

When it comes to memory, quality matters more than quantity

February 4 2014

The capacity of our working memory is better explained by the quality of memories we can store than by their number, a team of psychology researchers has concluded.

Their analysis, which appears in the latest issue of the journal *Psychological Review*, helps clarify a long-standing debate in psychology about the capacity of our "[working memory](#)": Are the limits on the amount of information we can remember for a short period, such as a phone number or a snapshot of a traffic situation, best understood as a cap on the total number of memories we can store or, rather, as a limitation on their quality?

"Our findings show that we don't simply store a set number of items and then recall them near-perfectly," says Weiji Ma, an associate professor in NYU's Center for Neural Science and Department of Psychology, and the study's senior author. "Rather, we try to memorize all relevant objects, but the quality of these recollections is uneven and gets worse as we have to remember more."

Working memory (WM) has a similar function as random access memory (RAM) in computers, but its mechanisms are not nearly as well understood. In recent years, psychology researchers have come to contrasting conclusions on the limits of working memory. Some have posited that there a fixed number of memories we can store in there—for example, we may be able to store the positions of only four different cars in our working memory at any one time.

However, others have maintained that working memory's storage is not defined by the number of items it can hold; rather, these scholars see its limits as better defined by the quality of memories. For instance, in recalling the colors in a painting, we may remember seeing light blue in the work when, in fact, the actual color was teal. In other words, working memory's bounds are a matter of precision rather than quantity.

In an effort to resolve this debate, Ma and colleagues examined data from 10 previously conducted experiments across six different laboratories, in total consisting of more than 130,000 subject responses. In a typical experiment, subjects were asked to recall one of up to eight colors they had seen a few seconds ago—a well-established measurement for gauging memory. This allowed the researchers to test different models that explained the capacity of our working memory—that is, is it a function of quality or quantity?

"This is the first study in this area that uses this much data, and we hope that our data set can serve as a benchmark for future studies," explains Ma.

Their analysis showed that working memory capacity is best explained in terms of the quality of memories. This quality gradually diminished as subjects were asked to recall more and more colors. Contrary to what many textbooks claim, memory performance could not be explained by a fixed number of memories.

Ma does add a caveat, "Our results certainly don't mean that you always remember everything that matters. However, 'remembering everything a little bit' seems much closer to the truth than 'remembering a few things perfectly and others not at all'."

Ma points to how we navigate traffic in illustrating how quality matters in working [memory](#). When driving, we may store the positions of cars

and pedestrians, the colors of the street signs, and the distance to the next traffic light. However, quality of some of these memories may be quite high (e.g., the positions of other cars) while for others it may be poor (e.g., the color of the street signs).

Provided by New York University

Citation: When it comes to memory, quality matters more than quantity (2014, February 4)
retrieved 4 May 2024 from

<https://medicalxpress.com/news/2014-02-memory-quality-quantity.html>

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