Did you know that by the age of 4, children can learn novel words (but only types of words that are found in human languages) and interpret semantically ambiguous sentences in adult-like ways? However, children at this age are still learning lots of things about language, and still interpret many types of sentences in non-adult-like ways.

These are just a few of the recent findings from researchers at the University of Maryland that have been made possible by your participation in our child studies. The Linguistics department’s Project on Children’s Language Learning wishes to thank you for your support by sharing some of the exciting progress we’ve made this year.

We hope you find it as interesting as we do, and we look forward to seeing you and your child again soon!

Dr. Jeffrey Lidz
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By the time children are 4 and 5 years old, their language skills are close to their adult form. Therefore, our work with preschoolers involves their interpretations of complex sentences that often have more than one possible interpretation. Children's understanding of these complex sentences can reveal important insights about language and cognitive development. Here is some of what your children helped us learn this year.

PRONOUNS

He Who?

Let's say that an elephant has a book and that a hamster and the elephant each read it. A puppet, who has been watching, says, “He read Elephant's book.” Even though there were two characters involved, most adult native speakers of English know that by using the pronoun “he,” the puppet is referring to Hamster and not Elephant. But does your preschooler know this?

The answer to this question will help us place a linguistic rule governing interpretation of pronouns, known as Principle C, into the timetable of child language acquisition. Previous experiments have suggested that preschool-age children do interpret pronouns using Principle C. If we can replicate these results, we then want to see how children react to sentences like these, but with stories that change the focus of the story to either the hamster or the elephant, to investigate how information about the world impacts how children utilize their grammars.

–Cory Perlowitz and Stacey Conroy

METHODS

Silly Snail! He thinks Pumba swam in the pool!

The Truth Value Judgment Task

This procedure involves two experimenters. One experimenter plays the role of a storyteller and the other plays the role of a puppet. The storyteller acts out a story using various toys and props. At the end of the story, the puppet tells the child what he thinks happened in the story.

Some of our puppets are very silly, and some of them are just learning how to listen. Sometimes they get mixed up about the story. The child's job is to tell the puppet whether he is right or wrong.

We use this task to determine how children interpret ambiguous sentences. Generally, the puppet's statement about the story can be interpreted in two different ways. However, the stories are designed so that only one interpretation is true. This way, if the child tells the puppet he is right, we know the child got the interpretation in which the statement is true, and vice versa.

We are careful to tell the stories so that under either interpretation, it's understandable how the puppet could be confused.
Differences in Ages

Last year, we investigated children’s interpretations of sentences like “Every cat didn’t hide behind the sofa,” which has two possible interpretations in adult English. This sentence can mean two things: either not all of the cats hid behind the sofa (preferred), or none of the cats hid behind the sofa (dispreferred). We present children with a picture, like the one at the right, where it is true that not all of the cats hid behind the sofa.

The puppy (upper left corner) says the ambiguous sentence, “Every cat didn’t hide behind the sofa,” and the child’s job is to say whether the pup is right or wrong. If a child gets the preferred adult interpretation, he or she will say “right,” because not all of the cats are behind the sofa. If the child gets the dispreferred adult interpretation, he or she will say “wrong,” because it’s not true that none hid behind the sofa.

Surprisingly, we found that 4 year olds were more likely than 5-year-olds to understand the sentence like adults do. We hypothesized that as children become more sophisticated language users, they bring more information into the process of sentence understanding.

This year, we explored how children interpret these types of sentences by using a game that places different demands on children. We told children a story in which two out of three girls paint one board, and none paint the other board. The puppet tries to say what happens, but he’s not very good with colors, so he needs the child’s help finishing his sentence. By seeing which board children choose to complete the sentence, we can determine how they understand the sentence.

In this game, we find fewer differences between 4- and 5-year-olds, suggesting that there are some fundamental similarities in the sentence understanding process that are consistent across development.

– Stacey Conroy

SYNTACTIC AMBIGUITY

The Cat on the Sofa on the Rug

The sentence put the cat on the sofa on the rug is ambiguous. It can be an instruction to take the cat that is sitting on the sofa, and put him on the rug. Or, it can be an instruction to take the cat and put him on the sofa that is sitting on the rug. When adults are given pictures that makes these objects available, (pictured below), they are equally likely to perform each of these actions.

