

Why Do Smells Trigger Memories?

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1. THE QUICK AND DIRTY

- In 2004, researchers found that participants showed more brain activity when smelling something they associated with positive memories.
- A 2014 study found that smells may trigger memories better than sight.

Whenever I smell the pages of a brand new book, I am reminded of all the late night reading I did as a kid. I can even feel the soft fabric on the arms of my favorite reading chair and sense the quiet of a house where everyone else is asleep. The stresses of the day start to give way a bit to feelings of calm and focus. We have an armchair in my daughter's room very similar to my childhood reading chair, but sitting in it doesn't quite conjure up those memories as effectively as that new book smell.

And I am not alone! Anecdotally, many of us have had experiences where a certain smell—perhaps chlorine, fresh baked cookies, or the salty beach air—floods our brain with memories of a distinct event or location that we associate clearly with certain emotions.

There have also been scientific studies using a variety of approaches to back up this anecdotal evidence. One of the first was [a study](#) led by Dr. Rachel Herz at Brown University in 2004. Herz and her collaborators found that a group of five women showed more brain activity when smelling a perfume with which they associated a positive memory than when smelling a control perfume they had never before smelled. The brain activity associated with the memorable perfume was also greater than that produced by the visual cue of seeing the bottle of perfume.

More recently, in [another study](#) in 2013, the researchers again found greater brain activity associated with olfactory stimuli (like the smell of a rose) than with visual stimuli (like the sight of a rose). [Clinical case studies](#) have also linked smells to strong negative emotions, a connection which can play a significant role in contributing to posttraumatic stress disorder.

So why is this? The majority of us clearly rely more on a sense of sight than our sense of smell day to day, so what is it about our sense of smell that works to better trigger our memory and our emotions? The link may simply be due to the architectural layout of our brain.

2. How does our sense of smell work?

The process through which molecules in the air are converted by our brain into what we interpret as smells and the mechanisms our brain uses to categorize and interpret those odors is, as you have probably guessed, a complicated one. In fact, the process is so complicated that the [Nobel Prize](#) in Physiology or Medicine was awarded in 2004 to the researchers Richard Axel and Linda Buck for their work in decoding it.

When we come into contact with an odor, or molecules from volatile substances drifting through the air, the neurons that make up your olfactory receptor cells send a signal to a part of your brain called the olfactory bulb. Axel and Buck found roughly 1,000 genes played a role in coding for different types of olfactory receptors, each of which focus on a small subset of odors. Thus each receptor is not responsible for understanding all possible smells. Those signals are then passed to what are called microregions within the olfactory bulb where again, different microregions specialize in different odors. The olfactory bulb is then responsible for interpreting those signals into what we perceive as smells.

Your olfactory bulb runs from your nose to the base of your brain and has direct connections to your amygdala (the area of the brain responsible for processing emotion) and to your [hippocampus](#) (an area linked to memory and cognition). Neuroscientists have suggested that this close physical connection between the regions of the brain linked to memory, emotion, and our sense of smell may explain why our brain learns to associate smells with certain emotional memories.

So many of these odor-driven memories may further be childhood memories because those years are when we experience most smells for the first time. There is not yet research to suggest that we can tap into the link between scents and memory to help us cram for tests or remember where we put our car keys as adults.

3. Smell may trigger memories better than sight

Additionally, the areas of the brain responsible for collecting auditory and tactile signals (i.e. our senses of sound and touch) [do not have the same direct connection](#). This may further explain why smells tend to trigger stronger emotional memories than our other senses.

Do those with a better sense of smell have better memories?

Although smell-o-vision, an experience where movie theaters piped in smells coordinated with whatever was on the screen, hasn't really been used since the 1950s (except for some [special showings](#) of Willy Wonka and the Chocolate Factory), scents are commonly used in advertising. Real estate agents may bring freshly baked pies to

their open houses to fill potential clients with memories of family togetherness and feelings of comfort.

Our brain is clearly an extremely complicated organ, and the multitude of factors influencing our memories can be very difficult to disentangle. For example, do those with a better sense of smell have better memories? We will have to wait for more research to find out.

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