This is your brain on LSD: Neuroimaging reveals how LSD affects brain activity

New study visualizes effects of LSD on brain activity for the first time.

Researchers with the Imperial College of London, working with the Beckley Foundation, have conducted a series of experiments allowing them to see how LSD (lysergic acid diethylamide) affects brain activity.

Researchers administered both LSD and placebo to 20 healthy volunteers, who had all previously taken some type of psychedelic drug. Their brains were then scanned using a number of techniques including fMRI and magnetoencephalography (MEG).

One of the major findings, which were published in Proceedings of the National Academy of Sciences (PNAS), shows what happens in the brains of people who experience visual hallucinations under LSD.

Under “normal” conditions, information is processed in the visual cortex, a part of the brain in the back of the head. But under LSD, many brain areas contributed to visual processing, according to the study’s brain scans.

Per Imperial College London:

Dr Robin Carhart-Harris, from the Department of Medicine at Imperial, who led the research, explained: “We observed brain changes under LSD that suggested our volunteers were ‘seeing with their eyes shut’ – albeit they were seeing things from their imagination rather than from the outside world.”
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The study also reveals what happens in the brains of people who report fundamental shifts in consciousness under LSD.

Under normal conditions, the brain consists of independent networks, which each perform separate functions, such as vision, hearing, movement and so forth.

Under LSD, however, researchers found the separate networks integrated into a more unified system.

Dr. Carhart-Harris explains:

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.

Researchers hope these findings will contribute to additional studies and scientific examination of how LSD and psychedelic compounds may be used to treat psychiatric disorders.

They say these compounds may be particularly useful for disrupting entrenched negative thought patterns that are commonly associated with depression or addiction.

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