We have found that children do something different. Many children take the cat that is on the sofa, and put him on the sofa that is on the rug. This is different from what adults do in the same situation, and we think it reveals the steps that children go through in processing and understanding language. We are currently investigating why it is the case that children perform these actions differently than adults.

- Lauren Clifford and Stacey Conroy
NUMBERS

Looking at Interpretations

Some of our earlier research examined children’s interpretations of ambiguous sentences like “The girl didn’t peel two apples.”

This sentence can have two interpretations. One interpretation, which we call “isomorphic” (don’t ask), is that the girl has peeled some number of apples other than two. The other interpretation, which we call “nonisomorphic” (still don’t ask), is that there are two particular apples that she failed to peel. We can see that these interpretations are different by creating scenarios in which one interpretation is true and the other is false.

First imagine a situation in which the girl has two apples and she peels one. In such a situation, the isomorphic interpretation is true because the number of apples that she peeled is not two. However, in that scenario, the nonisomorphic interpretation is false because there is only one apple that she failed to peel. Since the isomorphic interpretation can be true when the nonisomorphic interpretation is false, we can clearly see the ambiguity of the sentence.

Now imagine a situation in which the girl has four apples and she peels two. The sentence is still true because there are two apples that she didn’t peel. But now, it’s the nonisomorphic interpretation that is true. In this situation, the isomorphic interpretation is false because the girl did, in fact, peel two apples. Again, the ambiguity becomes clear.

In our previous research we found that preschool aged children speaking a variety of languages have difficulty accessing nonisomorphic interpretations. In the four-apple situation just described, 4-year-old children tend to say that the sentence is false because the girl did peel two apples. In other words, they say the sentence is false because the isomorphic interpretation is false. In the two-apple situation, they say the sentence is true because the isomorphic interpretation is true. (Though, for some reason, they never seem to use the word “isomorphic.”)

Interestingly, if you say ‘the girl didn’t peel two of the apples’, children find the non-isomorphic easier to obtain. In this study, we are investigating whether exposure to the non-isomorphic reading with the sentences containing “of the” will change children’s responses on the plain sentences.

This study is still underway, but it does appear that this kind of experience matters. It seems that when children can access the non-isomorphic interpretation, it helps them access this same interpretation, even in sentences where this was previously difficult. We are currently investigating what the mechanisms of learning are that can explain this phenomenon.

–Cory Perlowitz and Jeff Lidz
DETERMINERS

Learning a New Word

In this experiment, we investigated children’s abilities to learn new words. Specifically, we are interested in a class of words called determiners, which are words like some, all, most and every. Let’s look at a sentence like (1).

(1) Every girl is on the grass

In (1), as English speakers, we know that the word every describes something about the set of girls. However, there is another logical possibility. A sentence like (1) might mean something like everything that is in the park is a girl, sort of like (2)

(2) Only girls are on the grass

We are investigating whether determiners that act like this are possible to learn, since we don’t see them occur in any natural language (only isn’t a determiner).

In this experiment, children were introduced to Platy, the platypus, who is very picky. He likes some cards, but not others, and we asked the children to help us figure out what kinds of cards that Platy likes. We used the word gleeb, to mean not all. For example, we told the children that Platy only likes cards where gleeb girls are on the grass. Some children saw pictures where not all the girls were on the grass. For these children gleeb would describe something about the girls, similar to other determiners. Other children received pictures where not all the people on the grass were girls. For these children gleeb would describe something about the people on the grass, unlike real determiners. After seeing a few cards that Platy likes, we asked them to sort new cards in order to see if they could figure out what kinds of cards Platy likes (and, in turn, what they thought gleeb meant).

We have found that children learn the determiner that occurs in natural language, but have a lot of difficulty learning the determiner that does not occur in language. These results suggest that the way that children learn language plays an important role in determining the kinds of meanings natural languages can express.

– Tim Hunter and Stacey Conroy