Exploring effects of expressive vocabulary size and maternal education on lexical processing by preschoolers using the visual world paradigm

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Franzo Law II, Tristan Mahr, and Jan R. Edwards

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Spoken word recognition

- To take advantage of learning opportunities, children need to recognize words efficiently.

– Distinguishing familiar words from words to be learned.

Cup and saucer 

– Parsing and learning syntactic structures.

I eat cookies because I like them. 

– Other aspects of learning.

Lions are bigger than dogs! 

Studying spoken word recognition in young children

Looking-While-Listening (LWL) paradigm

- Two images presented on screen:
- Target words presented:
  - See the dog!
  - Find the book!
- Eyetracker records where child looks over time.

Spoken word recognition in young children

- 2-year-olds with larger vocabularies process familiar words more efficiently. (Fernald et al., 2006)
- Processing speed at age 2 predicts language and working memory scores at age 8. (Marchman & Fernald, 2008)
- Children who hear more linguistic input process words more efficiently than children who receive less input. (Weisleder & Fernald, 2013)
- 2-year-olds from high-SES families process words more efficiently than children from low-SES families (Fernald et. al, 2013)

Socioeconomic status and spoken word recognition

- Why are children from low-SES families slower and less accurate to recognize familiar words than children from high-SES families?
- Non-linguistic consequences of poverty (Noble et al., 2005, 2007)
  - –Poorer attentional skills
  - –Poorer executive function

Socioeconomic status and spoken word recognition

- Why are children from low-SES families slower and less accurate to recognize familiar words than children from high-SES families?
- Linguistic consequences of poverty
  - Decreased linguistic input
  - Smaller vocabulary size
  - Non-mainstream dialect

Dialect mismatch and academic achievement

- Dialect mismatch:
  - Home language (NMAE) ≠ School language (MAE)
  - High levels of non-mainstream dialect at kindergarten entry ➔ Lower literacy scores in first grade (Terry & Connor, 2012)

Dialect mismatch and spoken word recognition

- Adults
  - Less effect of semantic predictability (Clopper, 2012)
  - Greater effect of noise (Adank et al., 2009)
- Children
  - 20-month-olds but not 25-month-olds influenced by dialect differences (van Heugten et al., 2015)

Spoken word recognition in preschool children

- What are the contributions of vocabulary size and maternal education level to spoken word recognition of preschool children? (Law, Mahr, Schneeberg, & Edwards, in revision)
- Differences from previous research:
  - Children tested in their native dialect.
  - Individual rather than group differences.

Participants

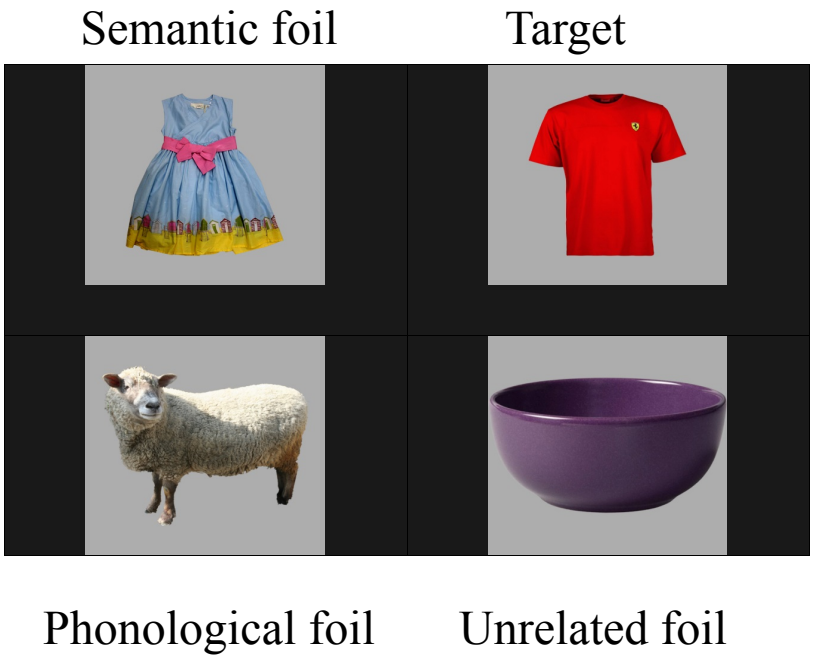
- 60 children, 28-64 months
- Half spoke AAE and half spoke MAE
- Groups matched by age and sex

African American English vs. Mainstream American English

- Phonological differences
- Morpho-syntactic differences

Procedure

- Visual world paradigm
  - Semantic, phonological, and unrelated foils
- Secondary questions
  - How do children respond to semantic and phonological competitors?
  - Is there an effect of vocabulary size or maternal education level on responses to lexical competitors?

