on the other hand, found no evidence of an effect or reported increased emotional reactivity.

All in all, Verdonk and colleagues wrote, these findings suggest that mindfulness practices may have some influence on people's ability to block irrelevant information from conscious awareness and to disassociate from emotional responses, decreasing their emotional reactivity.

“Bringing information to consciousness could be viewed as a decisional process, a choice between leaving information unconscious or helping it to reach consciousness,” Verdonk and colleagues explained. “The idea of a lower threshold of conscious access is congruent with this hypothesis because attentional amplification helps to keep information under the threshold or bring it above the threshold

depending on its relevance to the context.”

Additionally, long-term mindfulness practice was found to be more strongly associated with cognitive control than brief laboratory interventions. It may take a significant amount of time and effort to learn these strategies, Verdonk and colleagues explained, which means that inexperienced participants may show no change or even reduced attentional control.

“These findings suggest that although the development of mindful cognitive abilities is resource-consuming, mindful functioning is beneficial because it becomes more economical with the level of expertise,” Verdonk and colleagues concluded.

### **Losing Sleep**

Unpleasant thoughts may arise for anyone who lets their mind wander or ruminates on the past, but intrusive unpleasant thoughts can come to dominate the lives of people with conditions like post-traumatic stress disorder, obsessive compulsive disorder, and major depression, wrote Marcus O. Harrington (University of York) and colleagues in a [2020 article in \*Clinical Psychological Science\*](#). Harrington’s research suggests that sleep deprivation, a common feature of many mental health conditions, may be one factor limiting these individuals’ ability to suppress unwanted thoughts.

“The onset of intrusive thoughts and affective dysfunction following bouts of poor sleep could create a vicious cycle whereby upsetting intrusions and emotional distress exacerbate sleep problems ... inhibiting the sleep needed to support recovery,” Harrington and colleagues wrote.

In the study, Harrington and colleagues observed the responses of 60 healthy adults, half of whom had been awake for at least 24 hours, to a series of negative images of wounds, accidents, and insects, as well as neutral images such as landscapes. Participants who hadn’t slept the previous night were found to report 50% more intrusions while attempting to suppress their thoughts.

However, all of the participants became better at suppressing their thoughts with each successive trial, Harrington and colleagues noted, although sleep-deprived participants were slower to do so—and after participants had successfully suppressed a negative image, they found it less aversive when they saw it again. This suggests that improvement is possible even under trying conditions.

“Sleep deprivation substantially increases people’s vulnerability to unwanted memories intruding into conscious awareness when they confront reminders,” Harrington and colleagues concluded.

“Developing interventions that improve retrieval suppression in poor sleepers may be a promising avenue for averting the potentially pathogenic consequences of disordered control over distracting thoughts.”

### **Birthing consciousness**

Of course, not all altered states of consciousness require a person to consume a mind-altering substance

or even intentionally engage in a particular practice. In a 2020 article in *Perspectives on Psychological Science*, Orli Dahan (Tel-Hai College) proposed the concept of birthing consciousness—a state that allows people to retreat inward in the face of overwhelming pain while giving birth—and suggested that this experience may be most accessible without the use of common medical interventions.

Giving birth, even with access to modern pain management, is often severely painful. But, Dahan explained, it isn't uncommon for people to also report feelings of empowerment, joy, or even pleasure throughout the experience—a contradiction that may be made possible by the power of our prefrontal cortex.

“Birthing consciousness is an example of an adaptive, pain-induced, altered state of consciousness,” she wrote. “Because successful natural birth for the mother and for her baby was essential to reproduction throughout most of human history, and because natural birth is an experience of extreme pain ... the unique ACSs [altered states of consciousness] that I refer to as birthing consciousness increases the probability for optimal birth outcomes.”

This altered state of consciousness reduces activity in the prefrontal cortex, a process referred to as hypofrontality, which is associated with pain reduction, Dahan wrote.

