Massive Auditory Lexical Decision: Going Big in the Auditory Domain

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APhL Alberta Phonetics Laboratory

Background

'Megastudies' have several important advantages:

- statistical power
- minimization of strategic effects
- comprehensiveness
- multi-functionality
- complementing traditional small factorial experiments
- model development and testing

Megastudies

Visual Lexical Decision

For example:

- the English Lexicon Project (Balota et al., 2007): 40,000 words and non-words
- the French Lexicon Project (Ferrand et al., 2010): 38,000 words and non-words
- the Dutch Lexicon Project (Keuleers et al., 2010): 14,000 words and non-words
- the British English Lexicon Project (Keuleers et al., 2012): 28,700 words and non-words

Auditory megastudies

The only Auditory Lexical Decision megastudy: BALDEY (Ernestus Cutler, 2015):

- 5,541 words and 5,541 pseudo-words
- 10 female and 10 male listeners

Auditory megastudies

The only Auditory Lexical Decision megastudy BALDEY (Ernestus Cutler, 2015):

- 5,541 words and 5,541 pseudo-words
- 10 female and 10 male listeners

And now:

- MALD: Massive Auditory Lexical Decision

Items

- Male Western Canadian English speaker (age 32) recorded in a sound attenuated booth
  - 28,511 words
  - 11,400 non-words (wuggy, Keuleers Brysbaert, 2010b)
    - Words and non-words are morphologically complex
    - 1000 compound words and non-words
- About 2000 words/day or 800 non-words/day
- Items were extracted and mispronunciations removed leaving:
  - 26,800 English words
  - 9,600 pseudo-words
- All items provided with segmental level mark-up (p2fa, Yuan Liberman, 2008)

