Contextual inferences through variable exemplars: An artificial adjective learning study

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Gradable Adjectives

- **Relative** Gradable Adjectives (big, light, fun...)
- **Absolute** Gradable Adjectives (full, spotted, straight, flat... Kennedy & McNally, 2005)
- Adults have very abstract concepts: “Full” = “containing the maximal amount without spilling over”

How do we come to understand the abstract meaning of “full”?

Syrett et al. (2010)

What do adults and children know about absolute gradable adjectives?

- 30 children (3-5 years old) and 24 adults
- They are asked to help a puppet "learn how to ask for things"
  - Their job was to determine if they could give the puppet what he asked for, and if they could not, tell him why not.
- "Please give me the X one"

Syrett et al. (2010)

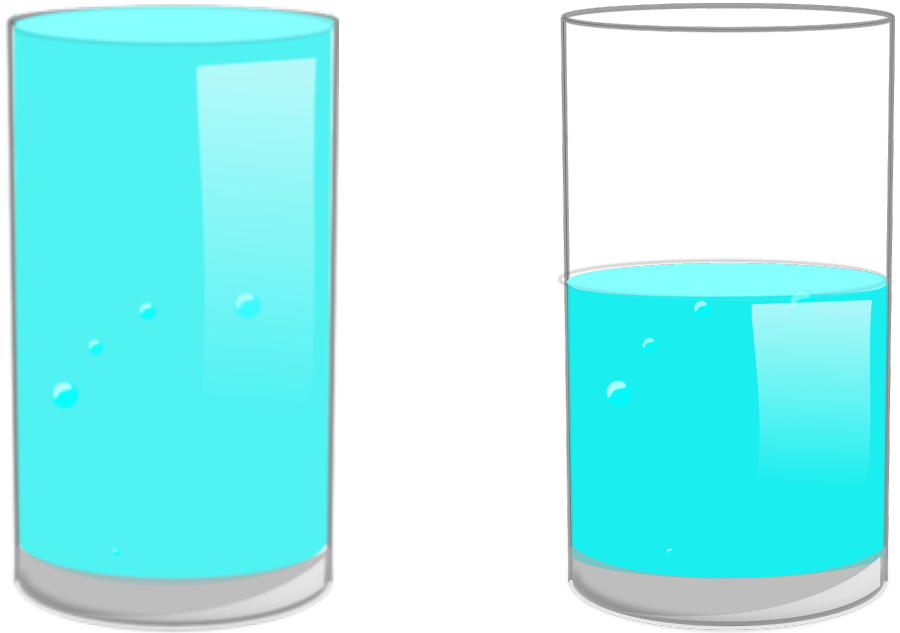
What do adults and children know about absolute gradable adjectives?

Give me the sad one.

Syrett et al. (2010)

What do adults and children know about absolute gradable adjectives?

Give me the full one.



Syrett et al. (2010)

What do adults and children know about absolute gradable adjectives?

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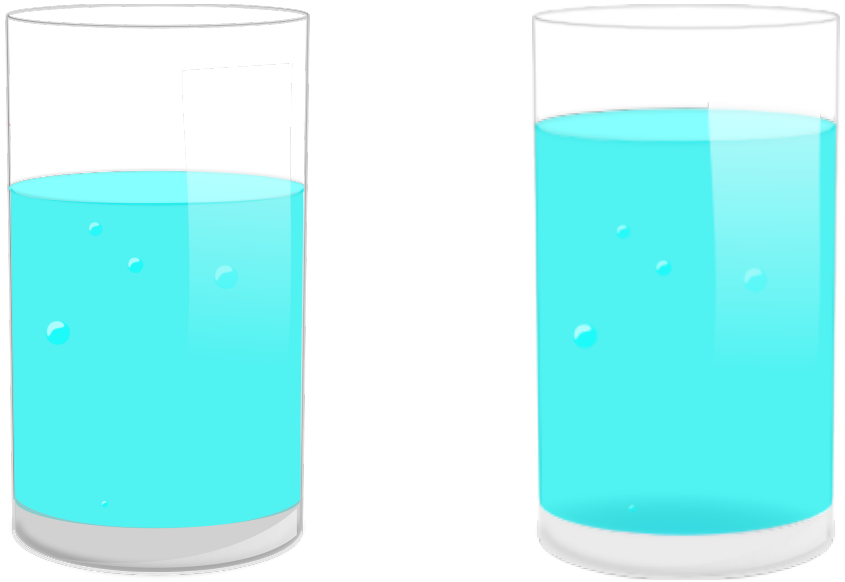
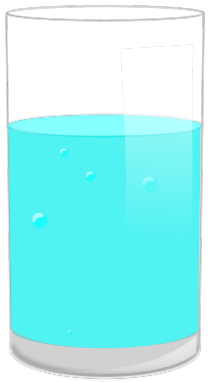


Syrett et al. (2010): ”Full” Responses

3 Responses



Not as full

Fuller

Neither is full!

