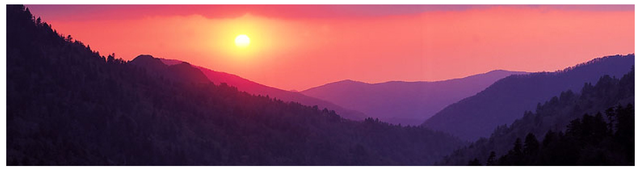

Using vowel trajectories for Southern U.S. monophthongization

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Introduction

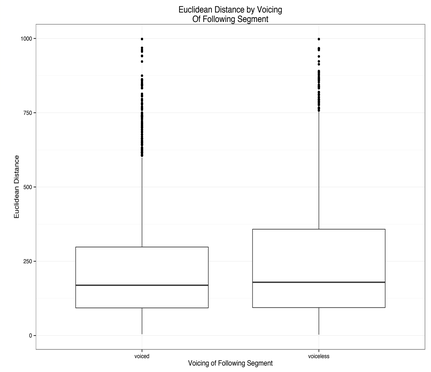
It is widely known that monophthongization of the diphthong /aɪ/ is a feature of Southern U.S. English (eg., Labov et al., 2006). However, many studies of this phenomenon only use two measurement points to attempt to grasp the spectral movement. Typically, measures from the onset (20-25% of the duration) and the glide (75-80% of the duration) are taken. While informative about whether or not a particular vocoid is monophthongal, this methodology does not permit distinguishing among different kinds of monophthongal realizations. Recent investigations (e.g., Fox and Jacewicz, 2009) have suggested that tracking the movement of the entire vocalic trajectory can detect variation across the vocalic gesture. Fox and Jacewicz were able to detect regional variation both within and across vowel categories.

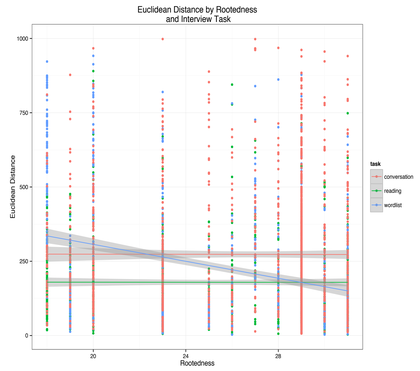
The current study uses tokens of /aɪ/ drawn from sociolinguistic interview data to determine whether social factors affect the overall trajectory length.

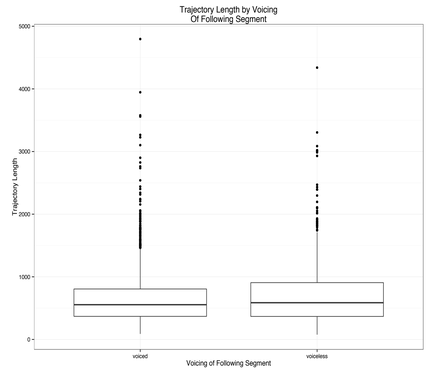
Purpose

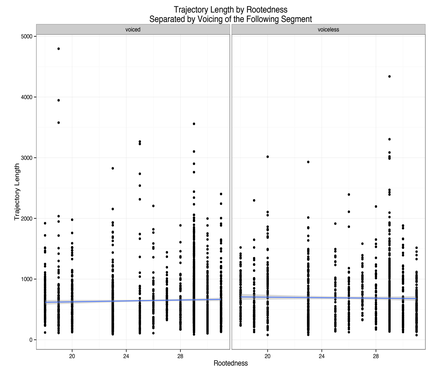
Investigate how different social factors affect spectral dynamics in a community of fairly monophthongal speakers in Appalachia.

