In the Right Ballpark: Systematic Partial Learning of Hard Nouns from their Observational Contexts

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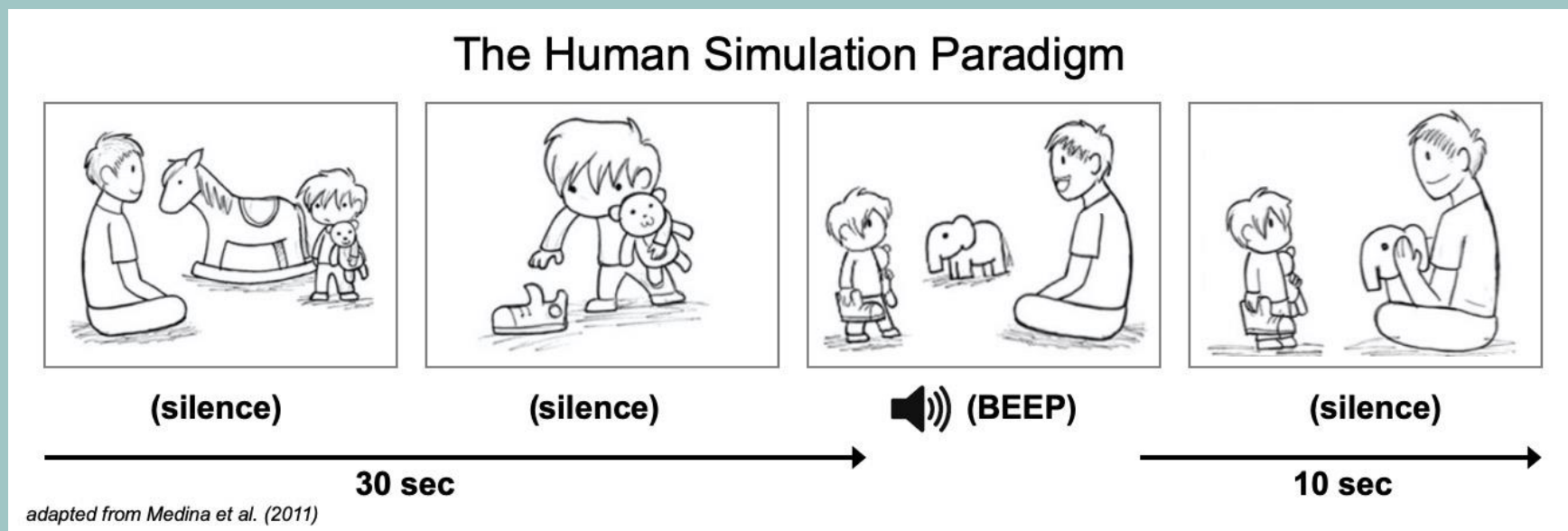
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BACKGROUND

Medina et al. (2011)

- Learning word meanings from their observational contexts is a notoriously difficult task (Bloom, 2000)
- This task is uniquely difficult for words that do not label concrete objects (or "hard words"; Gleitman et al., 2005)

The Human Simulation Paradigm

(silence)   (silence)   (BEEP)   (silence)

30 sec   10 sec

adapted from Medina et al. (2011)

- This difficulty has repeatedly been demonstrated in studies using the "Human Simulation Paradigm" (HSP; Gillette et al., 1999)
- In one HSP study, Kako (2005) revealed that whereas nouns that denote concrete objects were readily learned through their observational contexts alone, nouns that denote less concrete referents (e.g., "toy", "breakfast") required access to other kinds of contexts (i.e., linguistic)

