

# Study finds emotion reversed in left-handers' brains

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The way we use our hands may determine how emotions are organized in our brains, according to a recent study published in *PLoS ONE* by psychologists Geoffrey Brookshire and Daniel Casasanto of The New School for Social Research in New York.

Motivation, the drive to approach or withdraw from physical and social stimuli, is a basic building block of [human emotion](#). For decades, scientists have believed that approach motivation is computed mainly in the left hemisphere of the brain, and withdraw motivation in the right hemisphere. Brookshire and Casasanto's study challenges this idea, showing that a well-established pattern of [brain activity](#), found across dozens of studies in right-handers, completely reverses in left-handers.

The study used electroencephalography (EEG) to compare activity in participants' right- and left hemispheres during rest. After having their [brain waves](#) measured, participants completed a survey measuring their level of approach motivation, a core aspect of our personalities. In right-handers, stronger approach motivation was associated with greater activity in the left hemisphere than the right, consistent with previous studies. Left-handers showed the opposite pattern: Approach motivation was associated with greater activity in the right hemisphere than the left.

## A New Link Between Motor Action and Emotion

Most cognitive functions do not reverse with handedness. Language, for

example, is mainly in the left hemisphere for the majority of right- and left-handers. However, these results were not unexpected.

"We predicted this hemispheric reversal because we observed that people tend to use different hands to perform approach- and avoidance-related actions," says Casasanto. Approach actions are often performed with the [dominant hand](#), and avoidance actions with the nondominant hand.

"Approach motivation is computed by the hemisphere that controls the right hand in right-handers, and by the hemisphere that controls the left hand in left-handers," says Casasanto. "We don't think this is a coincidence. Neural circuits for motivation may be functionally related to circuits that control hand actions – emotion may be built upon neural circuits for action, in evolutionary or developmental time."

The authors caution that these data show a correlation between emotional motivation and motor control, and that further studies are needed to establish a causal link.

## **Implications for the treatment of depression and anxiety disorders**

To treat depression and anxiety disorders, brain stimulation is used to increase neural activity in the patient's left hemisphere, long believed to be the "approach hemisphere." "Given what we show here," says Brookshire, "this treatment, which helps right-handers, may be detrimental to left-handers – the exact opposite of what they need." The discovery that approach motivation reverses with handedness may lead to safer, more effective neural therapies for left-handers, according to Brookshire, "it's something we're investigating now."

**More information:** [DOI: 10.1371/journal.pone.0036036](https://doi.org/10.1371/journal.pone.0036036)

Provided by The New School

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