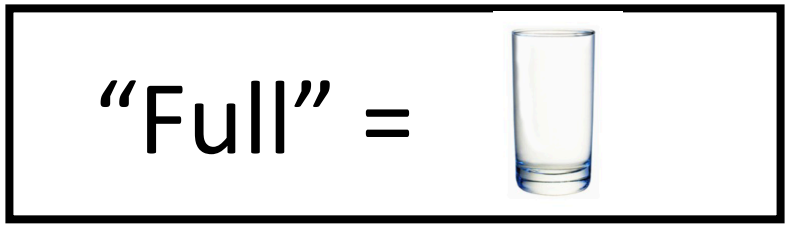
	3 year olds		4 year olds		5 year olds		Adults	
	Fuller	Neither	Fuller	Neither	Fuller	Neither	Fuller	Neither
Unambiguous	100%	0	100%	0	100%	0	96%	4%
Ambiguous	**60%**	**40%**	**70%**	**30%**	**70%**	**30%**	**12%**	**88%**

Three Possibilities

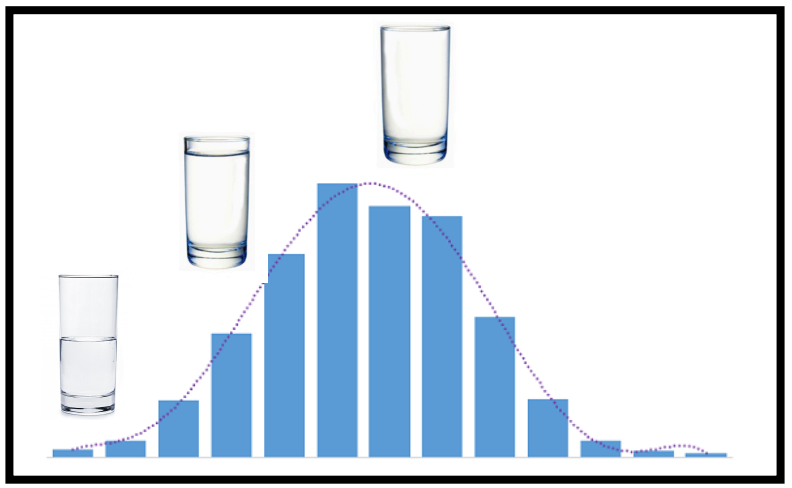
1. Representations are the same between kids and adults, but task demands cause differences in behavior
2. **Prototype-based learning:** Change in representation of "full" through development, based on prototypical exemplars
3. **Explanatory-based learning:** Changes in representation, based on contextual information

Possibility: Prototype-based Learning

INTENDED MEANING



EXEMPLARS

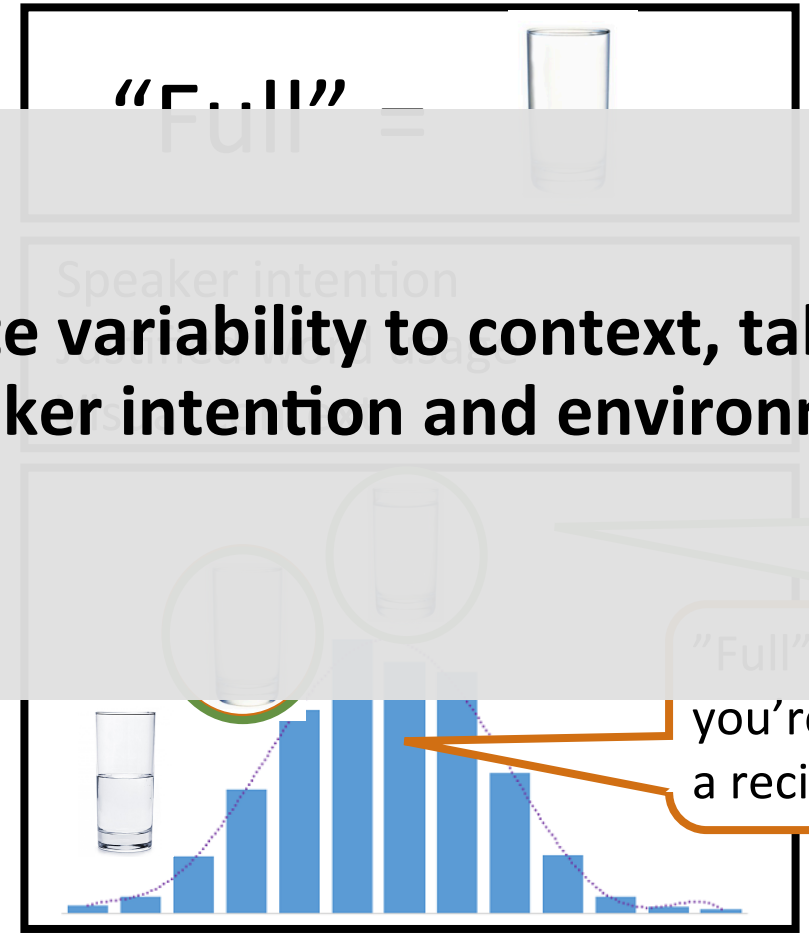


Learners first hypothesize "full" = "sufficient amount of content"

Possibility: Explanatory-based Learning

INTENDED

Learners attribute variability to context, taking into account speaker intention and environment



Question

Do learners use contextual explanations to explain away visual variability when learning absolute gradable adjectives?

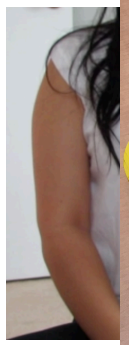
We explore this question in:

1. Adults
2. Children (4-7 year olds)

Experiment 1

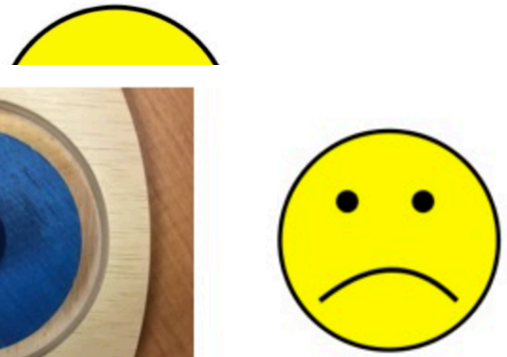
- Task: Teach **adult** English speakers (n=79, Turkers) a novel gradable adjective *pelty* = “tight-fitting” (Choi et al., 1999)
- Training (24 items):
  - **With-Context:** Contextual justifications
  - **Without-Context:** Irrelevant information
- Test (4 trials):





Experiment 1

Test Trials



2.