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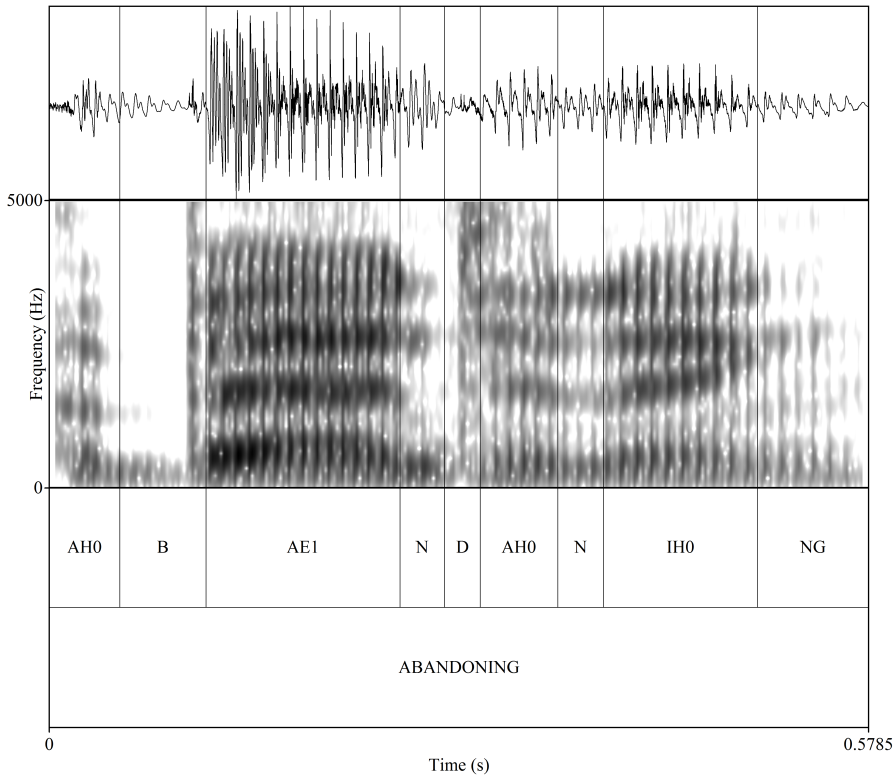
Item markup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N
D
AH0
N
IH0
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