Prior Reading Experience Explains Individual Differences in Nonword Reading

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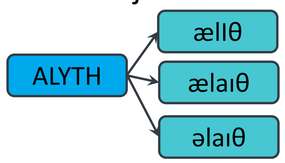
1. Background

Nonword reading in English is variable.

Previous studies focused on differences across nonwords [1, 2, 3].

VASUBE SOTTLE
ALYTH PASAKE

Our study focuses on differences across subjects.



2. General Approach

Differences in nonword reading across subjects reflect differences in reading experience.

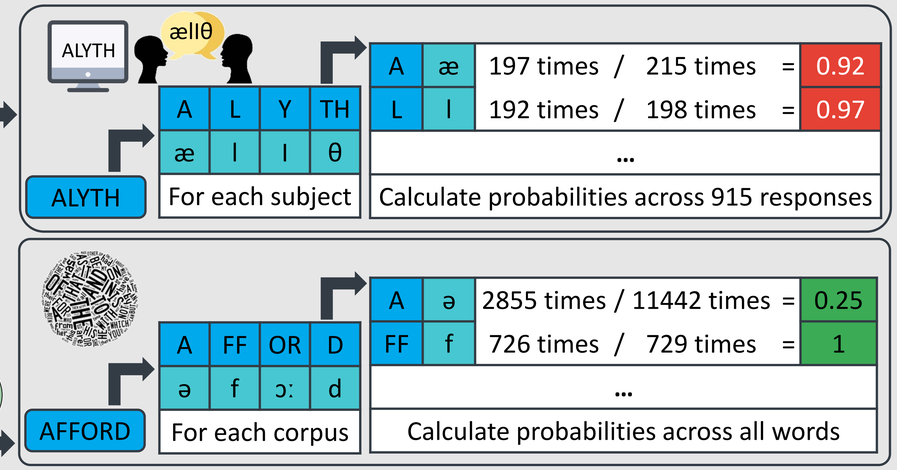
Differences in corpus size = Differences in reading experience → Individual differences in nonword reading

Print-to-sound statistics from corpora were compared to those of individual readers.

HUMAN DATA
Mousikou et al. (2017)
41 participants
915 disyllabic nonwords
Spelling scores [4]
Vocabulary [5]

CORPUS DATA
CELEX
75k words < 9 letters

16 corpora sampled using frequency cut-offs



3. Are Better Readers Closer to Large Corpora?

HYPOTHESIS

Large corpus = Good readers
Large corpus ≠ Poor readers

METHODS

A	æ	0.92
L	l	0.97
...		
For every subject		

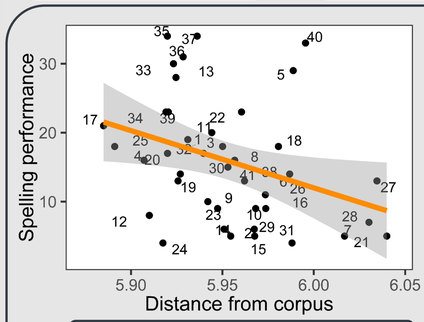
A	æ	0.92
L	l	0.97
...		
Full corpus		

Measured Euclidean distances

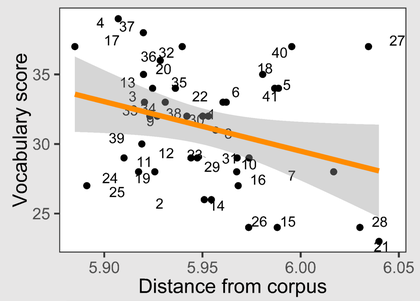
Corpus	Subjects				
	6.1	6.4	6.9	...	6.3

Produced a vector of mean distances between grapheme-to-phoneme correspondences (GPCs) in the corpus vs. each participant.

We investigated the relationship between the vector of distances from the corpus and subjects' spelling and vocabulary scores.



B = -83.02, *t* = -2.38, *p* < 0.05



B = -35.60, *t* = -2.05, *p* < 0.05

RESULTS

The further participants were from the corpus in terms of the print-to-sound statistics that they utilise, the lower their spelling and vocabulary scores were.

4. Variability across Humans and Corpora

HYPOTHESIS

Differences across corpora = Subject 1, Subject 1, Subject 3 ↕ Differences across subjects

METHODS

A	æ	0.07	0.01	...	0.09
L	l	0.97	0.95		0.80
...					
16 corpora					

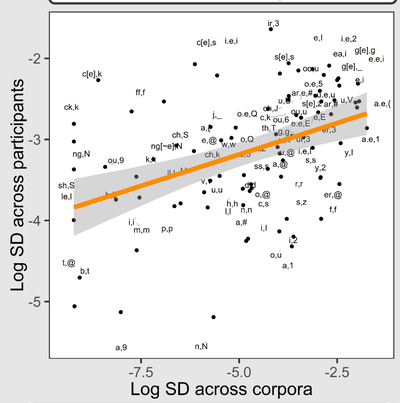
Calculated standard deviation (SD) for each GPC across corpora

A	æ	0.07	0.01	...	0.09
L	l	0.97	0.95		0.80
...					
41 subjects					

Calculated SD for each GPC across subjects

RESULTS

B = 0.33, *t* = 3.33, *p* < 0.01



The more variable the statistics were across corpora, the more variable they were across humans.

5. Conclusions

Varying reading experience can be modelled by diminishing a large corpus of written English.
Good readers' print-to-sound statistics resemble a large corpus, whereas poor readers' statistics are further away from large corpora.
Print-to-sound statistics vary less across individuals if they are less dependent on reading experience (i.e. changes in corpora size).

6. Funding and References

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[1] Pritchard, S., Coltheart, M., Palethorpe, S., & Castles, A. (2012). *JEP: HPP, 38*(5). [2] Mousikou, P., Sadat, J., Lucas, R., & Rastle, K. (2017). *JML, 93*, 169–192. [3] Coltheart, M., & Ulicheva, A. (2018). *PeerJ, 6*: e4879. [4] Burt, J., & Tate, H. (2002). *JML, 46*, 518 543. [5] Shipley, W. C. (1940). *Journal of Psychology, 9*, 371–377.