

## On Top of Words: Spatial language spurs kids' reasoning skills

**Rachel Ehrenberg**

Think before you speak may be apt advice, but new research suggests that speaking first fosters the ability to think later. Studies of spatial reasoning in deaf children support the idea that words help people encode certain concepts, and also suggest that using spatial words with children boosts overall reasoning skills.

"We learn in a specific context, but language invites us to compare across contexts," says Dedre Gentner of Northwestern University in Evanston, Ill., who presented the work in Boston last week at the annual meeting of the American Association for the Advancement of Science.

Previous work by Gentner and colleagues found that preschool children perform better at spatial-reasoning tasks when they hear spatial words like "middle," "on top of," or "under" before and during the task. In the latest study, the researchers studied deaf children who hadn't learned conventional sign language to see whether they were at a disadvantage for spatial reasoning.

The researchers worked with 13 hearing and 13 deaf 5-year-olds in Istanbul whose hearing parents hadn't exposed them to conventional sign language. Each child was shown two boxes having a top, middle, and bottom shelf; each child also saw three cards, one with a star on the back designated the "winning" card. The researchers placed the winning card on a shelf in one box, and the child was then asked to find a duplicate winning card in the other box. The card was always placed on the same shelf in each box. After several trials, the researchers upped the ante by using cards that looked different on the front.

On both tasks the hearing children fared significantly better than the deaf children, especially on the second task, Gentner says. "If you are doing something where you have to carve up the world in a spatial way, language is going to come in really handy," she says.

The research team also tried to establish that the deaf children didn't have gestures for spatial relations. Both the deaf and hearing children watched short videos of spatial events such as a baby crawling toward a cat. Then the children were asked to describe the events. While the hearing children often used spatial words such as "to" or "top" in their descriptions, the deaf children rarely used gestures that seemed to refer to spatial relations.

"Language does give you a kind of scaffolding to reason from," says Karen Emmorey, director of the Laboratory for Language and Cognitive Neuroscience at San Diego State University in California. But she cautions that it is difficult to tease out how spatial language might be encoded in the deaf children's gestures. In fact, users of sign language often fare better than non-signers at tasks that involve spatial reasoning. Emmorey and Gentner are now considering collaborating on future projects.

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### **References:**

2008. Spatial language potentiates spatial cognition: Evidence from deaf homesigners. Presentation at the annual meeting of the American Association for the Advancement of Science. Feb. 14-18. Boston.

**Further Readings:**

Bower, B. 2001. Deaf kids establish own sign language. *Science News* 160(July 28):54. Available to subscribers at <http://www.sciencenews.org/articles/20010728/fob6.asp>.

**Sources:**

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