3. Neither

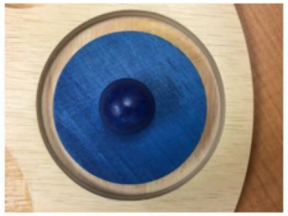
"I'm running a marathon and don't want to worry about my shoes falling off. This shoe is not *pelty*."

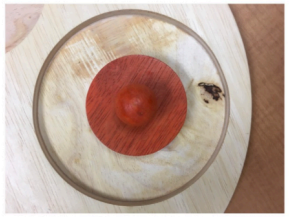
"I wanted to wear this shoe with this sock. This shoe is not *pelty*."

"I'm running a marathon and don't want to worry about my shoes falling off. This shoe is *pelty*."

Predictions

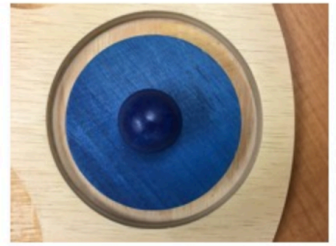
- If *pelty* was understood as an absolute gradable adjective, then we predict:
  - ”Tighter” responses in Unambiguous Trials
  - **Neither responses in Ambiguous Trials**



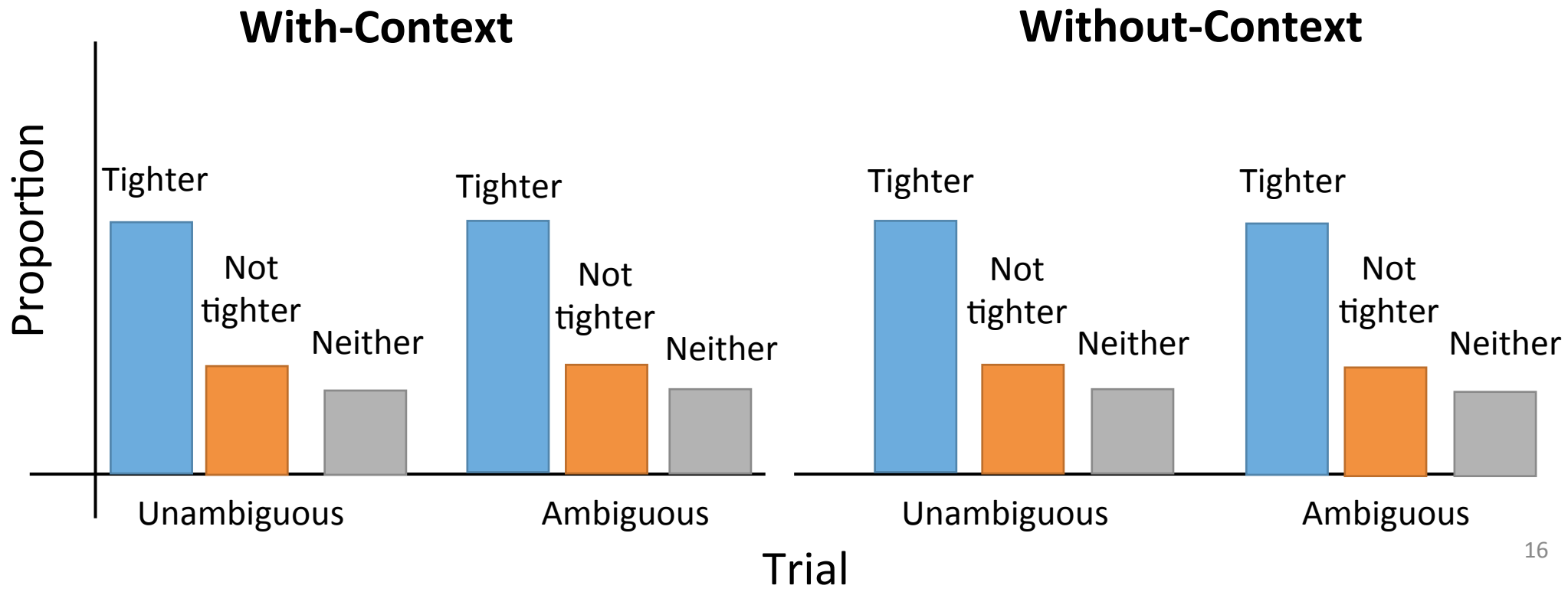
Unambiguous

Predictions




Ambiguous

- Prototype-based learning: no effect of context in responses

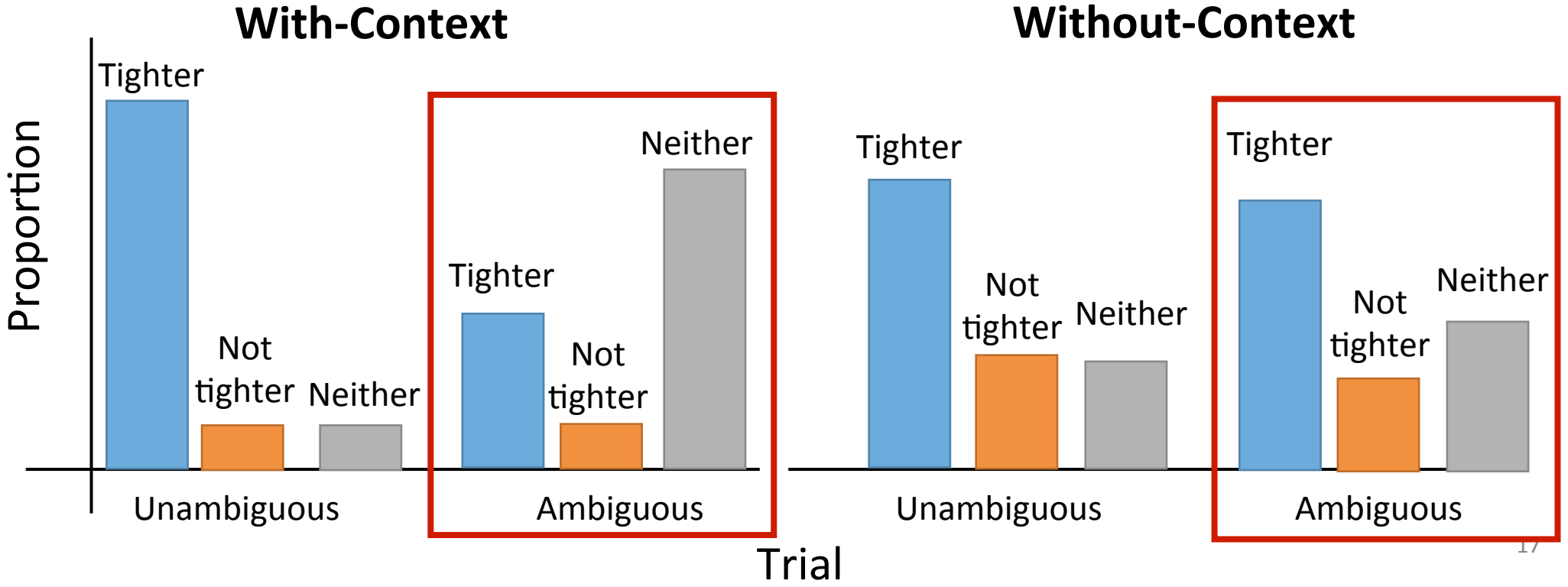


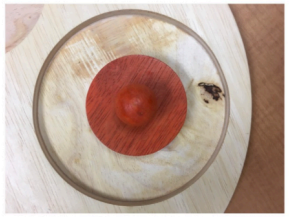
