Scientists ‘reading minds’ to discern what’s real

By Byron Spice
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What you are doing and what you think you are doing aren’t always the same thing, and a University of Pittsburgh neurobiologist has identified what he believes are the areas of the brain where this mismatch between reality and perception plays out.

The experiments, reported in Friday’s issue of the journal Science, make use of techniques that come close to “reading minds,” enabling Andrew Schwartz and his fellow researchers not only to see that parts of the brain are active, but to actually discern what is being thought by monitoring the electrical activity of brain cells.

The same monitoring technique might eventually be used to control artificial limbs, enabling users to move a prosthetic arm or leg just by thinking about it.

In this new study, however, Schwartz and his colleagues focused on studying perception. They created an illusion that made the subjects, including humans and macaque monkeys, think they were tracing ellipses with their hands, though they actually were moving their hands in a circular motion.

By monitoring groups of nerve cells in the monkeys, the researchers were able to see that the area of the brain’s motor cortex that controls hand motion was indeed directing the hand to make circles, while trajectory
Differentiating perception, reality

“Now we have a way of identifying perception and differentiating that from reality” in separate brain structures.

— Andrew Schwartz, University of Pittsburgh neurobiologist

In the experiments involving perception, the human and monkey subjects were directed to use a hand-controlled cursor to trace an oval that was projected on a computer monitor so that it appeared to float shoulder-high in space. As they traced the oval, however, their view of their hands was blocked.

Each traced the oval five times. With each pass, the researchers adjusted the cursor to exaggerate horizontal movements until, by the fifth pass, the subjects needed to move their hands in a circle to move the cursor around the oval shape they saw. Afterward, the human subjects consistently said they were moving their hands in an elliptical motion during the experiment, unaware that their hands actually were moving in circles.

Presumably, that’s what the monkeys thought as well. The animals can’t tell you what they’re doing,” said Schwartz, who co-authored Friday’s report with Pitt’s Dr. Anthony Reina and Daniel Moran of Washington University.

Monkey moves

In an experiment involving perception, University of Pittsburgh researchers had monkeys trace an oval shape, but blocked their view of their hands, forcing them to view a computer image instead. The researchers create an illusion that the monkeys thought they were moving their hands in an elliptical pattern, when actually they were moving in circles.

Source: Andrew Schwartz

James Hilsen/Pitt-Gazette

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