

# Research shows that attention, imagination equally important for creativity

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The role that attention plays in generating new and useful ideas is controversial among neuroscientists. Some neuroimaging studies have shown that creativity involves more cognitive control, or focused attention. Other studies have shown it involves less.

Scott Barry Kaufman, scientific director of the Imagination Institute at

the University of Pennsylvania's Positive Psychology Center, has contributed to a study showing that creative thinking involves both deliberate focus, through the brain's "executive network," and spontaneous imagination, through its "default network."

The Imagination Institute was founded in 2014 as a way to stimulate scientific research on imagination, creativity and thinking related to possible futures and alternate perspectives.

"These traits are critical for people's growth and well being, but they haven't been studied as rigorously as other types of mental processes," Kaufman said. "By better understanding how creative thinking arises in the brain, we can develop better ways of encouraging it."

The study, published in *Nature Scientific Reports*, was led by graduate student Roger Beaty and professor Paul Silvia, both of the University of North Carolina at Greensboro's Department of Psychology. In addition to Kaufman, they collaborated with Mathias Benedek at the University of Graz in Austria.

"These results suggest that [creative thinking](#) involves the ability to exercise control over our imaginations," Beaty said.

The researchers used functional magnetic resonance imaging technology to explore the interactions between brain regions. Participants in the study completed two tasks while having their brains scanned. They were asked to find creative uses for everyday objects, such as a brick, or to simply think about the objects' physical characteristics.

The results showed that creativity doesn't happen in just one region of the brain. Rather, it involves cooperation between brain networks linked to both focused attention and imaginative thinking. However, the researchers found that the "imagination" network only showed

cooperation with the "attention" network later in the task, not at the beginning, suggesting that the creative thought process involves an early stage of unconstrained imagination.

"Although imaginative thinking can help us generate different possible solutions to a problem, we then have to evaluate these ideas to determine whether they will actually work and revise them accordingly," Beaty said. "Our results suggest that [imagination](#) may benefit from these more controlled aspects of thinking, especially when we are trying to come up with creative ideas that are both novel and useful."

**More information:** "Default and Executive Network Coupling Supports Creative Idea Production." *Scientific Reports* 5, Article number: 10964 [DOI: 10.1038/srep10964](https://doi.org/10.1038/srep10964)

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