

Memories—Good and Bad



A person's memory can be like a mansion with many, many rooms. Some of the rooms you visit frequently, while others you may not enter for many years. As you age, some of these rooms may change, and you may remember things slightly differently than how they actually happened. In other cases, the rooms may stay the same, but the doors may become locked. Sometimes these rooms can only be unlocked if you find a special key. Some of these rooms you may enjoy visiting; some of them, you may just wish the door stayed shut.

One of the keys that can often unlock a person's memory is a specific sensory input—something you can see, smell, touch, taste or hear. There is the famous case of the novelist Marcel Proust, who tasted a madeleine—a kind of cookie—and it caused him to suddenly remember an enormous amount of his childhood, memories that had previously been locked away. He went on to write a seven-volume novel called *In Search of Lost Time*, in which he explored these memories and what they meant to him. Proust might not have written these volumes exactly as they are had he not eaten that fateful madeleine.

As Proust demonstrates, while we can consciously summon certain memories—for example, if you try to think of your mother's face, you can almost certainly do it—there are others which visit us involuntarily. This has to do with how the human brain is wired. While much of the brain

is still mysterious to scientists, it has been determined that the memory center of the brain, where memories are made and stored, is closely linked to the sensory center, where the brain controls and processes your senses. So, a certain sensory input, such as Proust's cookie, may fire up not just the sensory center, but the memory center, too.

The senses you possess are a way for your brain to monitor what's going on outside. When you receive a particular sensory input, meaning one of your senses is stimulated, that sense will send a signal to your brain telling the information it just received. For example, when Proust tasted his cookie, the sense receptors on his tongue sent a message to his brain telling it how the madeleine tasted. The messages are signals transmitted along nerve cells until they reach the brain. When the brain receives these signals, it processes them, and controls the body's reaction to them.

Sense reactors react to many different types of inputs, including electromagnetic, mechanical and chemical. In Proust's case, his tongue was sensing the chemical makeup of the cookie and probably its mechanical properties—how it felt against his tongue. If Proust had been zapped when he was getting his laundry out of a dryer (which is unlikely, considering Proust was born in the 19th century, before electric dryers were used) his skin would have registered it as an electromagnetic signal and informed his brain through nerve cells, what had just occurred. Perhaps this would have caused Proust to write a different set of novels—maybe a science fiction epic?

When a nerve signal reaches the brain, the brain can react in a multitude of ways. Often the signal will trigger immediate behaviors or memories that happen automatically, without conscious decision on your part. For example, let's say you're barefoot and you step on something sharp. You probably won't have time to think, "Gosh, that really hurts. Should I pick up my foot? Yup, I think I'll do that." Your brain, having registered the pain, reacts by picking up your foot for you. Just as your brain receives signals from its sense receptors through nerve cells, it can send out a command through nerve cells. In this case, your brain sent a signal to your foot telling it to move away from the sharp thing.

Not all behaviors your brain tells you to do are the best choice. If you're walking in the woods and you see a bear, your brain, having received the image of the bear through the eye's optic nerve, may start producing chemical compounds called hormones. Amongst other things, hormones affect moods and many behaviors. In this case, the brain will likely produce a hormone that generates the feeling of fear. It may also produce a hormone called adrenaline, which causes your body to gain energy and alertness. It may also send a signal to your legs that says, "Run!" Your brain has learned from experience—both from your experience and the many thousands of ancestors who aided in its evolution—that it is a good idea to run from danger. Often, this is the right decision. However, in this case, running from a bear is a bad idea. Instead, experts say people should back away from the bear at a relatively slow pace. If you run, the bear is more likely to chase. Hopefully, you will remember this fact, and the next time you see a bear in the woods, your brain will access the memory of what to do.

The way the brain reacts to its senses often has a lot to do with how it has learned to react in the past. Consider the case of a soldier who goes to war. When a soldier is on a battlefield, he very frequently feels unsafe. He may believe that the enemy could strike at any time. As part of his training, he has learned to stay alert for any signs of danger and, if he detects one, to react immediately. This is often very important, as any hesitation could result in harm to him or his fellow soldiers. Good soldiers often learn to react automatically to certain kinds of danger, much like you would react automatically when you step on something sharp. For example, if a soldier hears a gunshot, he may react immediately by dropping to the ground to avoid getting hit.

The longer a soldier stays at war, the more his brain can become used to reacting in this way. His senses may become attuned to certain inputs they were never attuned to before. For example, his nose may begin to be alert for odors that signal danger and his ears may become alert to certain sounds. If he successfully avoids danger using his senses in this way, then the soldier's brain may tell him to continue doing this. The brain may also become quicker at releasing hormones, such as adrenaline, if it thinks the soldier needs to defend himself.

