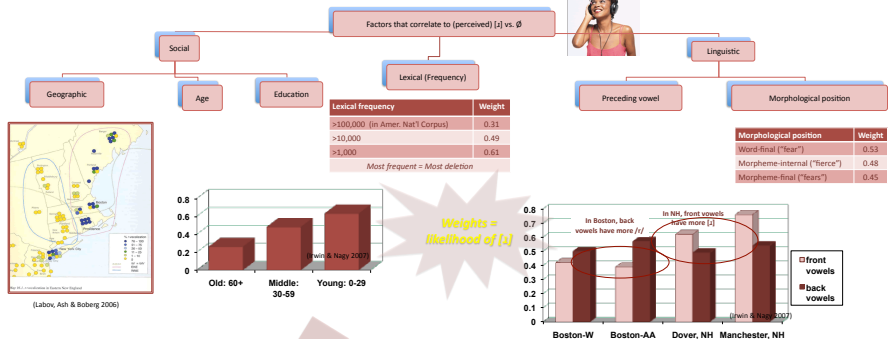


Perceptual Frequency and Formant Frequency in R speech

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Variation in surface form patterns with many factors.



Method

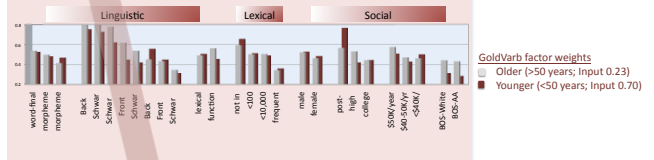
Data collection: Reading passage

People who are new to New England often worry about how to get through New England's fierce winters. Although don't swimmers might appear to be unpleasant, New Englanders have many ways of keeping warm. When asked the question, "How do you make it through the winter up there?" many natives in New England answered not to wear that they will be cold or to wear heavy coats. In fact, snow is a part of the culture of New England, and many of us enjoy skiing and ice skating in many 1800s winter sports and 1900s games.

Throw a 160-pint Get some 170 beer, 171 wear 172 summer clothes, and whip out the 173 tennis, just like it was 174 summer.

Patterns get transmitted from speaker to speaker.

E.g., Older and younger generations show same factor effects, although they have quite different overall rates of [ɹ]-presence



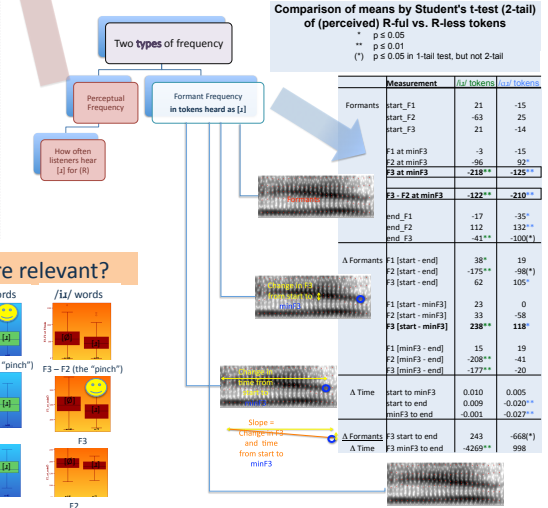
How? Patterns of Perceptual Frequency are supported by Formant Frequency.

Problem

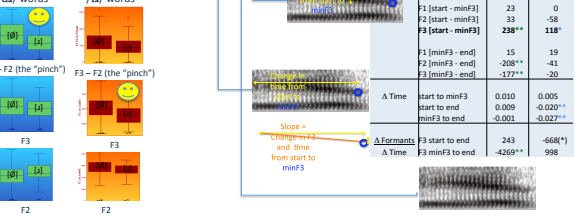
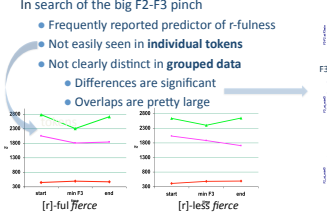
- Poverty of the Stimulus:
- How are stochastic patterns transmitted?

Solution, in a nutshell

- The kind of word that gets [ɹ] more often also gets stronger [ɹ]s.
- "Kind" may be defined linguistically, socially, or lexically.
- In other words, the "strength" of [ɹ] can be meaningfully interpreted in two related ways:
 - how often [ɹ] is heard in a particular context (Perceptual Frequency)
 - how constricted the [ɹ] is in each production (Formant Frequency)



Which acoustic aspects are relevant?



Auditory

56 speakers from Boston and southern New Hampshire were digitally recorded reading a light-hearted story containing 224 words with post-vocalic /ɹ/. Environments were categorized according to morphological position, phonological context, and the interacting factors of word class (functional/lexical), word length, and lexical frequency. Two coders listened to each token a number of times and coded it as r-ful or r-less. Factors were submitted to multivariate logistic regression analysis. All linguistic factors except word class proved significant, with perceived [ɹ] vs. [ɹ̥] as the independent variable. Social factors, including age, sex, ethnicity, education, location, and income were also significant.

Acoustic

Data for 20 of the speakers (10 White, 10 African-American, all Bostonian) and 20 words (of similar lexical frequency and containing /ɹ/ or /aɪ/ in a stressed syllable closed by another coronal consonant, e.g., "ferce", "card") were selected. Formant at various points and duration of the /ɹ/ were measured. Linear regression analyses were conducted to examine the relationships between these continuous acoustic measurements and the independent variables above. Similar patterns of significant effects were found in the binary and scalar approaches.

References

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Connections between Perceptual Frequency and Formant Frequency.

