Limited short-term memory caused by 'interference' from similar items seen earlier, says study

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Our short-term memory is severely limited in everyday experience, but according to a new study from City, University of London and the Hungarian Academy of Science, it has no intrinsic limits when it comes to remembering information.

Instead, it is often limited by interference from similar items which we have seen earlier, which leads to the appearance of a low fixed and limited capacity.

Offering mathematical proof of this 'interference' effect, the researchers found that short-term memory capacity generally appears limited as soon as there are interfering items encountered earlier.

In their mathematical model, each item has some probability to be remembered if there are no interfering items in memory. This probability is reduced by interference from the items already in memory, and the more items we already have in memory, the stronger this interference becomes. The researcher show that this interplay between an open-ended short-term memory and the presence of interfering items can lead to the appearance of a low fixed and limited capacity. The research is published in *Psychological Review*.

These mathematical results support earlier research from academics at City, University of London and the Massachusetts Institute of Technology, showing that participants have essentially no memory capacity limitations – unless there are interfering items in memory. In these experiments, participants were shown rapid sequences of everyday images.

Participants remembered roughly the same proportion of pictures in each sequence, independently of how many pictures had been presented, even when they were shown dozens of pictures. In other words, there were essentially no memory capacity limits.

Crucially, these results were observed only when each sequence used completely new images. By definition, new images are not (yet) in memory, and thus cannot interfere either. In a sharp contrast, when the sequences were constructed from changing combinations of a small set of images, people remembered less than 5 pictures from each sequence, similar to the usual capacity quoted for our short-term memory.

This suggests that one of the main determinants of the memory limitations we sometimes feel is interference from other items, while memory in itself might have an unbounded capacity. For example, quickly remembering a phone number might not be difficult because our short-term memory capacity is so limited, but rather because we have remembered many other number sequences in the past, and these earlier sequences intrude into the recall of the sequence we are currently trying to memorise.

Speaking about the study, Dr Ansgar Endress, a Senior Lecturer in the Department of Psychology at City, University of London, said:

"In some sense, our short-term memory system has an undeservedly bad reputation: it can remember many more items than we give it credit for. However, when remembering items that we have seen earlier in changing combinations - such as numbers or items from a shopping list - the memory problem becomes much more tricky, and we suffer from relatively stringent memory limitations, because these earlier memories interfere with what we are trying to remember right now."

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