CURRENT PROJECT

- **Research Goal:** to revisit the role of the observational contexts in the acquisition of nouns that do not label concrete objects (i.e., "hard nouns")
- In this study, we modified the HSP design by incorporating additional tests of learning
- We examined whether learners can acquire systematic partial knowledge about hard nouns from their observational contexts even when they fail to acquire their precise meanings
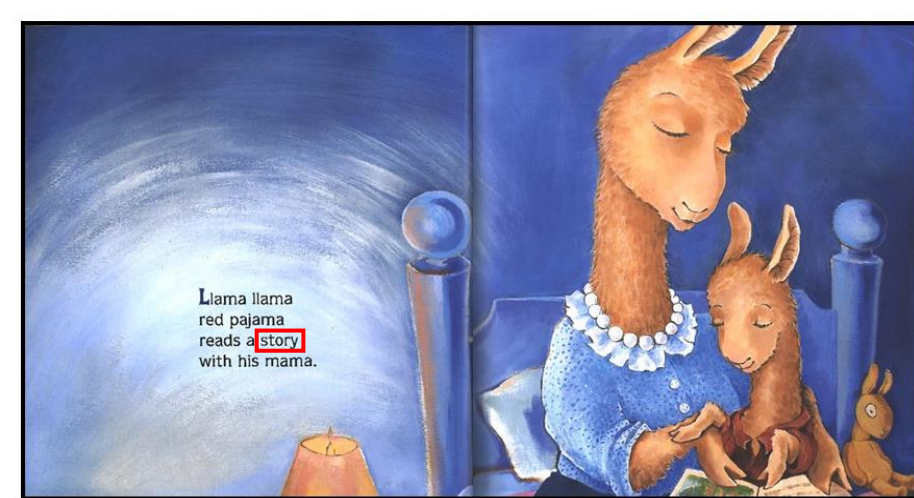
METHODS

Participants

- 120 adults participated in an online study that was built and hosted on Gorilla Experiment Builder (Anwyl-Irvine et al., 2019)

Stimuli

Vignettes

Original Page ("Story")   Created Vignette

- Target vignette: static picture book scene (see above) in which the target noun (e.g., "story") had appeared
- Distractor vignette: scene in which the target noun had not appeared
- Selected target nouns: "dinner", "friend", "hand", "morning", "school", "story", "tomorrow", "toy", "water", and "wind"
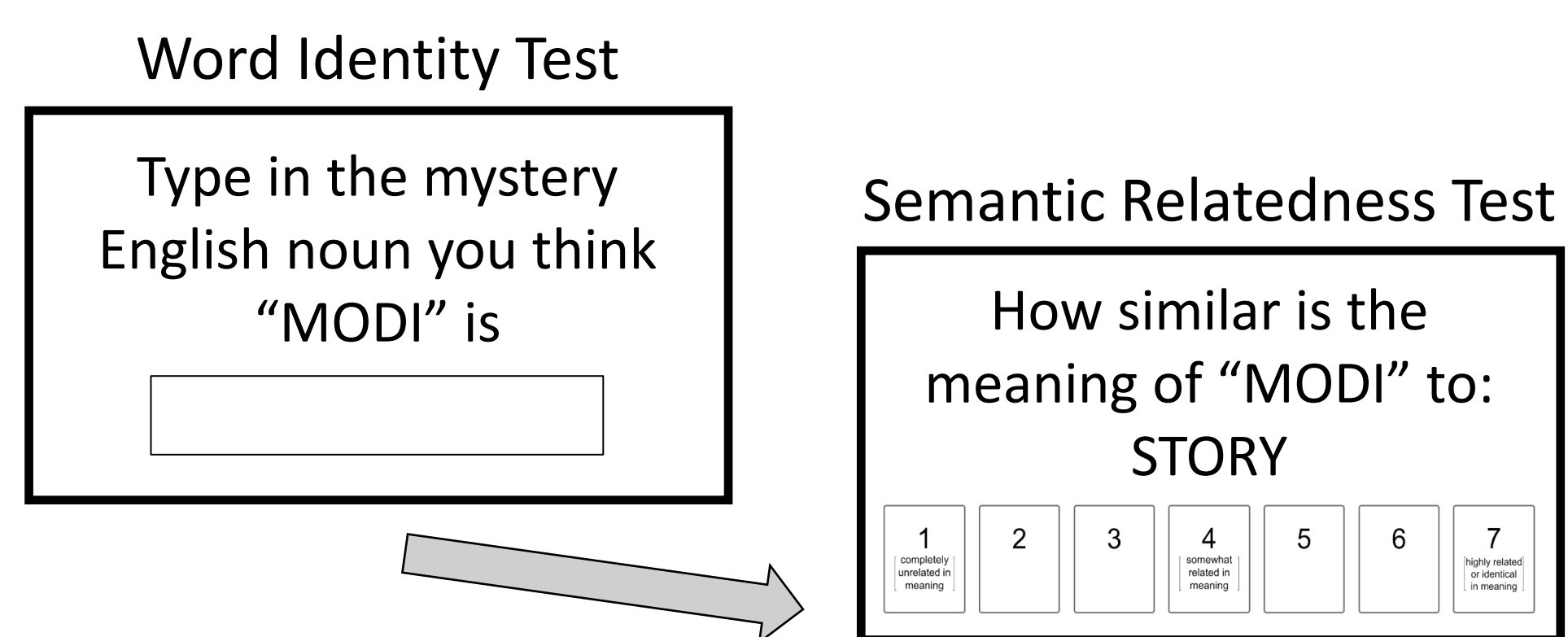
A Modified HSP Design

