



Sylvia R. Karasu M.D.
The Gravity of Weight

The Olfactory Landscape

Smell is our most underappreciated sense.

Posted Jan 20, 2021



Monument, "The Nose of Kovalev," from the short story by Nikolai Gogol. St. Petersburg, Russia. Source: Wikimedia Commons/Creative Commons Attribution-Share Alike 4.0 International (no author noted).

"My God! Why this misfortune? If I lacked an arm or a leg, it would still be better; if I lacked ears, it would be bad but still more bearable; but lacking a nose ... It's incredible that a nose should vanish, simply incredible," bemoans Kovalev, the protagonist in Nikolai Gogol's absurdly implausible short story, "The Nose" (1836).

Awakening one morning, Kovalev finds his nose missing from his face. Later, when a newspaper clerk, realizing his obvious distress, offers him some tobacco, Kovalev, impatiently retorts, "Can you not see that I precisely lack what's needed for a pinch of snuff?" Fear not, as mysteriously as it had vanished, the nose, after some preposterous adventures, miraculously reappears and reattaches itself sometime later. Russian composer Dmitri Shostakovich wrote his first opera (1928) based on Gogol's story.

Gogol himself was apparently preoccupied with his own unsightly nose and the "nasal leitmotif," i.e., "nose-consciousness" infiltrates his work—"... it is

hard to find any other author who has described with such gusto smells, sneezes, and snores ... ", with noses that drip and twitch and an "orgy of snuff-taking" (Nabokov, *Nikolai Gogol*, 1944). Aesthetics and Freudian interpretations aside, what do we know about the nose — our "human external pyramid" (Jacobs, *Journal of Experimental Biology*, 2019)?



Philippe Mercier, "The Young Wine Taster," c. 1725, Louvre, Paris. Surprisingly, those expert at discriminating fine wine are not better at determining other odors. Source: Wikimedia Commons/Public Domain. (Unknown photographer).

"We 'see' the world through the nose," writes Ann-Sophie Barwich of Indiana University at Bloomington, in her book *Smellosophy*; even our hands are extensions of our nose. Our sense of smell, though, is "hopelessly misunderstood" and under-appreciated, she adds. Odors are volatile, and our chemical environment is "always in flux," unpredictable, and hard to control, all of which make studying smell challenging (Barwich, 2020). Despite common belief, humans are actually excellent at detecting, though not necessarily in naming, i.e., the so-called "olfactory-verbal gap," more than one trillion odors. (Majid, *Trends in Cognitive Sciences*, 2020; McGann, *Science*, 2017).



Manufacturing of masks and noses. Illustration for *Le Petit Français Illustré*, 1900. French School, Private Collection. Source: Copyright Look and Learn/Bridgeman Images. used with permission.

Some people have a better sense of smell than others. Significantly, those who are expert at discriminating fine wines are not necessarily better at identifying other smells (Majid, 2020). And even though dogs may be better at sniffing, they don't have the ability to appreciate good food. During evolution, humans lost the bone that

separates our olfactory from our respiratory function, and our mouth functions as a “second nose”—it is this “retronasal smelling,” intensified by chewing and swallowing, that gives food much of its taste (Barwich, 2020) and why a stuffy nose makes food tasteless (Stillman, *Perception*, 2002).

Researchers, such as professor Leslie Vosshall of Rockefeller University, sequence the actual genes involved in odor detection, rather than rely on self-report as most studies do, and have found more than 400 olfactory receptor genes; genetic variation in a single receptor has more of an effect on the intensity and pleasantness of a smell than on detecting it (Trimmer et al, *Proceedings of the National Academy of Sciences*, 2019).

Things can smell differently, depending on our physical and emotional state (e.g. hungry, pregnant, inebriated), and we can respond to the same smell differently depending on the context and even the label given (Barwich, 2020). English has fewer “smell-associated words” than other languages, though we use olfactory metaphors, such as “this stinks;” “smell a rat;” “sniff for clues” to indicate suspicion (Majid, 2020).



Picasso, "Bust of a Man," 1968. Private Collection. Source: Photo copyright Christie's Images/Bridgeman Images. Copyright 2021, Estate of Pablo Picasso/Artists Rights Society (ARS), NY. Used with permission.



