

Retrieval from Long Term Memory Ch 8 nb

The World Memory Championships is an organized competition of memory sports in which competitors memorize as much information as possible within a given period of time. The championship has taken place annually since 1991, with the exception of 1992

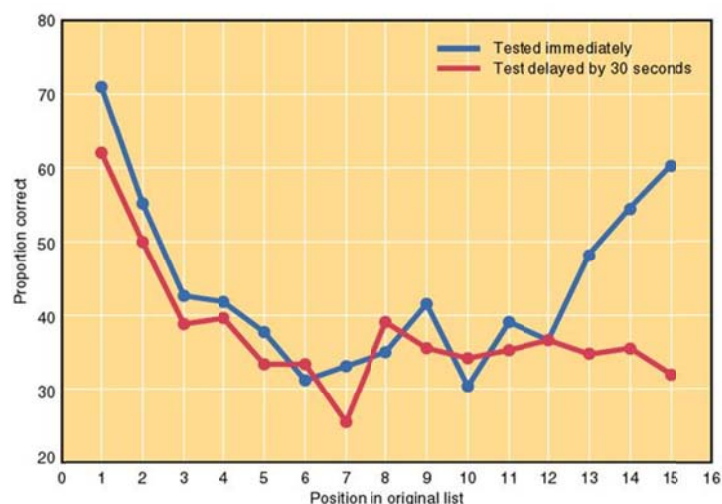
Every event in the World Memory Championships begins with encoding data into the memory system and storing that information for later use. Contestants are presented with information—numbers, words, historic dates, and the like—and provided a certain amount of time to file it away in long-term memory. But no matter how much information they absorb, the contestants' efforts are meaningless if they can't retrieve it in the recall phase of the event.

One of the most grueling events in the World Memory Championships is "One Hour Numbers," a race to see who can memorize the greatest number of random digits in an hour. Contestants are given four sheets of paper, each containing 1,000 random digits, and 1 hour to cram as many as possible into their long-term memories. During the recall phase that follows, they get 2 hours to scrawl the correctly ordered numbers on blank sheets of paper. This is a backbreaker because there are no reminders, or retrieval cues, to help contestants locate the information in their long-term memory. Retrieval cues are stimuli that help you retrieve stored information that is difficult to access (Tulving & Osler, 1968). For example, let's say you were trying to remember the name of your junior high math teacher. If someone gave you the first letter of his/her last name, would that help you retrieve the name? If so, then that letter would have been an effective retrieval cue. In this case, the first letter "primed" your memory. Priming is the process of awakening memories with the help of retrieval cues.

Now let's return to the "One Hour Numbers" event of the World Memory Championships. This type of challenge relies on pure recall, the process of retrieving information held in long-term memory without the help of explicit retrieval cues. **Recall** is what you depend on when you answer fill-in-the-blank or short-answer essay questions on exams. Say you are given the following prompt: "Using a computer metaphor, what are the three processes involved in memory?" In this situation, you must come up with the answer from scratch: "The three processes are encoding, storage, and retrieval."

Now let's say you are faced with a multiple-choice question. Answering that type of question relies on **recognition**, the process of matching incoming data to information stored in long-term memory. Recognition is generally a lot easier than recall because the information is right before your eyes; you just have to identify it (Hey, I've seen that before). Recall, on the other hand, requires you to come up with information on your own. Most of us find it easier to recognize the correct answer from a list of possible answers in a multiple-choice question than to recall the same correct answer for a fill-in-the-blank question.

Serial Position Effect. Suppose your task is to recall a list of items in the order they were presented to you. The ability to recall items appearing in a list depends on where they fall in the list, a phenomenon psychologists call the **serial position effect** (see pic at the right). . When given a list of words to memorize, research participants are better able to remember items at the beginning of the list, which is known as the



primacy effect, as well as items at the end, which is called the recency effect (Deese & Kaufman, 1957; Murdock, 1962).