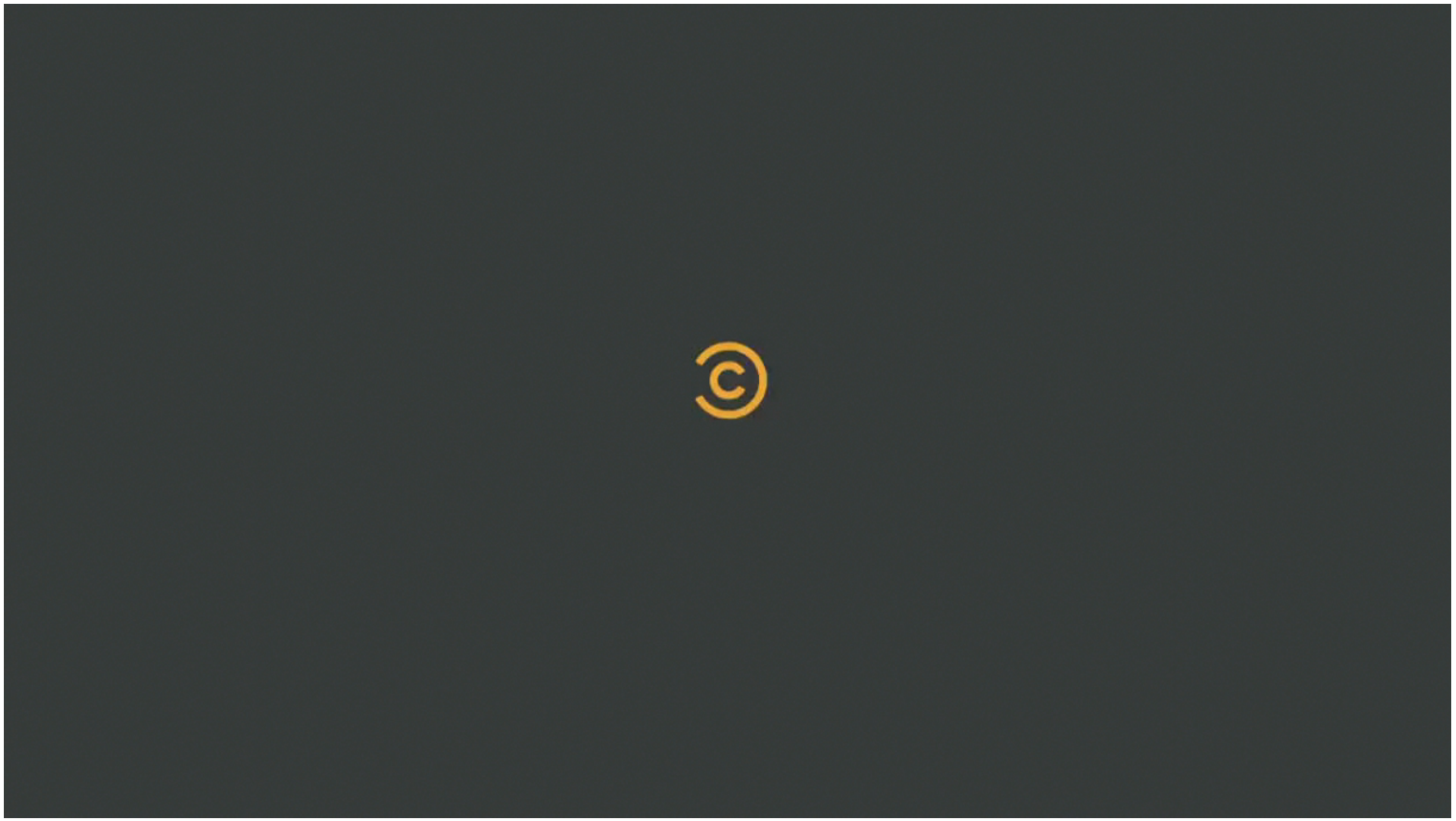


Stimuli

- Stimuli chosen using age of acquisition norms.
  - AOA between 38 and 57 months.
- Pictures normed in two preschool classrooms.
  - Preschool attended by children from high SES families
  - Head Start classroom
- Stimuli recorded in both Mainstream American English (MAE) and African American English (AAE).

