MIND FOUNDATION

Dissolving ego dissolution

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> The public often runs off with a compelling story before the scientific results are in. This is equally true for the ego narrative as it is for the DMN narrative.

It has been three years since Michael Pollan's *How to Change Your Mind* launched psychedelic science back into mainstream awareness. The book popularized the notion that the Default Mode Network (DMN), the brain network that becomes active when people are not engaged in a task and let their mind wander is the seat of the ego or self, and that psychedelics work primarily by "shutting it down." In it Pollan writes:

"It appears that when activity in the default mode network falls off precipitously, the ego temporarily vanishes, and the usual boundaries we experience between self and world, subject and object, all melt away."1

Since the book's publication, the media has been flooded with stories framing ego death via DMN-silencing as the hallmark of the psychedelic experience.2 This framing has been so widely accepted as common knowledge among the psychedelic-minded general population that well-known psychedelic retreats now incorporate lines like the following into their mission statements: "[We] make the most of psilocybin's effects on the DMN by helping participants explore the freedom from egoic control in a safe, comfortable, and guided environment."3 By contrast, most psychedelic scientists, if pressed, will explain that the tie between the ego and the DMN is something of a myth, or at least an overblown narratives.

“I think that a lot of researchers are maybe barking up the wrong tree in terms of ego dissolution,” says David Yaden, PhD, a postdoctoral research fellow at Johns Hopkins Center for Psychedelic and Consciousness Research, in a 2020 interview with humanistic psychologist Dr. Scott Barry Kaufman. “The focus on the DMN is something that will probably not continue to be very helpful in terms of scientifically understanding why these experiences are so beneficial.”4

So, how did we get here, along with Pollan and others? And does it even matter that we’re here? What’s the harm, if any, in believing psychedelics shut down the DMN and dissolve the ego that is rumored to live there?

Ego dissolution and psychedelics

Handed down from Sufi Muslim and Buddhist traditions, ego death was adopted by Timothy Leary in the 1960s to describe the first stage, or “*bardo*” (Tibetan, intermediate or transitional state between death and rebirth) of drug-induced altered states of consciousness in his book *The Psychedelic Experience*: “complete transcendence—beyond words, beyond space-time, beyond self.”5 Leary describes subsequent stages as “periods of hallucinations” and finally “a rebirthing into routine reality.”5 Around the same time, although only indirectly related to psychedelics, the concept of “psychic death” was introduced by Carl Jung6 and comparative mythologist Joseph Campbell described the Hero’s Journey as a process of stripping one’s self in order to return changed to routine reality.7 In the 1970s, transpersonal psychologist Stanislav Grof offered the view that ego death should be the primary objective of psychedelic therapy.8 During the psychedelic research slump, spiritual author and speaker Eckhart Tolle continued to popularize ego death, equating it with freedom from suffering.

Sixty years after it was introduced to the West, ego death has become something of a competitive sport in certain circles, with entire online psychedelic forums devoted to comparing levels of its experience.2 As an anecdotal phenomenon during both psychedelic and non-psychedelic states, ego death is well-documented, but does current neuroscience research reflect our interpretation of this phenomenon as a “loss of self,” and is it really localized to one brain network?

Ego dissolution and the default mode network

Prof. Dr. Robin Carhart-Harris’s 2014 paper on the Entropic Brain (here is our blog post on this) was the first to argue that the experience of psychedelic states arises from a disintegration of the DMN.9 Also, Carhart Harris’s research group at Imperial College London published the first major study tying decreased DMN connectivity under LSD to ego dissolution.10 Since then, many other psychedelic researchers have jumped on board, investigating these links.11, 12

In a 2020 study on ego dissolution after psilocybin, Natasha Mason et al. from Maastricht University further found that glutamate concentrations in the medial prefrontal cortex and the hippocampus, two brain regions belonging to the DMN, correlated with positive and negative experiences of ego death, respectively.12 However, in interpreting these results, they state that “these areas were chosen based on previous anatomical, functional, and behavioral evidence implicating them as potential key regions in modulating the psychedelic experience.” In other words, regions outside the DMN were not considered specifically because the running research narrative did not include them—an approach that may favor deduction over discovery.

Can the link between ego dissolution, psychedelics, and the DMN really be fortified by such studies? When examined more closely, there appear to be a few holes worth patching up.

First off, despite decreases in connectivity being reasonably consistent across the research literature, these decreases are often not “selective” to the DMN. This means they happen in other brain networks too, including

the Salience Network, which plays a firmly established role in self-awareness.13 The effect sizes in these other networks are often larger than in the DMN. What's more, since measuring DMN activity is essentially measuring mind wandering that researchers often face the problem of having insufficient data to extract significant patterns from.

