

Visual Tales: Navigating Word Worlds through Picture Book Illustrations

Amanda Mankovich & Sumarga H. Suanda



INTRODUCTION

- Children's picture books are known to support early word learning¹
- Most studies have focused on how picture books' linguistic properties promote early word learning^{2,3}
- Much less empirical research has focused on the visual world
- In child-directed speech, the simultaneous presence of words and their visual referents (i.e., 'word-referent copresence') is important for early word learning^{4,5}
- Evidence suggests this copresence might also occur in picture books⁶

Objective: To explore how the visuals of commonly read picture books written for very young children may aid early word learning by:

1. Analyzing the *prevalence* and *nature* of copresence
2. Looking at how this copresence *varies by word type*
3. Assessing how copresence *changes across target audiences*

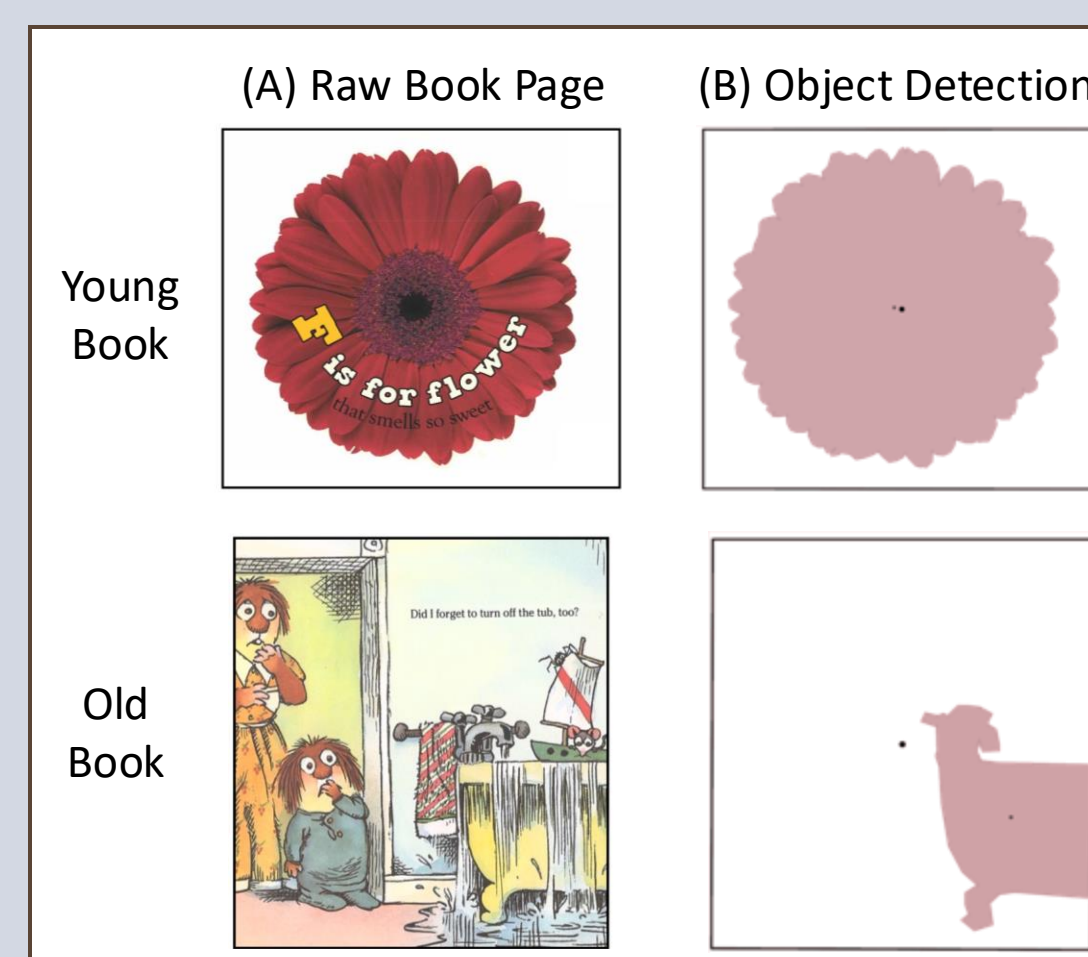
METHODS

Children's Picture Book Corpus

- 128 picture books frequently read to/by children compiled from studies of picture books^{2,3,7,8} and Amazon Best Sellers
- Divided into two target audience age groups:
 - 64 'Young Books' written for 0-to-3-year-olds
 - 64 'Old Books' written for 4-to-8-year-olds
- 3,957 MCDI noun events
 - Noun Age of Acquisition
 - 1798 First events (50% of children understand by 16 mos.)
 - 2159 Early events (50% of children produce by 30 mos.)
 - Noun Type
 - 1745 BLOC events (whole, situation-independent objects that share similar shapes)
 - 2212 NBLOC events (non-BLOCs)

