### Background
- One source of phonetic variation: lexical competition (e.g. minimal pair competitor existence, neighborhood density)
- Competition can cause hyperarticulation, especially of vowel formants ([1], [2])
- Competition can also cause reduction: words with more neighbors have shorter duration ([3], [4])
- Minimal pair competitor existence, but not neighborhood density, causes **contrastive hyperarticulation** of the English initial stop voicing contrast:
  - Longer VOT for voiceless stops (T) ([5], [6])
  - Shorter VOT for voiced stops (D) ([6])

### Research question
Is there contrastive hyperarticulation of the English final stop voicing contrast on the cue of preceding vowel duration?

- Goldrick, Vaughn, & Murphy 2013: in a reading task, minimal pair competitor existence **shortens** Vs before final D **reduces** final voicing contrast; no effect on Vs before final T
- **Current study:** Corpus study, modeled on Wedel, Nelson, & Sharp 2018, looking for contrastive hyperarticulation of the final stop voicing contrast

### Method
- Monosyllabic content words (verbs, common nouns, adjectives) ending in /p t k b d g/ extracted from the Buckeye corpus (Pitt et al. 2007)
- Exclusions included: words before pauses or utterance boundaries, inflected words, words in which target V preceded by a V, tokens with V durations more than 3 SDs from within-speaker mean
- 6,291 tokens (4,388 T-final words and 1,903 D-final words)
- Data analyzed with linear mixed effects models
- **Dependent variable:** ratio of duration of V to duration of word (V Ratio)
- **Critical predictors:**
  - MinPair: minimal pair competitor existence (Yes or No)
  - ND: neighborhood density
  - Voicing: voicing of the final stop (Voiced or Voiceless)
  - MinPair × Voicing
  - ND × Voicing
- **Controls:** Gender, Age, Part of Speech, Intervening C, # of Phonemes, Intervening C, # of Phonemes, Log Word-Familiarity, Previous Mention, Place of Articulation, MinPair × Place of Articulation, ND × Place of Articulation, Voicing × Place of Articulation
- Random intercepts for Speaker (n = 39) and Word (n = 426)

### What Would Contrastive Hyperarticulation Look Like?
- An interaction of MinPair and Voicing and/or ND and Voicing such that:
  - Greater competition makes Vs longer before D and/or shorter before T
  - Or greater competition at least makes difference in V duration before D vs. T bigger

### Results
- Significant main effect of minimal pair competitor existence ($p(\chi^2) = 0.023$)
  - Smaller V ratios before D and T
  - No contrastive hyperarticulation
  - Instead, across-the-board reduction

#### Effect Plot: MinPair by Voicing

<table>
<thead>
<tr>
<th>D#</th>
<th>No</th>
<th>Yes</th>
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<td>V Ratio</td>
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<td>10</td>
<td>20</td>
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- Marginally significant interaction of ND and Voicing ($p(\chi^2) = 0.072$)
  - Contrastive hyperarticulation?

#### Effect Plot: ND by Voicing

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### Discussion
- Minimal pair competitor existence **reduces** Vs before final voiced and voiceless stops
- Failure to find contrastive hyperarticulation under minimal pair competition consistent with Goldrick, Vaughn, & Murphy 2013

### Selected References

### Conclusion
- A corpus study corroborates Goldrick, Vaughn, & Murphy 2013’s experimental result:
  - Minimal pair competitor existence does **not** cause contrastive hyperarticulation of the final stop voicing contrast on the cue of preceding V duration
  - Instead, words with minimal pair competitors have shorter Vs before final voiced and voiceless stops **across-the-board reduction**

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**What accounts for these results?**
- Three accounts of lexically conditioned phonetic variation ([5]):
  - **Production-internal:** pronunciation varies with ease of lexical access and production
  - **Listener-oriented:** competition → increased intelligibility to aid listener
  - **Perceptual restructuring:** with competition, stored exemplars more extreme → production targets more extreme
- Listener-oriented and perceptual restructuring accounts predict contrastive hyperarticulation, which is **not** found
- **Production-internal** explanations of the current results:
  - Competition facilitatory for production → reduction in duration ([4])
  - Minimal pair competitor existence affects initial and final contrasts differently (Goldrick, Vaughn, & Murphy 2013):
    - Initial minimal pairs (tip/dip) → facilitation/increased activation → contrast enhancement/hyperarticulation
    - Final minimal pairs (tap/tab) → inhibition/reduced activation → contrast reduction/hypoarticulation