

Short-term memory is more flexible than thought

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(Medical Xpress) -- A theory that has been widely accepted for many years can be overturned: our short-term memory does not limit itself to remembering four to seven things at the same time. Groundbreaking research demonstrates that we can remember far more elements at once. However, the more we remember the poorer the quality of the information we retain. NWO researcher Dr. Ronald van den Berg and his supervisor professor Whee Ky Ma conclude this on the basis of various experiments. The researchers recently published their findings in the renowned scientific journal *Proceedings of the National Academy of Sciences (PNAS)*.

Up until now it has been assumed that thanks to our short-term [memory](#) we could remember four to seven elements at once, such as numbers, letters or images. Anything else we wanted to remember was instantly forgotten. Recent research from Dutch [neuroscientists](#) Ronald van den Berg and Whee Ky Ma, both working at Baylor College of Medicine in Houston, overturns this established theory. "Our research shows it is not true that you either remember everything really well or not at all," explains Van den Berg. "Your [short-term memory](#) divides its attention over the several elements you want to remember, even if these are more than four elements. Due to the competition for attention there are gradations in how well you remember things. For example, later you might remember one thing partially, forget something else completely and remember a last thing perfectly."

Experiment

In one of the researchers' experiments, study subjects briefly saw circles with random colours on a [computer screen](#). They subsequently had to state which color they had seen at a certain point. The greater the number of colors that appeared on the screen, the more difficulty study subjects had in stating the correct color. The researchers subsequently tested a series of mathematical models on the data obtained. This revealed that the new theory was the most successful in explaining the answer pattern from the study subjects.

Quality versus quantity

"In effect it is just like watering plants with a watering can," explains Van den Berg. "The more plants there are the less water each can receive. The same is true for our memory: the more you want to remember, the less well each element is retained." Furthermore the quality of your memory of each element is subject to fluctuations. "For example, if you only have a limited amount of time to water your plants then you will not give each one exactly the same amount. That is also the case with the short-term memory: you remember one thing better than another," says Van den Berg.

Temporary buffer

Our short-term memory can be compared with the buffer in the computer. It ensures we retain information relevant for subsequent actions for several seconds to minutes. A football player who scans the field searching for the right path to the goal, imprints the position of his opponents in this scan. Without the several seconds of storage in the short-term memory it would be impossible for the footballer to remember where each player is located and to determine the route to the

goal.

Van den Berg carried out his research with a Rubicon grant from the Netherlands Organisation for Scientific Research. Rubicon offers scientists who have recently gained their PhD the opportunity to gain experience at a top institute in the Netherlands or abroad for a maximum period of two years. The aim of the programme is to keep talented researchers in science after they have completed their PhD research.

Provided by Netherlands Organisation for Scientific Research (NWO)

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