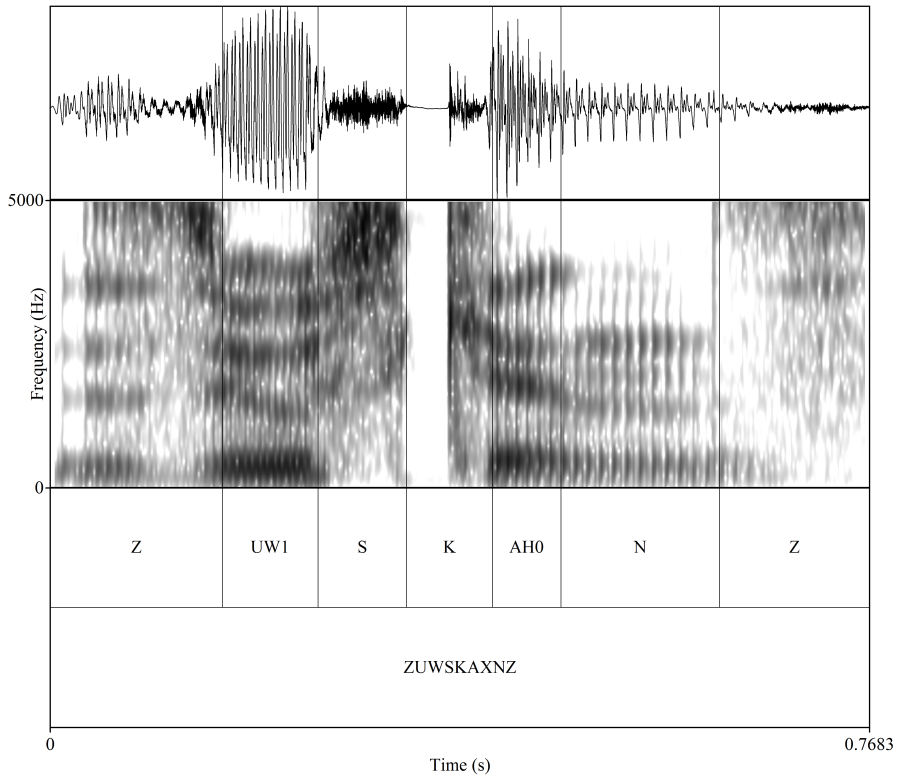
Time (s)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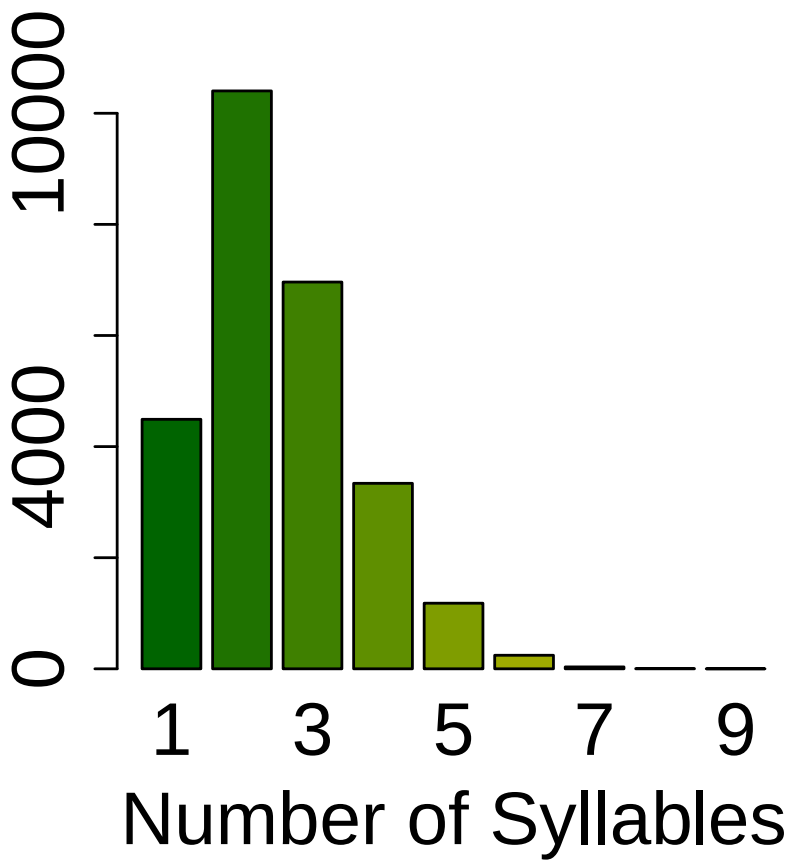
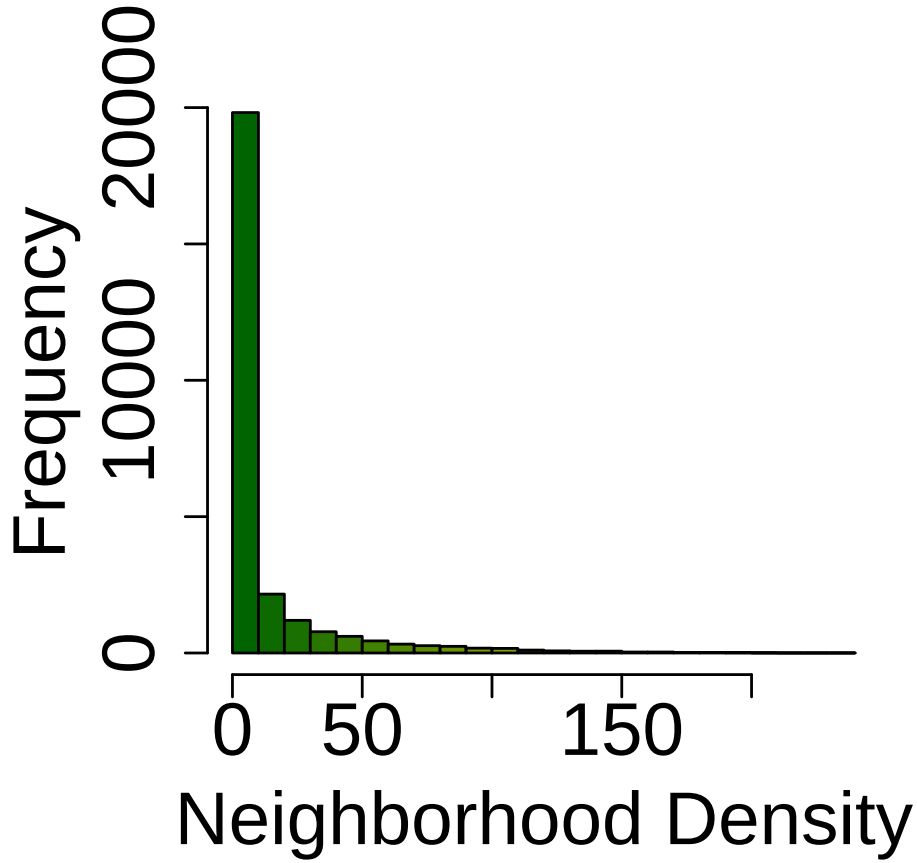




