



Diachronic change in formant dynamics of California low back vowels: an improved analysis method using the Discrete Cosine Transform

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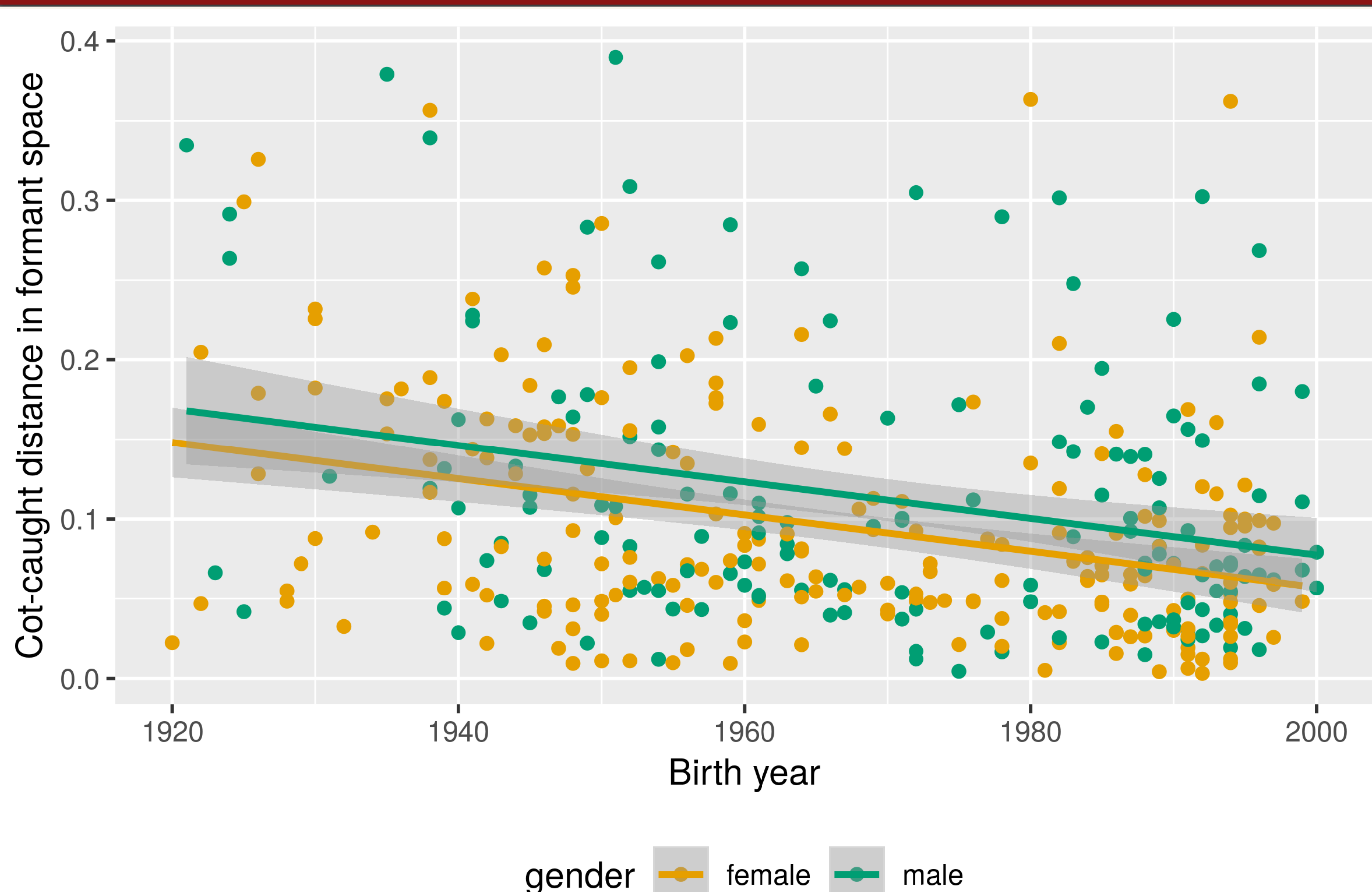
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Do merged midpoints always indicate a merger in production?

Background

- ▶ Work on California Vowel Shift (CVS) has hypothesized a LOT-THOUGHT merger (e.g. Labov 1991, Eckert 2008)
- ▶ Perceptual studies provide little evidence of perceptual merger (Labov, Ash & Boberg 2006)
- ▶ Production studies routinely show evidence of F1-F2 midpoint convergence
- ▶ Dimensions other than F1-F2 may maintain contrasts despite midpoint convergence
 - ▶ Formant dynamics (Nycz & De Decker 2006)
 - ▶ Length (Labov & Baranowski 2006)
 - ▶ Voice quality (Di Paulo & Faber 1990)
- ▶ Classifying mergers in progress requires more robust vowel measurements
- ▶ Discrete Cosine Transform models of formant trajectories allow analysis of...
 - ▶ synchronic variation (Watson & Harrington 1999)
 - ▶ diachronic change (c.f. SSANOVA)
 - ▶ multiple formants at once (c.f. GAMMs)

