







Making Story Books Count: Improving Math Learning at Home through a Parent-Delivered Intervention

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- Parents are more likely to reinforce literacy (Cannon & Ginsburg 2008)
  - Powerful way to introduce math learning into the home is through shared book reading
- Experimental evidence suggests semi-scripted input is beneficial (Berkowitz et al., 2015; Gibson, Gunderson, & Levine, under review)

# Scripting Math Input



# What kinds of materials best support number learning?



Wynn, 1992; Le Corre et al., 2006

# Number Development





2

1

Wynn, 1992; Le Corre et al., 2006

# Number Development

3 Fish



- Counting is no longer perceived as a meaningless activity
- Fixed learning stages

Wynn, 1992; Le Corre et al., 2006

# Number Development

3 Fish

# Number Development



Wynn, 1992; Le Corre et al., 2006

## What kinds of materials best support number learning?

### **Current Study:** Effect of the contextual presentation of number in counting books

- Presented in the illustrations
- Talked about in the text











#### Ramscar et al. 2011; Mix et al., 2012







# Current Study

Comparing the effects of sparse vs. rich context on children's number • development through a parent-delivered intervention



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# Method

- 3-year-olds and their parents
- Pre-Mid-Post test
  - Sessions scheduled two weeks apart, for a total of four weeks of practice
- Parent-child dyads assigned to 1 of 3 practice conditions
  - Asked to practice with assigned books at home in between testing sessions
- Parents kept a log to measure frequency of practice

# Book Interventions

Counting Books

- Sparse
- Rich
- Color Book (Control)







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#### LUCY'S FAVORITE COLOR!



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## Sparse Counting Book

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#### Look at the cupcakes!

There are two!

Can you count the two cupcakes?





## Rich Counting Book

But Lucy does not have enough to share with all of her friends! She walks into the kitchen and finds cupcakes! Look at the cupcakes!

There are two.

Can you help Lucy count the two cupcakes?





But Lucy still wants to find something in her favorite color! She walks into the kitchen and finds a cupcake!

Look at the cupcake! What color is it?

### It is **pink**!







## Participants

- 71 3-year-olds (M = 36.52 months, range = 34.46 39.97 months, 38 females) •
- N per starting knower-level: •

0 knowers	1-2 knowers	3-4 knowers
23	26	22

Results

	1.0	
tion of Children o Improved	0.8	_
	0.6	
	0.4	
'opor Wh	0.2	
<u> </u>	0.0	

## Cardinality

### Control Rich Sparse

	1.0	
oportion of Children who Improved	0.8	
	0.6	
	0.4	
	0.2	
	0.0	
		Control

## Cardinality

#### Sparse Rich

	1.0	
oportion of Children who Improved	0.8	
	0.6	
	0.4	
	0.2	
	0.0	
		Control

## Cardinality





## Counting Skill

2

0

**Highest Count** 

Session 2 Session 3 Session 1



## Counting Skill



# Highest Count



Session 2 Session 3



Highest Count

## Counting Skill

## Counting Skill



Highest Count

## Frequency of Book Reading





## Frequency of Book Reading



## Summary

- Positive effects for both number books
- Marked condition effects favoring the *rich counting books*





## Summary

- Positive effects for both number books
- Marked condition effects favoring the *rich counting books*
- Unanswered question of which features are driving children's learning
  - Is the narrative just as effective without the rich scenes?
  - Does the narrative have to be centered on a number goal?

# Thank You!

- To all the families who participated in the study
- Cognitive Development Lab at UChicago
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