



BRAIN & COGNITIVE SCIENCES

Um . . . Let's Learn

Rochester cognitive scientists find that 'um's' and 'uh's' help toddlers learn new words.

By Alan Blank

THERE'S GOOD NEWS FOR PARENTS WHO ARE worried that they're setting a bad example for their children when they say "um" and "uh" when they're searching for the right word.

▲ **SCREEN TIME:** Two-year-old Jackson Coles, of Webster, N.Y., watches a special monitor designed to track eye movements as his mother, Christy, identifies objects on the screen during a research study to explore how children use verbal hesitations as clues to understanding new words.

A new University study shows that toddlers use their parents' stumbles and hesitations to help them learn language more efficiently.

Say you're walking through the zoo with your two-year-old, hoping to expand your child's vocabulary of wild animals. You point to a rhinoceros and say, "Look at the, uh, uh, rhinoceros."

As you're fumbling for the correct word, you're also sending a signal that you're about to teach your child something new. In other words, your youngster takes your verbal hesitations—your disfluencies, as they're known to cognitive scientists—as a

sign to pay close attention, according to the researchers.

Richard Aslin, the William R. Kenan Professor of Brain and Cognitive Sciences and one of the study's authors, says young kids have a lot of information to process while they listen to adults speak, including many words that they have never heard before. Deciphering what a word means after it's been spoken is a more difficult task for a young child's brain, and a child is apt to miss what comes after the new word.

"The more predictions a listener can make about what is being communicated, the more efficiently the listener can understand it," says Aslin.

The study, which was conducted by Celeste Kidd, a graduate student at the University, Katherine White, a former

postdoctoral fellow at Rochester who is now at the University of Waterloo, and Aslin, was published online in the journal *Developmental Science*.

The researchers studied three groups of children between the ages of 18 and 30 months. Each child sat on his or her parent's lap in front of a monitor with an eye-tracking device. Two images appeared on the screen: one image of a familiar item (like a ball or a book) and one made-up image with a made-up name (like a "dax" or a "gorp"). A recorded voice talked about the objects with simple sentences. When the voice stumbled and said "Look at the, uh . . ." the child instinctively looked at the made-up image much more often—almost 70 percent of the time—than the familiar image.

"We're not advocating that parents add disfluencies to their speech, but I think it's nice for them to know that using these verbal pauses are OK—the "uh's" and "um's" are informative," says Kidd, the study's lead author.

In the study, the effect was only significant in children older than two years. The younger children, the researchers reasoned, had not yet learned the fact that disfluencies tend to precede novel or unknown words.

When kids are between the ages of two and three, they usually are at a developmental stage where they can construct rudimentary sentences consisting of about two to four words. And they typically have a vocabulary of a few hundred words.

The study builds on earlier research by Jennifer Arnold, a scientist at the University of North Carolina and a former postdoctoral fellow at Rochester, which found that adults also can use "um's" and "uh's" to their advantage in understanding language. Additionally, work by Anne Fernald at Stanford University has shown that it's not the quality but the quantity of speech that a child is exposed to that's most important for learning. **R**

Alan Blank writes about the sciences for University Communications.

Research Roundup

SCIENTISTS FIND A KEY TO MAINTAINING DNA

Scientists have discovered how DNA maintenance—a critical yet complex part of the aging process—is regulated, opening the door to interventions that may enhance the body's natural preservation of genetic information. Robert Bambara, chair of the Department of Biochemistry and Biophysics, led the research, which was published in the *Journal of Biological Chemistry*. The new finding—that a process called acetylation determines the degree of fidelity in DNA replication and repair—may ultimately help researchers delay the onset of aging and aging-related diseases by curbing the loss of or damage to DNA, which makes people more susceptible to cancers and neurodegenerative diseases.

IRON DEFICIENCY HARMS THE DEVELOPING BRAIN

A mother's iron deficiency early in pregnancy may have a profound and long-lasting effect on the development of her child's brain, even if the lack of iron isn't enough to cause severe anemia, according to researchers. Low iron is so common that an estimated 35 percent to 58 percent of all healthy women show some degree of deficiency—and one in five women of childbearing age has iron-deficient anemia, a more serious condition. Led by Margot Mayer-Proschel, an associate professor of biomedical genetics, the research underscores the need for monitoring a pregnant woman's iron status beyond anemia. The journal *PLoS One* published the study.

LARGER CITIES DRIVE GROWING WAGE GAP

Soaring salaries of many urban dwellers are behind a growing income gap in the country's megacities, say researchers. A new study by Ronni Pavan, an assistant professor of economics, and Nathaniel Baum-Snow of Brown University and the National Bureau of Economic Research, shows that up to one-third of the growth in the wage gap between rich and poor is driven by city size, independent of workers' skills. Using U.S. Census data and American Community Surveys from 1980 to 2007 across the nation, the researchers found that the larger the city, the wider the wage gap among its workers. The country's largest cities—New York, Los Angeles, and Chicago—are home to the greatest extremes in incomes, while midsized cities experience relatively less wage inequality and rural areas, the least.

RESEARCH CLARIFIES 'OBESITY PARADOX'

A new study shows that obese patients with high blood pressure and diabetes are at much higher risk for major complications following noncardiac surgery compared to otherwise healthy obese patients and patients of normal weight. The finding—which provides a simple, clinically useful way of identifying patients who may be at high risk—diverges from previous research showing that obesity is associated with a lower risk of death and complications after noncardiac surgery. It also helps to clarify the so-called "obesity paradox"—the notion that a high body mass index (BMI) confers a protective effect in certain circumstances. Laurent Glance, a professor of anesthesiology and community and preventive medicine, led the study, which was published in the journal *Anesthesiology*.

ANTIDEPRESSANTS BOOST BRAIN CELLS AFTER INJURY

Antidepressants may help spur the creation and survival of new brain cells after brain injury, according to a study by neurosurgeons. Jason Huang, an associate professor of neurosurgery, and colleagues undertook the study after noticing that patients with brain injuries who'd been prescribed antidepressants were doing better in unexpected ways than their counterparts who didn't take such medications. Not only did their depression ease, but their memory also seemed to improve compared to the other patients. The team's study of the antidepressant imipramine suggests that it boosts the number of neurons in the hippocampus, the part of the brain responsible for memory. The findings were published online in the *Journal of Neurotrauma*.