Categorization Phase

Prompt
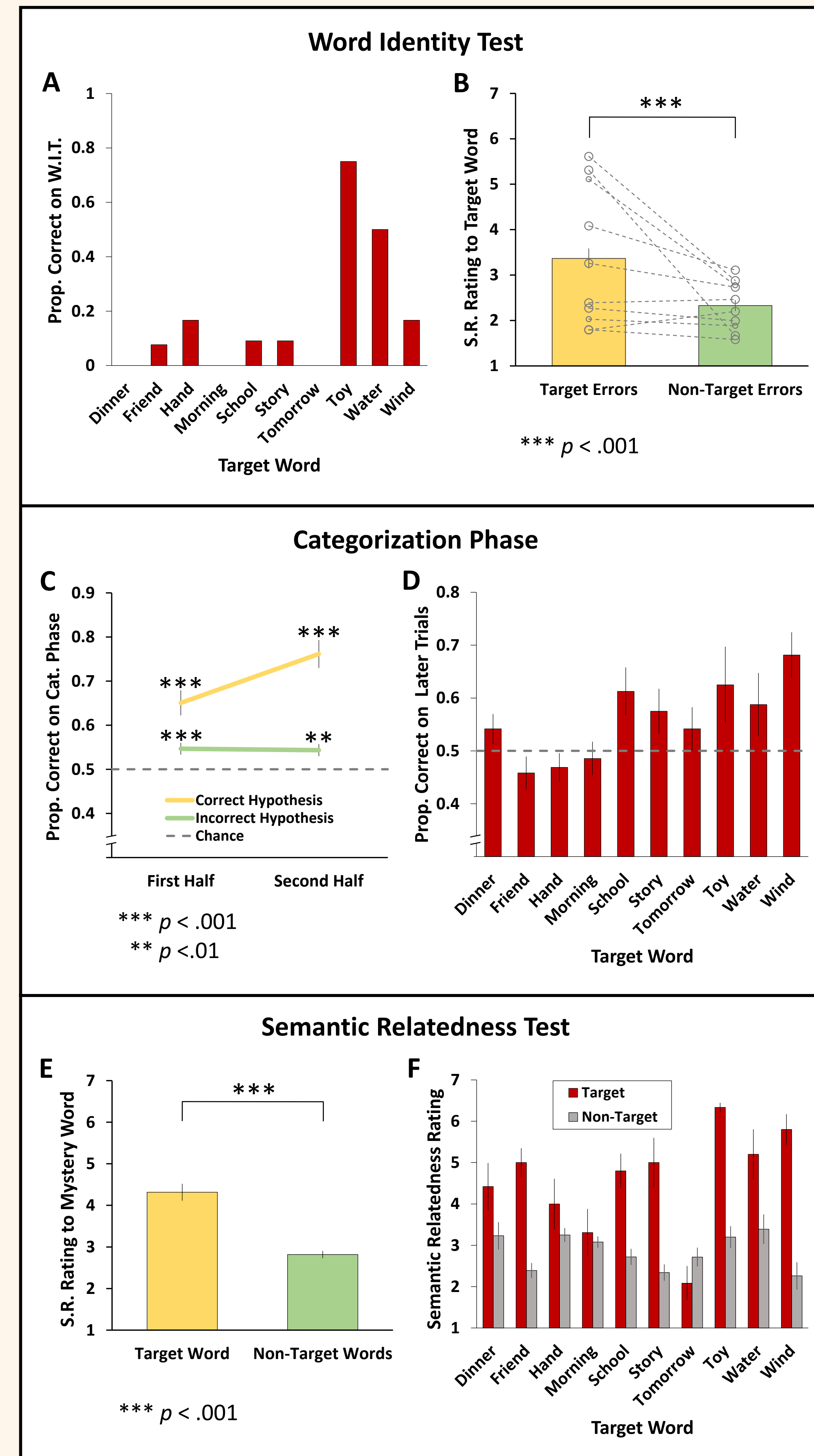
MODI   NO MODI

Feedback

SORRY, you are INCORRECT…
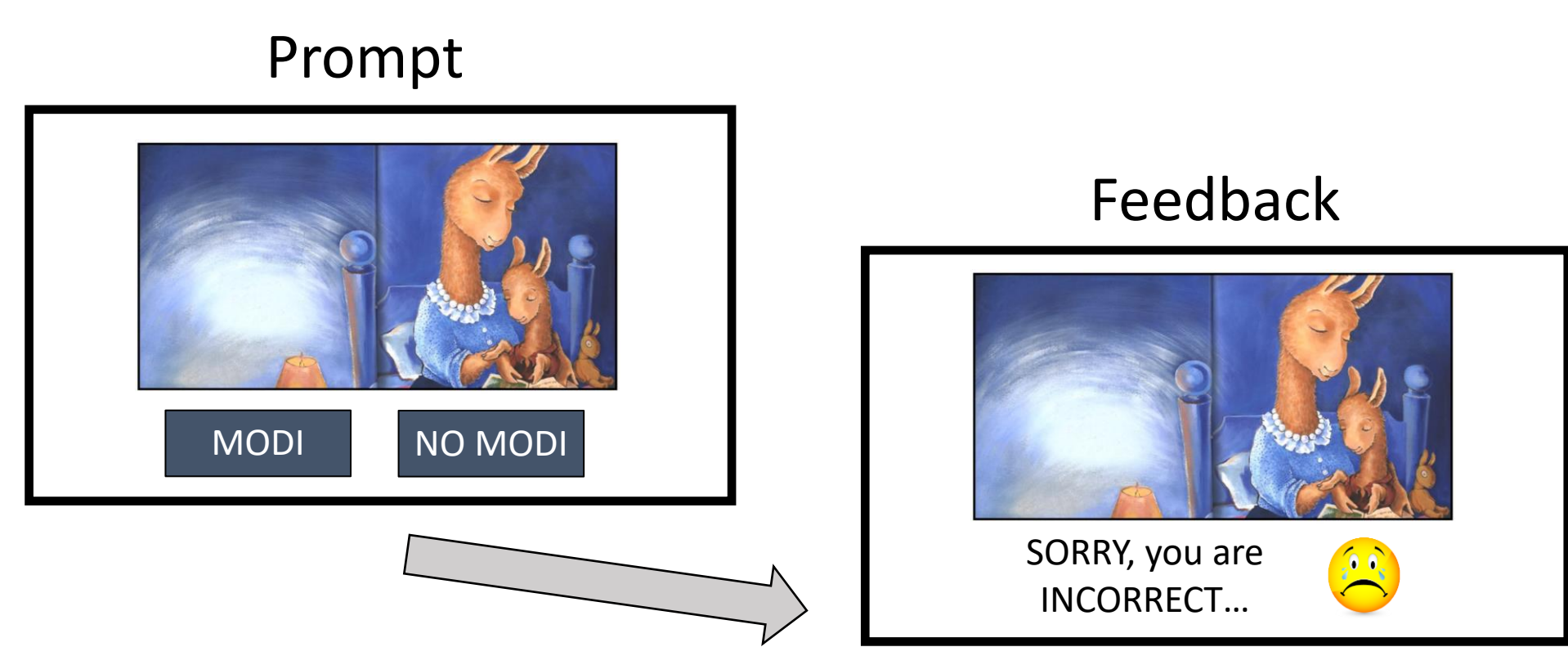
- Participants were shown either a target or distractor vignette and asked whether the mystery word ("MODI") was present in the original text. Feedback followed each trial
- 32 semi-randomized trials in total (16 targets, 16 distractors)

Testing Phase

Word Identity Test

Type in the mystery English noun you think "MODI" is

Semantic Relatedness Test

How similar is the meaning of "MODI" to: STORY

1 2 3 4 5 6 7

- Single word identity test following categorization phase
- 10 semantic relatedness tests, including the target noun

RESULTS

Word Identity Test

A — Prop. Correct on W.I.T. (Target Word: Dinner, Friend, Hand, Morning, School, Story, Tomorrow, Toy, Water, Wind)