Jean Dubuffet, "Le Nez au Vent" ("Nose in the Air"), 1950. Private Collection. Source: Photo copyright Christie's Images/Bridgeman Images. Copyright 2021 Artists Rights Society (ARS), NY/ADAGP, Paris. Used with permission.

Our sense of smell can have significant effects on mood and behavior (Franco et al, *International Journal of Environmental Research and Public Health*, 2017). It can serve as an “early warning system” to protect from dangerous odors of smoke, gas (Stillman, 2002), and even spoiled food. Odors can promote appetite, increase food intake, and stimulate salivation (McCrickerd and Forde, *Obesity Reviews*, 2016), as well as aid in personal hygiene and even mate selection. We each have our own smell--our "body odor cocktail"--that reflects dietary, environmental, and immune histocompatibility markers that help us tell kin from non-kin (McGann, 2017). Odor "starts to become a form of communication" in utero, and recognition of a mother's smell can facilitate breastfeeding (Boesveldt and Parma, *Cell and Tissue Research*, 2021).

Further, there is a strong link between odor and memory. The most famous example, of course, is Proust's description of dipping the madeleine in his cup of tea: "... it infinitely transcended those savours ... I drink a second mouthful ... a third ... the potion is losing its magic. It is plain that the object of my quest...lies not in the cup but in myself" (*In Search of Lost Time, Vol 1, Swann's Way*, 1922). Barwich explains the aroma becomes a “placeholder” for a memory. She notes, though, that evocative memories are rare: “Imagine being thrown back in time each time you smell a familiar odor, ending up trapped in an endless loop of olfactory Groundhog Day!”

Smells linger (e.g. dead mouse) when odor molecules stick on walls and clothes (Vosshall, personal communication); family members are often reluctant to discard clothing from their deceased relatives because their smell remains long after death (Barwich, 2020). The strongest memory of a place is often its smell: The "sick building syndrome" is clearly different from the delicious smell of rich

"olfactory landscapes" found in nature (Spence, *Cognitive Research: Principles and Implications*, 2020).

A loss of smell, *anosmia*, can have a considerable impact on our sense of well-being. Referred to as an “invisible disability” (Boesveldt and Parma, 2021), it can be a harbinger of the onset of diseases such as Alzheimer’s, Parkinson’s, and most recently COVID-19. Researchers and clinicians have found that a sudden total or partial loss of smell, “remarkably” *without nasal congestion*, (Parma et al, *Chemical Senses*, 2020) is one of the first signs of COVID and in some datasets, more predictive than fatigue, cough, or fever (Cooper, *Neuron*, 2020). This loss of smell is often accompanied by a loss of taste and changes in *chemesthesis*—the ability to sense irritants such as ammonia or menthol. Rarely, there are distortions in smell perception—*parosmias* (Cooper, 2020). The exact mechanism for this loss of smell remains unknown and may be due to genetic factors and viral load, among other factors (Glezer et al, *Journal of Neurochemistry*, 2020). Its frequency, by self-report, varies widely and will eventually require a clinical in-person evaluation and even autopsy studies (Cooper, 2020; Parma et al, 2020). Recovery is usually within one to two weeks but can take considerably longer (Vaira et al, *International Forum of Allergy & Rhinology*, 2020).



Jasper Johns, Untitled, 1990. Private Collection. Source: Photo copyright, Christie's Images/Bridgeman Images. Copyright 2021 Jasper Johns/Licensed by VAGA at Artists Rights Society (ARS), NY. Used with permission.



Paul Klee, "Was Fehlt Ihm?" ("What's the Matter with Him?") 1930 Source: Wikimedia Commons/ used with permission of Artists Rights Society.

Bottom line: Our sense of smell has been vastly underappreciated. Yet it is important for our well-being and our relationship with others. Odor can warn of danger in the environment or changes in our own health and personal hygiene. It can function as a placeholder for memory. A loss of smell can be partial or total and can come on gradually or suddenly. Sometimes it can signal the advent of diseases such as Alzheimer’s, Parkinson’s, and most recently COVID-19. Just as we screen for hearing and visual impairment, we should be cognizant of impairment in our olfactory landscape as well.

Special thanks to Dr. Leslie Vosshall of Rockefeller for her assistance and to James M. Musser, MD, Ph.D. on the front lines of COVID-19 research at my sister institution, Houston-Methodist, for suggesting this topic.

About the Author



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