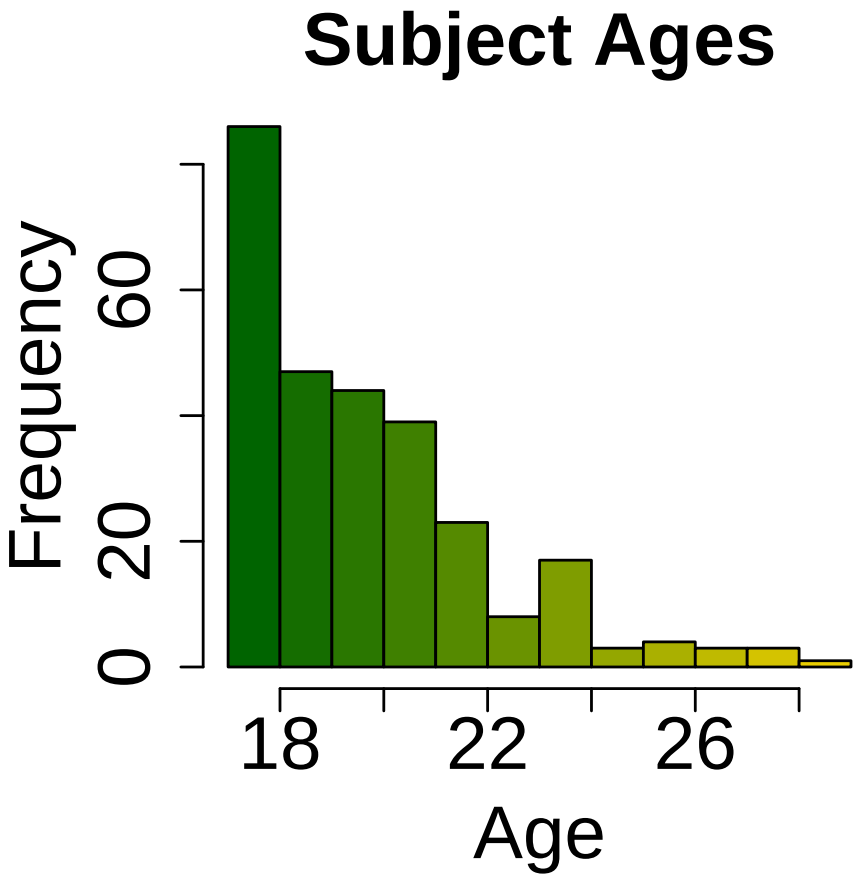
Procedure

- Hearing screening
- Auditory Lexical Decision task
- Session lasts approximately 25min
  - Goal: At least 4 responses per word (400 words/400 pseudowords per experiment)
- Participants could participate in up to three sessions

- 232 monolingual Canadian English participants
- 285 total experimental sessions

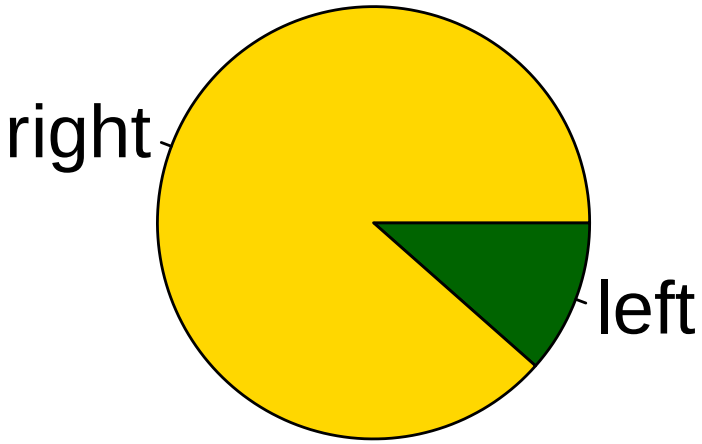
228,000 total button presses

Participants

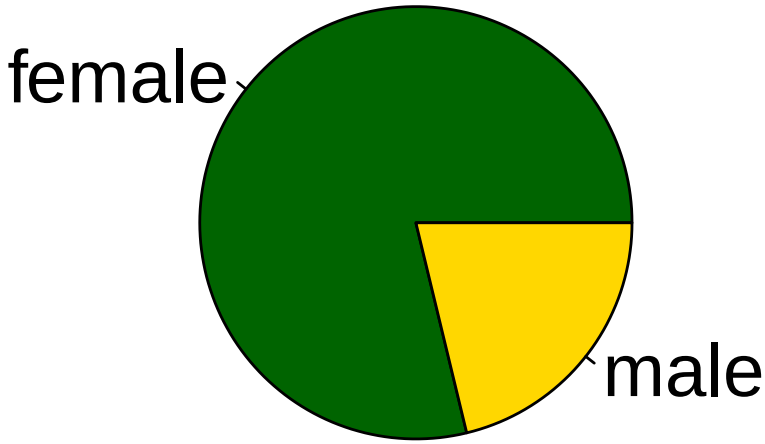


Participants

Subject Handedness



Subject Sex



Data Frame

Independent Variables (already in the data file):

