

# Where religious belief and disbelief meet in the brain

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(PhysOrg.com) -- Researchers have found that the process of believing or disbelieving a statement, whether religious or not, seems to be governed by the same areas in the brain.

When it comes to religion, believers and nonbelievers appear to think very differently. But at the level of the brain, is believing in God different from believing that the sun is a star or that 4 is an even number?

While religious faith remains one of the most significant features of human life, little is known about its relationship to ordinary belief. Nor is it known whether religious believers differ from nonbelievers in how they evaluate statements of fact.

In the first neuroimaging study to systematically compare religious faith with ordinary cognition, UCLA and University of Southern California researchers have found that while the human brain responds very differently to religious and nonreligious propositions, the process of believing or disbelieving a statement, whether religious or not, seems to be governed by the same areas in the brain.

The study also found that devout Christians and nonbelievers use the same [brain regions](#) to judge the truth of religious and nonreligious propositions. The results, the study authors say, represent a critical advance in the [psychology](#) of religion. The paper appears Sept. 30 in the journal [PLoS ONE](#).

Sam Harris, who recently completed his doctoral dissertation in the lab of Mark Cohen, a professor of psychiatry at the UCLA Staglin Center for [Cognitive Neuroscience](#), was a lead author on the study. Jonas Kaplan, a research assistant professor at the USC's Brain and Creativity Institute, was the co-lead author.

The study involved 30 adults — 15 committed Christians and 15 nonbelievers — who underwent three functional MRI ([fMRI](#)) scans while evaluating religious and nonreligious statements as "true" or "false." The statements were designed to produce near perfect agreement between the two groups during nonreligious trials (e.g., "Eagles really exist") and near perfect disagreement during religious trials (e.g., "Angels really exist").

Contrasting belief and disbelief yielded increased activity in the ventromedial prefrontal cortex (VMPFC), an area of the brain thought to be involved in reward and in judgments of self-relevance.

"This region showed greater activity whether subjects believed statements about God, the Virgin Birth, etc., or statements about ordinary facts," the authors said.

The case for belief being content-independent was further bolstered by the fact that while the trial statements accepted by religious believers were rejected by nonbelievers, and vice versa, the brains of both showed the same pattern of activity for belief and disbelief.

A comparison of all religious with all nonreligious statements suggested that religious thinking is more associated with brain regions that govern emotion, self-representation and cognitive conflict in both believers and nonbelievers, while thinking about ordinary facts is more reliant upon memory retrieval networks. Activity in the brain's anterior cingulate cortex, an area associated with cognitive conflict and uncertainty,

suggested that both believers and nonbelievers experienced greater uncertainty when evaluating religious statements.

The study raises the possibility that the differences between belief and disbelief may one day be reliably distinguished by neuroimaging techniques.

"Despite vast differences in the underlying processing responsible for religious and nonreligious modes of thought," the authors write, "the distinction between believing and disbelieving a proposition appears to transcend content. These results may have many areas of application — ranging from the neuropsychology of religion, to the use of 'belief-detection' as a surrogate for 'lie-detection,' to understanding how the practice of science itself, and truth-claims generally, emerge from the biology of the human [brain](#)."

Harris is the author of two New York Times best-sellers, "The End of Faith" and "Letter to a Christian Nation," which have been published in more than 15 languages, and is the co-founder and CEO of the The Reason Project. His writing has appeared in Newsweek, the New York Times, the Los Angeles Times, the Times of London, the Boston Globe, the Atlantic and many other journals.

Other authors on the study included Cohen, Susan Y. Bookheimer and Marco Iacoboni, of UCLA, and Ashley Curiel, of Pepperdine University. The authors report no conflict of interest.

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