Development of familiar word recognition in preschoolers

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Background

- Recent work suggests word recognition efficiency—how well children map incoming speech to words—may help identify early differences in children's language trajectories
- We do not know, however, how word recognition itself develops over time or how individual differences in word recognition change over time.

Current study

- How does familiar word recognition develop over the preschool years?
- Are individual differences in word recognition stable over developmental time?
- How does children's sensitivity to lexical competitors change with age?

Method

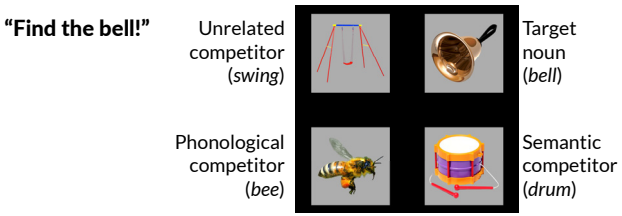
Participants

- Data were collected during a three-year longitudinal study.

Time Point	Children	Age (months) Mean ± SD	Age (months) Range	EVT-2 standard Mean ± SD
Age 3	149	33 ± 3.5	38–39	113 ± 18
Age 4	162	45 ± 3.5	39–52	118 ± 16
Age 5	153	57 ± 3.7	51–66	118 ± 15

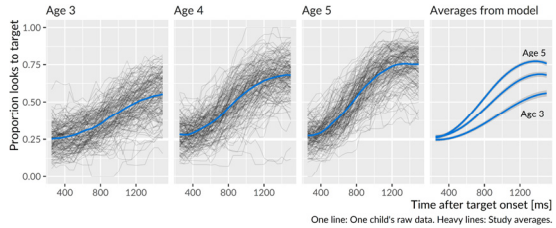
Procedure

- Children heard a familiar word in a carrier phrase (e.g., "find the bell") and saw an array of photos, including a target, a semantic, a phonological, and an unrelated competitor.
- Tobii T60XL eyetracker measured children's patterns of looking to the images over the course of a trial.
- This procedure measures a child's real-time comprehension of words by capturing how the child's gaze location changes over time in response to speech.

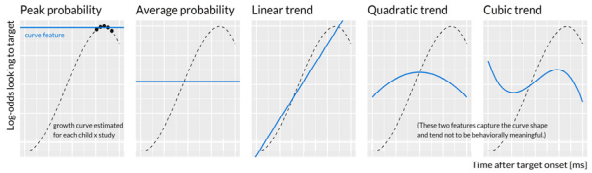


Growth curve analysis

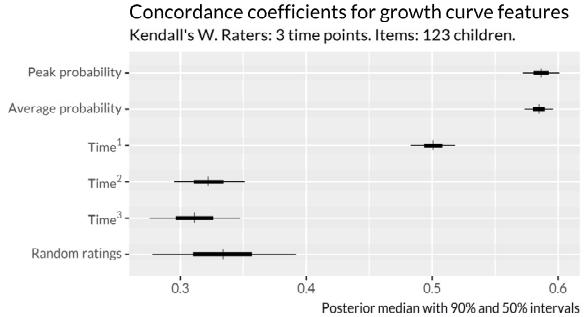
- We estimated a growth curve for each child x year with Bayesian mixed effects logistic regression.



- We used growth curve features to measure individual differences in word recognition.



- Peak and average probabilities and linear time trends increased with each year of the study: Children became faster and more accurate at recognizing familiar words.
- We asked whether individual differences were longitudinally stable. We treated each year as "a judge" which had to rank children on each growth curve feature. We used Kendall's W to compute the concordance of these rankings.

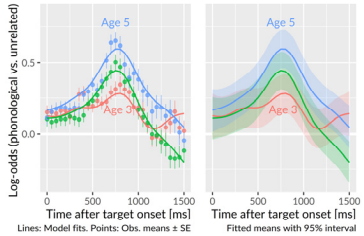


- Children's rankings using the peak and average probabilities and the linear trend were longitudinally stable. The other features ranked children as well as random numbers.

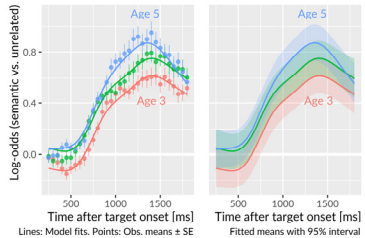
Looks to competitors

- We modeled the ratio of looks to the phonological and semantic competitor versus the unrelated image.
- The advantage of a competitor over the unrelated word reveals children's sensitivity to the competitor.
- Children became more sensitive to phonological and semantically related words as they grew older.

Immediate activation of phonological information. Phonological competitors had the same syllable onset as the target (e.g., *flag-fly*, *bell-bee*). Relative looks to the phonological competitors spike early on, a tendency that increases with age: Children became more likely to use part-word information during word recognition.



Late activation of semantic information. Semantic competitors belonged to the same category as the target (e.g., *bell-drum*, *bear-horse*). Relative looks to these words peak later on (well after the end of the target noun). This timing suggests cascading activation from the target noun. These words peak *only after* activation of the target has peaked.



Conclusions

- Children's recognition of familiar words improved each year.
- Individual differences in word recognition were stable over time, so that relatively fast children at Age 3 remained relatively fast at Age 5.
- As children grew older, they were more likely to look to the phonological and semantic competitors, compared to the unrelated word. When children err, they are more likely to err on a lexically relevant word.
- Children become more efficient at recognizing familiar words by becoming more efficient at activating the target word and related words.

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