Stimulus dialect

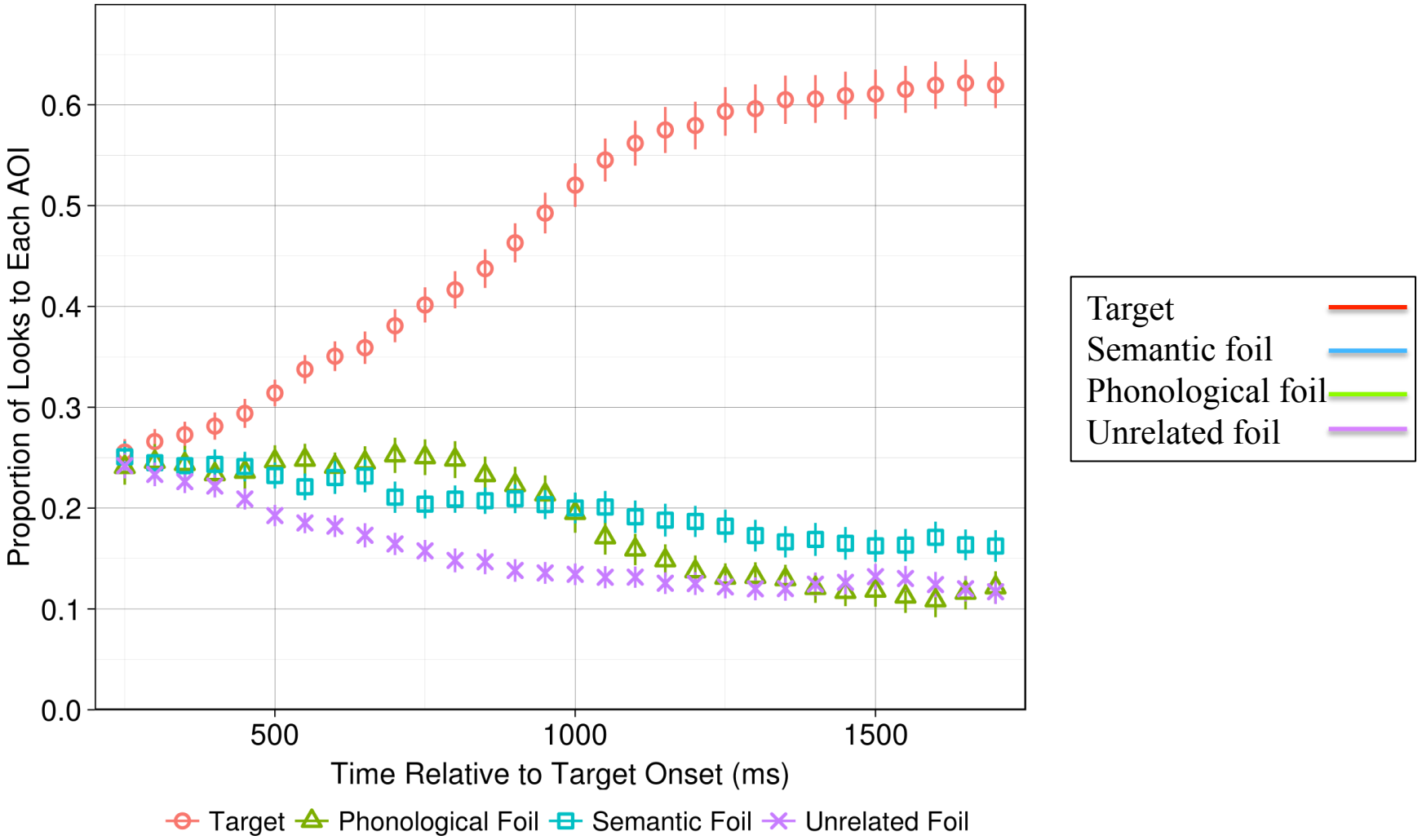
- All children tested in their home dialect
- Home dialect determined by a number of factors.



