

# How words can be learned by observation depends on what is meant by “learned”

Nina Schoener, Sara C. Johnson, & Sumarga H. Suanda

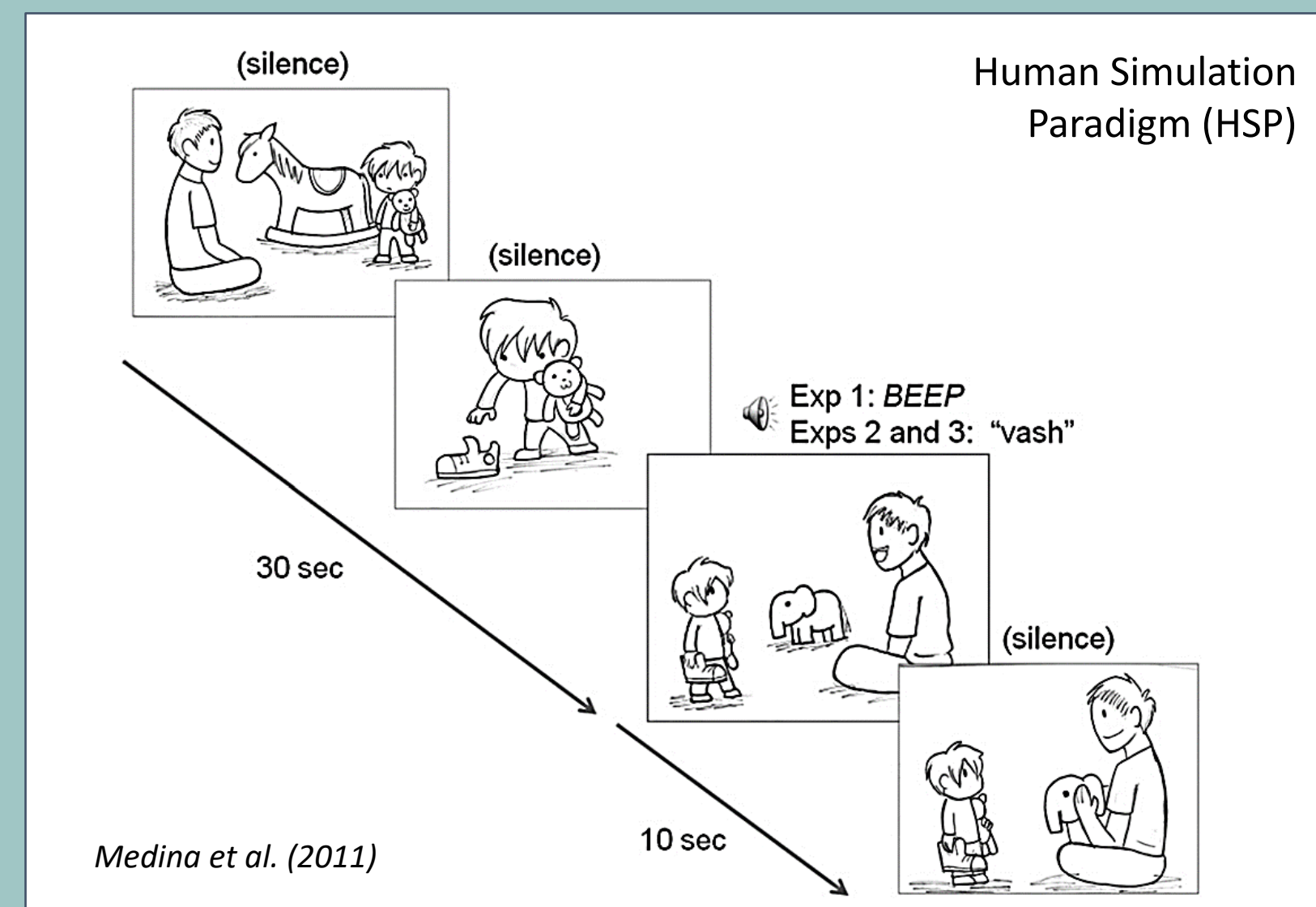
Department of Psychological Sciences, University of Connecticut

## INTRODUCTION

- Word learners observe naming events that vary widely in their referential quality



- Research is mixed on whether word learning is shaped by a few referentially transparent events or also by the referentially ambiguous ones



- Current study:** could referentially ambiguous events support “partial” word learning even when they do not lead to “full” word learning?

