Teaching an old dog new tricks? Learning rates, aging, and language change

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Section 1

Background literature

Something to set it up

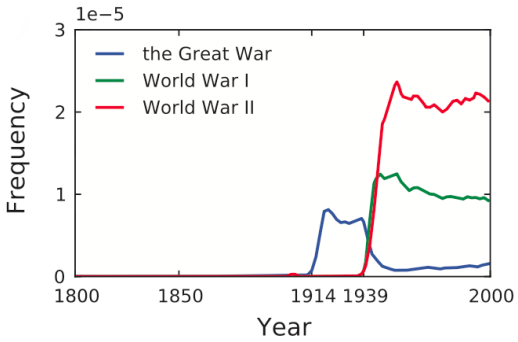
- Language change examples?
- Language acquisition?

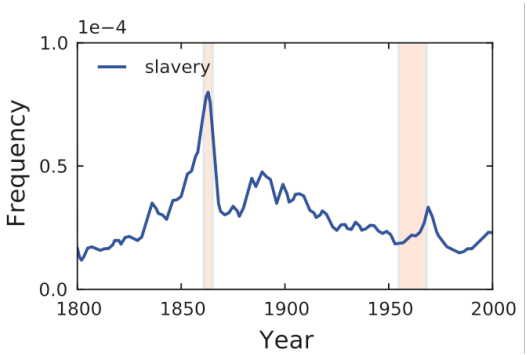
Language changes over time

- Google Books corpus (5.2 mill books) from 1800-2000[1]
- Ran a "culturenomics" study through an n-gram corpus analysis
- Quantified trends in lexical usage, grammatical patterns, and social usage

[1](Michel et al. 2011)

Language changes over time





Verb Bias figures

- Verb bias figures

How does language change over time

Types of lexical change[2]:

- Metaphor: *head* or *face*
- Metonymy: *bureau* as cloth over a table
- Inference: *since* from temporal to causal
- Bleaching: *guys*
- Narrowing / generalization

[2](Bybee 2015)

Mechanisms of language acquisition

- Statistical learning
- Propose but verify (hypothesis testing)
- Structural inference

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- Not exactly clear how these learning mechanisms may change over the lifespan, and how cognitive decline may impact executive functioning and learning.

Learning rates

- MacMurray study: parallel learning, constant learning rate
- Blachstein study? Changes over the lifetime?
- Bryersbart study?

Shift to modeling

- Previous models
- Main points

Main research question

Given that adults learn throughout their life and update their linguistic representations[3], it is especially relevant to understand:

[3](Brysbaert, Warriner, and Kuperman 2014; Castro, Curley, and Hertzog 2021; Ryskin et al. 2017)

Main research question

Given that adults learn throughout their life and update their linguistic representations[3], it is especially relevant to understand: **How do changes in meaning across time impact our understanding of those words?**

[3](Brysbaert, Warriner, and Kuperman 2014; Castro, Curley, and Hertzog 2021; Ryskin et al. 2017)

Model description:

- Overview
- Assumptions

Agents/nodes

- Properties

Initialization

- See chart

Speaking

- Explanation

Listening

- Explanation

Modification: Gamma

- Explanation
- Modifications

Modification: Aging

- Learning curve plot

Analysis 1

Analysis 2

Conclusions

Thank you.

References

Brysbaert, Marc, Amy Beth Warriner, and Victor Kuperman. 2014. "Concreteness Ratings for 40 Thousand Generally Known English Word Lemmas." *Behavior Research Methods* 46 (3): 904–11.

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Michel, Jean-Baptiste, Yuan Kui Shen, Aviva Presser Aiden, Adrian Veres, Matthew K. Gray, The Google Books Team, Joseph P. Pickett, et al. 2011. "Quantitative Analysis of Culture Using Millions of Digitized Books." *Science* 331 (6014): 176–82. https://doi.org/10.1126/science.1199644.

Ryskin, Rachel A, Zhenghan Qi, Melissa C Duff, and Sarah Brown-Schmidt. 2017. "Verb Biases Are Shaped Through Lifelong Learning." *Journal of Experimental Psychology: Learning, Memory, and Cognition* 43 (5): 781.