Consciousness-altering behavior is common throughout the animal kingdom, she added, so it's likely this adaption occurred long ago in our shared evolutionary history. “This evolutionary explanation for the ubiquitous phenomenon of ASCs associated with transient hypofrontality can be roughly divided in two: Pain-induced ASCs are adaptive, whereas ASCs that are not pain-induced benefit from this brain mechanism because of its therapeutic effects.” Although this theory requires further study, it suggests that altered states during labor may have played an essential role in successful reproduction before modern medical interventions, laying the groundwork for other altered states of consciousness—such as dreaming, daydreaming, runner's high, and hypnosis—that allowed humans to “retreat into an inner world where time seemed to be suspended.” The effects of certain drugs may also result in part from this adaptation.

“Perhaps we are hardwired to desire reaching states linked with transient hypofrontality because this brain mechanism once conferred a crucial evolutionary benefit in situations of acute pain,” Dahan suggested. “If so, it is possible that natural birth and other pain-induced ASCs benefit from a much more ancient and broader adaptation.”

These and other altered states of consciousness challenge some of our most basic assumptions about what constitutes an individual, stilling our perception of time, destabilizing our sense of self, and even extinguishing—if only temporarily—our desire to escape pain. Like the Ship of Theseus, parts of our psyche we take for granted as stable and fixed can be quietly replaced, becoming a new mind by the same name.

*Kim Armstrong is a freelance writer in Boston, Massachusetts.*

*Feedback on this article? Email [apsobserver@psychologicalscience.org](mailto:apsobserver@psychologicalscience.org) or scroll down to comment.*

## References

Carhart-Harris, R., Giribaldi, B., Watts, R., Baker-Jones, M., Murphy-Beiner, A., Murphy, R., Martell, J., Blemings, A., Erritzoe, D., & Nutt, D. J. (2021). Trial of psilocybin versus escitalopram for depression. *New England Journal of Medicine*, 384(15), 1402–1411.

<https://doi.org/10.1056/NEJMoa2032994>

Dahan, O. (2020). Birthing consciousness as a case of adaptive altered state of consciousness associated with transient hypofrontality. *Perspectives on Psychological Science*, 15(3), 794–808.

<https://doi.org/10.1177/1745691620901546>

Harrington, M. O., Ashton, J. E., Sankarasubramanian, S., Anderson, M. C., & Cairney, S. A. (2020). Losing control: Sleep deprivation impairs the suppression of unwanted thoughts. *Clinical Psychological Science*, 9(1), 97–113. <https://doi.org/10.1177/2167702620951511>

Kempermann, G., Gage, F. H., Aigner, L., Song, H., Curtis, M. A., Thuret, S., Kuhn, H. G., Jessberger, S., Frankland, P. W., Cameron, H. A., Gould, E., Hen, R., Abrous, D. N., Toni, N., Schinder, A. F., Zhao, X., Lucassen, P. J., & Frisén, J. (2018). Human adult neurogenesis: Evidence and remaining questions. *Cell Stem Cell*, 23(1), 25–30. <https://doi.org/10.1016/j.stem.2018.04.004>

Lindahl, J. R., Fisher, N. E., Cooper, D. J., Rosen, R. K., & Britton, W. B. (2017). The varieties of contemplative experience: A mixed-methods study of meditation-related challenges in Western Buddhists. *PLOS ONE*, 12(5), e0176239. <https://doi.org/10.1371/journal.pone.0176239>

Spalding, K. L., Bhardwaj, R. D., Buchholz, B. A., Druid, H., & Frisén, J. (2005). Retrospective birth dating of cells in humans. *Cell*, 122(1), 133–143. <https://doi.org/10.1016/j.cell.2005.04.028>

Taves, A. (2020). Mystical and other alterations in sense of self: An expanded framework for studying nonordinary experiences. *Perspectives on Psychological Science*, 15(3), 669–690.

<https://doi.org/10.1177/1745691619895047>

Verdonk, C., Trousselard, M., Canini, F., Vialatte, F., & Ramdani, C. (2020). Toward a refined mindfulness model related to consciousness and based on event-related potentials. *Perspectives on Psychological Science*, 15(4), 1095–1112. <https://doi.org/10.1177/1745691620906444>