## STUDY 1: Norming Study

- Multiple scenes containing 40 early-learned words were normed for their referential quality

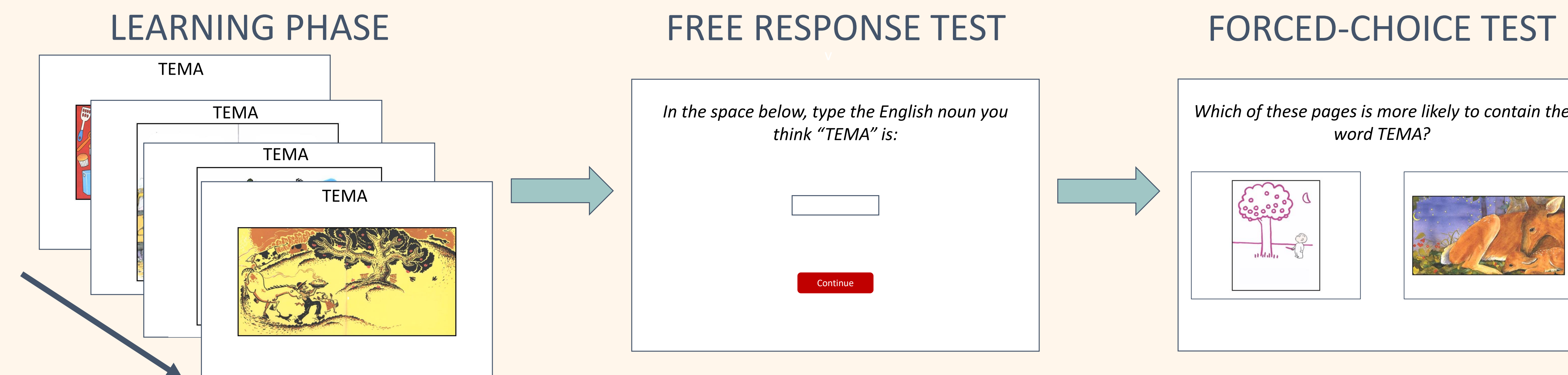
- Referential quality of words in picture book scenes ( $M = .12$ ) were similar to the referential quality of words in child-directed speech ( $M = .17$ ; Medina et al., 2011; Trueswell et al., 2016)



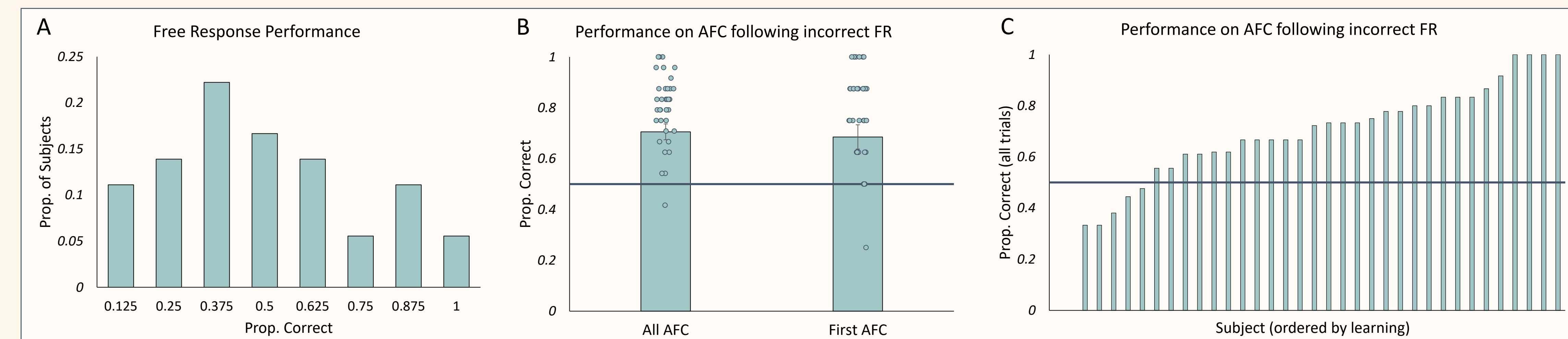
## STUDY 2: Cross-Situational Word Learning Study