Unambiguous

Predictions

Ambiguous

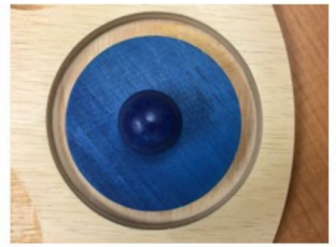
- Prototype-based learning: no effect of context in responses
- **Explanatory-based learning: effect of context (reflected in Neither responses)**



Unambiguous

Results

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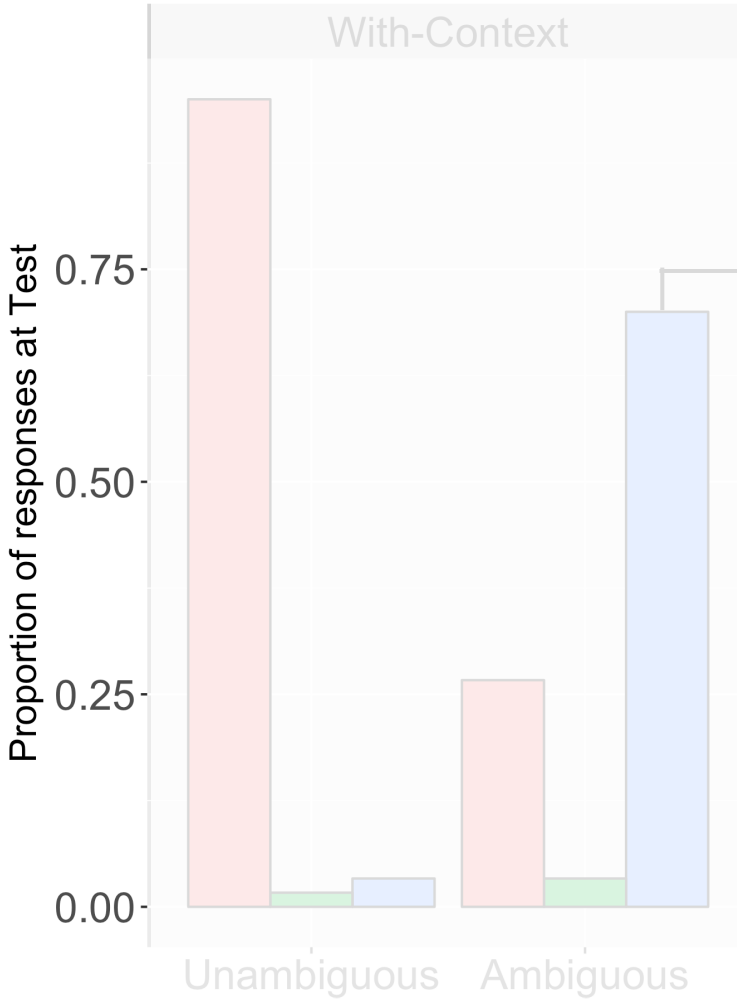


Results

- Listeners were able to deduce a meaning with a maximal standard when given contextual information
- Explaining away variance in exemplars: attributing to speaker intention
- Allows for deduction of a meaning that can be generalized to broader range of exemplars
- Evidence for **Explanatory-based learning**

Question

Do learners use contextual explanations to explain away visual variability when learning absolute gradable adjectives?