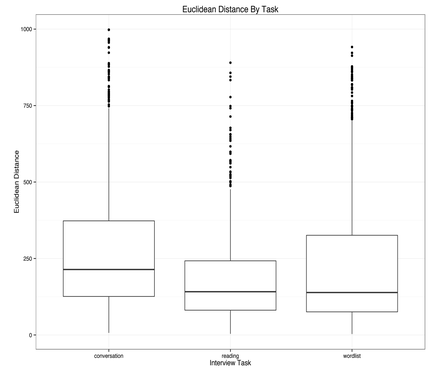
Results

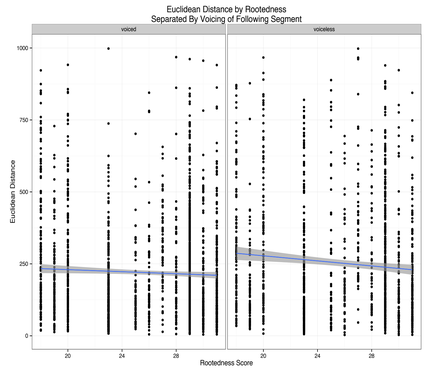


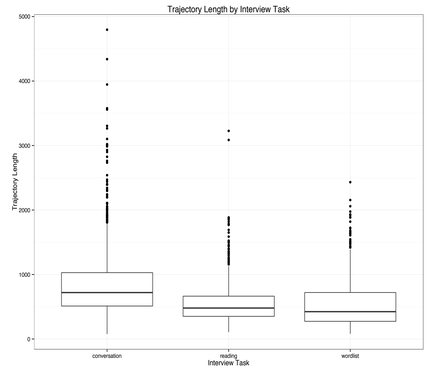


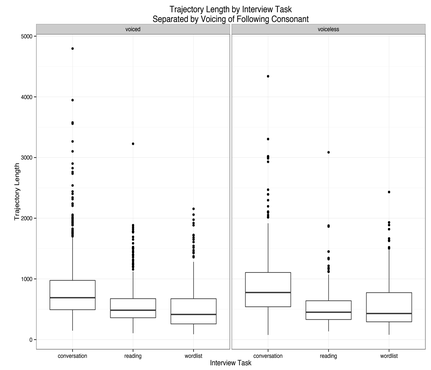












Methods

Participants

- 12 male speakers (27-92 yr)
- 12 female speakers (25-94 yr)

Data Source Sociolinguistic interviews: conversational portion, reading passage, and word list.

Vocalic Tokens

- 25 pre-voiceless and 25 pre-voiced/open from conversation
- 11 pre-voiceless and 23 pre-voiced/open from reading
- 19 pre-voiceless and 20 pre-voiced/open from word list

Acoustic Methods

- EuD - measured F1/F2 at 20% and 80% of the tokens duration, and computed Euclidean Distance, $\sqrt{(F1_i - F1_{i+1})^2 + (F2_i - F2_{i+1})^2}$
- TL - measured F1/F2 at 10ms intervals for the duration, computed EuD between each point, and then summed the total distance traveled

Statistical Analysis - Mixed effect linear regression models

- Dependent effects: Euclidean Distance (EuD), and Trajectory Length (TL)
- Independent social effects: Age, Gender, Education, Interview Task
- Independent Linguistic Effects: Following Voicing and Duration one with Euclidean Distance (EuD) (the same as VL)
- Logical Two-Way Interactions

Results and Discussion

For EuD, interview task and following voicing were significant main effects. The significant interactions were: rootedness × interview task, rootedness × following voicing, gender × interview task, gender × duration, interview task × duration, and interview task × following voicing.

For TL, interview task and following voicing were also significant main effects. There were fewer significant interactions: rootedness × following voicing, gender × interview task, interview task × following voicing, and duration × following voicing.

Following voicing was significant in both models, with a smaller EuD (p=.009) and TL (p<.0001) for pre-voiceless conditions. Interview task was also significant in both models, but Word List was significant for EuD (p<.0001) while Reading Passage was significant for TL (p<.0001). This would indicate that the beginning and ending points are close for Word List, but the actual distance travelled is shortest for the Reading Passage. Both models also had an interaction between local attachment and following voicing, with more rooted speakers having a shorter EuD (p=.02) and a shorter TL (p=.01)

Within this community, speakers with higher rootedness scores and thus a more local orientation had shorter EuD and TL, i.e., a more monophthongal realization of /aɪ/. Thus, the spectral dynamics vary between local and non-local orientation within a single community.

References

Fox, R. A. and Jacewicz, E. (2009). Cross-dialectal variation in formant dynamics of American English vowels. *Journal of the Acoustical Society of America*, 126:2603–2618.

Labov, W., Ash, S., and Boberg, C. (2006). *Atlas of North American English: Phonetics, phonology, and sound change*. Mouton de Gruyter, New York.