

FOCUS ON VOCABULARY AND LANGUAGE

Without memory—our *storehouse of accumulated learning*—there would be no *savoring of past joys*, no guilt or anger over painful recollections. Myers is using an analogy to help you understand the general concept of **memory**. *Storehouses* are used to keep materials (for example, water or food) until we need them. Likewise, your memory system retains most of the things you have experienced (*accumulated learning*), and items can be recalled or retrieved as required. Without memory, you would not be able to enjoy (*savor*) previous happy experiences (*past joys*) or feel anguish over painful memories; each moment would be new (*fresh*).

Studying Memory

. . . *gold medal winners in a memory Olympics*. Here, people with exceptional memories are being likened or compared with top athletes at the Olympic games. S, for example, would clearly receive the top prize (be a *gold medal winner*) in any competition that tests the ability to remember vast amounts of information (*a memory Olympics*). While most of us can repeat (*parrot back*) a short series of numbers (*a string of digits*), S could recall up to 70 if they were presented at three-second intervals in a quiet room.

How does our brain *pluck* information out of the world around us and *tuck* that information away for later use? Memory is the retention of learning over time. Here, the question is how does our brain select and pick (*pluck*) information from our environment and store (*tuck*) it away until we need it? We remember events through the processes of **encoding**, **storage**, and **retrieval**.

Building Memories

Encoding and Effortful Processing

How much of this page could you sense and recall with less exposure than a *lightning flash*? In his investigation of sensory storage, George Sperling showed his subjects an array of nine letters for a very brief period (for about the length of a *flash of lightning*). He demonstrated that this was sufficient time for them to briefly view (*glimpse*) all nine letters and that an image remained for less than half a second before fading away. He called this brief (*fleeting*) memory of visual stimuli **iconic memory**.

. . . *boost* . . . There are many strategies for improving (*boosting*) memory, such as **chunking**, using **mnemonics**, forming *hierarchies*, and making material personally meaningful, to name just a few. One common method for improving and increasing the power of our memory is to use *rehearsal*. Thus, actively repeating some new information (such as a stranger's name or new terminology) will help strengthen (*boost*) our ability to remember this material. As Myers notes, for effective retention it is important to space out or distribute rehearsals over time (*the spacing effect*) rather than doing repetitions all at once (*massed practice* or *cramming*). In addition, repeatedly testing yourself improves learning and memory (*the testing effect*).

This *mnemonic* [the *peg-word system*] requires you to memorize a *jingle* . . . A *jingle* is an easily remembered succession of words that ring or resound against each other due to alliteration or rhyme. *Jingles* are often used in radio or TV commercials. The memory aid (*mnemonic*) called the *peg-word system* is based on memorizing a 10-item poem (*jingle*) that can be associated with a new list of 10 items through visual imagery. The new items are hung on, or *pegged to*, the familiar items.

Referring to such mental mismatches, Gordon Bower and Daniel Morrow (1990) have likened our minds to theater directors who, *given a raw script*, imagine *the finished stage production*. This statement suggests that what we remember is not an exact replica of reality. We construct some mental representation or model (*the finished stage production*) from the basic sensory information (*the raw script*) available to us. So, when we **recall** something, it is our own version or model that comes to mind and not the real thing.

Memory Storage

. . . *Sherlock Holmes* . . . Mystery writer Arthur Conan Doyle's most popular character was a very intelligent and logical private detective named *Sherlock Holmes*. Holmes believed, as did many others, that our memory capacity was limited, much as a small empty room or attic can hold only so much furniture before it overflows. Contemporary psychologists now believe that our ability to store long-term memories is basically without any limit.

Retaining Information in the Brain

(*Photo caption*) Among animals, one contender for *champion memorist* would be a mere *birdbrain*—the *Clark's Nutcracker* . . . *Clark's Nutcracker* is a small bird with a small brain (*a birdbrain*) but a phenomenal memory (it is a *champion memorist*) for where it buries its food. It can recall, after a period of more than 6 months, 6000 different locations of hidden food (*caches*).

. . . *London cabbie* . . . Taxicab drivers are often called *cabbies*. Those who work in London, England (*London cabbies*) face an enormous challenge trying to memorize the complicated layout (*maze*) of city streets; the longer they work there, the larger the rear area of the **hippocampus** (which specializes in spatial memory) becomes.

One day, she yanked her hand back, for *the physician had pricked her with a tack in his palm*. A patient with amnesia was unable to recognize her doctor (*physician*) even though he shook her hand and introduced himself every day. On one occasion, he concealed a small sharp pin (*tack*) in the center of his hand (*his palm*). That day, when they shook hands, the sharp object pierced her (*pricked her*), causing her to quickly pull (*yank*) her hand away. Though she has no memory of this incident, she cannot explain why she will no longer shake hands with the doctor (she has been *classically conditioned without awareness*). This type of **implicit memory** involves a part of the brainstem called the cerebellum.

