

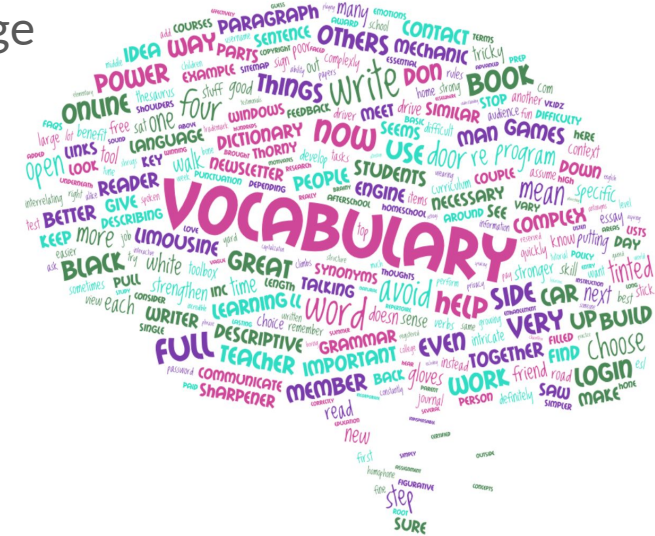


The relation between Lexicon and Grammar in child language development

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What is the Lexicon?

- The set of words or morphemes you know
- These are the basic units of meaning in a language





What is Grammar?

- The set of abstract rules that govern how we combine the units of meaning in our lexicon.
- E.g. Why do we say ‘the purple flower’ and not ‘flower purple the’ in English ?
- E.g. Why do we say ‘The books are on the table’ and not ‘The books is on the table’
- Grammar allows us to make the sentences of our language from the Lexicon.



The current picture:

- **Learning words** and **learning grammar principles** have historically been studied as separate learning processes.
- One seems concrete - learning the words you are directly given as input.
- While the other seems abstract - abstracting grammatical principles from the sentences you are given as input.

The current picture:

Input

Child directed speech and
language environment



Outputs

Lexicon



Grammar





About this study:

- There is evidence to suggest that **word learning** and **grammar learning** are related learning processes beyond using the same input.
- A replication of two such pieces of evidence from the work of Bates et al. (1994) and Braginsky et al. (2015)



Data:

- CDI forms are parent report questionnaires about a child's language development.
- contain word lists (300-600 words) that parents can check if their child 'produces' or 'understands'
- contain complexity questions about grammar comparing complex vs simple forms, eg. 'Ball there' vs 'Ball is there'.



Research Questions:

1. Do nouns, predicates, and functional words have different learning trajectories in early child language development? (Analysis 1)
2. Is there a strong correlation between lexicon size and complexity score (a metric for syntactic development)? (Analysis 2)
3. If so, does a model with lexicon size as a predictor explain more of the variance than a model which age as a predictor? (Analysis 2)



Hypotheses:

1. Nouns are more easily acquired than function words in early language acquisition.
2. Vocabulary size is a significant predictor of complexity score.
3. A linear model with vocabulary size as a predictor explains more variance in reported complexity scores than a model with age as a predictor.