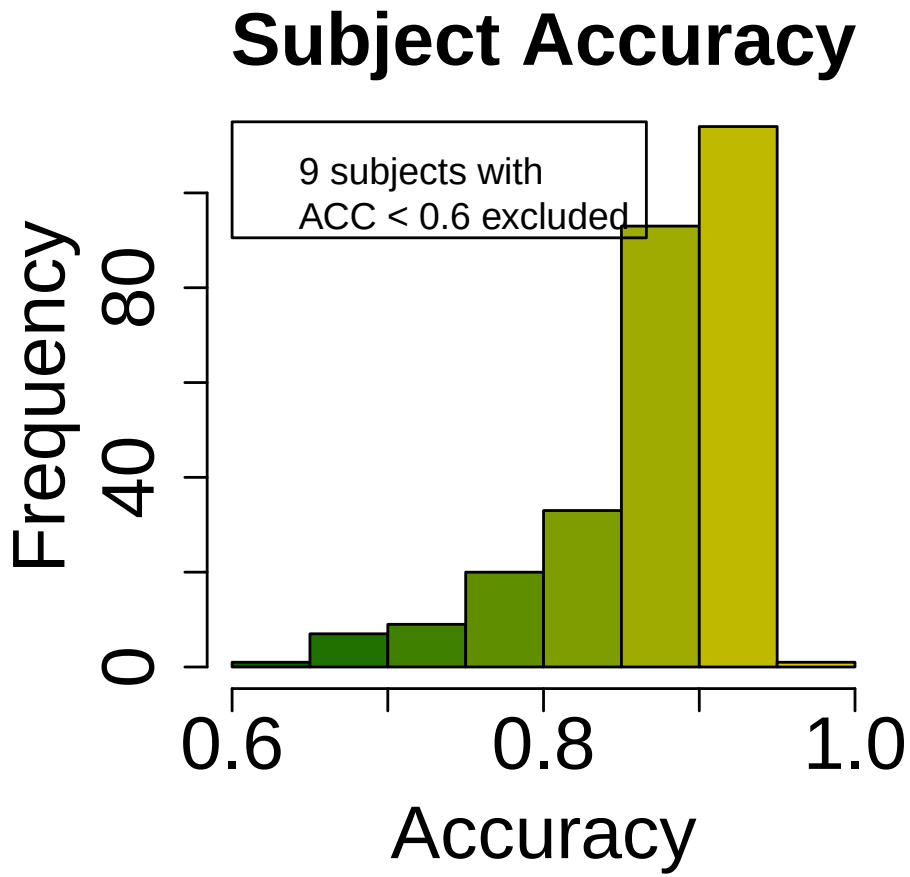
- Word Duration
- Education
- Neighborhood Density
- Frequency (COCA, COCA Spoken, Google nGram)
- Non-word characteristics (e.g. phonotoactic probability, Phonological Neighborhood Density)
- Age
- Sex
- Handedness
- Word Run Length