### Methods

- Participants:** 36 adults participated online via the Gorilla Experiment Builder platform (Anwyl-Irvine et al., 2019)
- Task Design:** HSP was modified to probe both: **(A)** learning of precise word meaning (via free-response/FR test) and **(B)** learning of partial word meaning (via alternative-forced choice/AFC test)



### Results – Learning Patterns



- Overall, participants failed to guess the meaning of the novel word in about half of the cases ( $M = 0.50$ ,  $SD = 0.25$ ; Fig. A)
- When participants did not learn the precise word meaning, they nonetheless guessed above chance on AFC trials ( $M_{all} = 0.71$ ,  $SD_{all} = 0.18$ ;  $t(33) = 5.89$ ,  $p < .001$ ;  $M_{first} = 0.67$ ,  $SD_{first} = 0.28$ ;  $t(33) = 3.78$ ,  $p < .001$ ; Fig. B-C)

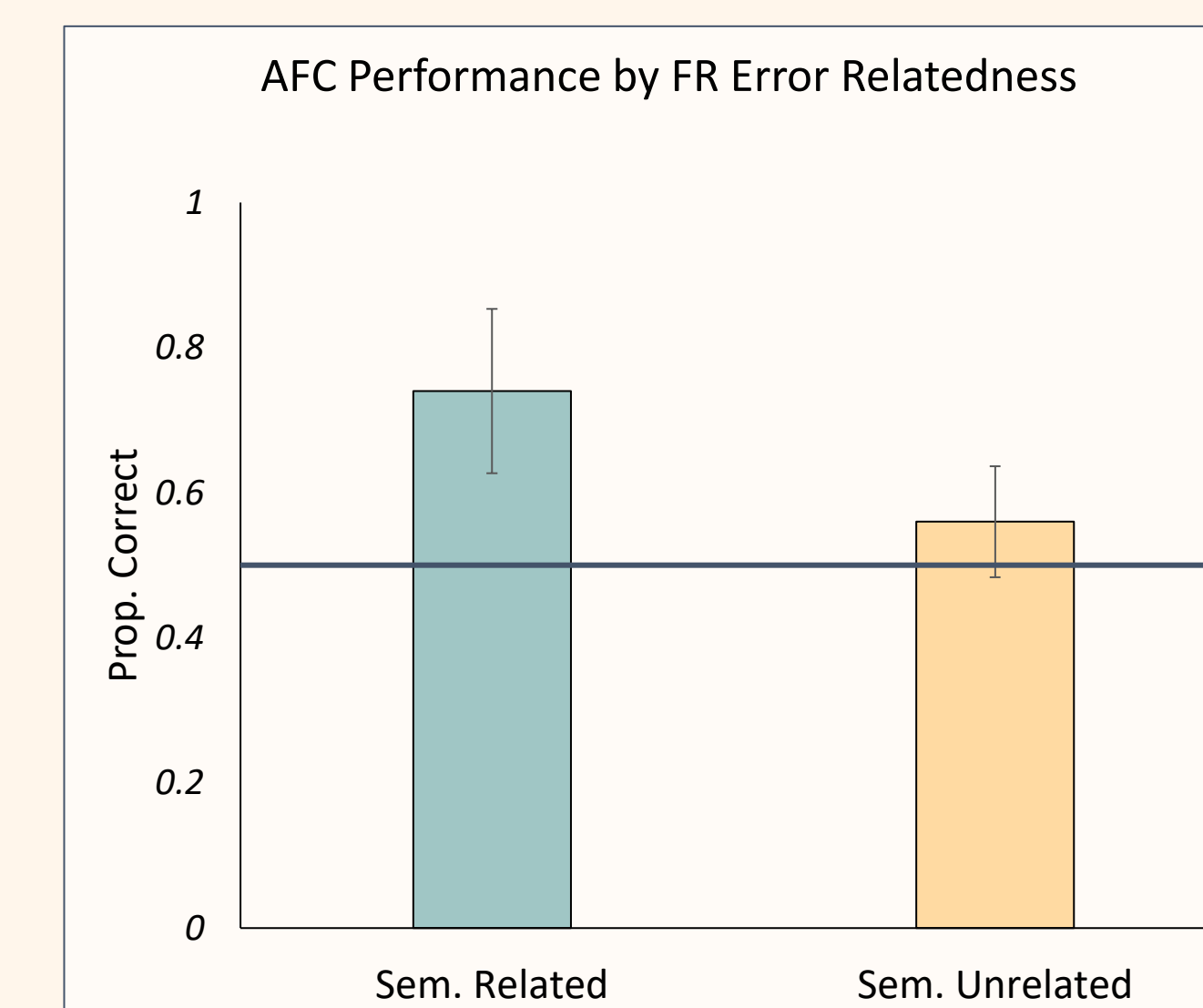
### Results – Error Analyses

- When participants gave a wrong free response, it is often semantically related to the target word
- There may be a link between the semantic-relatedness of errors and performance on the AFC test