Coding the Visual World

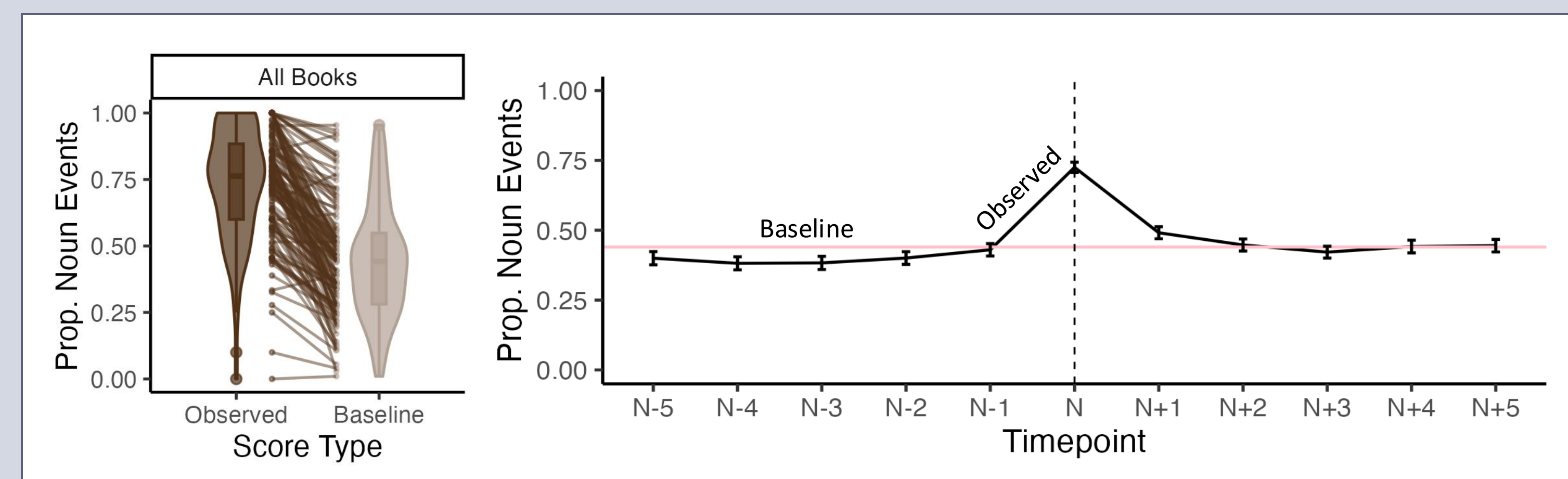
- Visual presence of each noun in a book was identified across all pages
- **Observed Copresence Score:** proportion of noun events with visual referents in view
- **Baseline Score:** likelihood of copresence from visual prevalence



RESULTS

1. Prevalence and Nature of Copresence

- On average, 75% of pages visually depict the referent mentioned in the text
- Baseline of nearly 50% visual presence
- Alignment at the naming event (N) without a significant increase in the referent's visual presence before or after naming



