Evidence for very early understanding that “two” means “a pair”
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Background
This project studies the development of the word “two” as a window onto children’s first understanding of numerical language.

The Knower-Levels View (Wynn, 1992)
• Acquisition of number words including “two” is cumbersome and slow.
• Children learn the first three number words sequentially, passing through “one-knower,” “two-knower,” and “three-knower” stages.
• Children’s first meaning for the word “two” is as a general plural (more than one) – not distinguishable from “three” or other number words.

A puzzle in the Knower-Levels View
• According to this view, meanings for one, two, and three are mapped directly onto “object-file” representations, a preverbal system for representing small numbers of objects (Wynn, 1992; Carey & Feigenson, 2003). It is not clear why, then, children have to learn these words slowly and sequentially.
• Furthermore, the Knower-Levels view posits that children first interpret “two” as plural, and later as exact (i.e. a pair). But research suggests that a conceptual representation (i.e. object files) for a pair is available by 12 months, whereas the conceptual representation more than one (i.e., singular-plural distinction) is only available about a year later (Carey & Feigenson, 2003; Barner et al., 2007).

• Given infants’ lack of understanding of plurality and their success at precisely representing small numbers, it is surprising that the earliest meaning for the word “two” is not exact.

A new look at “two”
In contrast to the Knower-Levels view, diary studies document correct use of small number words such as “two” by children as soon as they begin speaking (e.g., Barooody & Benson, 2002). These reports motivate a new look at how children map meanings to the first number words.

Current Study & Hypotheses
CHILDES analysis of speech from 18 to 39 months.
• If children’s earliest meaning for the word two for an unspecified plural as previous research suggests, then pair meanings of “two” should not predominate in early speech.
• If, on the other hand, children’s earliest meaning for the word two is as a pair, then pair meanings should predominate in early speech.

Methods
• 205 utterances analyzed from 51 children.
• Sampling geared at incorporating as many children as possible and for children sampled across ages.
• Selected databases searched for children’s use of “two.”
• Coded using context (5 lines before and after target utterance) into one of nine categories.
• Coders blind to child’s age during coding.

Description of Coding Categories

Results
Distribution of uses of “two” by age

Conclusions
• Use of the word “two” changes as a function of age.
• Children’s earliest uses of “two” are exact. They do not represent plural quantities greater than two.
• After an initial burst of correct pair usage, children’s production shifts toward unspecified plural usage. The timing of this shift corresponds to typical reports of the “one-knower” stage.
• Children’s recovery of exact meanings for two probably reflects transitions into the “two-knower” stage. Our sample is too young to capture many children in this stage.
• Our analysis suggests a more complicated trajectory in developing an understanding of the word “two” than previous research suggests.

Discussion
Do object file representations support learning “two”? Consistent with the hypothesis that object-files support first number acquisition, these data suggest that “two” is acquired early and easily.

Is “two” a dual marker for young children?
Some languages, unlike English, have singular-dual-plural or singular-dual or plural morphology. Researchers have argued that English-speaking children first assign “two” the grammatical role of dual marker at the “two-knower” stage (Carey, 2004; Sarnacka et al., 2007).

Our data support this claim, but suggest that children acquire a dual-marker sense of two much earlier than the “two-knower” stage.

Why do children lose the early, exact meaning of “two”?
There is a suspicious coincidence in timing: around 24 months, children lose the exact meaning of two and they acquire a singular-plural distinction. We hypothesize that learning the English plural overshadows knowledge of “two.”

In most cases, “two” co-occurs with plural – s. When children acquire the plural – s marker, they may reinterpret “two” from its initial limited meaning to an over-generalized plural.

What does this tell us about “two-knowers”?
If very young children do interpret “two” as a dual marker, then two-knowers, who are older, may have a richer semantic representation for “two.”

Two-knowers may understand “two” as a number – not just as a grammatical marker of duality – explaining the range of inferences they can make about operations involving “two” (e.g., Condy & Spelke, 2008).

Future Research
• Do 18-24 month old children comprehend “two” as exactly two or as a nonspecific plural?
• Do children start over-generalizing “two” only after they acquire plural – s?

References

[Further references included here]