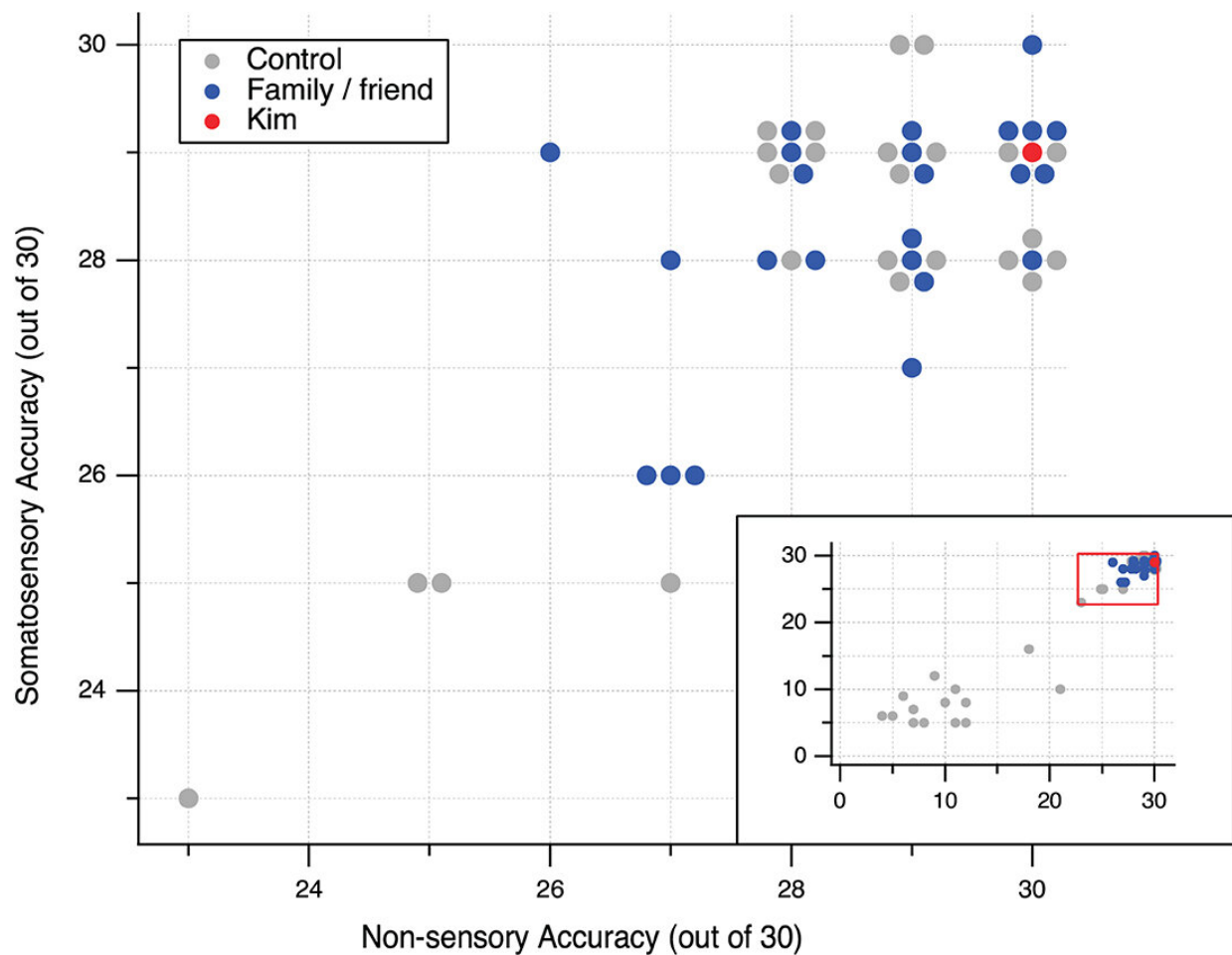


Can you describe a sensation without feeling it first?

April 17 2023, by Matt Wood



Number of expressions accurately selected given the context for the non-sensory (x-axis) and tactile (y-axis) expressions. The number 30 indicates that the accurate and anticipated expression was selected for every vignette, while 7.5 indicates performing at chance. The inset illustrates accuracy for all participants who passed the attention checks, but the primary pane focuses on the attentive

participants performing well above chance. Note that Kim (in red) and all the direct-recruited friends and family of Kim (in blue) are performing near ceiling. Credit: *Frontiers in Communication* (2023). DOI: 10.3389/fcomm.2023.1144018

Blind or colorblind people can describe colors and use expressions like "green with envy" or "feeling blue." A hearing-impaired person can also say those same vibrant hues are "loud." But many linguists and cognitive neuroscientists have assumed that somatosensation—touch, pain, pressure, temperature, and proprioception, or the sense of where your body is oriented in space—is fundamental for understanding metaphors that have to do with tactile sensations. Understanding expressions like "she is having a tough time" or "that class was hard," it was believed, requires previous experience with those sensations to extend their meaning to metaphors.