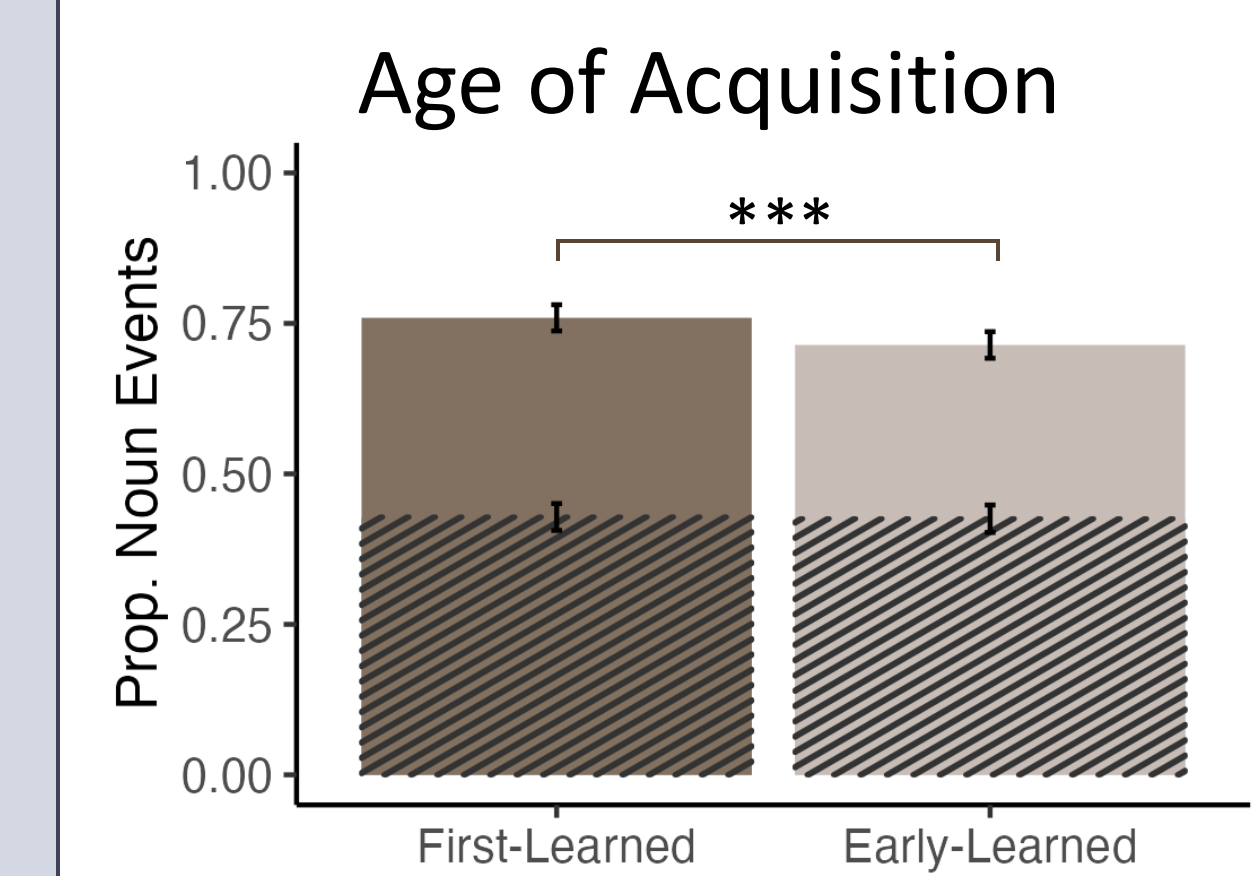
2. Variability in Copresence across Word Types

