Groundbreaking Study Shows Your Brain (Though Perhaps Not Your Ego) on LSD

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By: Jon Queally, staff writer

Under the influence of LSD, the brain’s visual cortex has increased connectivity with other brain regions (right) than when imaged under placebo (left). (Image: Imperial College London)

You may or may not know what it feels like for your ego “to dissolve” under the effects of LSD, but now—with a brain-imaging study described as a historic breakthrough—you can at least know what it looks like.

In a study published on Monday in the Proceedings of the National Academy of Sciences, researchers from Imperial College London, in partnership with the Beckley Foundation, have for the first time visualized the effects of lysergic acid diethylamide, commonly called LSD, on the brain of users.

The study, according to a statement by the researchers, reveals what happens in the brain when people experience the complex visual hallucinations that are often associated with LSD state. They also shed light on the brain changes that underlie the profound altered state of consciousness the drug can produce.

A major finding of the research is the discovery of what happens in the brain when people experience complex dreamlike hallucinations under LSD. Under normal conditions, information from our eyes is processed in a part of the brain at the back of the head called the visual cortex. However, when the volunteers took LSD, many additional brain areas—not just the visual cortex—contributed to visual processing.

As the Guardian described, the phenomenon, “trippers experienced images through information drawn from many parts of their brains, and not just the visual cortex at the back of the head that normally processes visual information. Under the drug, regions once segregated spoke to one another.”

Amanda Feilding, Director of the Beckley Foundation, said: “We are finally unveiling the brain mechanisms underlying the potential of LSD, not only to heal, but also to deepen our understanding of consciousness itself.”

Dr. Robin Carhart-Harris, from the Department of Medicine at Imperial, who led the team, explained their findings this way:

Normally our brain consists of independent networks that...
Normally our brain consists of independent networks that perform separate specialized functions, such as vision, movement and hearing – as well as more complex things like attention. However, under LSD the separateness of these networks breaks down and instead you see a more integrated or unified brain.

Our results suggest that this effect underlies the profound altered state of consciousness that people often describe during an LSD experience. It is also related to what people sometimes call ‘ego-dissolution’, which means the normal sense of self is broken down and replaced by a sense of reconnection with themselves, others and the natural world. This experience is sometimes framed in a religious or spiritual way – and seems to be associated with improvements in well-being after the drug's effects have subsided.

Our brains become more constrained and compartmentalised as we develop from infancy into adulthood, and we may become more focused and rigid in our thinking as we mature. In many ways, the brain in the LSD state resembles the state our brains were in when we were infants: free and unconstrained. This also makes sense when we consider the hyper-emotional and imaginative nature of an infant's mind.

Professor David Nutt, another of the study’s lead researchers, championed the groundbreaking nature of the work. “Scientists have waited 50 years for this moment,” Nutt said in a statement. “For the first time we can really see what’s happening in the brain during the psychedelic state, and can better understand why LSD had such a profound impact on self-awareness in users and on music and art. This could have great implications for psychiatry, and helping patients overcome conditions such as depression.”

In a separate conversation with the Guardian, Nutt added, “This is to neuroscience what the Higgs boson was to particle physics. We didn’t know how these profound effects were produced. It was too difficult to do. Scientists were either scared or couldn’t be bothered to overcome the enormous hurdles to get this done.”

Though government- and university-sponsored research was pervasive in the 1940’s and 50’s, further study of psychedelics was greatly curbed after the 1960’s following the prohibition and criminalization of LSD and other hallucinogenics like magic mushrooms and MDMA.

On the methodology of this study, Gizmodo reports:

The researchers used several different imaging techniques, including fMRI and magnetoencephalography (MEG). Each participant was injected with either 75 micrograms of LSD (a standard “hit”) or a placebo consisting of a saline solution (the control group). As the volunteers tripped out in the brain scanners with their eyes closed, the machines recorded the inner workings of their acid-addled brains. Afterwards, each participant rated their visual hallucinations and altered states of consciousness.

These brain scans were done back in 2014. Since that time, Carhart-Harris and his colleagues have been pouring over this unprecedented trove of data.
The areas that contributed to vision were more active under LSD, which was linked to hallucinations. (Imperial College London)

Despite all the demonizing of psychedelics over the decades, a renewed scientific interest and a batch of a new research, as the Washington Post reported earlier this month, is showing that the possible upsides of such substances should not be ignored.

In addition to what the research on Monday revealed about how LSD users visualize, Gizmodo noted how another key finding “had to do with the phenomenon of ego dissolution, or what some LSD users refer to as ‘ego death.’”

“Psychedelics are a stark reminder that the sense of self that we have is kind of precarious,” Carhart-Harris told Gizmodo. “Under LSD, consciousness is still intact—but what’s missing is this sense of self, a sense of having an ego.”

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