Child-level variables

- Age
- Vocabulary size (EVT-2)
- SES: Maternal education level
  - 24: high
  - 14: middle
  - 22: low

Results


Proportion of Looks to Each AOI
0.0
0.1
0.2
0.3
0.4
0.5
0.6
500
1000
1500
Time Relative to Target Onset (ms)
Target
Phonological Foil
Semantic Foil
Unrelated Foil
Target
Semantic foil
Phonological foil
Unrelated foil

Analytic strategy

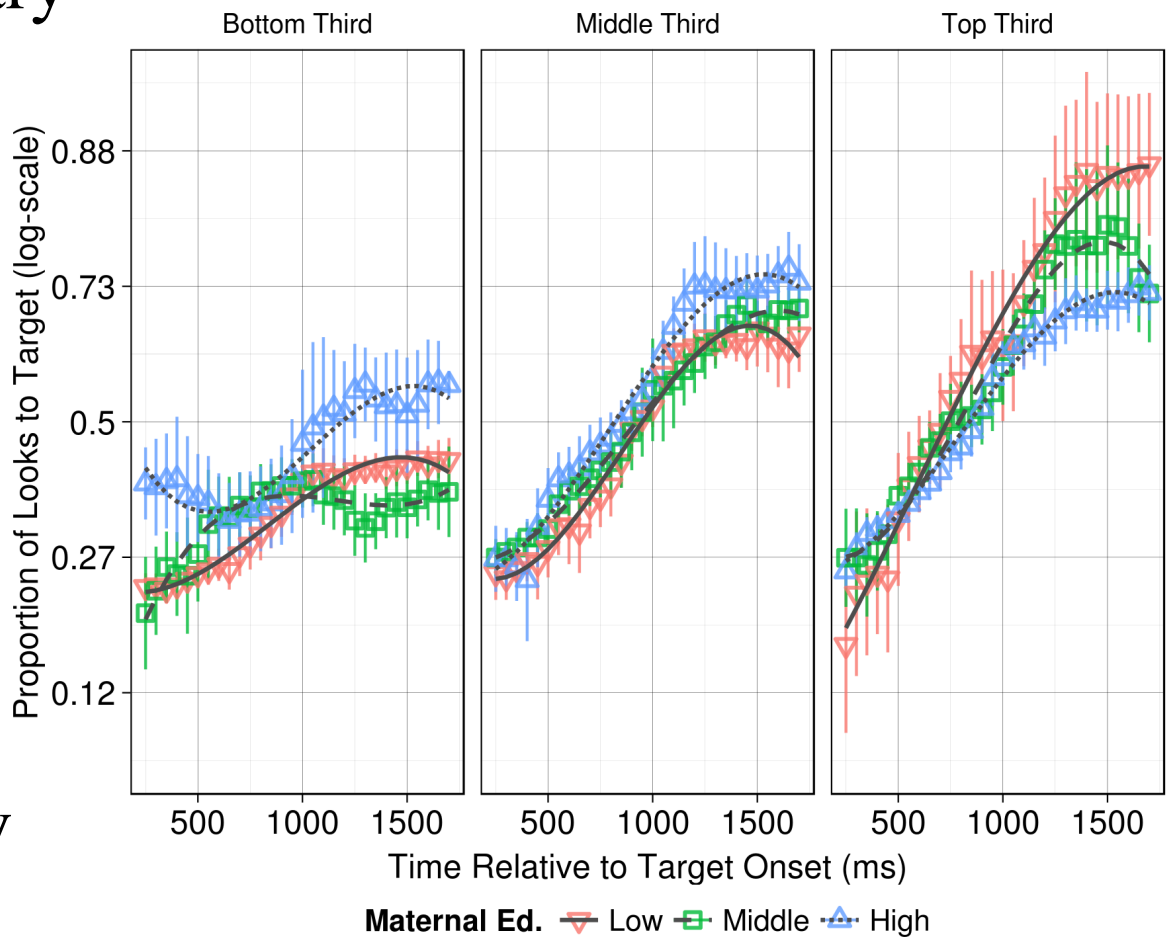
- Growth curve analysis (Barr, 2008, Mirman et al., 2008, Mirman, 2014)
  - Restrict analysis to a meaningful time window.
  - Model how fixations to a target *area of interest* (AOI) change as a function of time.
  - Include random effects for participant.
  - Transform to empirical log-odds so models work.
  - Subject-level variables: age, vocabulary size, , maternal education level,
  - Condition: stimulus dialect

Results: Stimulus dialect

- No main effect of dialect and dialect did not interact with any of the other predictors.
- Combined data across the two stimulus-dialect groups.
- Methodologically feasible to test children in their native dialect.