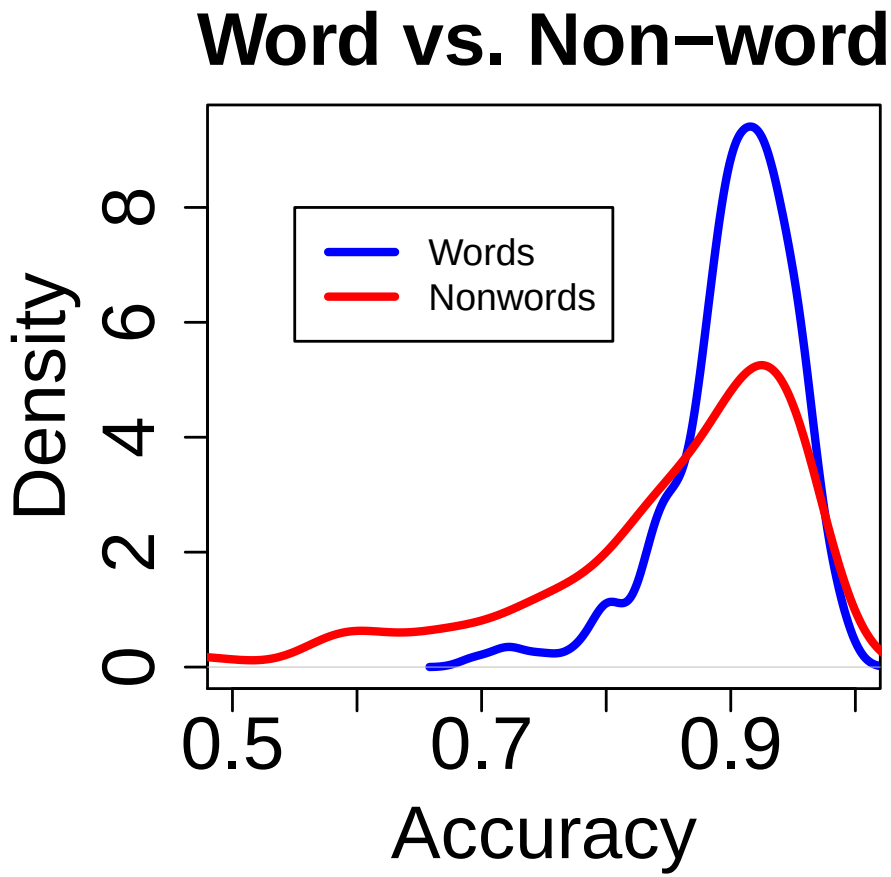
Data Frame

Dependent variables:

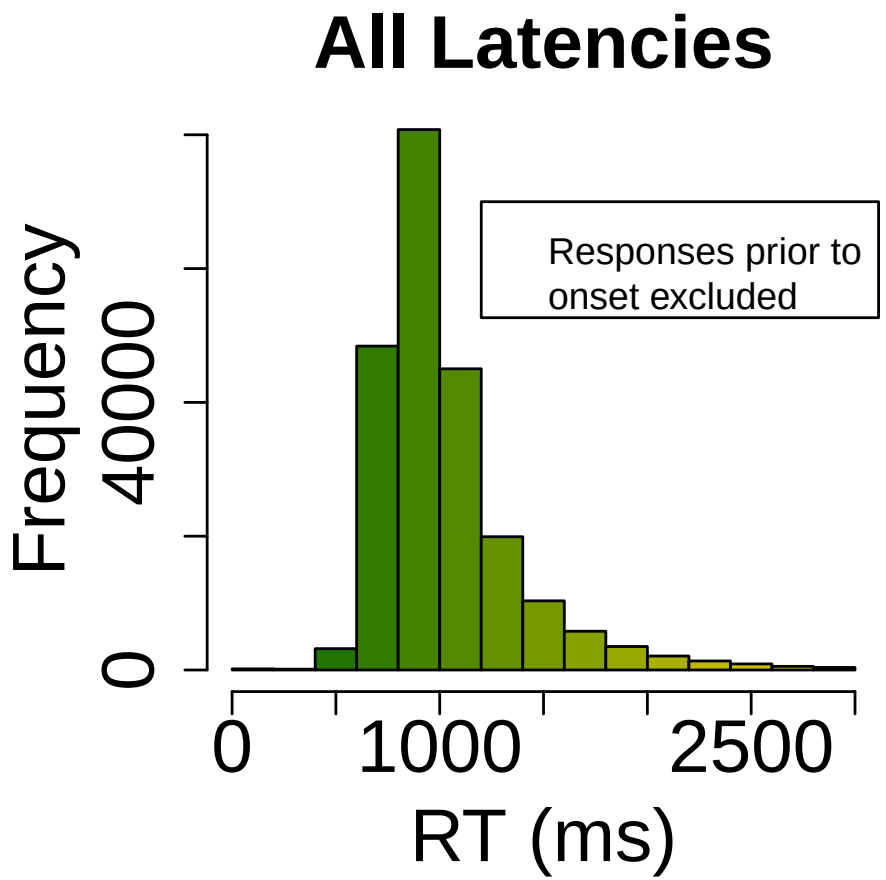
- Acoustic characteristics
- Response Latency
- Accuracy

