INTRODUCTION

• American English rhotics can be transcribed [ɹ, ɾ, ʁ] 

• General consensus:
  o There is a rhotic monophthong [ɾ] that can act as the nucleus of a syllable. 
  o There is a consonant [ɹ] that appears in onset position. 
  o Debate over postvocalic rhotics: 
    - Should they be classified as offglides of rhotic diphthongs or as coda consonants?

Postvocalic (7)

• Questions of theoretical interest:
  o Phonetically, do postvocalic rhotics more closely resemble the rhotic in onset or nucleic position? 
  o Can we find phonological evidence for the representational status of rhotacized vowels? [1] 
  o Also a question of clinical importance: 
    - Children achieve perceptually accurate production at different times across rhotic allophones [2]. 
    - Clinical gains on one allophone do not automatically carry over to others [3; 4; 5]. 
  o Previous phonetic findings on children’s rhotics: 
    - F3-F2 distance is the acoustic measure that best predicts listener ratings of rhotic accuracy [6] 
    - Significant differences by position: 
      1. Experienced adult listeners...accept a wider range of acoustic values for children’s [onset /ɹ] than they do for vocalic [rhotics].” [7] 
      2. Possibly tied to durational differences between allophones—not a primitive distinction per se. 

This study asks... 
• Is positional rating asymmetry mediated by typical durations of different rhotic allophones? 
  o Extend model from [6] to include duration. 
  o Can these findings tell us anything about the phonological status of rhotic allophones?

MEASURES & MODELS

• Duration of interest was operationalized as time elapsed from onset of lowering of F3 height to midpoint of offset of raising of F3.

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• Four ordinal mixed-effects regression models were fitted to predict perceptions of accuracy while controlling for age and sex. 
  - Predictors: Category (4 levels), Duration, F3-F2n (normalized relative to [8]), Age (scaled), Sex 
  - Base model was that selected in [6] (did not include duration).

CONCLUSIONS

• BIC-based finding suggests that the variance in perceptual rating previously attributed to allophonic category is in large part reducible to duration.

  - With F3-F2 distance held constant, shorter durations are associated with higher accuracy.
  - Among rhotics rated correct by 3/3 listeners: 
    1. Tokens with the highest F3-F2 distance are in the bottom quartile for duration. 
    2. No tokens with duration above .5 s have extreme high values of F3-F2 distance. 
    3. Compatible with claim from [7] that listeners are more lenient in rating onset rhotics (∆duration) than syllabic rhotics (∆duration).

  - To the extent that the interactions in the AIC-based model are robust, they provide novel phonetic support for the division of rhotics into “vocalic” (post-vocalic, syllabic) and “consonantal” (onset) categories.

  - Vocalic and consonantal rhotics group separately with respect to duration.

  - In the “3/3 correct” category, direction of the relationship between spectral and durational characteristics differs across vocalic and consonantal categories.

  - More data from typical speakers, as well as phonological evidence, will be needed for stronger conclusions.

REFERENCES