APPLE		BIRD		BOOK		DOG	
ERROR	% of ERR	ERROR	% of ERR	ERROR	% of ERR	ERROR	% of ERR
fruit	42%	sky	20%	read	40%	animal	50%
food	21%	friend	15%	blue	20%	carnival	10%
line	5%	animal	10%	learn	20%	cat	5%

DOOR		FLOWER		HAT		SHOE	
ERROR	% of ERR	ERROR	% of ERR	ERROR	% of ERR	ERROR	% of ERR
house	15%	plant	23%	child	17%	clothes	30%
animal	15%	tree	18%	father	11%	child	22%
open	8%	leaf	14%	alone	6%	learn	7%



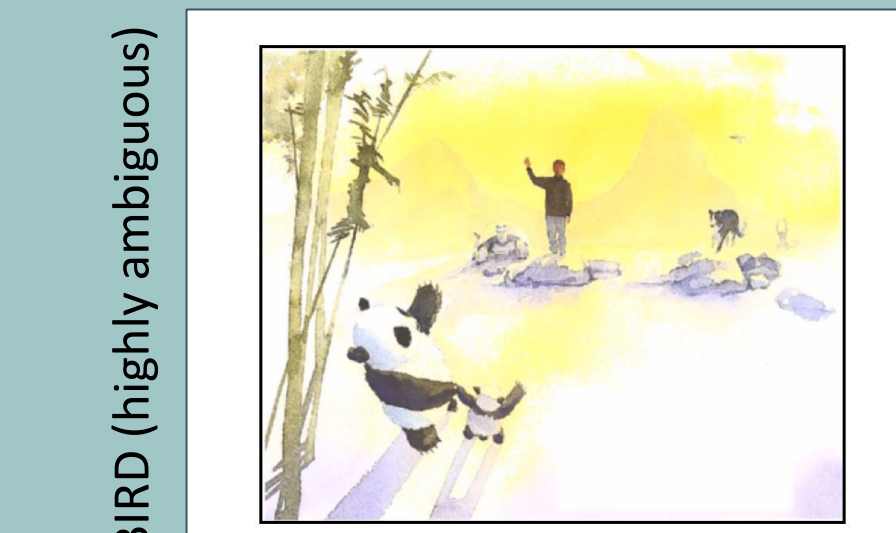
## DISCUSSION

- The role of referentially ambiguous events in word learning is a matter of debate (Gleitman & Trueswell, 2020)
- The current study investigates whether the role of referentially ambiguous events in word learning depends on how learning is defined
- Results show that although referentially ambiguous events do not lead to “full” word learning, they nonetheless lead to partial knowledge of word meaning
- Multiple analyses highlight the importance of understanding partial knowledge in word learning