Now, research from the University of Chicago with a unique, perhaps one-of-a-kind individual, shows that you can comprehend and use tactile language and metaphors without relying on previous sensory experiences. These findings challenge notions of embodied cognition that insist that language comprehension and abstract thought require direct memory of such sensations.

Life without somatosensation

Since 2014, Peggy Mason, Ph.D., Professor of Neurobiology, has been working with Kim (who agreed to be identified by her first name), a woman who was born without somatosensation. She does not have sensory nerve fibers to feel her body. This includes proprioception, so she cannot walk or stand independently due the difficulty of maintaining balance.

Because Kim can't perceive [tactile sensations](#), she relies on other senses to perceive the world. For example, to determine the hardness of an object, she listens to what kind of sound it makes when she strikes it against a surface. She relies on [visual cues](#) to determine textures, but since she has never experienced those sensations directly, she has no stored memories or experiences to refer to later when using language and metaphors. Nevertheless, on a multiple-choice test that asked users to select the best sensory expression to complete a sentence, Kim performed just as well as controls.

"Phrases like 'driving a hard bargain' are extensions of words that have a very sensory root," Mason said. "Since Kim has no somatosensation, we really wondered how she would deal with this. But we see that while sensory experiences could be very important to many people, it's not required. You can learn this too."

To investigate Kim's use of language, Mason, a neurobiologist who studies empathy and other pro-social behaviors, collaborated with two faculty from the UChicago Department of Linguistics: Jacob Phillips, Ph.D., a Humanities Teaching Fellow, and Lenore Grenoble, Ph.D., the John Matthews Manly Distinguished Service Professor. Grenoble said that Kim provided a unique opportunity because until now, ideas about language and metaphors derived from somatosensation simply couldn't be tested.

"Kim is a gift in that respect because we can test things with her that we can't possibly test otherwise, since everyone has had some of this experience. Some people have lost it, but they have a memory of it to draw on," she said. "She's just never had it and that's unique. It may be a [case study](#) of just one, but it's a pretty powerful one."

Learning through association vs. experience

In addition to Kim, the researchers recruited two control groups to take the test. Thirty-nine native speakers of American English were recruited online, and 24 of Kim's friends and family were recruited to account for potential differences between the use of idiomatic expressions within Kim's social circle and the average English speaker. The online quiz featured 80 questions with short vignettes of a sentence or two that were followed by a choice of four idiomatic expressions. For example:

Liza bought her first car and successfully negotiated the price down five thousand dollars. Liza:

- a) drove a hard bargain. (correct answer)
- b) made a rough guess.
- c) missed the mark.
- d) hit the hay.

Kim performed as well or better than the control groups, identifying the correct response for nearly every example including both tactile and non-sensory expressions. Grenoble says this lays down a marker in the debate about embodied cognition and [metaphor](#).

"Now we have data to show which side of the debate is correct, and that is you don't have to have somatosensory experience. That opens gateways to really understanding how these things are acquired, how they change, and how they're used for all kinds of things," she said.

While Kim aced the multiple-choice exam, the paper describes an interaction that gives insight into her experience of the world. The researchers were discussing the word "gritty" with Kim and her mother, and Kim said that she assumed grits, the food, must be gritty because it

uses the same root word. Her mother pointed out that cooked grits are definitely not gritty, and Kim responded:

"I think pretty literally about words, especially words about, like you know, sensation and things like that. [...] A lot of times words like we're talking about 'gritty' or like 'soft' or 'hard' or, like I'm trying to think of examples, like 'coarse.' My definitions come strictly from what other people have told me, so that's where I'm getting it from."

Grenoble said this experience shows that while direct experience helps, the way Kim interprets these expressions may not be much different than how everyone else does.

"I actually think that most people learn it through association, because they are metaphors. They aren't literal meanings, so, you have to understand how to interpret the metaphor," she said. "What Kim is really showing us is that you're interpreting it linguistically, because she's got nothing else."

Mason, who has also published research on how Kim and another person lacking sensation use visual cues to develop a sense of their bodies in space, said she looks forward to working with Grenoble and Phillips on more projects about how Kim describes objects and uses gestures.

"Kim has been an incredible study participant, verging on being a co-author on some of these studies," she said. "This has been a blossoming and very enjoyable collaboration with such a unique individual."

The study, "The unembodied metaphor: Comprehension and production of tactile metaphors without somatosensation," is published in *Frontiers in Communications*.

More information: Jacob B. Phillips et al, The unembodied metaphor:

comprehension and production of tactile metaphors without somatosensation, *Frontiers in Communication* (2023). [DOI: 10.3389/fcomm.2023.1144018](https://doi.org/10.3389/fcomm.2023.1144018)

Provided by University of Chicago

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