The Amygdala, Emotions, and Memory

Emotional arousal can *sear* certain events into the brain, . . . When arousal level rises because of stress, so too do the levels of certain hormones. These hormones in turn signal to the brain that something important has happened and the events that triggered the arousal make an indelible impression on the brain—much as a hot grill burns (*sears*) its shape on the surface of the meat placed on it. Following disturbing and distressing incidents (*traumatic experiences*), very clear memories (*vivid recollections*) may repeatedly occur spontaneously as if they were “burned” in the mind. James McGaugh notes that it is adaptive for strong emotional experiences to create strong, more reliable memories.

Synaptic Changes

. . . much as a *shell-shocked soldier* jumps at the sound of a *snapping twig*. Someone in the military who has been in combat and subjected to bomb blasts and gunfire (*a shell-shocked soldier*) may become classically conditioned as a result of the experience. Now, an unexpected noise, such as the sound of a small branch breaking (*a snapping twig*), may elicit a startle response or fear. This is similar to the classically conditioned withdrawal response of the sea slug in response to a squirt of water, and Kandel and Schwartz were able to precisely locate (*pinpoint*) the synaptic changes that take place when this learning occurs. This **long-term potentiation**, or **LTP** (an increase in a synapse's firing potential), provides a neural basis for learning and remembering associations.

Their working memory had no time to *consolidate* the information into long-term memory *before the lights went out*. People who have been rendered unconscious by a blow to the head typically have no memory of events that occurred just before they lost consciousness (*events just before the knock out*). Their **working memory** had no time to strengthen (*consolidate*) the information and transfer it to **long-term memory** before becoming unconscious (*before the lights went out*).

The target market for memory-boosting drugs includes . . . *countless millions* who would love to *turn back the clock on age-related memory decline*. Some researchers focus on the biological basis of memory (*memory-biology explorers*) and have helped establish pharmaceutical companies that are in a race (*competing*) to produce memory-altering drugs. The market for these drugs includes a large number of people (*countless millions*) who would like to stop or reverse (*turn back the clock on*) the deterioration in memory that can occur as we get older (*age-related memory decline*). Consequently, the amount of money to be made is potentially very large (*from expanding memories will come bulging profits*).

Retrieval: Getting Information Out

Retrieval Cues

. . . people put in a *buoyant mood* . . . have recalled the world *through rose-colored glasses* (DeSteno et al., 2000; Forgas et al., 1984; Schwarz et al., 1987). Our memories are affected by our emotional states (our *moods*). Thus, if we are in a good or happy (*buoyant*) mood, we are more likely to view the total situation in a more optimistic and hopeful way (*through rose-colored glasses*). And, if we are sad and unhappy, our memories are affected, or tainted, by our negative mood (*being depressed sours memories*). Memory of events and people is influenced by the particular mood we are in, whether it is good or bad, and we tend to remember the events accordingly (**mood-congruent memory**).

When teens were *down*, their parents seemed *inhuman*; as their mood *brightened*, their parents *morphed from devils into angels*. Because our memories tend to be *mood-congruent*, we are likely to explain our present emotional state by remembering events and people as being consistent (*congruent*) with how we now feel. In one study, when young adolescents were in a bad mood (*down*), they viewed their parents as cruel and uncaring (*inhuman*). Later, when they were in a much better (*brighter*) mood, their parents were described in much nicer terms. While it seemed as though their parents had undergone an amazing change in character (*they morphed from devils to angels*), the change was simply in the teenagers' moods. As Myers notes, "passions [or emotions] exaggerate."

Forgetting

Amid all the *applause for memory* . . . have any voices been heard in praise of forgetting? We tend to focus on the importance of remembering and recalling information (there is much *applause for memory*). However, if we could not forget, we would be like the Russian memory expert (*memory whiz*) S who was overwhelmed by the amount of useless information he had stored (*he was haunted by his junk heap of memories*). Thus, many people, from William James to contemporary cognitive psychologists, acknowledge the importance of forgetting.

Forgetting and the Two-Track Mind

They can learn to read *mirror-image writing* or do a *jigsaw puzzle* . . . They can be *classically conditioned*. People who have lost the ability to remember new information (people suffering from *amnesia*) may nevertheless be capable of learning through association (through *classical conditioning*). They may also learn to solve problems (for example, to complete a *jigsaw puzzle* or read *mirror-image writing*) even if they are not aware that the learning has taken place. Myers notes that these findings suggest memory is not a single, unified system. People suffering from amnesia can learn how to do something (*implicit memory*) without any knowledge of this learning (*explicit memory*). Such findings suggest that we have two distinct memory systems controlled by different parts of the brain.

Retrieval Failure

How frustrating when a name *lies poised on the tip of our tongue*, just beyond reach. The expression “*it’s on the tip of my tongue*” refers to the feeling you get when you are trying to remember something (for example, a name or a place) but you can’t, even though you feel you know this thing and can *almost* say it (*it lies poised on the tip of your tongue*). Given an appropriate *retrieval cue* (such as the first letter of the name or something it rhymes with), you can often remember the item. The problem here is one of *retrieval failure* and not one of a memory that has faded or decayed.

