

# Gender and schizophrenia

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Credit: University of Dayton

New research from University of Dayton psychologist Julie Walsh-Messinger and Icahn School of Medicine at Mount Sinai psychiatrist Dolores Malaspina uncovers key differences in the brains of men and women suffering from schizophrenia.

"For a long time, researchers overlooked that men and women are neurobiologically different," said Walsh-Messinger, an assistant professor. "A lot of research was conducted on males and it was assumed the results could be generalized to females, or vice versa. Our research suggests that may not be true."

Walsh-Messinger and her co-researchers found clear disparities in how men and women with schizophrenia respond emotionally to odors in a study published in the peer-reviewed Journal of *Psychiatry Research*. She also used smells to identify differences in how they identify another person's mental state, and infer that person's intentions, in work published in the peer-reviewed journal *Social Neuroscience*. Both studies were supported by National Institutes of Mental Health grants.

Scents are important because neurodegenerative diseases like schizophrenia are known to affect the sense of smell. Odor has a direct line to the brain's emotional processing. As Walsh-Messinger explains, someone can see an apple pie and think it looks good, but when they smell the pie, they have a more visceral reaction to it and want a piece.

"The neural structures that process smell and emotion are closely related, so understanding how they interact might help us better understand the emotional and social impairments associated with schizophrenia," she said.

The Psychiatry Research study asked 26 people with schizophrenia and 27 without to rate odors for their pleasantness and unpleasantness. There were no differences between men and women without schizophrenia. However, when Walsh-Messinger looked at men and women with schizophrenia who had increased symptoms of depression, the women rated neutral odors more unpleasant and the men rated them more pleasant. Men with schizophrenia and women without the disorder also judged pleasant odors as more unpleasant than men without the disorder.

Overall, test participants with schizophrenia were less able to identify odors accurately, especially when the odor was neutral or pleasant, a possible hallmark of neurodegenerative damage. People with more severe negative symptoms—a term doctors use to describe social isolation and lack of motivation associated with schizophrenia—found pleasant odors more unpleasant, and unpleasant odors more pleasant.

Those with more prominent positive symptoms—the term for delusions, hallucinations, disordered behavior—gave stronger ratings to neutral odors, which the researchers said fit the way those symptoms work: They cause people to assign significance to meaningless stimuli. For example, someone with schizophrenia may be more likely to observe a neutral facial expression and perceive it as threatening..

Because of the close neural connections between smell and emotion, the study published in *Social Neuroscience* used [odor](#) identification as a proxy of how one's emotion processes contribute to accurately identifying another person's [mental state](#), including their beliefs, desires, intentions and emotions. They also examined the contributions of intelligence. In [women](#), higher intelligence was more relevant. In men, their emotions were more closely related. In people with [schizophrenia](#), the findings were reversed.

Walsh-Messinger said what her research so far doesn't reveal is what causes the differences in the sexes.

"That's the next big missing piece we need to figure out," she said, noting the cause will be a focus of her future work. "We can't really figure out the treatment until we understand the cause."

**More information:** Julie Walsh-Messinger et al. Normal sexual dimorphism in theory of mind circuitry is reversed in Schizophrenia, *Social Neuroscience* (2018). [DOI: 10.1080/17470919.2018.1536613](https://doi.org/10.1080/17470919.2018.1536613)

Julie Walsh-Messinger et al. Sex differences in hedonic judgement of odors in schizophrenia cases and healthy controls, *Psychiatry Research* (2018). [DOI: 10.1016/j.psychres.2018.08.058](https://doi.org/10.1016/j.psychres.2018.08.058)

Provided by University of Dayton

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