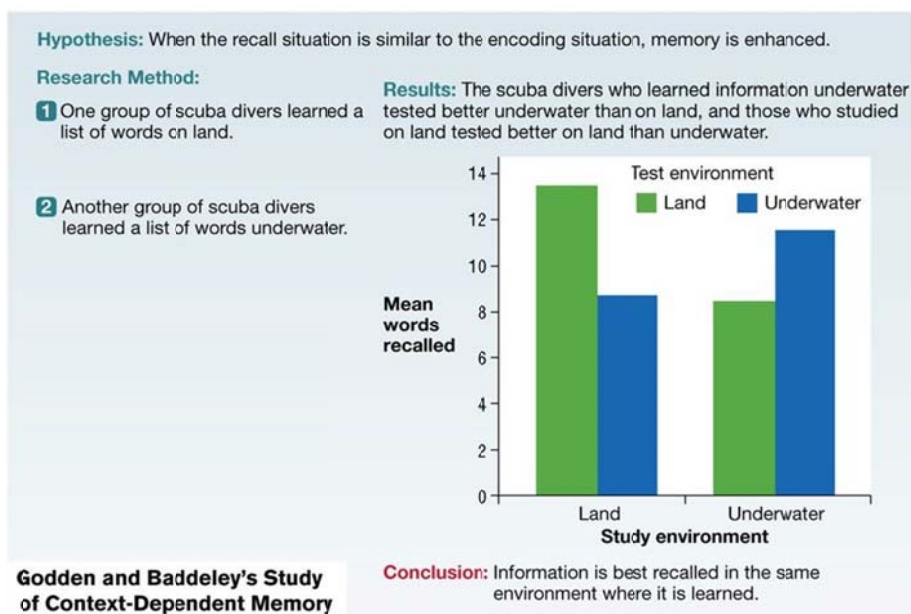
Imagine you are on your way to the store to buy supplies for a dinner party, but your cell phone battery is about to die. Your phone rings; it's your housemate asking you to buy the following items: napkins, paper towels, dish soap, butter, laundry soap, paper plates, sparkling water, ice cream, plastic spoons, bread, pickles, and flowers. Without any way to write down this list, you are at the mercy of the serial position effect. In all likelihood, you will return home with napkins, paper towels, and a bottle of dish soap (due to the primacy effect), as well as bread, pickles, and flowers (due to the recency effect); the items in the middle will more likely be forgotten.

Now imagine you are a top executive at a television network, and one of your responsibilities is to decide which time slots advertisers should pay the most for—those at the beginning, middle, or end of a commercial break. One study looking at college students' viewings of TV commercials found that the brand names they recalled best came from ads appearing at the beginning and end of breaks (Terry, 2005). The first ads were etched most deeply in students' long-term memories because they had the most time to think about them (the primacy effect). Alternatively, if you are given a list of words to recall, the first words in the list benefit from more rehearsal time. This also makes them better recalled. The final ads, on the other hand, were easily recalled because they still lingered in short-term memory (the recency effect).

What do you think happened to recall of your word list when instead of recalling immediately at the end of presentation of the list, there was a 30 second delay before you could begin recall? Recall of words at the end of the list suffered. In other words, the recency effect was wiped out because they were no longer in short term memory when recall started.

Context is Everything. When it comes to retrieving memories, context matters. Where were you when you encoded the information, and what was occurring around you? Researchers have found that environmental factors play a key role in determining how easily memories are retrieved.

In a classic study conducted by Godden and Baddeley (1975), participants learned lists of words under one of two conditions: while underwater (using scuba gear) or on dry land. They were then tested for recall in one of the 2 conditions: If they learned the list underwater, they were tested underwater or on dry ground; if they learned the list on dry ground, they were tested on dry ground or underwater. The participants were better able to retrieve words when the learning and recall occurred in the same location. If they learned the words underwater, they had an easier time retrieving them underwater. The same was true for words learned on land. Here we have an example of **context-dependent memory**; memories are easier to access when the encoding and retrieval occur in similar contexts.



Context-dependent memory is part of a broader phenomenon conveyed by the **encoding specificity principle**, which states that memories are more easily recalled when the context and cues at the time of encoding are similar to those at the time of retrieval (Smith, Glenberg, & Bjork, 1978; Tulving & Thompson, 1973). In other words, the best retrieval cues are those that were present at encoding.