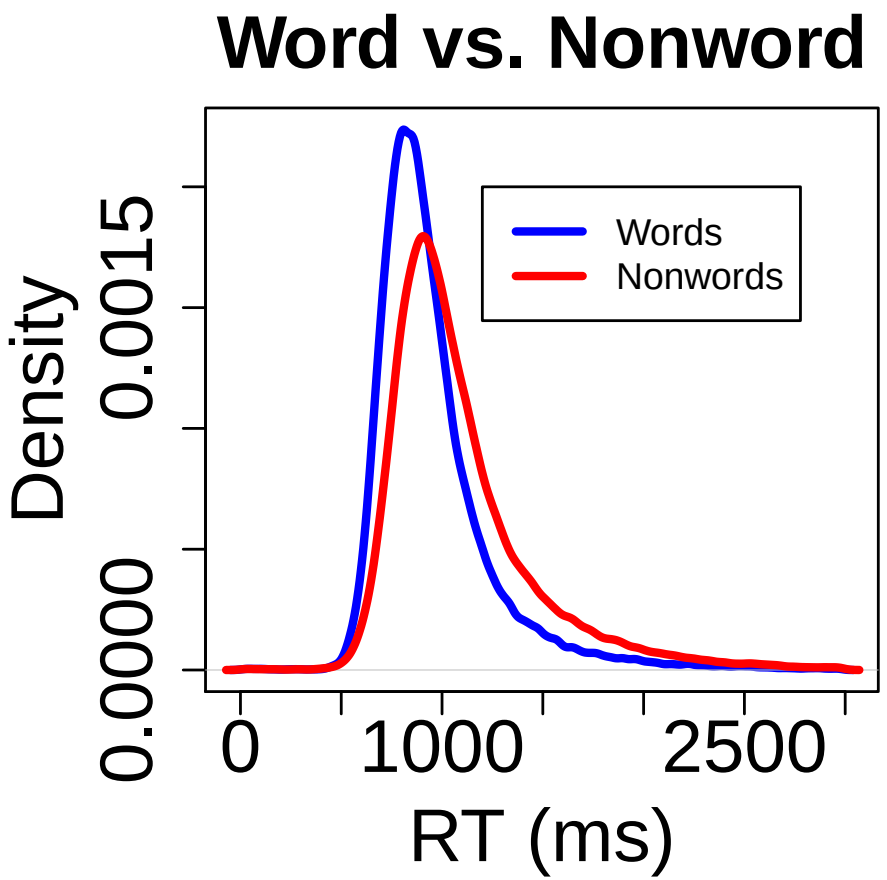
Accuracy


Subject Accuracy
9 subjects with
ACC < 0.6 excluded
Frequency
0
40
80
0.6
0.8
1.0
Accuracy


Word vs. Non−word
Words
Nonwords
Density
0
2
4
6
8
0.5
0.7
0.9
Accuracy

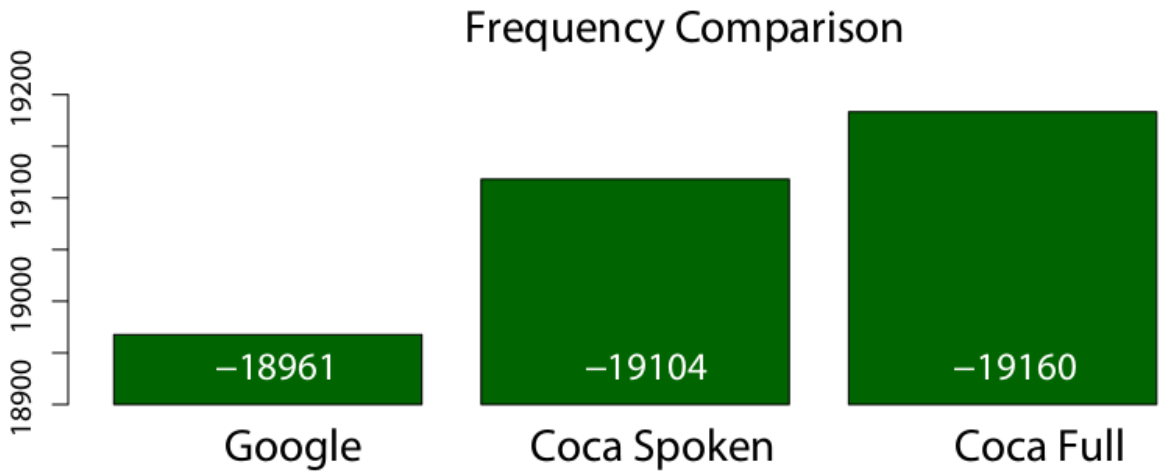
Response Latency





Frequency

Linear mixed effects regression (R core team, 2013; Bates et al., 2014)



- Counts based on all genres in COCA are better than spoken language
- Counts based on the Google Unigram corpus are less predictive than COCA

Thank you!

Stay tuned for the public release of the database:
https://aphl.artsrn.ualberta.ca/