*** $p < .001$

A. Age of Acquisition

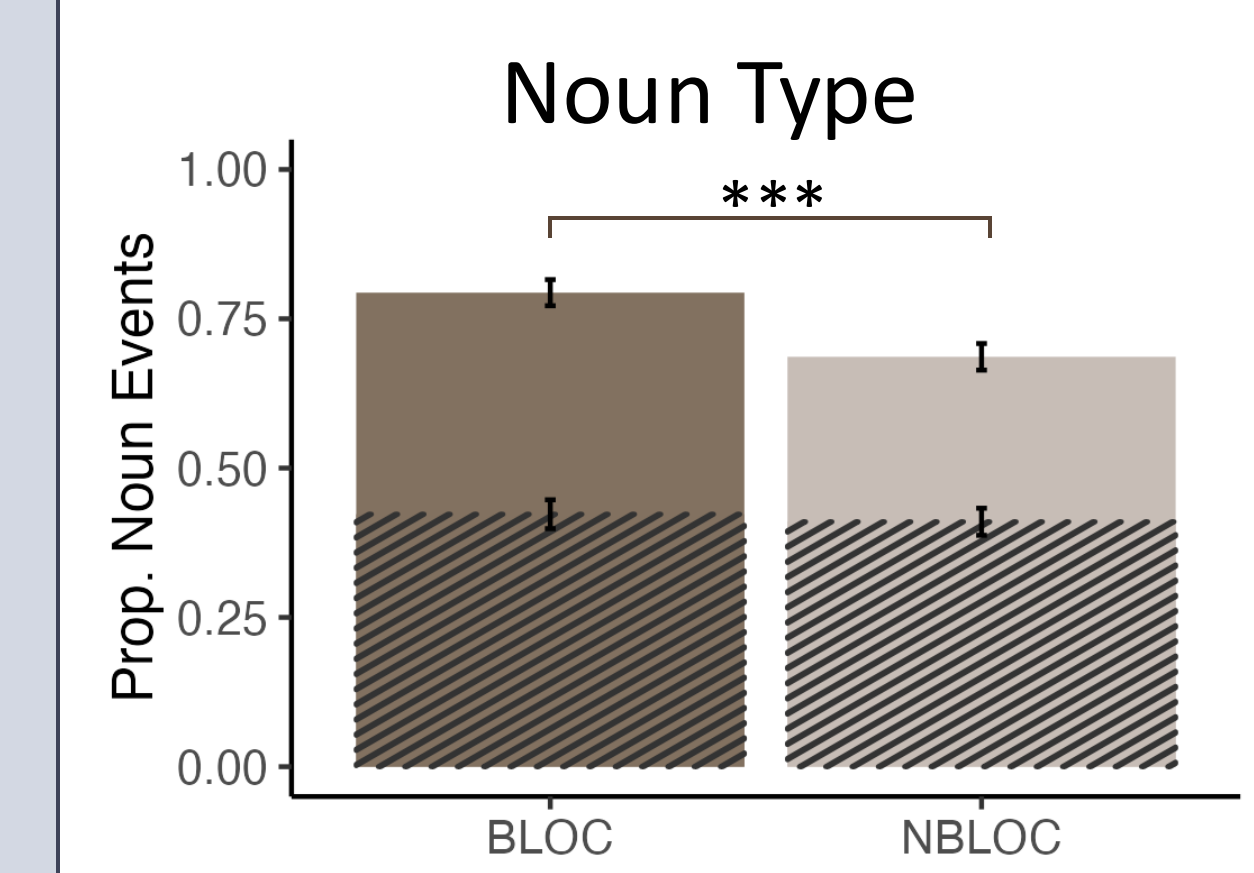
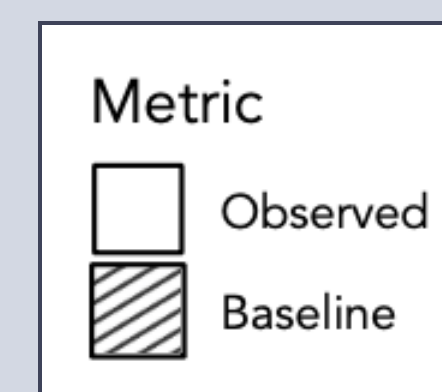
- First-learned words have higher copresence than Early-learned words, which is driven by increased visual prevalence

Word Category	Example Words
First	• apple • finger
Early	• school • sky
BLOC	• pig • blanket
NBLOC	• night • friend



