



Parent-Child Conversation Facilitates Number Talk During Shared Storybook Reading



Savanna Goldstein

Faculty Advisors: Anna Shusterman and Sierra Eisen
Cognitive Development Lab, Wesleyan University

Background

- Early math understanding is the strongest predictor of later school achievement (2) and life outcomes such as salary (1), career success (5), and incarceration rates (3).
- Parents and preschool teachers spend significantly less time teaching math than literacy and psychosocial skills (6).
- This may be because they feel unqualified, so it is important for parents to include math talk in their daily routines.
- Increased number talk is associated with earlier development of important math skills (4).
- Previous studies found that certain types of number talk (e.g., labeling the quantity of a set followed by counting the set) are more effective at teaching quantity than other types (e.g., counting alone) (6).
- Can parents and teachers use picture books to help their children understand quantity?

Previous Study

- How do picture books most commonly represent numbers?
- In part 1 of this study, researchers selected 101 picture books (62 recommended by Connecticut's State Education Resource Center for their math content and 39 from librarian recommendations).
- Books were coded for number content such as counting, Arabic number use, pictures depicting quantity, etc.
- The books generally had low percentages of number content (M=15%, SD=19%) compared to non-number content.
- The most common type of number content was labeling cardinality.
- Only one book included counting and labeling, the optimal number input for learning about quantity.

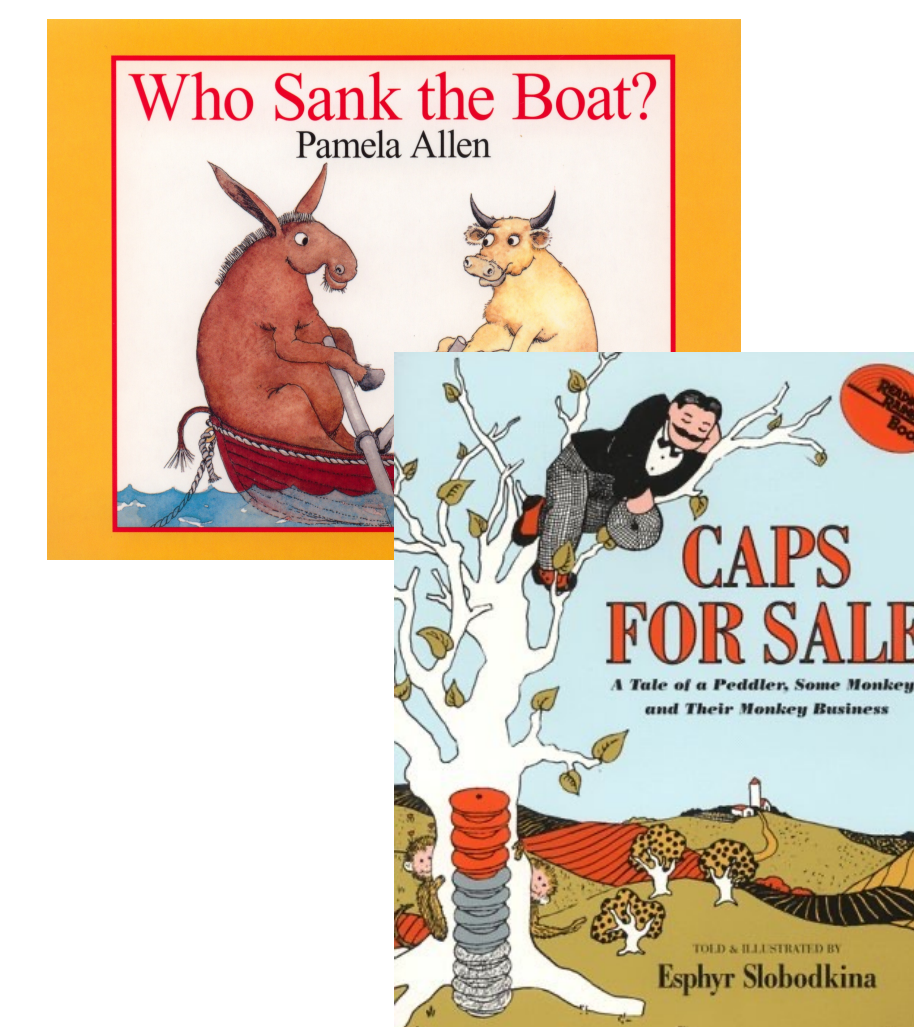
Research Questions

- Will parents produce more number talk during shared storybook reading if they are primed to think about math beforehand?
- What types of number talk are elicited when parents read explicit vs implicit number books?