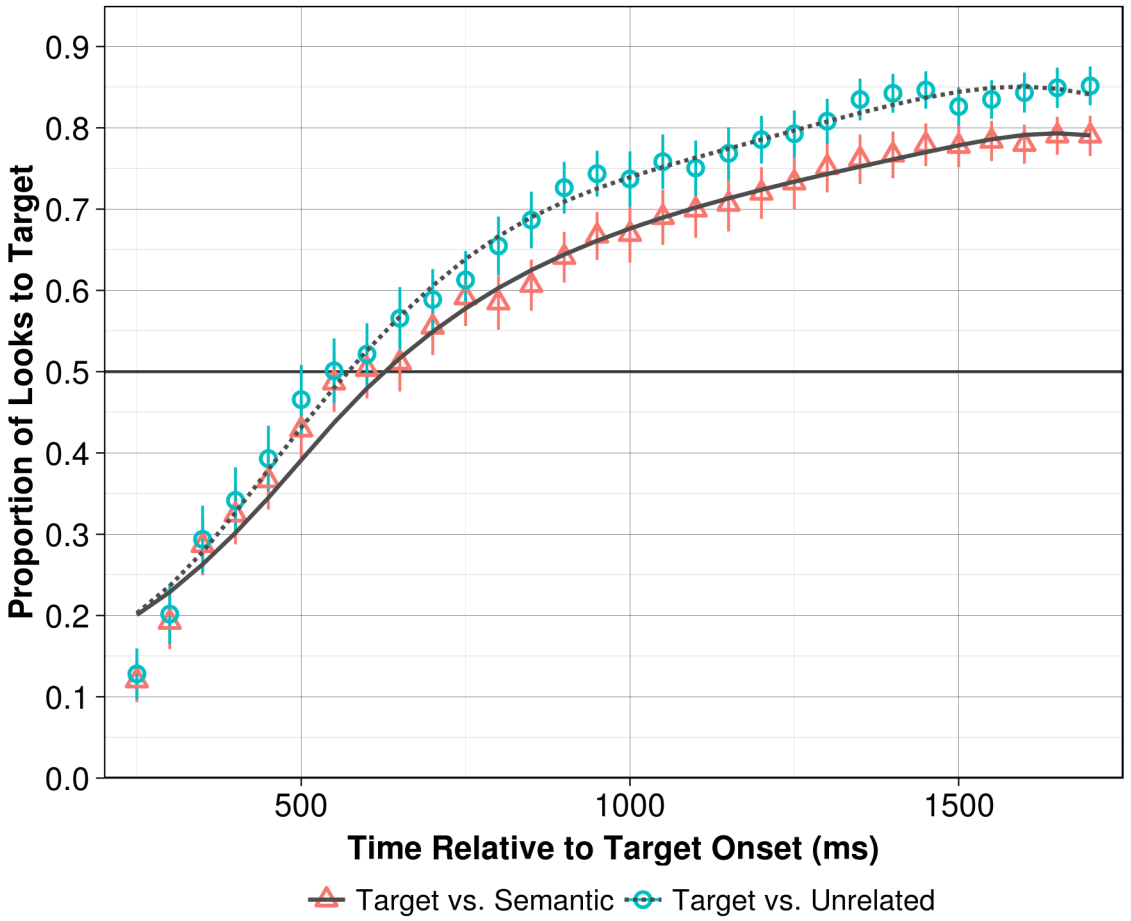
Results: Expressive vocabulary and maternal education level

- Expressive vocabulary size is significant predictor of both accuracy and speed.
- No significant main effect of maternal education level.
- Interaction between maternal education level and vocabulary size.



