

Body movements can influence problem solving (w/Videos)

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University of Illinois psychology professor Alejandro Lleras led research that demonstrated that physical movements, such as eye movements or arm swinging, can aid in problem solving. Photo by L. Brian Stauffer

Swinging their arms helped participants in a new study solve a problem whose solution involved swinging strings, researchers report, demonstrating that the brain can use bodily cues to help understand and solve complex problems.

The study, appearing in an upcoming issue of the journal *Psychonomic Bulletin & Review*, is the first to show that a person's ability to solve a problem can be influenced by how he or she moves.

"Our manipulation is changing the way people think," said University of Illinois <u>psychology</u> professor Alejandro Lleras, who conducted the study



with Vanderbilt University postdoctoral researcher Laura Thomas, his former graduate student. "In other words, by directing the way people move their bodies, we are - unbeknownst to them - directing the way they think about the problem."

Even after successfully solving the problem, almost none of the study subjects became consciously aware of any connection between the physical activity they engaged in and the solution they found.

"The results are interesting both because body motion can affect higher order thought, the complex thinking needed to solve complicated <u>problems</u>, and because this effect occurs even when someone else is directing the movements of the person trying to solve the problem," Lleras said.

The new findings offer new insight into what researchers call "embodied cognition," which describes the link between body and mind, Lleras said.

"People tend to think that their mind lives in their brain, dealing in conceptual abstractions, very much disconnected from the body," he said. "This emerging research is fascinating because it is demonstrating how your body is a part of your mind in a powerful way. The way you think is affected by your body and, in fact, we can use our bodies to help us think."

In the study, the researchers asked study subjects to tie the ends of two strings together. The strings dangled from ceiling rafters and were so far apart that a person grasping one could not reach the other. A few tools were also available: a paperback book, a wrench, two small dumbbells and a plate. Subjects were given a total of eight, two-minute sessions to solve the problem, with 100 seconds devoted to finding a solution, interrupted by 20 seconds of exercise.



"Our cover story was that we were interested in the effects of exercise on problem-solving," Lleras said.

Some subjects were told to swing their arms forward and backward during the exercise sessions, while others were directed to alternately stretch one arm, and then the other, to the side. To prevent them from consciously connecting these activities to the problem of the strings, the researchers had them count backwards by threes while exercising. (To see videos of the problem-solving and exercise sessions, click on the video links.)

The subjects in the arm-swinging group were more likely than those in the stretch group to solve the problem, which required attaching an object to one of the strings and swinging it so that it could be grasped while also holding the other string. By the end of the 16-minute deadline, participants in the arm-swinging group were 40 percent more likely than those in the stretch group to solve the problem.

"By making you swing your arms in a particular way, we're activating a part of your brain that deals with swinging motions," Lleras said. "That sort of activity in your <u>brain</u> then unconsciously leads you to think about that type of motion when you're trying to solve the problem."

Previous studies of embodied cognition have demonstrated that physical movements can aid in learning and memory or can change a person's perceptions or attitudes toward information, Lleras said.

Other studies by Lleras and his colleagues also have shown that directing a person's eye movements or attention in specific patterns can also aid in solving complex problems, but this is the first study to show that directed movements of the body can, outside of conscious awareness, guide higher-order <u>cognitive</u> processing, he said.



"We view this as a really important new window into understanding the complexity of human thought," he said. "I guess another take-home message is this: If you are stuck trying to solve a problem, take a break. Go do something else. This will ensure that the next time you think about that problem you will literally approach it with a different mind. And that may help!"

<u>More information:</u> Thomas and Lleras' article in *Psychonomic Bulletin & Review* is titled "Swinging Into Thought: Directed Movement Guides Insight in Problem Solving."

Source: University of Illinois at Urbana-Champaign (<u>news</u> : <u>web</u>)

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