Since last summer, we’ve explored a wide range of topics through our research, from how children’s color categories change as they learn their color words, to how the language a child speaks affects how easy or difficult it is to learn to count. In this issue of our newsletter, we are excited to share some of our most recent findings! Two different studies are featured: one study explored how children learn that every number has a number than comes after, and the other study investigated how French- and English-speaking children differ in their understanding of words like “a” and “one.”

This is only a peek at all the research we’ve been conducting, and, as always, we are developing new studies at the Language and Development Lab as well. Our research is not possible without you. In fact, as a result of all the families’ involved in our studies, we have been able to do research no one else has done before! If you are interested in having your children participate in our studies and be a part of cutting-edge research, please do not hesitate to reach out to us! We are always looking for “child scientist” collaborators to join us!

Find us on @UCSDLADLab
Sign up at ladlab.com
Reach us at (858) 246-0576
Visit us in KidCity at the Fleet Science Center in Balboa Park and the Birch Aquarium at UCSD
CHILDREN LEARN PROPERTIES OF NUMBERS BEFORE THEY ARE FORMALLY TAUGHT MATH FACTS

Rose Schneider

Human beings are capable of learning across a variety of subjects, but one of the most impressive examples of this is learning our numbers. Adults know that every number has a successor, which can be found by simply adding 1 to that number. For example, if adults were asked to find the successor of, say, “bajillion-two,” they would know to say, “bajillion-three,” even though both are made-up numbers. This is because, in English, counting has a repetitive structure; the numbers 1 through 9 are repeated in each decade, and this pattern never changes no matter how high we count. In fact, one might pick up on this pattern after only a few repetitions and assume that it continues on forever, and that numbers must also continue on forever then. We wondered if this is how children learn that every number has a successor. We proposed that it happens through one of two ways: either 1) by recognizing the repetitive structure of counting, or 2) by learning math facts and realizing you can add 1 to any number.

To test this, we had 3.5- to 6-year-olds complete several tasks. To explore children’s understanding of the repetitive structure of counting, we asked them to count as high as they could, providing them with prompts when they got stuck. After that, we asked children what number came after a range of different numbers.

To test children’s mathematics skills, we asked children to provide the answer to several simple addition problems (all which were a number +1).

We found that children’s knowledge of the repetitive structure of counting was most closely associated with their understanding that every number has a successor. Our findings suggest that children do not discover that you can always add 1 to a number by learning math. Instead, they learn this information by recognizing and mastering the repetitive structure of counting.

“CHILDREN DO NOT DISCOVER THAT YOU CAN ALWAYS ADD 1 TO A NUMBER BY LEARNING MATH. INSTEAD, THEY LEARN THIS INFORMATION BY RECOGNIZING AND MASTERING THE REPETITIVE STRUCTURE OF COUNTING.”
FRENCH-SPEAKING CHILDREN INTERPRET THE WORD FOR "ONE" DIFFERENTLY THAN ENGLISH-SPEAKING CHILDREN

Elisabeth Marchand

In English, although both questions seem the same, whether we ask someone, "Is there a cat?" or "Is there one cat?" depends on what exactly we want to know. When we ask someone, "Is there a cat?", we want to know if there is at least one cat. When we ask someone, "Is there one cat?", we want to know if there is exactly one cat. However, several languages use the same word to represent both "one" and "a." One such language is French, which uses "un." In languages like French, where the same word is used for both 'one' and "a," it might be more difficult for children to learn their numbers due to the conflicting meanings. We wondered if French-speaking children generally interpreted "un" as "one" or "a," or if it depended on the context in which they heard "un." We proposed that French-speaking children would interpret "un" to mean "exactly one" when it was used with other exact number words, such as "two," and they would interpret "un" to mean "at least one" when it was used with other non-exact words, such as "some."

To test this, we asked children from 2.5 to 4.5 years old to complete a set of games. In the first game, children saw different numbers of toy animals situated in either a forest or a barn house and were then asked questions like, "Est-ce qu’il y a un chat dans la maison?" ("Is there a/one cat in the house?"), "Est-ce que tous les canards sont dans la maison?" ("Are all the ducks in the house?"), and either, "Est-ce qu’il y a des cochons dans la maison?" ("Are there some pigs in the house?") or, "Est-ce qu’il y a deux cochons dans la maison?" ("Are there two pigs in the house?"). Then, we played some games to test children's understanding of numbers.

We found that, most of the time, children said "yes" when they were asked if there was "un" (a/one) animal in the house when they saw either one or two animals in the barn house. These findings suggest that French-speaking children interpret "un" in a different way than English-speaking children interpret "one" and "a," specifically in that French-speaking children do not take the context of the question into consideration when answering the question; they always interpret the question to be asking if there is at least one item present. This supports the idea that learning that "un" can mean both "exactly one" and "at least one" can be particularly challenging for French-speaking children because the language does not have two different words for the two different meanings.
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