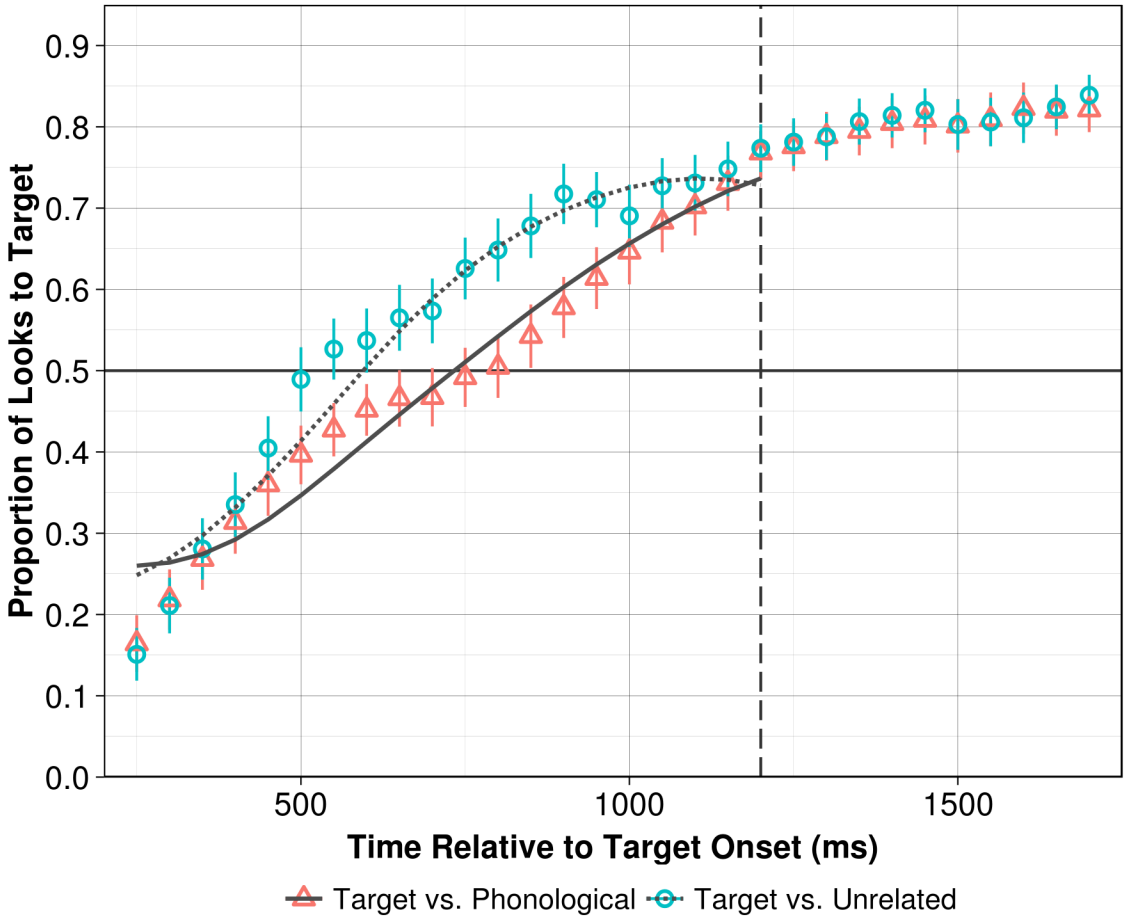
Looks to semantic and unrelated foils

- Compare looks to target for trials were children were looking at target onset to:
  - semantic foil
  - unrelated foil
- Children more distracted by semantic foil
- Significant effect of vocabulary size for both trial-types
- No significant effect of maternal education level



Looks to phonological and unrelated foils

- Compare looks to target for trials were children were looking at target onset to:
  - phonological foil
  - unrelated foil
- Children (slightly) more distracted by phonological foil
- Significant effect of vocabulary size for both trial-types
- No significant effect of maternal education level



Discussion

- Methodologically feasible to test children in native dialect.
- .What about dialect mismatch?
  - –Not directly addressed in this study because all children received stimuli in their native dialect.
  - –Ongoing study with both MAE and AAE speakers.

Discussion

- Spoken word recognition in children
  - Preschool children, like adults, were sensitive to phonological and semantic competitors
  - Vocabulary size did not interact with inhibition of semantic/phonological competitors
  - Results argue for a continuity between children and adults in spoken word recognition (Mayor & Plunkett, 2014)

Discussion

- Why do children from high-SES families process familiar words more quickly and accurately than children from low-SES families?
- Linguistic versus non-linguistic explanations.
  - –Vocabulary size explained much of this effect
- Insulating effect of high maternal education level.

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