

# Study shows creativity is state of mind that can be trained

April 19 2018, by Adela Talbot

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Credit: George Hodan/public domain

As an undergraduate student at York University, Joel Lopata was studying film production and jazz performance when a discrepancy became apparent.

"I noticed students in the jazz program were really developing a language of creative engagement, whereas in the film program, we weren't having

the same education. It was a lot more theoretical than practical, and a lot less creative and innovative," said Lopata, who received his Ph.D. in Education from Western in 2015.

Improvisation, a key aspect of jazz music, was actively taught to students and Lopata wanted to see what role it played in one's capacity for creativity. He came to Western to pursue a master's degree, followed by a Ph.D., researching creativity and creative engagement, specifically focusing on the creative mental space he observed in jazz performance.

"I wanted to see how that (creative mental space) could be facilitated into education more generally, and in higher education, especially," he said.

Lopata's doctoral research, recently published in the journal *Neuropsychologia*, suggests creativity is a state of mind – and one that you can train. The study was done in conjunction with Education professor Elizabeth Nowicki and Psychology professor Marc Joanisse of the Brain and Mind Institute.

Participants, comprised of 22 pianists (13 men and 9 women), were asked to either passively listen to, playback, or improvise jazz melodies. During each performance, researchers measured participants' brainwaves using electroencephalography (EEG) caps.

Synchronization of brainwaves occurred in trained musicians when each was playing back a previously heard melody, but there was more electrical activity when they were improvising. This was not the case for untrained pianists.

When expert musicians later listened to the recordings, they preferred improved performances which featured the highest level of synchronization.

The higher level of synchronization only occurred in pianists with formal improv [training](#), leading the researchers to speculate a specific and devoted focus on that skill helped them become more creative.

"We recorded EEGs while musicians – both with and without previous training in improvisation – improvised freely, compared to when they played back pieces of music more deliberately," Lopata said.

"What we found was a distinct pattern of activity in the front right brain area, which suggests that while these musicians were improvising creatively, they were in what we call 'a creative mental state.' They were in a distinct state of consciousness different from when they are thinking more rationally and logically. This has implications for both our understanding of creativity and creative engagement and also for whether or not that can be taught," he continued.

There are two questions that emerge out of Lopata's research: What's going on when people are being creative? Is creativity something that's innate or is it something that can be taught and learned?

Research evidence he gathered speaks to both of them, Lopata noted.

"When artists – or people in general – work across domains, they are engaging spontaneously and creatively and they are in what can be called a distinct creative mental space, which is distinct and different from a rational, logical and analytical state, which people are in, not just when copying music, but when they are using critical thinking skills," he explained.

"There are two different modes (in the brain) and we only observed that (creative mode) in individuals that had previous training in improvisation – not in those that didn't have that training. That suggests that that creative mental state is something that is likely best learned through

formal training."

How we nurture that warrants future investigation, Lopata added, noting he would like to look at different teaching practices and curricula that would best nurture an individual's creative mental state.

But what about the role of genetics? As is the case with one's IQ, the capacity has to be there first in order for skill to develop, he continued.

"It appears that genetics are playing a mediating role, meaning that you have to have the aptitude for creative thinking in the first place in order to have it developed. Anybody can learn to become better at [creativity](#), but our evidence supports the notion that in order to be creative at elite levels, in order to have elite creative performance, you have to have that aptitude in the first place, that genetic, natural ability and then, it is best if they are nurtured in formal training into fully developed talents," Lopata said.

**More information:** Joel A. Lopata et al. Creativity as a distinct trainable mental state: An EEG study of musical improvisation, *Neuropsychologia* (2017). [DOI: 10.1016/j.neuropsychologia.2017.03.020](https://doi.org/10.1016/j.neuropsychologia.2017.03.020)

Provided by University of Western Ontario

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