

A priming study

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BACKGROUND

Main Questions: Can 4- to 6-year-olds be *primed toward a particular interpretation* of a globally ambiguous sentence? Can this priming *overcome verb-based biases* toward the less frequent NP attachment / modifier interpretation?

Goal of the Study: Investigate whether children's interpretation of sentences with PP-attachment ambiguities can be primed against verb-based attachment biases by producing sentences with an unambiguous meaning.

Globally Ambiguous Sentences / PP-Attachment Ambiguity

(1) The lion chooses the pig with the ruler.

VP Attachment / Instrument:

The lion uses the ruler to choose the pig.

NP Attachment / Modifier:

The lion chooses the pig that is holding a ruler.

Comprehension Priming

- Adults' interpretation of PP-attachment ambiguities primed by comprehension & production [1]
- 3- to 6-year-olds primed (e.g., [2-4]) but research has focused on structural alternatives with similar meanings – active vs. passive; dative alternation (see [5])
- Production-priming is robust (e.g., [2,3]); comprehension-priming is seldom utilized (e.g., [4], see [5])

Verb Biases

- 5-year-olds rely on verb biases, even when the visual context supports the alternate interpretation [6]

METHODS

Priming Study

Participants 32 children, mean age = 5;7, range 4;8 – 6;4

Modifier-Biased Verbs (from [5]) choose / look at / listen to / yell at / sing to / find / talk to / hug

Control Study

- Children have access to both interpretations [9], but need to establish a baseline preference (see also [5,7,8])

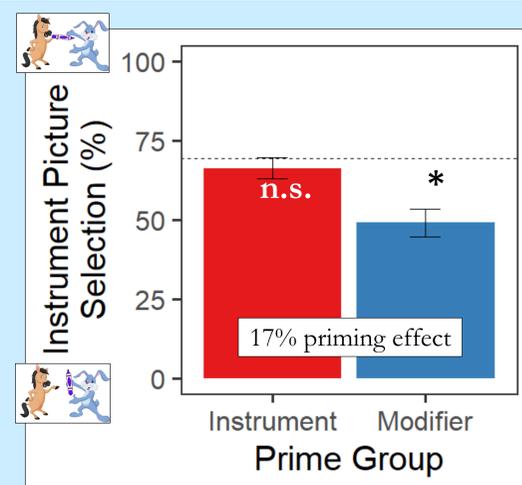
Participants 16 children, mean age = 5;0, range 4;1 – 6;3

Target Sentences (n = 8) Ambiguous target trials without prime sentence

Filler Sentences (n = 16) Sentences with a different structure & verbs than the targets



Comprehension-priming possible when prime is globally ambiguous. No evidence for “overcoming” verb bias.

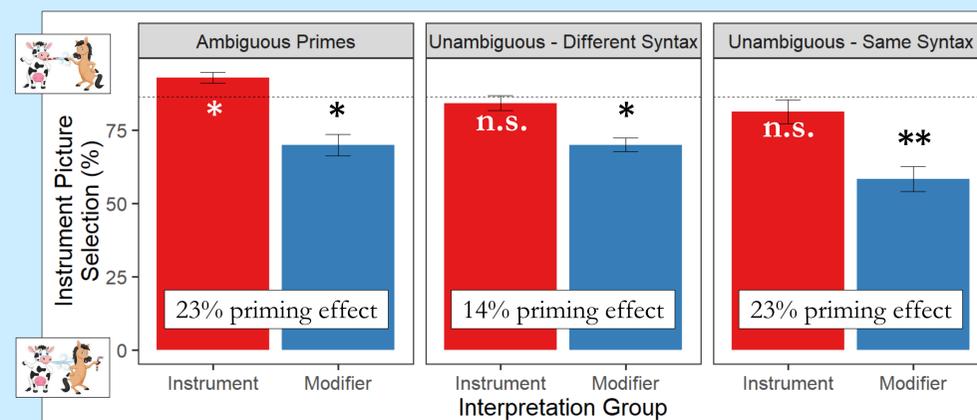


Prime (n = 8): “The lion chooses the pig with the ruler.”

