

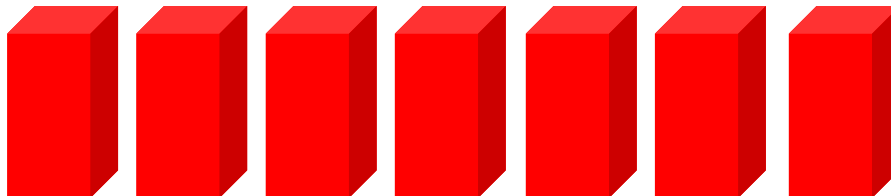


DISPLACEMENT THEORY OF FORGETTING

The theory of displacement affecting forgetting within the short-term memory

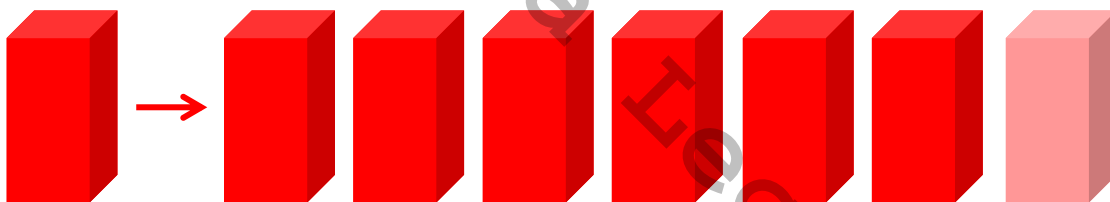
Displacement is based on the idea that the short-term memory has a limited capacity for information. **Miller** (1956) argued that the short-term memory capacity is approximately 7 ± 2 items of information. These can be “chunked” together to increase capacity, but there is a fixed number of slots.

The red blocks below represent pieces of information within our short-term memory



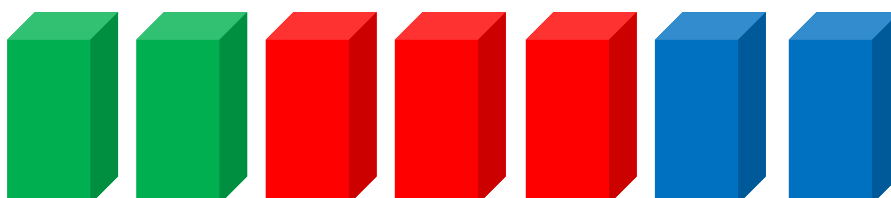
If the short-term memory is full and new information is registered, then some information is going to be pushed out. There are two options in this case: information can either be forgotten, or moved into the long-term memory where it is encoded and stored. The information pushed out in either way is then overwritten with this new data. The key idea is that information will be lost unless rehearsed enough to be moved into the long-term memory.

The diagram shows that as the new piece of information enters the short-term memory, the one on the end is forced out: this will either go into the long-term memory (if rehearsed enough) or will be forgotten



There is much evidence for the theory of displacement. The **multi-store model** of memory supports the theory with primary and recency effects. A **primary effect** derives from information which is learnt first, and so is quite well-remembered, so the information is most likely moved into the long-term memory. Whereas **recency effects** come from information which is learnt last (most recently), therefore it will still be in the **rehearsal loop** of the short-term memory, and so also remembered well.

Information which is taken in from a list displays a good example of these effects. The blocks below represent pieces of information from a list of seven items which have been presented to a participant.



The ones on the left were the items at the top of the list, and the ones on the right on the bottom. When the list is taken away from the participant and they are asked to recall as many items as they can remember, it is not uncommon to only remember those which are highlighted green (**primary effect**), as these were first taken in, and those in blue (**recency effect**), as those will still be in the short-term memory. Those shown as red from the middle will be **forgotten**. This is because, due to primary and recency effects, information in the middle of the list is *not* so well-remembered because it has neither been processed into the long-term memory nor remains in the rehearsal loop: it is forgotten.

WAUGH AND NORMAN (1965)

Waugh and Norman decided to test this idea. They read to participants a list of sixteen digits, like below:



7 0 8 4 1 6 0 9 5 5 3 7 2 4 7 8

The participants are then given a number and have to state the number which proceeds the number they are given. For example, if the **probe** (digit given to the participant) is 6, the recall should be 0. However, between the probe and the final digit (the second 8), there is a time gap and more digits have been called out to the participant, making it unlikely that they will remember the recall. Primary and recency effects are displayed in this experiment:

7 0 8 4 1 6 0 9 5 5 3 7 2 4 7 8

The results of the study found what was expected: it was easier for participants to recall numbers which proceeded digits from earlier on (primary) and the most recent (recency). Those in the middle were forgotten, as the information had been lost.

Waugh and Norman tested to see if it was indeed displacement, or **decay** that was causing forgetting. They did this by altering the experiment slightly. They did it again, this time with two variations. In one variation, the numbers were read **slowly** (one digit per second), and the other variation **fast** (four digits per second):

-  *Displacement theory* suggests that information is lost as new information is taken in because it is replaced - therefore displacement theory would say that the speed of reading would not affect participants' recall
-  *Decay theory* suggests that information is lost as the memory trace fades over time - therefore decay theory would say that when the digits are all read out more quickly, recall would improve as there is less time for the information to decay from the short-term memory

They ran each of these conditions *three times*, placing the probe in a different place along the number line each time. Both decay and displacement theories suggest that recall will improve as the probe moves closer to the final digit.

What Waugh and Norman found from these variations was that there was a slight, but not very huge, improvement on recall when the digits were read out fast. This suggests that perhaps the conclusions of the original experiment were wrong, as it might have been decay causing the forgetting: but because the difference was so insignificant, this is unlikely. However, there was a clear improvement in recall when the probe was closer to the end of the number line: which both theories suggest. This supports both theories.

EVALUATION OF THE DISPLACEMENT THEORY OF FORGETTING

- ✓ The theory has been tested by scientific experiments with good controls, which have shown **cause-and-effect relationships** (for example, Waugh and Norman)
- ✓ These controls mean that the experiments could be replicated, the findings appear to be reliable
- ✓ The theory fits with the multi-store model of memory and working model memory, both of which are supported with a great deal of evidence, so this helps to support the model
- ✗ It is difficult to operationalise the theory and measure displacement: what is taken as displacement could simply be decay (loss of information due to lack of rehearsal over time) or **interference** (when something already learned interferes with current learning or when something learned later gets in the way of what was learned previously)
- ✗ Tasks used in the experiments are artificial so the findings may lack experimental validity (for example, the Waugh and Norman studies were not real-life tasks)