How many senses do humans really have?

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Ask even the youngest schoolchild how many senses we have and she'll tell you five—sight, sound, smell, taste and touch.

Neuroscientist Don Katz thinks this might be wrong. The correct answer, he says, will most likely turn out to be is one.

For nearly a decade, Katz, an associate professor of psychology, has been investigating the interconnection of smell and taste in rats. In 2009, he showed that when rats lose their ability to taste, it alters their sense of smell. Two years later, he published a paper suggesting that rats depend on smell as much as taste to determine what food they like.

In a paper published in the Oct. 19 issue of *Current Biology*, Katz showed what happened when you shut down the rat's sense of taste. Using an optical probe, he turned off the brain cells in the animal's primary olfactory cortex that process taste signals from the mouth. There was an immediate impact on the firing patterns of the neurons handling smell. In fact, the smell neurons were transformed so radically the rat could no longer recognize familiar odors.

These findings about the interdependence of taste and smell have lead Katz to speculate that they are one single sense—the "chemosensory system" is what he calls it. "How things taste depends on a lot of other factors than what's on the tongue," Katz says. "We think that taste and smell are part of one large system with two doors," the mouth and the nose, he says.

Other researchers have show that sound, touch, and sight are also inextricably connected. This leads Katz to a grand hypothesis—all our senses belong to a single system. We have only one sense. It's meaningless, for example, to talk of the taste of food because "taste" is equally a function of what you sense on your tongue as it is of what you see, touch, smell, and hear. We don't taste food. We have an experience of food.

Katz likens the brain to a computer fed an immense amount of data so it can generate a single, simplified finding. For the program to run, information must be gathered through all the senses. But we don't realize this. We are only aware of program's final result, which is the illusion that only one sense is responsible for what we experience.

All this remains unproven. Katz plans to continue working on taste and smell in rats. Research moves forward incrementally and methodically. But somewhere in the not-so distant future, we may finally have a grand unified theory of the senses.

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