We explore this question in:

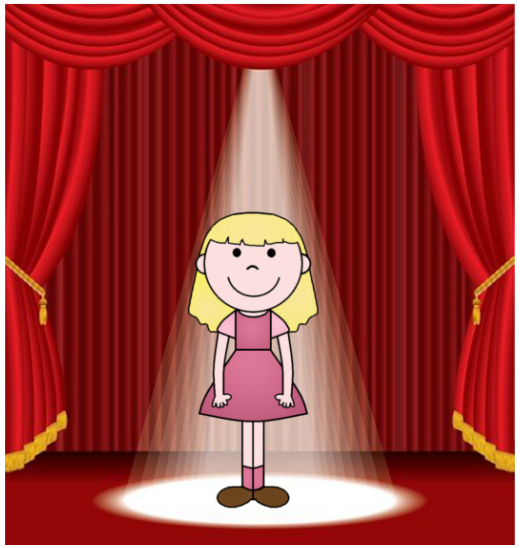
1. Adults → Can infer a maximum standard ✔
2. Children (4-7 year olds)

Experiment 2

- Conceptual replication of Experiment 1 with **4-7 year olds** (n=49)
- Training (12 trials):
  - **With-Context:** Contextual justifications
  - 2AFC task
- Practice (3 trials):
  - 3AFC task
- Test (4 trials):
  - Modeled after Syrett et al. (2010)
  - "Select the *pelty* one."

Experiment 2

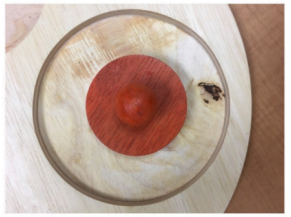
Which bracelet should she choose?



Experiment 2

Choose the yellow bus.

Neither

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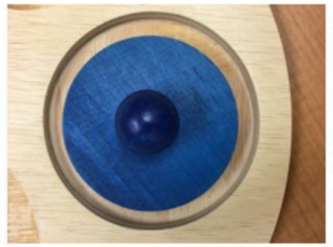
Results

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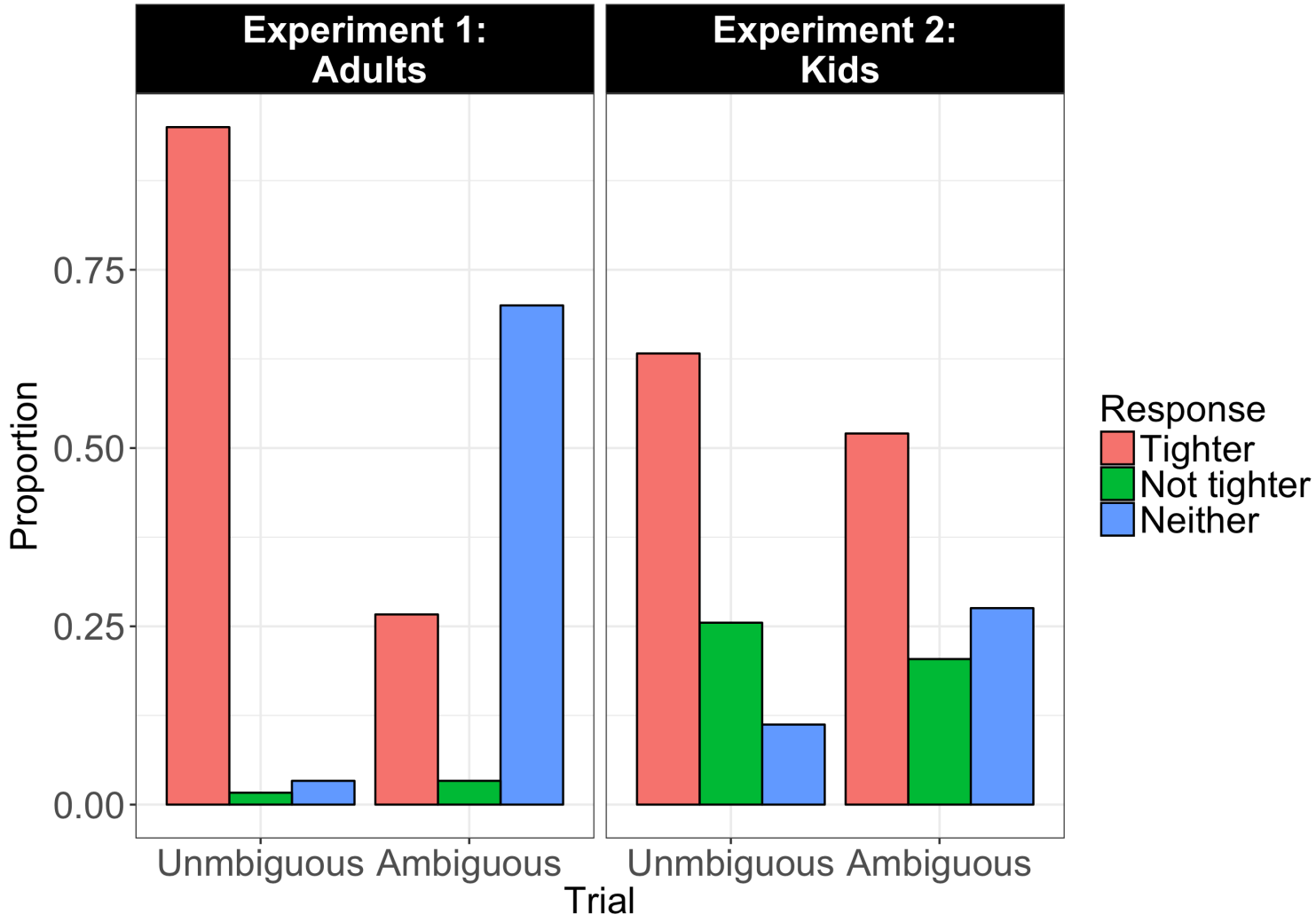
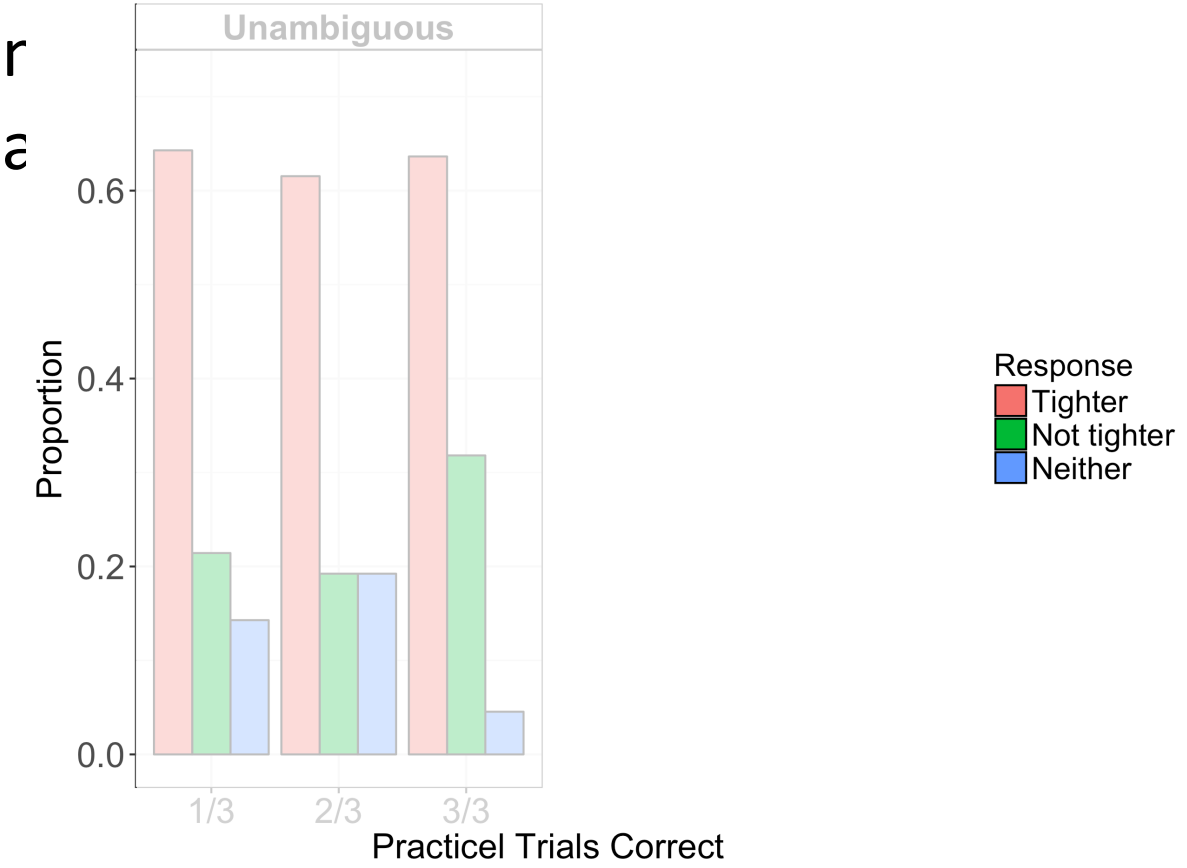