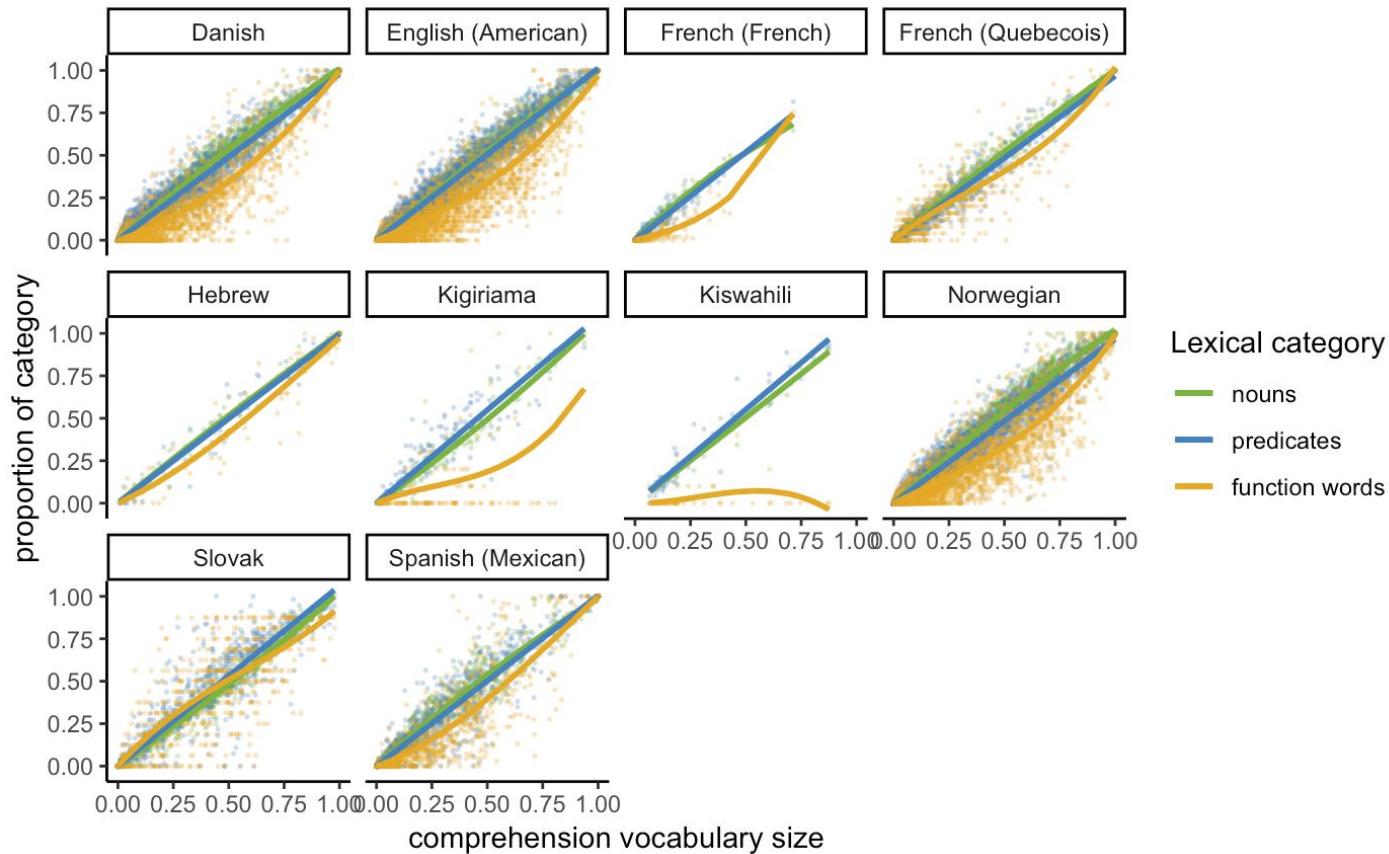
Analysis 1

If word learning does not take into account any grammatical information about words such as lexical category:

- Then we expect words from all lexical categories, i.e. nouns, predicates (verbs and adjectives), and functional words (conjunctions, particles, complementizers,...), to be acquired at the same rate.
- ◆ If the opposite is observed, grammatical categories matter.

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Analysis 1





Analysis 2

If word learning and grammar learning are overlapping learning processes :

- Then we expect there to be a strong correlation between vocabulary scores and complexity scores cross-linguistically and that this is not solely an effect of age.

