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Passive learning imprints on the brain just like active learning

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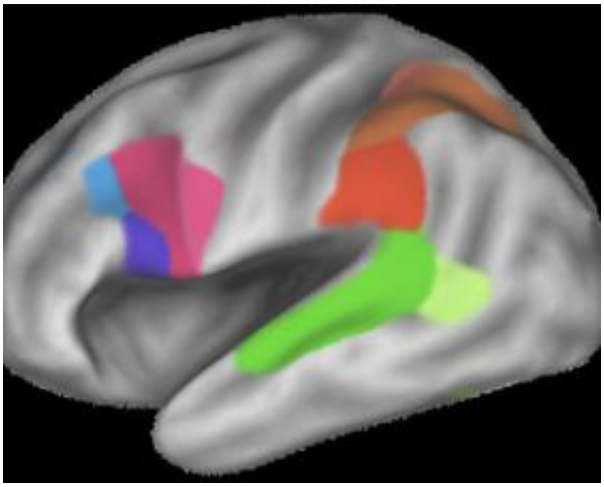

A view of the left hemisphere of the brain (with the left part of the image being the forward part of the brain) illustrating the Action Observance Network regions. (image courtesy Emily Cross)

It's conventional wisdom that practice makes perfect. But if practicing only consists of watching, rather than doing, does that advance proficiency? Yes, according to a study by Dartmouth researchers.

In a study titled "Sensitivity of the Action Observation Network to Physical and Observational Learning" published in the journal *Cerebral Cortex* in May 2008, Dartmouth researchers determined that people can acquire motor skills through the "seeing" as well as the "doing" form of learning.

"It's been established in previous research that there are correlations in behavioral performance between active and passive learning, but in this study we were surprised by the remarkable similarity in brain activation when our research participants observed dance sequences that were actively or passively experienced," says Emily Cross, the principal investigator and PhD student at Dartmouth. Cross, who earned her degree in June, is currently a post-doctoral fellow at the Max Planck Institute for Cognitive and Brain Sciences in Leipzig, Germany.

Cross and her collaborators used a video game where players have to move in a particular sequence to match the position of arrows on the screen, similar to the popular Dance Dance Revolution game. The researchers measured the skill level of participants for sequences that were actively rehearsed daily, and a different set of sequences that were passively observed for an equivalent amount of time. Brain activity when watching both kinds of sequences (as well as a third set of sequences that were entirely unfamiliar) was captured using fMRI, functional magnetic resonance imaging. The study focused on the Action Observance Network (AON) in the brain, a group of neural regions found mostly in the inferior parietal and premotor cortices of the brain (near the top of the head) responsible for motor skills and some memory functions.

"We collected fMRI data before and after five days of both visual and physical training," says Cross, "and there was common AON activity when watching the practiced and observed dance sequences."

This research contributes to a growing body of study about how people learn and how best to help people with brain injuries. Cross explains that future studies might consider how such overlap between physical and observational learning at the brain level can improve upon rehabilitation therapies for individuals affected by physical or neurological injury.

Source: Dartmouth College