In your own life, you may have noticed that old memories tend to emerge from the woodwork when you return to the places where they were created. Dining at a restaurant you once frequented with an ex-boyfriend or girlfriend probably sparks memories of romantic moments (or perhaps a bitter argument) you had there. Going to a high school reunion might bring back

The encoding specificity principle does not merely apply to the context of the surroundings. Remembering things is also easier when physiological and psychological conditions, including moods and emotions, are similar at the time of encoding and retrieval. Sometimes memories can be best retrieved under such circumstances; we call this **state-dependent memory**. One morning while arising from bed, you spot a red cardinal on your window ledge. You forget about the cardinal for the rest of the day—even when you pass the very same window. But come tomorrow morning when you are once again half-awake and groggy, memories of the red bird return. Here, your ability to recall the cardinal is dependent on your internal state being the same as it was at the time of encoding. In that example, your mood state can be a context. So, for example, if you learned a list of words while depressed, the theory would predict your recall is best if you are depressed at recall.

Your memories can also be biased by whether or not your current mood is consistent with the emotional nature of the material you are trying to remember. This phenomenon is known as **mood congruence** (Bower, Gilligan, & Menteiro, 1981; Drace, Ric, & Desrichard, 2010). You are more likely to remember happy events if you are feeling happy than if you are sad. If you are in a sad mood, you will more easily remember sad events in your past rather than happy ones. This has important implications for depression because if you are depressed, the sad events in your past are more easily recalled than happy events. Thinking and remembering a bunch of sad events can also help make you more depressed. This can have the effect of keeping you stuck in your depression.

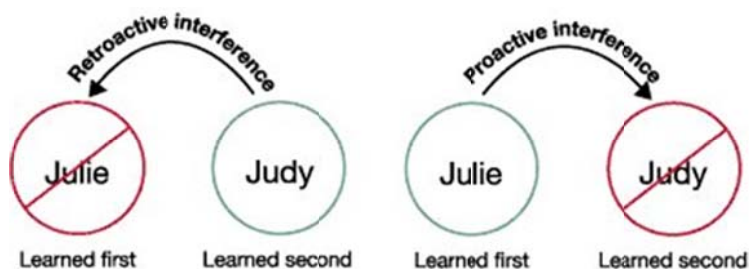
Interference

Another theory holds that forgetting occurs because similar items of information interfere with one another in either storage or retrieval; the information may get into memory and stay there, but it becomes confused with other information. Such interference, which occurs in both short- and long-term memory, is especially common when you have to recall isolated facts—names, addresses, personal identification numbers, area codes, and the like.

Suppose you are at a party and you meet someone named Julie. A little later you meet someone named Judy. You go on to talk to other people, and after an hour, you again bump into Julie, but by mistake you call her Judy. The second name has interfered with the first. This type of interference, in which new information interferes with the ability to remember old information, is called **retroactive interference**:

Suppose you learned Psychology and a few days later learned Sociology. You take a test on Psychology, but the Sociology material has hurt your memory of the Psychology. New material (Sociology) has interfered with the retrieval of older material (Psychology). Because new information is constantly entering memory, we are all vulnerable to the effects of retroactive interference

Interference also works in the opposite direction. Old information (such as the Spanish you learned in high school) may interfere with the ability to remember new information (such as the French you are trying to learn now). This type of interference is called **proactive interference**.



Memory Savings

Our text mentions Ebbinghaus and his forgetting curve (see figure 8.15). Another important discovery Ebbinghaus gave us is that of **savings**. This refers to the amount of information retained in the subconscious even after this information cannot be consciously accessed. Ebbinghaus would memorize a list of items until perfect recall and then would not access the list until he could no longer recall any of its items. He then would relearn the list, and compare the new learning curve to the learning curve of his previous memorization of the list. The second list was generally memorized faster, and this difference between the two learning curves is what Ebbinghaus called "savings". So after you spend effort learning material in a class only to find after the semester ends that you can't recall much of it. Remember all is not as dire as you think. You probably have a "savings".