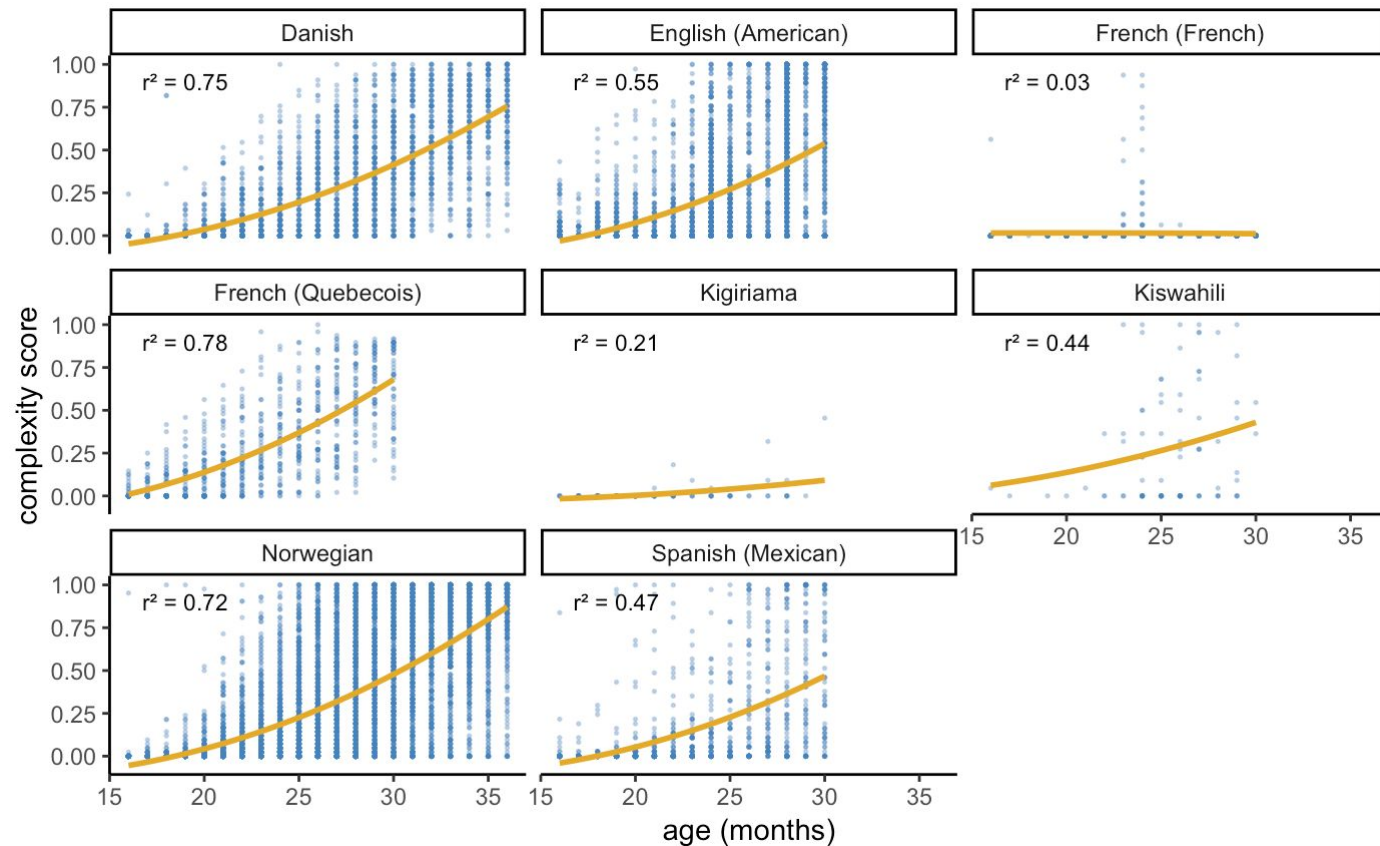
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Analysis 2

