Brain-game experiments test creativity and surprise scientists

Most of us have experienced writer's block at some point. We will sit down to write, paint or make something only to find we can't. Most frustrating of all, the more effort and thought we put into it, the harder it may become. Now neuroscientists might have found a clue about why it is so difficult to force that creative spark.

Scientists at Stanford University recently set out to explore creativity in the brain. They came up with surprising findings. Their study suggests that the cerebellum, the brain region that controls muscles and movement, is also involved in creativity. If so, the discovery could change our understanding of the way the brain works.

The Brain Game Experiment

The cerebral cortex is the outer layer of the brain. Scientists believe it is the part of the brain that helps us to think, memorize and learn languages. There are two parts of the cortex. It is thought that these two parts affect how we think. People who think creatively are thought of as being "right-brained." People who think logically are often called "left-brained."

Three years ago, Grace Hawthorne wanted to do an experiment. She is a professor of design at Stanford University Institute of Design. She approached Allan Reiss, a behavioral scientist at Stanford's School of Medicine. Hawthorne wanted to measure whether or not her design class made students more creative. So Reiss, inspired by the word game Pictionary, developed an experiment.

Participants in the study were placed into a functional magnetic resonance imaging machine, or an fMRI. This machine can produce pictures of activity inside the brain. While inside the machine, they were asked to draw pictures based on action words like vote, exhaust and salute. They had 30 seconds for each word. They also drew a zigzag, or crooked, line to show basic brain activity for the task of drawing. It is used for comparison, and is known in experiments as a "control."

The participants later ranked each word picture based on its difficulty to draw. Then people at the design school looked at the drawings and scored them for creativity. Scientists at Stanford looked at the fMRI scans for brain activity patterns.

Don't Think, Just Do It

The results were surprising: the prefrontal cortex, traditionally associated with thinking, was busiest for the most difficult drawings. Even more surprising, the cerebellum was busiest for the drawings the participants scored highest on for creativity. Basically, the less the participants thought about what they were drawing, the more creative their drawings were.

Manish Saggar, who helped write the Stanford study, said: "The more you think about it, the more you mess it up."

If the cerebellum takes part in creativity, it could change our understanding of how the brain works. We used to think it was only involved in controlling the body and was not connected to some parts of the brain. Newer studies on the human brain, however, show something different. They show that as humans evolved, the cerebellum connected with many different brain regions.

The findings may show that the different brain regions are interconnected. Scientists may need to develop new models for how the brain works, including creativity.

Our Multitasking Brains

The study provided evidence for the “practice-makes-perfect” way of brain activity. For instance, the motor cortex is the part of the cerebral cortex that plans movement. We know that the motor cortex is busy when we are learning new movements. Then the cerebellum is responsible for coordinating the motion. This frees up the brain's motor cortex for further learning. Cerebellar activity decreased when study participants faced a challenging task. It increased when the task required little thought. This supports the theory that the cerebellum works in thinking in much the same way it works in controlling the body's movements.

The study did have a number of limitations, however. First, scientists do not agree on what creativity means, so to truly measure it they must decide on a meaning for creativity.

Second, the cerebellum controls muscles and motion. Because of that, the creativity of the drawings could have been due to the complexity of the physical motions required to draw them.

The control used in the experiment, drawing a zigzag, was probably less difficult than the drawings of the words. Future experiments should attempt to match the tasks more closely with the control.

Calling On More Research

Finally, the study measured only visual creativity. To better understand different brain regions’ involvement in creativity, future studies will have to examine brain activity patterns involved in other forms of creativity, such as music or verbal creativity.

Scientists hope the Stanford experiment can be improved and repeated. Then it will have advanced our understanding of the how the brain develops creativity and other forms of advanced thinking.