Experiment 1 and 2: Difference between adults and children

- Representations of *pelty* may be the same between adults and kids, but **task difficulty** may have caused a difference
- Representatior
  - Children ma erences



Conclusions

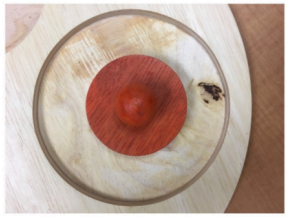
- Adults that have contextual explanations are able to
  1. Explain away visual variability based on context
  2. Extrapolate a maximum standard of comparison with a small number of exemplars
- Difference in comprehension of *pelty* between kids and adults
  - Ability to make contextual inferences may affect ability to infer abstract word meanings

Thank you!

Also thanks to: Amanda Pogue, Mike Tanenhaus, T. Florian Jaeger, Kinder Lab RAs, Experimental, Semantics, and Pragmatics group at UR

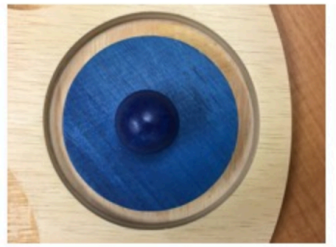
CHILDES: Use of “full”

- Providence (1-4yo)
  - Not commonly heard : average .04% of all tokens
  - “That is one full belly”
  - “Mommy is full of yawns”
  - “He found to his surprise that the bath was so full of water, it was starting to run over the side”
- Gleason (4-5yo)
  - Average .0004% of all tokens
  - “Don’t talk with your mouth full”