As you collect more and more information, your *mental attic* never fills, but it surely gets *cluttered*. We may have an unlimited amount of space in our memory system or *mental attic* (a room at the top of a house), but with a constant flow of new information coming in, the storage can become disorganized (*cluttered*). New information may get in the way of recalling old material (*retroactive interference*), or old material may block or disrupt recall of new information (*proactive interference*).

We *sheepishly* accepted responsibility for 89 cookies. Still, we had not come close; there had been 160. The Myers family obviously loves chocolate chip cookies. The story of how all 160 were devoured (*scarfed, wolfed down, eaten, consumed*) within 24 hours (*not a crumb was left*) is quite funny, but it also makes an important point. Embarrassed, guilty, and feeling a little foolish (*sheepish*), they could only account for and remember eating 89 cookies. This illustrates the self-serving nature of memory and how, unknowingly, we change and revise our own histories. Although Freud proposed that we repress memories of painful experiences in the unconscious mind in order to protect our self-concepts and minimize anxiety, Myers notes that most contemporary memory researchers believe **repression** rarely, if ever, occurs.

Memory Construction Errors

We don't just retrieve memories, we *reweave* them . . . Memories are sometimes altered or changed when they are formed (*we often construct our memories as we encode them*). They can also be modified or adjusted when we retrieve them (when we “*replay*” them). Thus, when we recall something, we may inadvertently revise (*reweave*) it and replace the original with a slightly altered version, a process called *reconsolidation*. As Daniel Gilbert notes, “information acquired after an event alters memory of the event.”

Misinformation and Imagination Effects

The human mind, it seems, comes with *built-in Photoshopping software*. Digital images on a computer can be altered with appropriate software (for example, with *Photoshop*). In a similar manner the human mind has an inherent capability for changing memories (*it has built-in Photoshopping software*). In one experiment, researchers altered family photos to include an event that never happened. After viewing the fake images, half the participants falsely remembered the experience, even describing it in vivid detail. This is an example of the **misinformation effect** (a memory that has been corrupted by misleading information).

Discerning True and False Memories

Because memory is *reconstruction* as well as *reproduction*, we can't be sure whether a memory is real by how real it feels. It is difficult to determine if a memory is real simply by noting how real it feels or how confident we are about its accuracy. We not only recall and retrieve real memories (*reproduction*) but we also manufacture false memories (*reconstruction*).

It [*memory construction*] explains why “*hypnotically refreshed*” memories of crimes so easily incorporate errors, some of which originate with the hypnotist's leading questions . . . Because of the tendency to manufacture events without consciously being aware of doing so (*memory construction*), people are likely to be influenced by suggestions and biased questions while under hypnosis. Their subsequent recollections (“*hypnotically refreshed*” memories) may therefore be a mixture of fact and fiction.

Children's Eyewitness Recall

If memories can be *sincere*, yet *sincerely wrong*, might children's recollections of sexual abuse be prone to error? Evidence suggests that, under appropriate conditions, children's memories can be reliable and accurate (*sincere*). But, they are also prone to the misinformation effect and can be misled by biased questions and suggestions; later, the children are not able to reliably separate real from false (*sincerely wrong*) memories.

Repressed or Constructed Memories of Abuse?

. . . even if false, their *memories are heartfelt*. For some people who recover memories in therapy through “*memory work*” techniques (for example, “guided imagery,” hypnosis, or dream analysis), the memory, even if false, feels very real and is often accompanied by strong and sincere emotions (*the memories are heartfelt*). Professional organizations such as the American Medical Association, American Psychological Association, and American Psychiatric Association have issued statements aimed at finding a solution (*a common ground*) to the controversial issues surrounding recovered memories (*the “memory war”*).

So, does *repression* of threatening memories ever occur? Or is this concept—the *cornerstone* of Freud's theory and of *so much of popular psychology*—misleading? A *cornerstone* is the foundation stone that forms the first part of a new building. In a sense, the whole building rests on it. In a similar manner, the concept of **repression** is the main conceptual idea (*the cornerstone*) of Freud's theory. It is also commonly believed that people *repress* memories of painful events (*repression is so much of popular psychology*). In contrast, Myers notes that more often the reaction to traumatic events and experiences is very clear and lingering recollections (*vivid, persistent, haunting memories*) that seem to be imprinted (*etched*) in the mind.

Improving Memory

Sprinkled throughout this chapter, and summarized here for easy reference, are *concrete* suggestions that could help you remember information when you need it. This chapter on memory has many good ideas for memory improvement scattered or interspersed (*sprinkled*) throughout. Myers has pulled them together in an easy to understand format—the **SQ3R** (Survey, Question, Read, Retrieve, Review) method. These are real and tangible (*concrete*) ways to help you improve your memory. Use them!!!