SCIENCE & TECHNOLOGY

Speeding Up Memories

THE SOURCE: "Schemas and Memory Consolidation" by Dorothy Tse, Rosamund F. Langston, Masaki Kakeyama, Ingrid Bethus, Patrick A. Spooner, Emma R. Wood, Menno P. Witter, and Richard G. M. Morris, and "Rapid Consolidation" by Larry R. Squire, in ***Science***, April 6, 2007.

Anyone with an unusual name has experienced the frustration of trying to get it across to a new acquaintance: The hearer betrays bewilderment, seems to be mentally shuffling through a card file of all previously known names, and settles on some remote approximation or gives up entirely. It's as if names can only be remembered if someone is already familiar with similar appellations.

The notion that the ability to remember new information often depends on prior knowledge of the topic is well known. Now, researchers in Edinburgh, Tokyo, and Trondheim, Norway, have conducted a study that helps answer one of the most important questions in neuroscience: Why is it that the more people know, the more they can learn?

Long ago, British psychologist Frederick Bartlett laid out a framework for how people remember. In a 1932 paper, he identified frameworks of existing knowledge or "schemas" in the brain into which newly acquired information could be incorporated, writes neuroscientist Larry R. Squire. What wasn't clear was how the biology of the mental circuitry actually worked.

Subsequent research showed that the initial learning of facts and events is recorded in a part of the brain called the hippocampus. As time passes, a permanent memory is constructed in a different, deeper part of the brain, the neocortex. It is the neocortex that holds the framework of knowledge that has been built up from many experiences, and the neocortex was, until now, considered a slow learner.

The research conducted by the eight authors of "Schemas and Memory Consolidation" investigated how rats remembered to find food in a maze. The rats were given a sample of one of six different-flavored pellets such as bacon or banana in a "start box" and could get more of the same treat by going to the correct sand pit and digging it up. The rodents practiced for six weeks, during which a "schema" of how to remember the locations of each flavor (even when the experimental arena was rotated slightly) built up in their long-term memories. Then two new flavors were introduced, and the rats remembered the locations after only a single trial.

When researchers removed almost all of the rats' hippocampus where initial memories are stored, the rodents not only still found their way to the original six locations but to the two new ones, even though they had been introduced only two days earlier. Previously, research had shown that the buildup of a schema for remembering took at least a month in rats, and several years in humans. Dorothy Tse, Rosamund F. Langston, and their colleagues theorize that the rats beat the clock on remembering the two new flavor locations because a framework for remembering them was already in place.

EXCERPT

The Glamour of Ink

Because progress has made communication so efficient, the prestige of inconvenience extends to personal life. . . . Just as luxury watches remain in demand while most people carry cell phones that give the time with virtually observatory-standard accuracy, the Web will never destroy older media, because their technical difficulties and risks help create glamour and interest. . . . The possibility follows that the more sophisticated students become as users of search engines and online databases, the more likely they will become readers, and perhaps buyers, of books. The knowledge-hungry person will need and appreciate print, just as many serious readers of traditional books in an older generation became the gurus of today's electronic scholarship.

—**EDWARD TENNER**, author of *Our Own Devices: How Technology Remakes Humanity* (2003), in ***The Chronicle Review*** (March 9, 2007)