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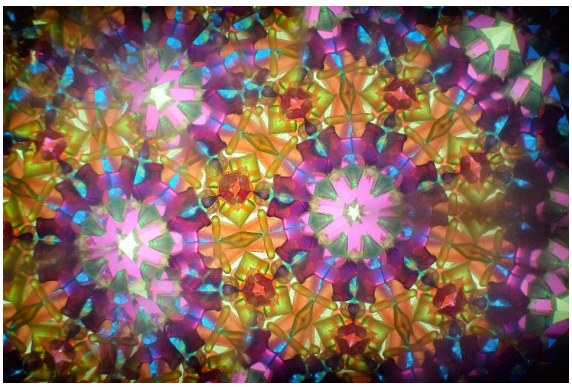
How Taking An Acid Trip Is Answering Big Questions About Brain Function



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The psychedelic drug LSD just helped researchers uncover the process the brain uses to attach meaning to experience. That's another big science win for a drug that's been clouded in controversy for more than half a century.

Psychedelics are proving to be fantastic tools for getting at the deepest, most abstract mysteries of brain function. The drugs have already helped scientists probe why some psychiatric disorders cause a blurring between one's sense of self and the environment. LSD, in particular, provides a way to track interactions between brain regions —across millions of connections—to understand the electro-chemical orchestra behind murky perceptions.

In the latest study, researchers asked participants to rate songs along a scale of meaningfulness (from "not at all" to "very"). The participants then took either LSD, a placebo or LSD plus a drug called ketanserin (which dampens LSD's effects) and listened to the songs, again evaluating their meaningfulness. While this was happening, the researchers examined the participants' brains using functional brain imaging.

Songs that were previously meaningless became meaningful to people taking LSD. The same effect was triggered and then erased for those taking LSD followed by ketanserin. Brain imaging allowed the researchers to track the effects to serotonin receptors, known as 5-HT2ARs, in brain areas thought crucial for enabling us to experience a sense of self.

Interpreting the findings will take time, but one early takeaway is that the process our brains undergo when something becomes meaningful to us is embedded in the same process that allows us to be an "I"—in other words, meaning-making is neurochemically hinged to identity.

The spooky, mechanistic part of this is that it seems the meaning-creation process can be squashed just as easily as it can be catalyzed. It's a matter of tapping the right brain receptors in the right proportion and sequence. This isn't cause for despair (we'll always be greater than the sum of our parts) but it tells us that even something as abstract as our experience of meaning has tangible, biological underpinnings.

"Our results increase our understanding of how personal relevance attribution is enabled in the brain," said lead study author Katrin Preller of the Zürich University Hospital for Psychiatry. "[We now know] which receptors, neurotransmitters and brain regions are involved when we perceive our environment as meaningful and relevant."

Next up for the researchers is to run similar tests with visual and tactile experiences to see if they match these results. All of this is leading to a clearer understanding of what happens when the meaning process takes odd turns, as it does in many psychiatric disorders, in hopes of developing more effective treatments.

The study was published in the journal *Current Biology*.

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