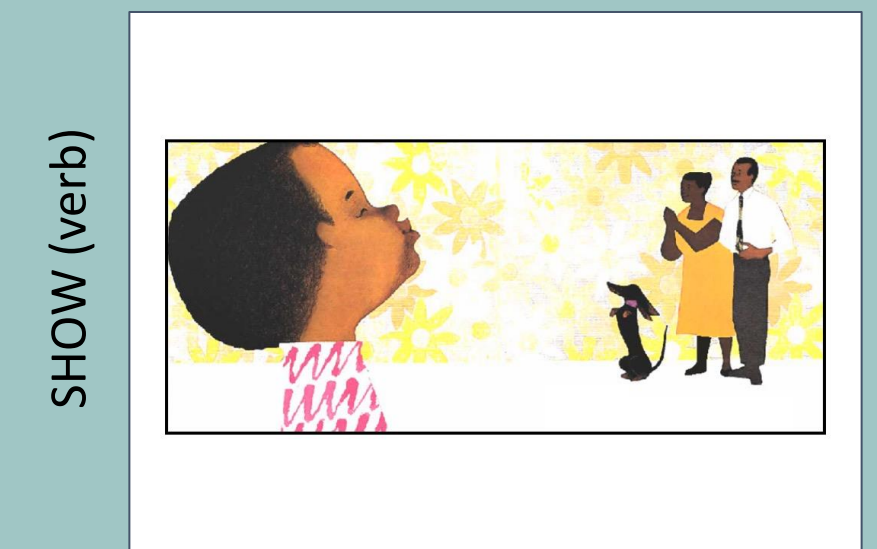
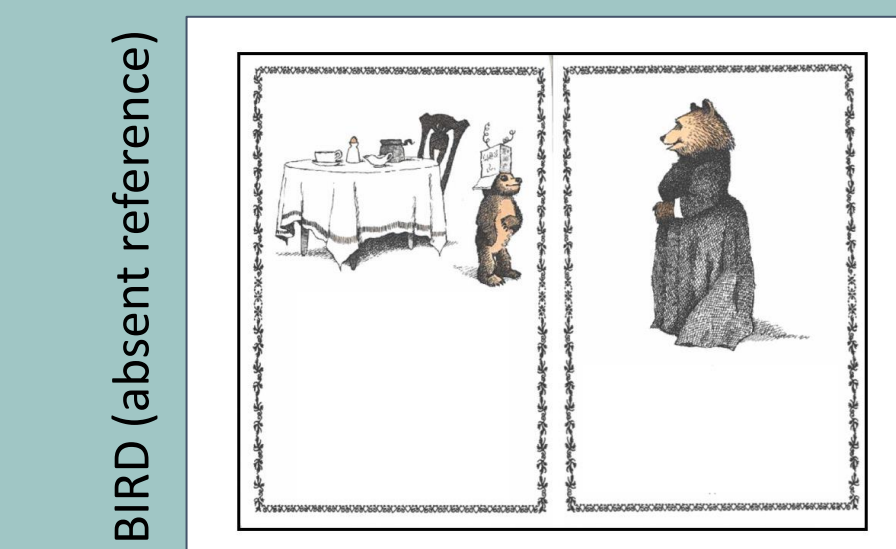
## FUTURE DIRECTIONS

- Explore the limits of input for partial learning (i.e., how learners perform with extremely low-informative stimuli)
- Investigate whether effects extend to abstract nouns and other word classes (e.g., verbs)

### 1. How low can you go?



### 2. Beyond basic nouns



## REFERENCES / ACKNOWLEDGEMENTS

Anwyl-Irvine, A. L., Massonnié, J., Flitton, A., Kirkham, N., & Evershed, J. K. (2019). Gorilla in our midst: An online behavioral experiment builder. *Behavior Research Methods*, 52(1), 388–407.

Gleitman, L. R., & Trueswell, J. C. (2018). Easy words: Reference resolution in a malevolent Referent World. *Topics in Cognitive Science*, 12(1), 22–47.

Medina, T. N., Snedeker, J., Trueswell, J. C., & Gleitman, L. R. (2011). How words can and cannot be learned by observation. *Proceedings of the National Academy of Sciences*, 108(22), 9014–9019.

Trueswell, J. C., Lin, Y., Armstrong, B., Cartmill, E. A., Goldin-Meadow, S., & Gleitman, L. R. (2016). Perceiving referential intent: Dynamics of reference in natural parent-child interactions. *Cognition*, 148, 117–135.

We thank the many members of the UConn Communication and Development Lab for their assistance. This Research was supported by the James S. McDonnell Foundation (JSMF 220020549), The National Institute of Health (R00-HD082358).