With Brain Positioning system, lost keys no longer an issue

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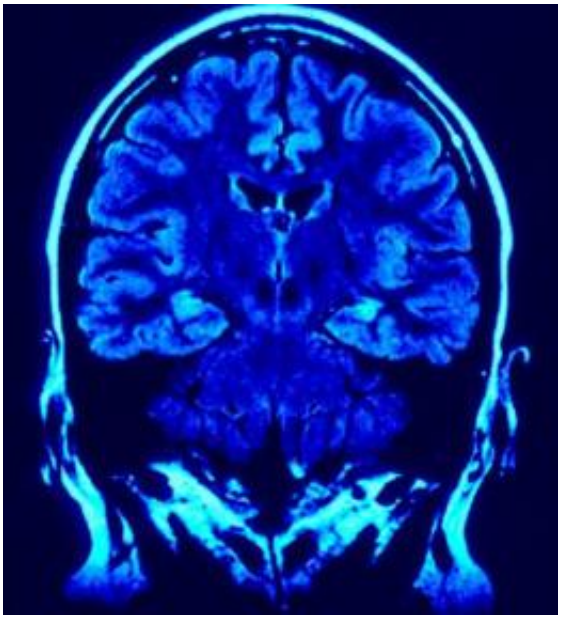

The human brain is a three-pound paradox: We use it every moment of our lives, yet so much about our brains remains a mystery to us. Credit: Morguefile

Imagine if getting lost became a thing of the past. Even the common search for lost keys would no longer seem like a lost cause. Well, cognitive psychologist Amy Shelton of Johns Hopkins University is doing research that might help us keep track of ourselves, as well as our things. "What we're trying to study is when you get around in the world and in your day-to-day environments, how is it that you learn them," she explains. With support from the National Science Foundation (NSF),

Shelton is exploring some of the ins and outs of our brains' navigation system.

On the day *Science Nation* visited, we found Shelton at the Kennedy Krieger Institute. This is where she comes to examine the brains of people willing to spend time learning their way through a virtual world that is projected on a small screen. They also have to lie still within the confines of an MRI while their brain blood flow is analyzed. Today, one of Shelton's research associates, Scott Clark, is the one willing to have his head examined, so Shelton can demonstrate one of her experiments.

"He's watching a movie of an observer moving around and, as the observer moves around, you see these items pop up," she says. "There's a shopping cart, and a palm tree ... and the job is to learn where in the environment those items are located."

Later, Clark takes an easy retrieval test and that reveals some hard evidence about how he learns the world around him. Does he make a map in his head, known as a place learner? Or does he follow the same route over and over again like a creature of habit, known as a response learner?

"What we look for is: are they taking the shortcuts or are they sticking to their familiar path," continues Shelton. "And this tends to be very diagnostic." The test requires the subject to recall the location of items that are in the virtual world. Shelton points out that if the individuals take short cuts to get to items, they tend to be place learners. But if they take familiar paths or routes, they would be response learners.

The MRI images Shelton takes can easily distinguish between place learners and response learners. "The hippocampus is more active or sort of pops up for people who are showing place learning on that test: who are taking detours or who are using space more flexibly. Whereas the

caudate, is more active for people who are creatures of habit: using the familiar routes over and over again," she says.

The hippocampus and caudate are parts of the brain.

Shelton believes that her research will help develop better memory techniques. "By understanding the different kinds of learning mechanisms and, in particular, what kinds of advantages and disadvantages each type of learning conveys, we can start to tailor people's GPS systems to play to their advantages, she adds."

If Shelton has her way, getting lost might get a whole lot harder.

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