Effect Size: Medium (Cohen's $d = 0.78$, 95% CI = 0.03-1.53)

- Compare to large effect for ambiguous primes & equi-biased verbs (Cohen's $d = 1.26$, 95% CI = 0.47-2.05)

Previous Study: Equi-Biased Verbs [5,7,8]



Prime Types (n=8 each):

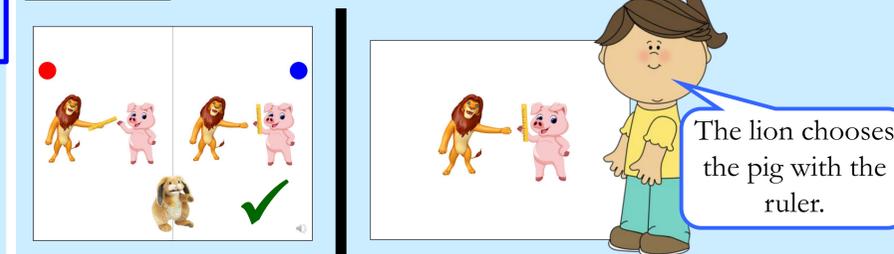
- Ambiguous** – “The elephant blows on the monkey with the fan.”
- Unambiguous (Different Syntax)** – “The elephant blows on the monkey **by using** / **that has** the fan.”
- Unambiguous (Same Syntax)** – “The elephant blows on **him** / **the one** with the fan.”

References: [1] Branigan, H., Pickering, M., & McLean, J. (2005). Priming prepositional-phrase attachment during comprehension. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, 31(3), 468-481. [2] Huttenlocher, J., Vasilyeva, M., & Shimpi, P. (2004). Syntactic priming in young children. *Journal of Memory and Language*, 50(2), 182-195. [3] Savage, C., Lieven, E., Theakston, A., & Tomasello, M. (2003). Testing the abstractness of children's linguistic representations: Lexical and structural priming of syntactic constructions in young children. *Developmental Science*, 6(5), 557-567. [4] Thothathiri, M. & Snedeker, J. (2008). Syntactic priming during language comprehension in 3- and 4-year-old children. *Journal of Memory and Language*, 58, 188-213. [5] Atkinson, E. (2022). Sticking to what we know: Methodological limitations to generalizability. In K. Messenger (Ed.), *Syntactic priming in language development: Representations, mechanisms and applications* (Trends in Language Acquisition, Vol 31). John Benjamins. [6] Snedeker, J. & Trueswell, J. (2004). The developing constraints on parsing decisions: The role of lexical-biases and referential scenes in child and adult sentence processing. *Cognitive Psychology*, 49, 238-299. [7] Atkinson, E., Bloss, N., Johnson, S., & Jones, C. (2019). *Priming children's interpretation of globally ambiguous sentences*. Poster at 32nd CUNY Conference on Human Sentence Processing, University of Colorado Boulder. [8] Atkinson, E., & Johnson, S. (2019). Interpretative priming of globally ambiguous sentences. [9] Zimmer, E. J. (2017). Children's comprehension of two types of syntactic ambiguity. *First Language*, 37(1), 7-23.

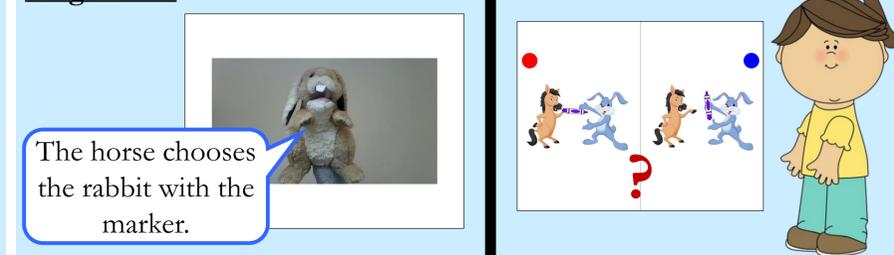
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PICTURE SELECTION TASK

Prime Trial



Target Trial



DISCUSSION

Verb Bias: Difficult to interpret!

- Children in the modifier group were primed against the instrument-prefering baseline
- Not unexpected, as priming is often limited to less common structure / interpretation
- BUT, these verbs are supposed to be modifier-biased!
- Priming toward their “bias,” not against it

Baseline Preferences: Despite being categorized as modifier-biased by adults' judgments [6], children still prefer instrument interpretation. May be a pragmatic effect based on particular images used, but this would contradict the findings of [6] in which 5-year-olds ignore visual context for verb bias.

Future Directions:

- In progress follow-up running unambiguous – same syntax condition with modifier-biased verbs: “The lion chooses **him** / **the one** with the ruler.”
- Test adults on (at least) the control study → do their biases hold up in this task?
- Given strong instrument interpretation preference, is it possible to prime against this interpretation paired with instrument-biased verbs?