"It's an issue of small samples, where we're looking at 10-15 subjects," says Dr. Manoj Doss, a neuropsychopharmacologist at the Johns Hopkins Center for Psychedelic and Consciousness Research, referring to the limited scope of existing psychedelic studies in general. "What's even worse is that it's unconstrained cognition. If I'm on psychedelics, there's going to be a handful of things [my brain] might be doing. [While in the MRI scanner,] I could be paranoid, wondering what the experimenter wants out of me, that they can read my mind or something with the fMRI. There are also situations in which you're really going to enjoy the experience and be paying attention to the visuals you're getting. Or you're going to be really empathic thinking about your mom or whatever it is. So, if some sub-sample of the subjects is more likely to do any one of those things, that's going to result in massively different findings. So even just getting a baseline 'What do psychedelics do in resting state [fMRI]?' is a bit of an ill-fated endeavor."

What's more, the primary target of psychedelics—5-HT2A receptors—are expressed across the whole brain, not just in DMN regions. "It is conceivable that the DMN contributes to the (subjective) effects induced by psychedelics," says Dr. Katrin Preller, a psychedelics researcher at the University of Zurich, and member of MIND's Scientific Advisory Board, "but most likely only in interaction with other brain areas and networks."

With a whole brain to explore, and many regions seemingly impacted equally, there would seem to be a risk in perpetuating a narrative built on a shaky foundation, if only because it encourages a myopic focus on the DMN and draws attention away from other possibilities. "Unfortunately, Pollan's book already came out," Doss says, not in a way of denigrating Pollan's work, but to lament the fact that the public often runs off with a compelling story before the scientific results are in. This is equally true for the ego narrative as it is for the DMN narrative. "'Ego dissolution' is a very broad term that captures quite a few experiences related to the psychedelic state, from more focused changes in body perception to the complete feeling of unity or loss of self," says Preller. "For it to be useful in research and/or clinical settings, we need a better, more fine-grained definition of what we mean exactly when we are talking about ego dissolution."

To deepen the issue, consider that some substances that decrease DMN connectivity actually increase egoism, which is in direct opposition to the enhanced empathy reported under psychedelics: "Amphetamine can make people more egotistical, yet it decreases DMN connectivity," Doss says. "Alcohol decreases DMN connectivity and can do the same thing. The idea of the DMN being strictly the self and decreases in DMN being involved with ego dissolution … I don't know if that's useful."

The stories we tell ourselves

If you're not a scientist, however, what's the danger in believing your ego sits on a throne in the DMN, presiding over your existence until usurped by psychedelics? If a perceived experience of self-loss translates to beneficial outcomes, why should it matter so much that we challenge this narrative? For one thing, this story leads us to two false beliefs: that the self is a singular entity in the brain, and that the DMN has a singular function. Both statements couldn't be farther from the truth.

"One huge aspect of our selves is that we come from here [pointing to his body], not from the corner of the room," Doss says. "Another aspect of who you are is what you do. And that's going to be more involved with motor networks and Executive Control Networks. So, to narrow down the self to the DMN … I don't know if that's useful. Which is why a lot of us in cognitive neuroscience try to narrow down these networks and brain

regions to functions of performance on certain tasks. Which then constrains the inferences you can make regarding what specific aspects of the self the DMN is involved in rather than just overall 'self.'"

Perhaps most significantly, the DMN is now widely believed to direct social thought just as much, if not more than, self-referential thought.13 Kevin Tan, a PhD candidate at the Social Cognitive Neuroscience Lab at UCLA, shows in a preprint submitted to *Nature* that thinking about the self and thinking about others recruit a common neurocognitive pathway involving the DMN.14 "I think all the major brain networks are involved in social cognition, but the DMN plays the most crucial role," Tan says. "The DMN supports computations that actually do abstract social cognition, rather than just providing antecedents for it."

If we ignore this relationship, we ignore some compelling evidence for the fact that self-perception and social perception are interlinked, a finding which could change the way we approach mental health care beyond psychedelics. What we lose in pigeonholing brain networks isn't just the elegant, nuanced functioning of the brain for the sake of understanding its mechanics; it's also the philosophical, behavioral, and clinical significance of discovering which cognitive processes overlap with one another.

"We know it's a sin at this point to call the amygdala the 'emotion center,'" Doss adds. "Yet we still refer to these networks by how they were first described, in an easy way for all of us to understand. Even scientists like stories."

To shut down or connect?

Just because a theory becomes a paradigm doesn't mean that the theory is accurately represented. When examined closely, Carhart-Harris's own work does not conclusively identify the DMN as the main character in the story. For example, in a 2016 paper on ego dissolution and LSD, he and his colleagues propose that it may be the enhanced connectedness among networks, rather than the increased or decreased activity within one particular network, that leads to the experience of ego dissolution:

"LSD increased global integration by inflating the level of communication between normally distinct brain networks. The increase in global connectivity observed under LSD correlated with subjective reports of 'ego dissolution.' The present results provide the first evidence that LSD selectively expands global connectivity in the brain, compromising the brain's modular and 'rich-club' organization and, simultaneously, the perceptual boundaries between the self and the environment."15

It's worth noting that experiences of ego dissolution often go hand-in-hand with feelings of connectedness and merging, perhaps mirroring what's happening in the brain. Still, some might argue a distinct ego is needed to experience a loss of ego. These are fundamental questions of consciousness which can't be neatly packaged into a single narrative. More books like Pollan's will come and go as psychedelic science advances, but in order to stay grounded in that science, it's important to keep the full story unwritten.

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