Explicit



Implicit



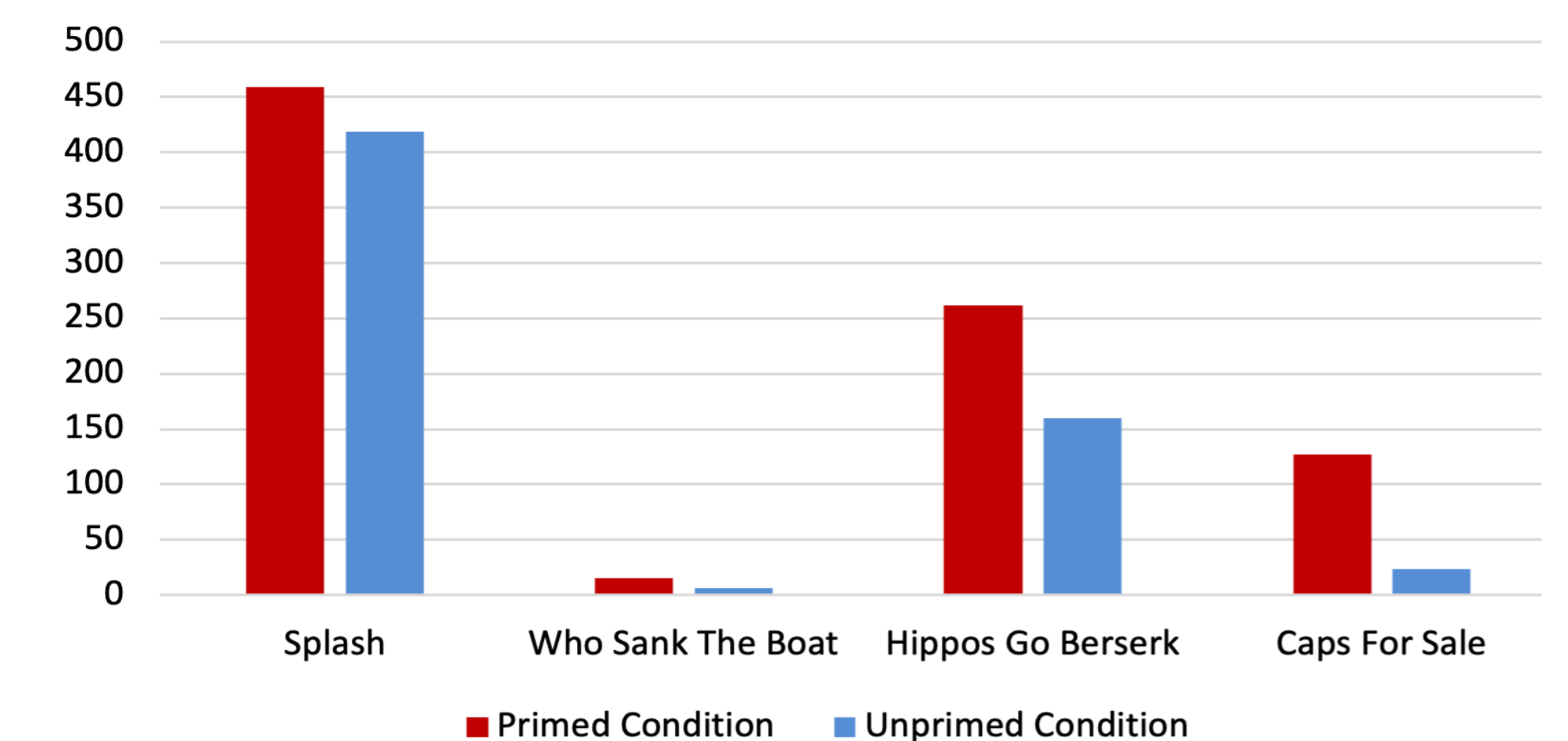
Methods

- Participants: 16 M and 16 F (average age 40.6 months).
- Parents read two books: one with number talk (explicit) and one that implicitly relates to quantity (implicit). Book sets were either Splash and Who Sank The Boat or Hippos Go Berserk and Caps For Sale.
- Parents were either told the study was about how reading can help children learn math (primed) or were simply told the study was about storybook reading (unprimed).
- The readings were recorded and transcribed to determine frequency of certain types of number talk (counting, labeling, tandem count, label then count, corrective feedback, etc.).
- Transcripts were originally coded by words used but were recoded by utterance so the data would reflect instances of number talk rather than amount of words used in each instance.