B — S.R. Rating to Target Word (Target Errors, Non-Target Errors) ***

*** p < .001

Categorization Phase

C — Prop. Correct on Cat. Phase (First Half, Second Half)
Correct Hypothesis, Incorrect Hypothesis, Chance
*** *** ** ***

*** p < .001
** p < .01

D — Prop. Correct on Later Trials (Target Word: Dinner, Friend, Hand, Morning, School, Story, Tomorrow, Toy, Water, Wind)

Semantic Relatedness Test

E — S.R. Rating to Mystery Word (Target Word, Non-Target Words) ***

*** p < .001

F — Semantic Relatedness Rating (Target, Non-Target) (Dinner, Friend, Hand, Morning, School, Story, Tomorrow, Toy, Water, Wind)

- Most participants failed to guess the mystery word (Fig. A)
- When participants did not learn the precise word, they still:
  1. Guessed a word that was semantically related to the target word (Fig. B)
  2. Performed significantly better than chance rates throughout the image categorization task (Fig. C-D)
  3. Rated the mystery word as more similar to the target noun than to the other nine nouns on the Semantic Relatedness Test (Fig. E-F)
- We observed notable variability in performance across target words in the Word Identity Test (Fig. A), Categorization Phase (Fig. D), and Semantic Relatedness Test (Fig. F)

DISCUSSION

- The role (or lack thereof) of the observational contexts in learning hard words is a matter of great interest (Gleitman et al., 2005; Kako, 2005)
- The current study reveals that the informativity of a particular source of input may depend on how the output of learning is defined
- Results confirm previous findings (e.g., Kako, 2005) that the observational context rarely leads to "full" learning of hard nouns
- Nonetheless, the observational context leads to the systematic acquisition of partial knowledge of hard noun meanings
- This partial knowledge may lay the foundation for full meaning acquisition upon the incorporation of linguistic information
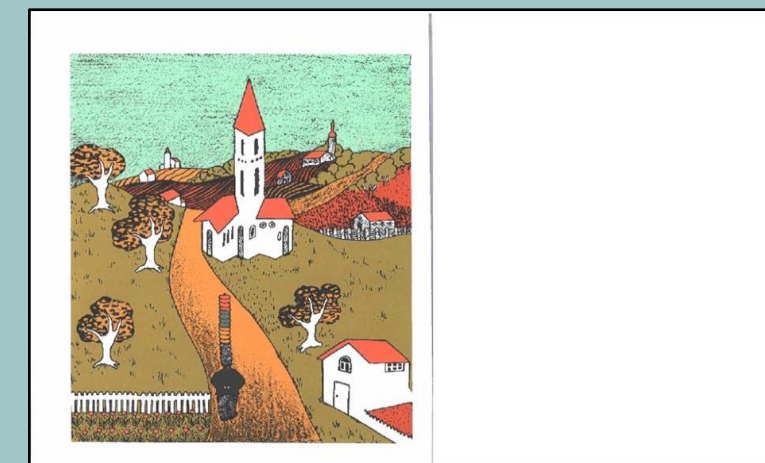
FUTURE DIRECTIONS

- Probing the nature of the partial knowledge participants acquired
- Exploring variability among hard nouns
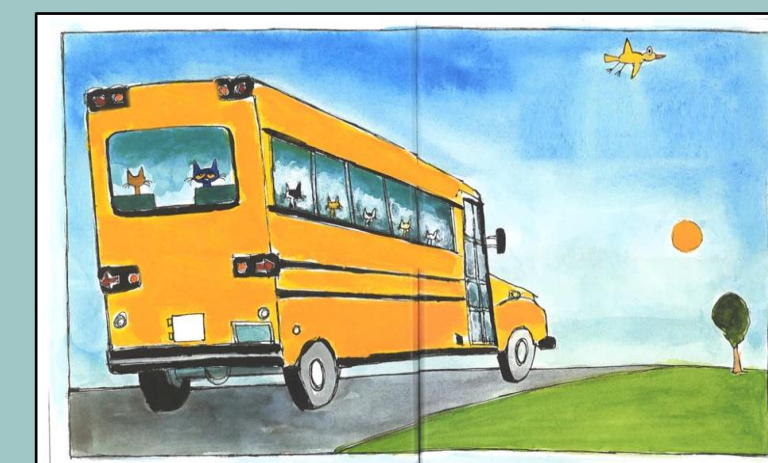
"School"   "Morning"

- Measuring learning when the observational contexts are supplemented by linguistic information

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