Unambiguous

By age

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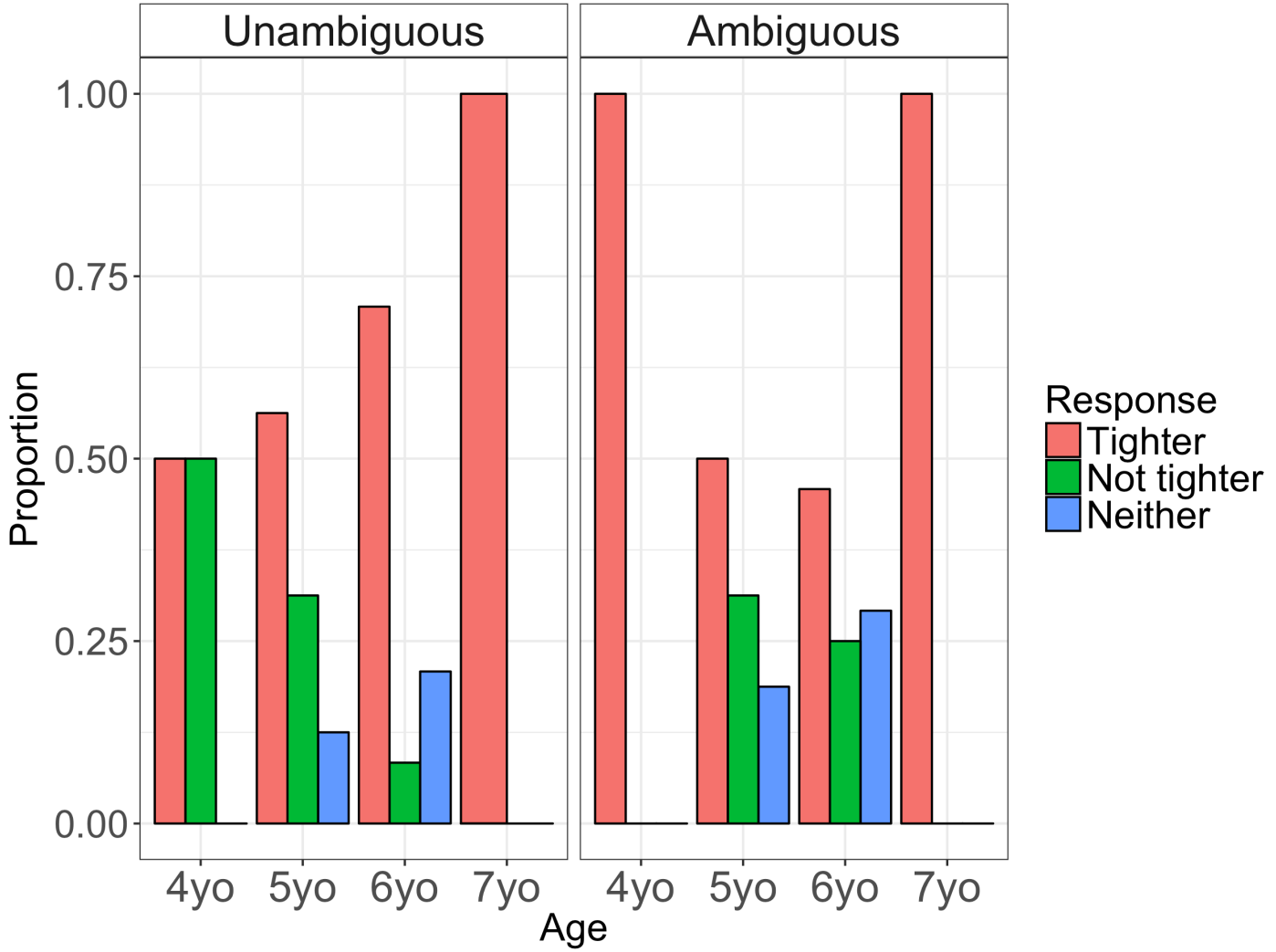
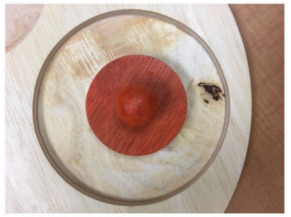
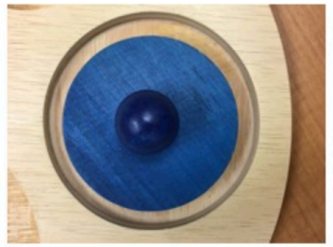


Unambiguous

By trial

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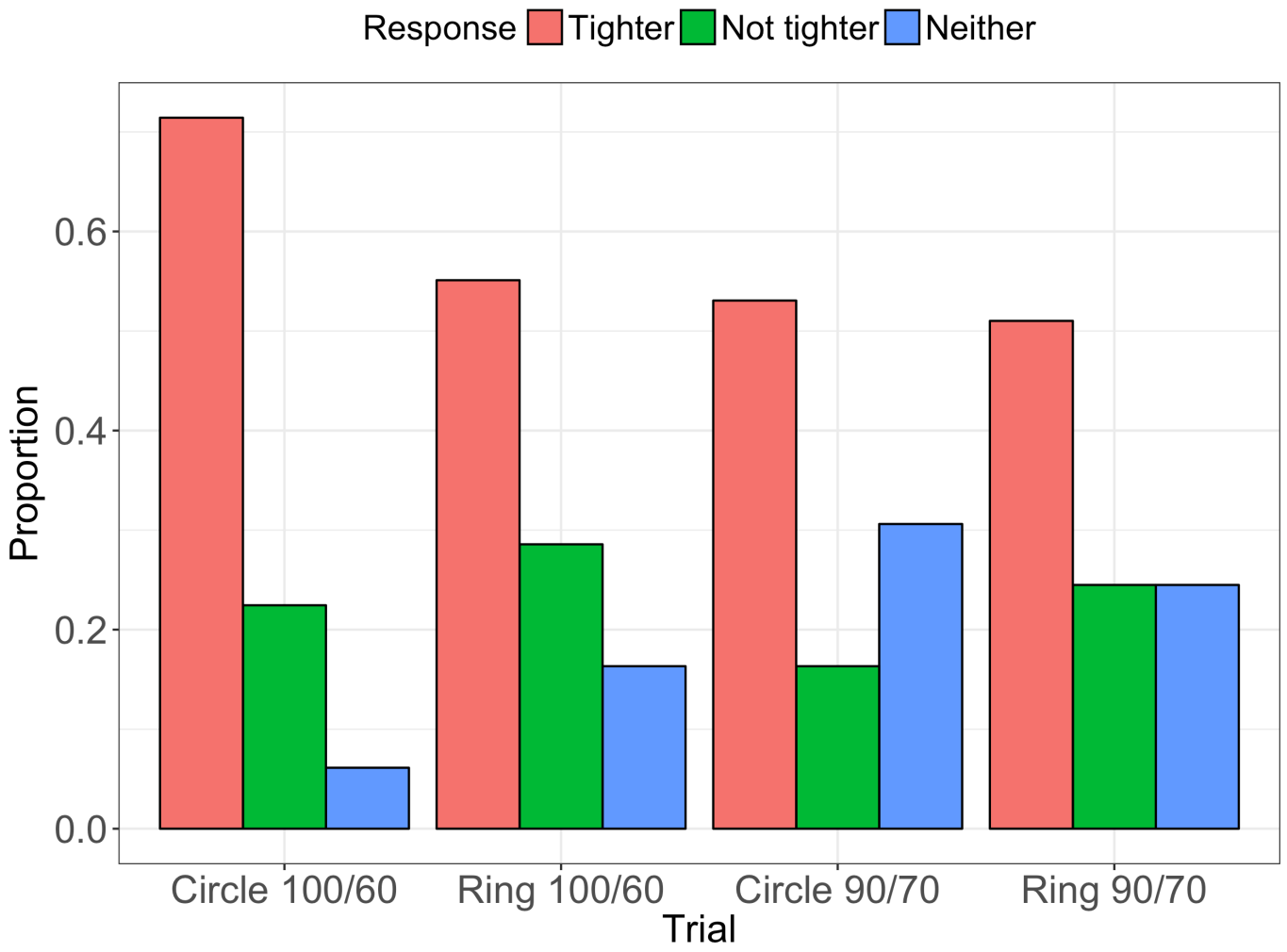
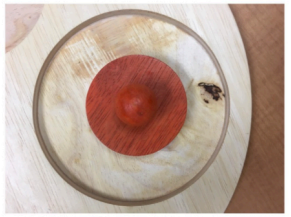
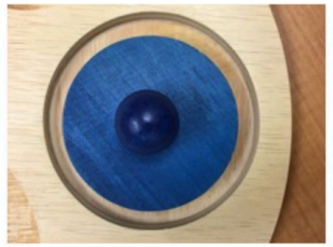


