

# Our brains have multiple mechanisms for learning

July 14 2011

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(Medical Xpress) -- One of the most important things humans do is learning this kind of pattern: when A happens, B follows. A new study, which will be published in an upcoming issue of *Psychological Science*, a journal of the Association for Psychological Science, examines how people learn, and finds that they use different mental processes in different situations.

“There’s a long history in the field of psychology of two different approaches to thinking about how we learn,” says James McClelland of Stanford University, who cowrote the paper with graduate student Daniel Sternberg. One is learning by association; Pavlov’s dog learned to associate food with the sound of a bell. “You learn things because they occur together in time,” McClelland says. In the brain, this probably happens when the neurons that are associated with food and the sound of the bell form a connection.

But there’s another way to learn, too, McClelland says. “If you go into a restaurant, eat two different foods, and get sick, you don’t know which one it was. It could have been the peanut sauce or the shrimp. If you go out the next day and eat shrimp and don’t get sick, you learn, aha, it’s the peanuts that make you sick. But you’re using an explicit reasoning process there.” The experience with the shrimp indirectly influenced what you know about the peanuts.

In practice, these two types of learning often look almost the same – indeed, both types can produce indirect effects as in the shrimp—peanut

sauce example. So McClelland and Sternberg devised an experiment to separate the two kinds of [learning](#). They had people watch a computer screen as objects appeared, singly or in pairs. Sometimes they were followed by a dot. Participants did two different kinds of tasks. They were either given as much time as they wanted to predict whether the dot was coming, or they were told to react quickly to its appearance, something they do better if they have learned which objects tend to be followed by the dot. Some people were instructed that some objects could independently cause the dot to appear; other people were only told to pay attention to the objects.

The results from the experiment show that how people apply what they've learned in a new situation depends on what kind of task they're doing. If the person had as much time as they needed to make a prediction, they only showed an indirect effect if they received the independent cause instructions. On the other hand, if they were forced to react quickly, they showed an indirect effect whether or not they received the independent cause instructions.

“I believe that a huge amount of our cognitive life is pretty automatic,” McClelland says. “Something appears in our visual field or we hear somebody’s voice and it triggers associations or reactions.” So we may learn to associate the sight of a particular food with eating something delicious, or we may learn to associate a particular face with bad feelings. “It wasn’t like we deliberated to come up with these. But at the same time, it’s just not enough to say that’s all there is to it. Of course human beings sit and think.” He suspects that when people learn, we use both of these processes to do—maybe different processes in different situations, or a blend of the two.

Provided by Association for Psychological Science

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