

People understand hyperbole through intent of communication, researcher says

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Noah Goodman, director of Stanford's Computation and Cognition Lab, explores the ways people communicate meaning through figurative language. Credit: L.A. Cicero



Stanford scholar Noah Goodman found that people understand nonliteral language – metaphor, hyperbole and exaggerated statements – when they focus on the intent behind the communication.

People tend to understand nonliteral <u>language</u> – metaphor, <u>hyperbole</u> and exaggerated statements – when they realize the purpose of the <u>communication</u>, according to new Stanford research published in *PNAS*.

Noah Goodman, an assistant professor of psychology at Stanford, believes that figurative <u>language</u> – the nuanced ways that people use <u>language</u> to communicate meanings different than the <u>literal meaning</u> of their words – is one of the deepest mysteries of <u>human communication</u>.

"Human <u>communication</u>," he said, "is rife with nonliteral <u>language</u> that includes metaphor, irony and <u>hyperbole</u>. When we say 'Juliet is the sun' or 'That watch cost a million dollars,' listeners read through the direct meanings – which are often false if taken literally – to understand subtle connotations."

'Sharp' vs. 'round' numbers

To understand this <u>communication</u> dynamic, Goodman, director of the Computation and Cognition Lab at Stanford, and his colleagues used computational modeling. Stanford graduate student Justine Kao was the first author on the paper, which included co-authors Jean Wu, a former graduate student at Stanford, and Leon Bergen of the Massachusetts Institute of Technology.

In their lab, they develop computational models that use pragmatic reasoning to interpret metaphorical utterances. Their research for this particular project involved four online experiments with 340 subjects.

Participants in the experiments read different scenarios involving



hyperbole. For example, a person bought a watch and was asked by a friend whether it was expensive. That person responded with different figures, ranging from low- to high-cost figures – such as \$50, \$51, \$10,000 or \$10,001. Given this, the participants rated the probability of the purchaser thinking it was an expensive watch or not.

People tended to interpret "sharp numbers" – such as a watch costing \$51 – more precisely than "round numbers," as in a watch costing \$50.

The findings suggest that even creative and figurative <u>language</u> may follow predictable and rational principles.

Kao said, "This research advances our understanding of <u>communication</u> by providing evidence that reasoning about a speaker's goals is critical for understanding nonliteral <u>language</u>. We were able to capture nuanced and nonliteral interpretations of number words using a <u>computational</u> <u>model</u>."

Common ground

The research showed that if listeners are trying to understand the topic and goal of <u>communication</u> as well as the underlying subtext – that which is not expressed explicitly – they're better able to truly understand the utterance. A sense of common knowledge about what is being described or expressed is also important. Speakers and listeners assume that individuals are rational agents who use common ground and reference points to best maximize information.

As Kao put it, "There is still a long way to go before computers can understand Shakespeare, but it is a start."

Goodman offered this example: Imagine someone describing a new restaurant, and she says, "It took 30 minutes to get a table." People are



most likely to interpret this to mean she waited about 30 minutes. But if she says, "It took a million years to get a table," people will probably interpret this to mean that the wait was shorter than a million years, but that the person thinks it was much too long.

"One of the most fascinating facts about <u>communication</u> is that people do not always mean what they say – a crucial part of the listener's job is to understand an utterance even when its <u>literal meaning</u> is false," the researchers wrote.

Goodman said the <u>computational model</u> he and his colleagues use to understand nonliteral utterances integrates empirically measured background knowledge, <u>communication</u> principles and reasoning about <u>communication</u> goals.

What is next in line research-wise?

Goodman and the others said they believe that the same ideas and techniques can extend to metaphor, irony and many other uses of <u>language</u>. For example, they have a promising initial exploration of "is a" metaphors such as "your lawyer is a shark," Goodman said.

"Beyond these cases of figurative speech, the overall mathematical framework is beginning to give a precise theory of natural <u>language</u> understanding that takes into account context, intention and many subtle shades of meaning," he said, adding, "There is a lot more work to do."

More information: PNAS,

www.pnas.org/content/early/2014/07/31/1407479111

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