Unambiguous

Experiment 3

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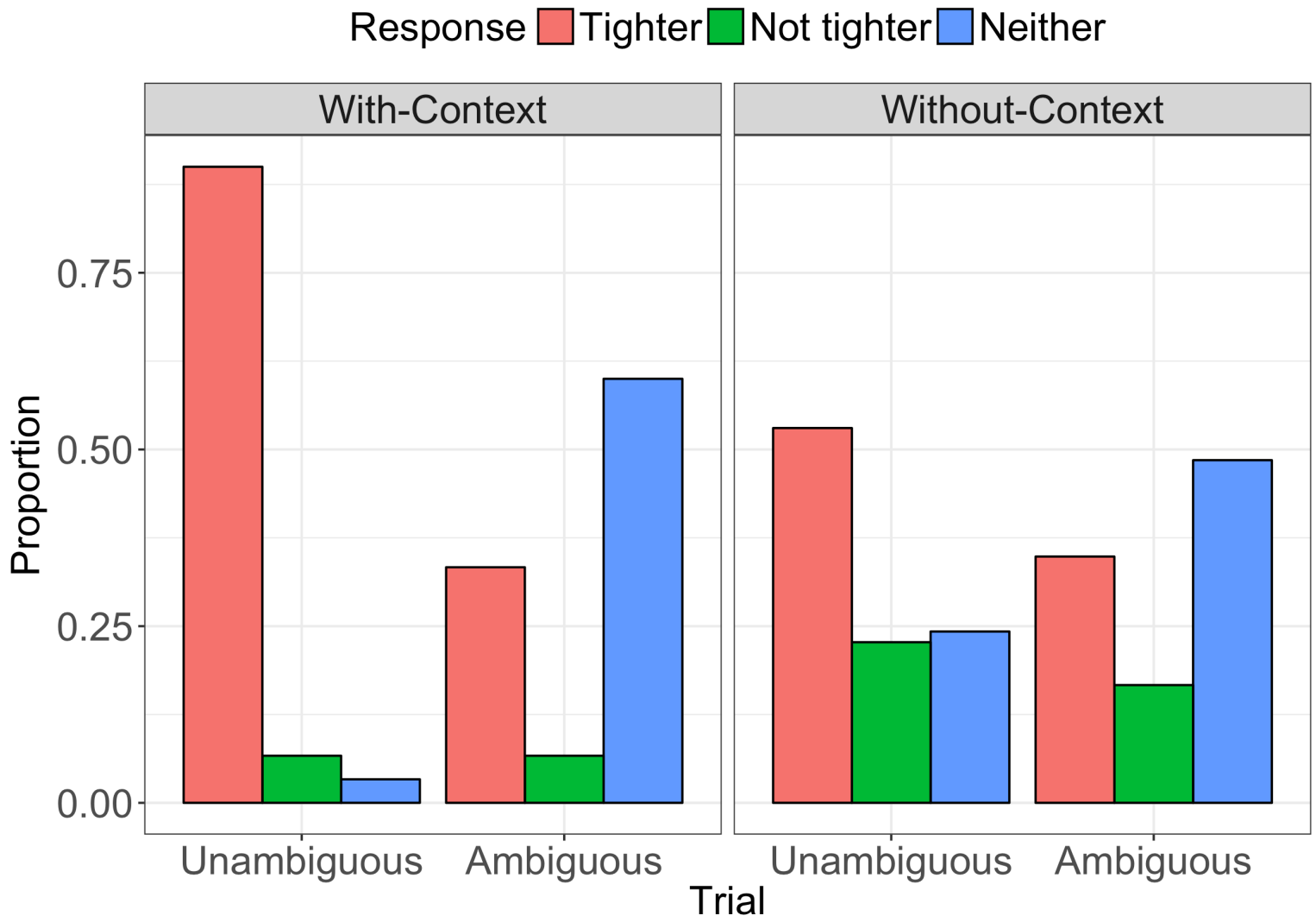

Experiment 4

Unambiguous

Ambiguous