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Jane Plailly

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Manifesto

The Persuasive Power of Smell

Jane Plailly



Photo courtesy of Jane Plailly.

Jane Plailly

Cognitive Neuroscientist (CRNL, Lyon, France)

[Jane Plailly](#) holds a PhD in Cognitive Science and is a CNRS researcher in the team [Olfaction from Coding to Memory](#) at the [Lyon Neuroscience Research Centre](#) (CRNL, Lyon, France). She has been working for more than 20 years on the links between olfaction, emotions, and memory and studies this relationship not only by questioning human behaviours but also by exploring the physiological and neural bases of these behaviours. She is particularly interested in the specificities of the sense of smell compared to other senses.

One winter morning, we step out onto our doorstep and a smell catches us, accompanied by a complex emotion. This smell is only a thin trace – almost imperceptible. We then close our eyes, take a deep breath and the smell is here, sweet and soft. As for the emotion, it feels like an awakening and an excitement. Although it seems improbable, since no other evidence than this delicate olfactory thread confirms it, spring is about to spring! It smells like spring! Smell has the power to make us experience realities that do not yet exist for our other senses and this power awakens me...

This is not the only talent attributable to the sense of smell. Smells also have the power to make us relive past realities with force, as they can be vivid reminders of autobiographical memories. This is known as the so-called '[Proust's phenomenon](#),' named after Marcel Proust whose writings brilliantly illustrate how a smell alone can be the cause of a sudden relapse into a memory of our past. Researchers in psychology and cognitive neuroscience have studied this phenomenon by comparing memories evoked by smells to memories evoked by other cues such as images, sounds, music, words, or tactile perceptions. Although still subject to debate, research findings suggest that memories evoked by smells are more emotional, accompanied by a stronger feeling of time travel and are recalled less often, making them striking, and deeper. Memories evoked by odours are primarily associated with early childhood, whereas memories associated with other sensory cues are predominantly associated with adolescence and young adulthood. It is important to note, however, that although smells have the power to raise memories with very specific characteristics, they generally generate fewer memories than other cues.

Whether it is a past or an upcoming event, smells make an event tangible. Why does smell have this persuasive power? One hypothesis is its connection to emotions. The perception of an odour generates a *de facto* emotional response of rejection or attraction – probably to promote the survival of our species by influencing mate choice or by allowing us to avoid predators and poisoning. This emotional response takes place even before the identification of an odour, which is often uncertain.

Although the research by neuroscientists working on the reasons behind the power of odours is still in its early stages, it allows advancing the following hypotheses. A first hypothesis is the anatomical proximity between the brain regions dedicated to olfaction, emotion and memory. The amygdala is crucial for emotional processes and the entorhinal cortex is a gateway for the hippocampus, a key region in memory processes. Both parts are the ensemble of the so-called 'primary olfactory' regions or the first brain regions integrating the information conveyed by the capture of the odourant molecules by their receptors in the nose.

Moreover, not only the olfactory and the memory brain regions are extremely close anatomically, but they are also strongly interconnected and emerged simultaneously during evolution. Another hypothesis is the absence of thalamic relays. The thalamus is a brain region that allows the filtering of sensory information before it is integrated by the primary sensory regions. While visual, auditory, gustatory and tactile information is previously sorted and pre-processed by the thalamus, olfactory information is processed as is, in its raw state.

Finally, among all the particularities of the sense of smell, what appeals to me the most is the extreme diversity by which each person can experience the same olfactory reality. Gene coding for olfactory receptors are extremely variable between individuals, contributing to a unique ensemble of receptors capturing chemical odours that provides us each with a personalised perception of our olfactory environment. If I dare to use a colour analogy, I would say that when I smell royal blue, you may smell soft green. This subjective nature together with the unique connection between smell, emotion and memory, adds a sense of intimacy to olfactory perception.

The sense of smell is unique compared to the other senses. Research is gradually disclosing the specificities of this sense and revealing it as a privileged entry to what makes us unique and singular, emphasising our own experience, our intimacy, and our individuality. However, olfaction remains a sense that conceals many mysteries. The work of neuroscientists is crucial for a better understanding of it and to guide us towards an optimal use of the sense of smell in our daily lives.