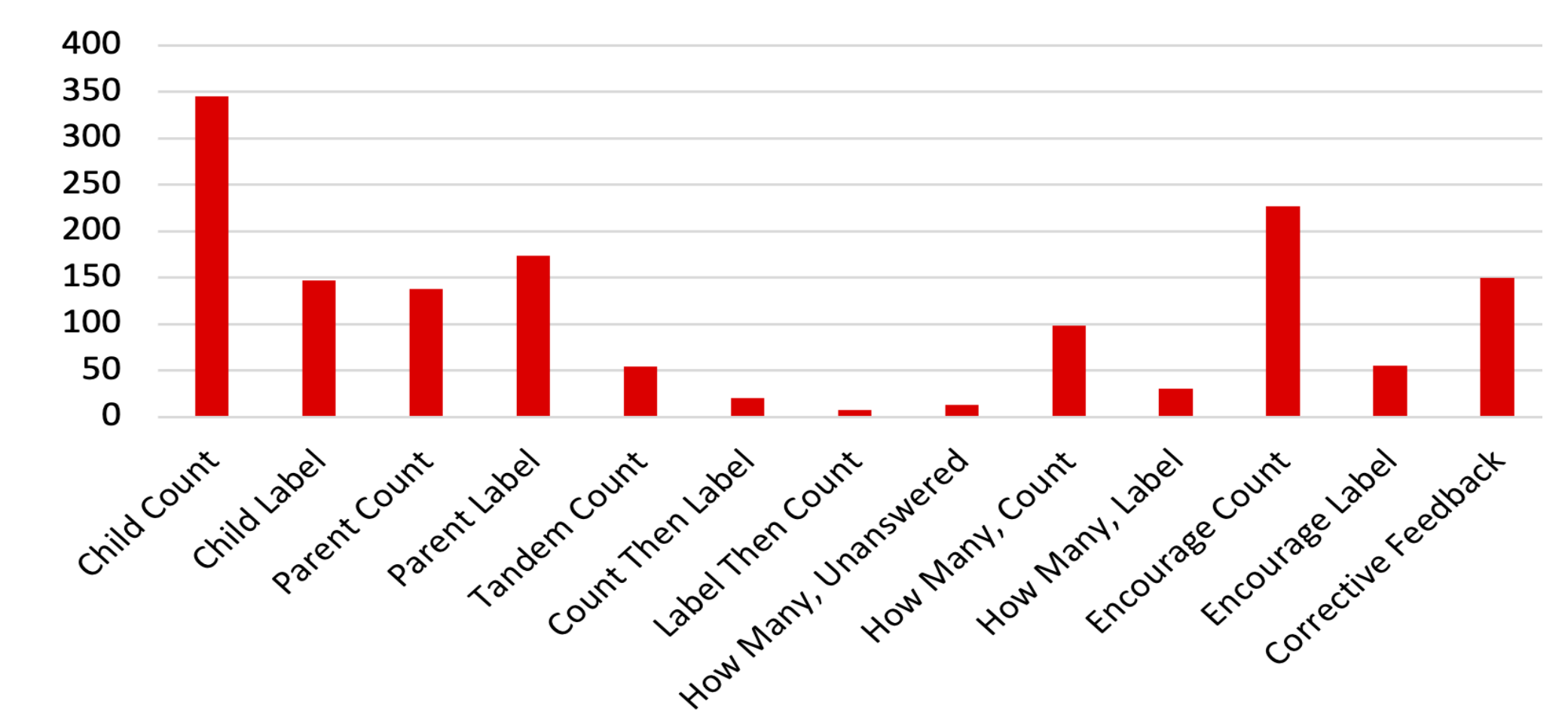
Results

- Parents made significantly more elaborations, including number elaborations, when reading explicit books vs implicit books.
- Priming parents to think about number talk did not affect total utterances nor total elaborations, but it increased the amount of number elaborations.
- These findings did not differ by age nor gender.
- While it was the least common type of number talk in the study, Label Then Count – which is ideal for teaching cardinality – did occur.

Total Number Elaborations For Each Book



Instances of Each Type of Number Talk



Discussion

- If parents begin story time with the intent of helping their child learn about math, they will likely produce more number talk and the interaction will be more meaningful.
- Despite their lack of ideal number talk, books explicitly about number are better for math-oriented story time than other books because of the discussions they inspire.
- Parents likely need to be taught about the best types of number talk to engage in with their children.
- While number books don't include "optimal number content" (Label Then Count) themselves, children may be exposed to these concepts through interactions with their parents.

References

- (1) Feigenson, Lisa, et al. "Links between the Intuitive Sense of Number and Formal Mathematics Ability." *Child Development Perspectives*, vol. 7, no. 2, 2013, pp. 74–79., doi:10.1111/cdep.12019.
- (2) Gilmore, Camilla K., et al. "Non-Symbolic Arithmetic Abilities and Mathematics Achievement in the First Year of Formal Schooling." *Cognition*, vol. 115, no. 3, 2010, pp. 394–406., doi:10.1016/j.cognition.2010.02.002.
- (3) Heckman, J. J. "Skill Formation and the Economics of Investing in Disadvantaged Children." *Science*, vol. 312, no. 5782, 2006, pp. 1900–1902., doi:10.1126/science.1128898.
- (4) Levine, Susan C., et al. "What Counts in the Development of Young Children's Number Knowledge?" *Developmental Psychology*, vol. 46, no. 5, 2010, pp. 1309–1319., doi:10.1037/a0019671.
- (5) Lubinski, David, et al. "Life Paths and Accomplishments of Mathematically Precocious Males and Females Four Decades Later." *Psychological Science*, vol. 25, no. 12, 2014, pp. 2217–2232., doi:10.1177/0956797614551371.
- (6) Mix, Kelly S., et al. "Acquisition of the Cardinal Word Principle: The Role of Input." *Early Childhood Research Quarterly*, vol. 27, no. 2, 2012, pp. 274–283., doi:10.1016/j.ecresq.2011.10.003.