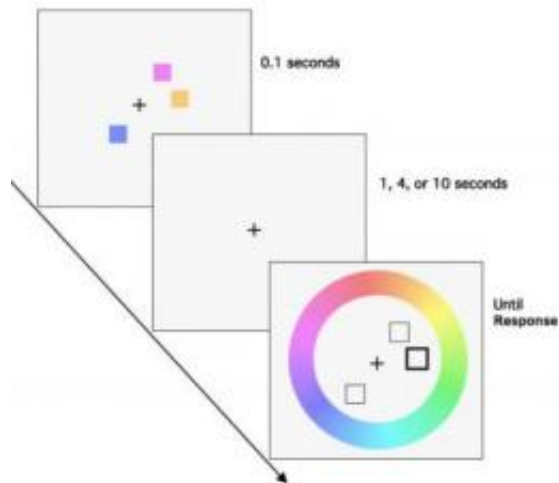


# Some Short-term Memories Die Suddenly, No Fading

April 28 2009



People who viewed these colored squares for a tenth of a second could usually accurately match the color they'd seen to a point on the color wheel after 1 and 4 second intervals. At 10 seconds, some people still made accurate matches, while most made random guesses. The results indicate that short-term visual memory remains precise until it suddenly dies. Credit: Steve Luck/UC Davis

(PhysOrg.com) -- The human brain stores some kinds of memories for a lifetime. But when our eyes are open and looking at things, our gray matter also creates temporary memories that help us process complex tasks during the few seconds these visual memories exist. For decades, scientists have held that such short-term memories don't suddenly disappear, but grow gradually more imprecise over the course of several seconds.

Now researchers at the University of California, Davis, have found just the opposite. Their subjects retained temporary memories of an object's color or shape for at least four seconds. After that, the memories began to wink out like streetlights at daybreak, remaining quite accurate until they suddenly disappeared.

To test the accuracy of short-term visual [memory](#), Weiwei Zhang, a postdoctoral scholar, and Steve Luck, a professor of psychology, both at the UC Davis Center for Mind and Brain, devised a pair of tests, both of which could separately measure two things: the accuracy of a short-term memory and the probability that the memory still existed. Each test was given to 12 adults.

In the first test, three squares — each with a different color fill — flashed for a tenth of a second on a computer screen. After an interval of one, four or 10 seconds a wheel showing the entire spectrum of colors appeared on the screen. The three squares also reappeared, only now they were colorless and one of them was highlighted. Subjects were asked to recall the color of the highlighted square and click on the area of the wheel that most closely matched it. Each subject repeated this test 150 times for each of the three memory retention intervals.

When subjects retained a memory of the color, they clicked very close to it on the wheel — the distance between the click and the actual color indicating the accuracy of the memory. When color had disappeared from memory, however, subjects clicked at random on the wheel.

The second test was similar to the first, but used shapes instead of colors.

Published in the April issue of the journal *Psychological Science*, the study found that subjects “either had the memory or didn't have the memory,” Luck said, “and the probability of having it decreased between four and ten seconds. The memories did not gradually fade away.”

The finding provides insight into the underlying mechanisms behind memory formation and retention. “The memories are not like flashlights that get progressively weaker as the battery runs low,” Luck said. “They are more like a laptop computer that continues working at the same speed until it suddenly shuts down.” This could be important in everyday life, he explained, because it would provide a mechanism to help us avoid the confusion that might arise if we tried to make decisions on the basis of weak, inaccurate memories.

Zhang and Luck are currently incorporating these findings into a study of short-term memory dysfunction in people with schizophrenia.

The research was supported by a grant from the National Institute of Mental Health.

Provided by UC Davis ([news](#) : [web](#))

Citation: Some Short-term Memories Die Suddenly, No Fading (2009, April 28) retrieved 17 April 2024 from <https://medicalxpress.com/news/2009-04-short-term-memories-die-suddenly.html>

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