Semantic development in early word learning

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Main goals

(1) Develop a new tool for infant vocabulary learning research

(2) Explore how real-time language processing is influenced by semantic structure in vocabulary

Background

Vocabulary assessments count the *number* and *type* of words infants understand or say using parental report.

Recent research has identified two factors that may improve predictors of term language growth and outcomes over and above that of simple vocabulary reports:

(1) Semantic vocabulary structure

Recognizing relationships among words may facilitate language growth.

(2) Language processing skills

The *speed* of word recognition is a factor in predicting concurrent and future language outcomes

Goal 1: Using semantic overlap between words as a measure of vocabulary skill in infancy

Goal is to develop detailed measures of semantic overlap between words that exist in early infant vocabularies.

Participants: 339 self reported native English speaking adults recruited via Amazon Mechanical Turk

Data collection: Participants provided an exhaustive list of semantic features for a list of 22-28 concepts that appear in early infant vocabularies. ~78,000 features reported by participants corresponding to 250 early acquired noun concepts

Feature standardization (ongoing):

Trained coders are standardizing responses from participants and coding features among numerous perceptual, motor and cognitive dimensions.

Next steps: Completed dataset will be used to create automated tools that can compute individual differences in semantic structure of vocabulary in infancy

Goal 2: Measure real-time language processing as a function of semantic vocabulary structure

The Task

Figure 1. An example of the visual stimuli in the experiment.

Condition	Example
Lexical	*Look! Shoe! Do you like it?* *Look! Truck! Do you like it?*
Sentence	*Wear the shoe! That's cool!* *Drive the truck! That's cool!*

Figure 2. Examples auditory stimuli in the experiment.

Participants: Thirty-two, 24 month old infants, typically developing, English-learning.

Online measurement of linguistic processing: Eye-movements are measured from the onset of the noun in the lexical condition, and from the onset of the verb in the sentence condition. Measures of interest include timing of looks to the Target relative Distractor item in relation to the unfolding speech.

Assessment of domain knowledge: Three high proficiency and Three low proficiency domains were identified for each child according to proportion of vocabulary items in each domain known according to parental report on a comprehensive vocabulary checklist.

Results

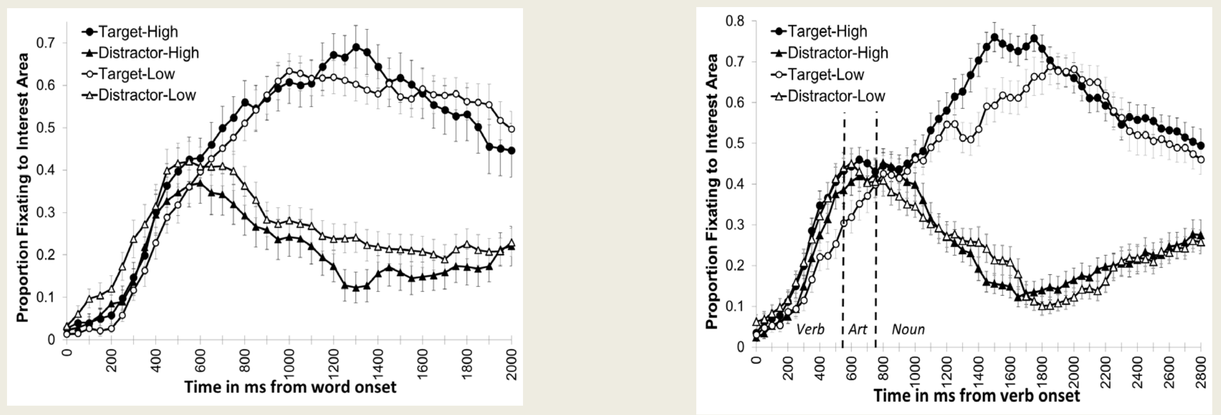

Figure 3. Mean fixation proportion to Target and Distractor images in Lexical (left) and Sentence (right) processing tasks. In both cases, looks to the Target diverge from that of the Distractor earlier in High vs. Low domains

Conclusions

- Infants' lexical and sentence processing was facilitated in high vs. low knowledge domains
- This is not simply a vocabulary effect – high and low knowledge domains were identified for each infant, so that total vocabulary is matched across domain knowledge conditions.
- In low-knowledge domains, infants appeared to "check back" to the non-target item, indicating greater semantic interference for items that have fewer semantic neighbors.
- Our results suggest that individual differences in language processing due are affected by the lexico-semantic knowledge of the listener.
- The organization of domain-relevant knowledge extends beyond simple lexical recognition to simple sentence processing