Age as a
predictor

Danish $n = 3714$

Kiswahili $n = 90$



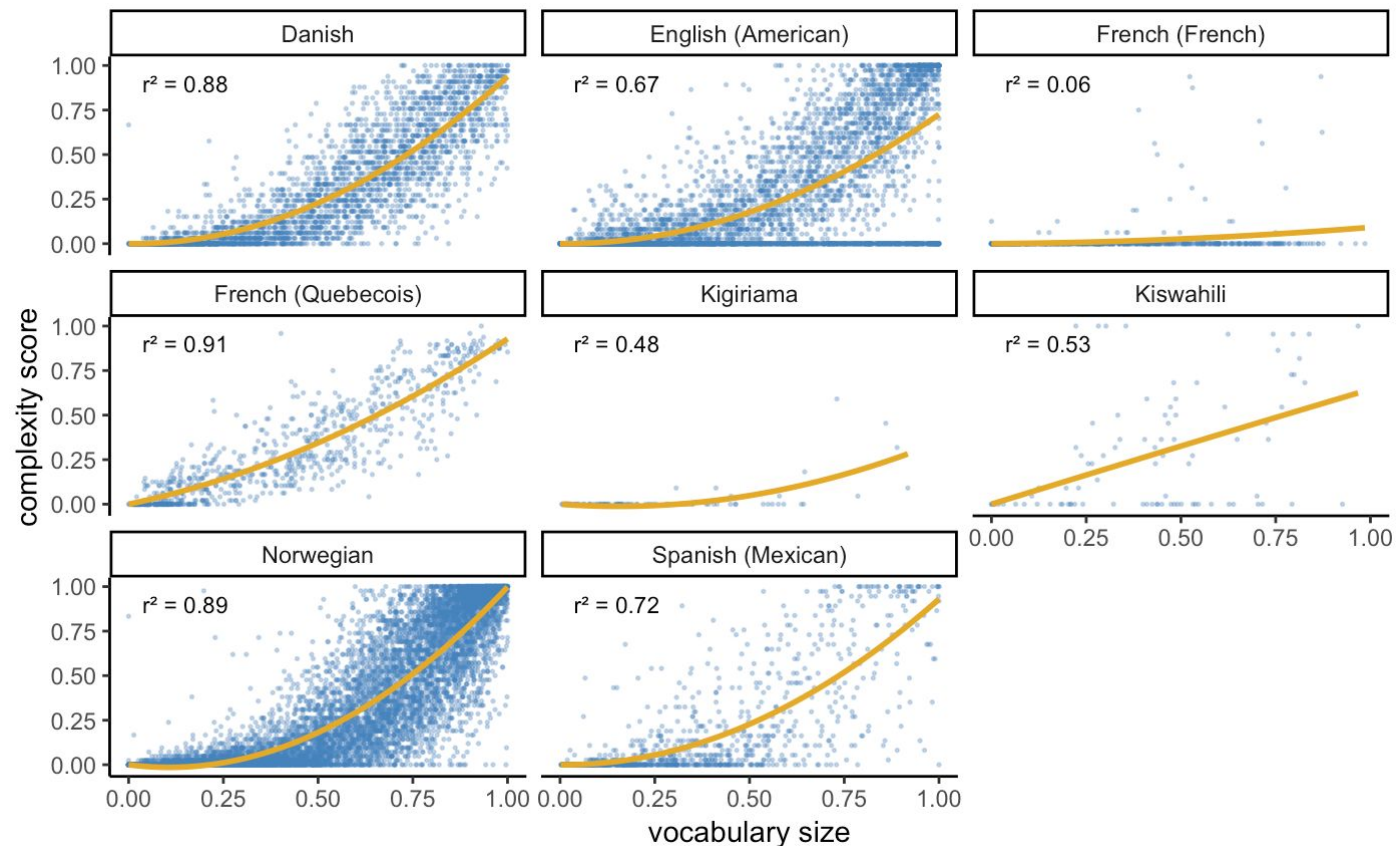
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Analysis 2

Vocabulary size
as a predictor

Danish $n = 3714$

Kiswahili $n = 90$





Discussion and conclusion:

- No strong noun bias, but strong bias against function words
- Strong correlation between vocabulary size and complexity score
- Issues with data led to difference in model fits cross-linguistically

Word learning and grammar learning are not independent processes.



References

Bates, Elizabeth, Virginia Marchman, Donna Thal, Larry Fenson, Philip Dale, J Steven Reznick, Judy Reilly, and Jeff Hartung. 1994. "Developmental and Stylistic Variation in the Composition of Early Vocabulary." *Journal of Child Language* 21 (1). Cambridge University Press: 85–123.

Braginsky, Mika, Daniel Yurovsky, Virginia A Marchman, and Michael C Frank. 2015. "Developmental Changes in the Relationship Between Grammar and the Lexicon." In *CogSci*, 256–61.