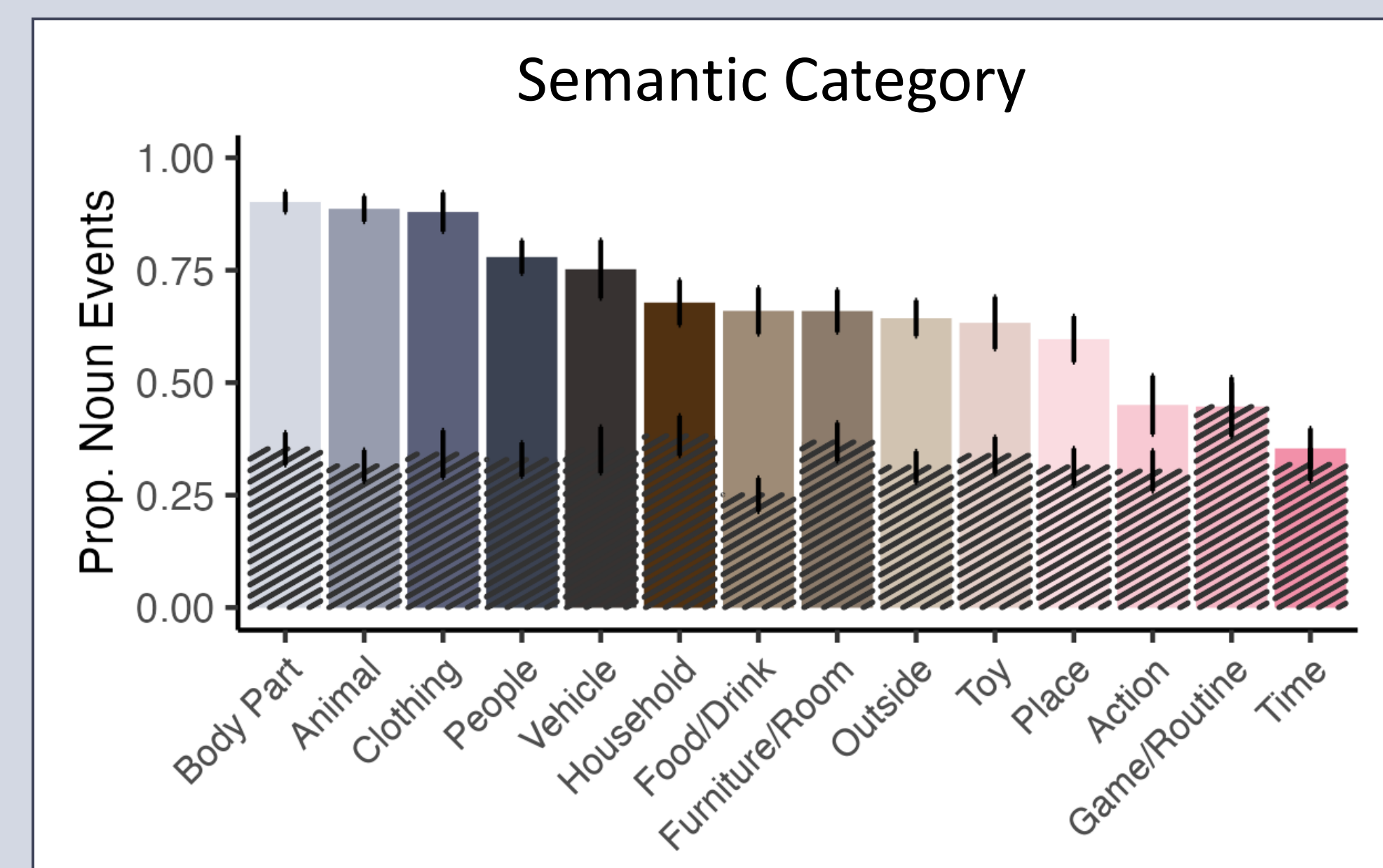
B. Noun Type

- BLOC words have higher copresence than NBLOC words, which is driven by increased visual prevalence