While these reactions may serve the soldier extremely well in a combat zone, they may not be as useful when he is at home. In fact, the soldier may have to spend some time readjusting to being in a place where he is out of danger. This is because the brain has become used to reacting to certain inputs in a particular way and may need some time to retrain itself to react in a different way. For example, on the battlefield, the brain may have learned to react to the sound of an airplane by producing adrenaline to prepare the soldier for action. However, if the soldier is away from the battlefield and hears a plane, this injection of adrenaline won't help him much. In fact, it may just make him nervous. The same is true when a soldier feels threatened. While it may serve him well to react instantly in combat, in civilian life, it may be better for him to think for a moment before reacting.

Soldiers, particularly soldiers who have been deeply affected by their time in combat may, like Proust, be overwhelmed by a flood of memories when they receive certain sensory inputs. While some of these memories may be positive, others may be distressing. The 1998 film "Saving Private Ryan" featured scenes of the historic D-Day landing at Normandy Beach that were recreated in incredible detail. In the battle, many soldiers were killed. When the film was released, there were reports of veterans, particularly World War II veterans, who grew deeply disturbed at seeing the battle scenes. In part, this was because, by recreating the sights and sounds of battle, the film had unlocked many memories the veterans had of the war, some of which were very painful.

Sometimes, triggering memories can be valuable for healing. Every year, many veterans visit the Vietnam Veterans Memorial in Washington, DC. The memorial is a long wall into which the names of U.S. soldiers who died in the war are etched. Veterans visit the wall for many reasons, but it is nearly always an experience that draws up many emotional memories. Seeing the names and touching the wall can hurt, but it can also remind someone of a trusted friend who they lost to the war. Without the wall, these memories might stay locked in a room to which no one has a key.

Name: _____ Date: _____

1. What is sensory input?

- A something that a person can see, smell, touch, taste, or hear
- B an electric shock
- C a memory
- D a message from the brain that produces hormones

2. The passage describes ways that sensory input can help people access or “unlock” forgotten memories.

Which of the following describes evidence that sensory input can unlock a memory?

- A Your brain produces a hormone that tells you to run when you see a bear.
- B Marcel Proust ate a madeleine and recalled a large portion of his childhood.
- C You automatically move your foot away from a sharp object after stepping on that object.
- D You can remember what your mother’s face looks like.

3. Behaving a certain way for an extended period of time can affect the way that our brains react to sensory input in the future. What evidence from the text supports this conclusion?

- A Writing a novel and remembering things from a long time ago.
- B Moving away from something that causes you pain automatically.
- C Feeling scared when you see something dangerous.
- D A former soldier hearing a plane overhead and automatically producing adrenaline.

4. Why are sense reactors important?

- A They tell your body to run away from bears.
- B They help make your memory stronger.
- C They are the way that your brain processes what’s going on in the world around you.
- D They let your brain know which parts of your environment to ignore.

5. What is this passage mostly about?

- A the life of Marcel Proust
- B the way that our brains respond to sensory input
- C how soldiers acclimate to life at home after returning from war
- D how to unlock the hidden memories in your brain

6. The author uses a metaphor to compare human memory to something else. What does the author compare human memory to?

- A a mansion with many rooms
- B a maze
- C a locked door
- D Marcel Proust's *In Search of Lost Time*

7. Choose the answer that best completes the sentence below.

Soldiers develop reactions that serve them extremely well in combat, _____, they may not be as useful when the soldiers return home.

- A instead
- B however
- C therefore
- D consequently

8. Sense reactors respond to a number of different types of inputs.

Use evidence from the text to support this statement.

9. Describe how a soldier may need to adjust his behavior when he is no longer in a combat zone.

10. Explain how sensory input impacts the ability to remember past experiences by using information from the text.

Teacher Guide & Answers

Passage Reading Level: Lexile 1180

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8. Sense reactors respond to a number of different types of inputs.

Use evidence from the text to support this statement.

Suggested answer: Students should note that sense reactors react to electromagnetic, mechanical, and chemical inputs. Students may also discuss the example of a person stepping on a sharp object and a person seeing a bear as two specific examples of sensory input that the brain reacts to.

9. Describe how a soldier may need to adjust his behavior when he is no longer in a combat zone.

Suggested answer: In a combat zone, a soldier's senses become heightened to detect sights, smells, and sounds that could signal danger, but at home, similar sounds, like those from airplanes, do not signify danger. A returning soldier needs to take time to think about the messages his brain is sending his body before responding right away to those inputs.

10. Explain how sensory input impacts the ability to remember past experiences by using information from the text.

Suggested answer: Answers may vary and should be supported by the text. Students should note that it has been determined that the memory center of the brain, where memories are made and stored, is closely linked to the sensory center, where the brain controls and processes your senses. So, a certain sensory input may fire up not just the sensory center, but the memory center, too.

Students may explain that ultimately these sensory inputs have the ability to unlock memories from the past that have been blocked out or forgotten. For example, students may note that Proust wrote a seven part novel after recalling memories from his childhood after eating a madeleine. On the other hand, the World War II veterans who watched *Saving Private Ryan* experienced severe emotional distress. Both Proust and the veterans were responding to sensory inputs that unlocked memories from the past that they had blocked out or forgotten.