C. Semantic Category

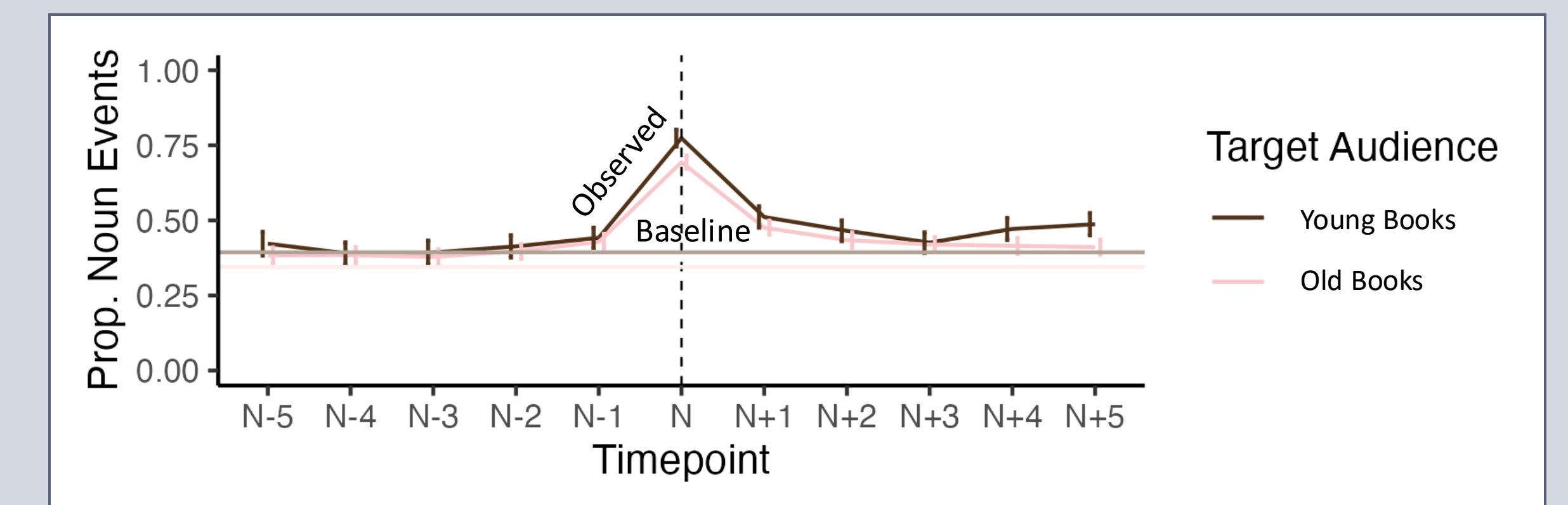
- Large variability
- Visual prevalence effects: game/routine, household, people, & vehicle
- Alignment effects: animal, body part, food/drink, & time



RESULTS CONTINUED

3. Copresence Across Target Audiences

- Slightly more precise alignment in Young Books
 - Driven by heightened referent presence at N
- Identical temporal profiles across target audiences



DISCUSSION

1. Picture Books' Visual World May Promote Word Learning

- Book copresence levels mirror those of child-directed speech⁵
- Copresence may reduce cognitive load, making it easier to isolate relevant visual information for word-referent mapping

2. Rich Visuals Operate at Two Timescales

- **Page-Level:** specific increase in the visual prevalence of the referent on pages where a word appears
- **Book-Level:** heightened visual prevalence of the referent in books where a word appears
- Different timescales shape copresence across word categories

3. Picture Books Appear "Coarsely Tuned" to Development

- First-learned and BLOC nouns appear *slightly* more visually prominent than Early-learned and NBLOC nouns
- Young Books have *slightly* higher alignment than Old Books

REFERENCES / ACKNOWLEDGEMENTS

- 1 Horst, J. S., & Houston-Price, C. (2015). An open book: What and how young children learn from picture and story books. *Frontiers in Psychology*, 6, 1-4.
- 2 Montag, J. L., Jones, M. N., & Smith, L. B. (2015). The words children hear: Picture books and the statistics for language learning. *Psychological Science*, 26(9), 1489-1496.
- 3 Cameron-Faulkner, T., & Noble, C. (2013). A comparison of book text and child directed speech. *First Language*, 33(3), 268-279. University of Georgia Press.
- 4 Nodelman, P. (1988). Words about pictures: The narrative art of children's picture books.
- 5 Bergelson, E., & Aslin, R. N. (2017). Nature and origins of the lexicon in 6-mo-olds. *Proceedings of the National Academy of Sciences*, 114(49), 12916-12921.
- 6 Clerkin, E. M., Hart, E., Rehg, J. M., Yu, C., & Smith, L. B. (2017). Real-world visual statistics and infants' first-learned object names. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 372(1711), 20160055.
- 7 Kam, C. L. H., & Matthewson, L. (2017). Introducing the infant bookreading database (IBDb). *Journal of Child Language*, 44(6), 1289-1308.
- 8 Wagner, L. (2017). Factors influencing parents' preferences and parents' perceptions of child preferences of picturebooks. *Frontiers in Psychology*, 8, 267556.

We thank the many members of the UConn Communication Development Lab for their assistance. This research was supported by the James S. McDonnell Foundation (JSMF 220020549), the National Institutes of Health (R00-HD082358), the National Science Foundation (DGE-1747486), and UCONN's Institute for Brain and Cognitive Sciences.