F1-F2 averages across vowel articulation

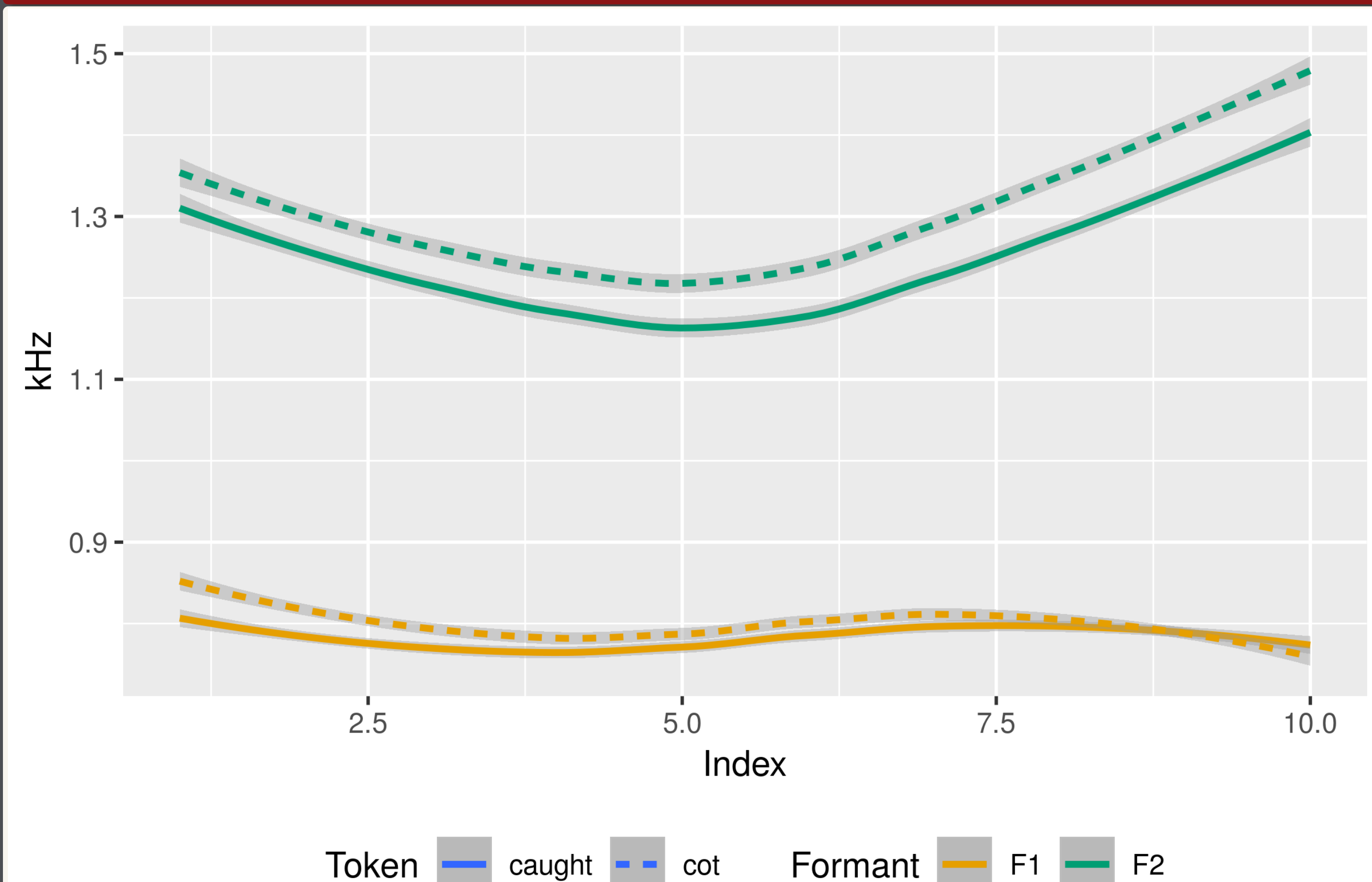


- ▶ 230 California speakers from 5 field sites reading “cot” and “caught” from wordlist
- ▶ Distance between average formant value across 10 equidistant points
- ▶ Significant change over time, in line with work using midpoint measurements
- ▶ Suggest change in progress

Discussion

- ▶ Merged midpoints may not always indicate merged vowels
 - ▶ Point measures are easily obtained making potential mergers easy to identify
 - ▶ Holistic vowel measurements using DCT can verify or falsify hypothesized merger
- ▶ California speakers may maintain LOT-THOUGHT contrast
 - ▶ Follow-up studies show LOT and THOUGHT diverging in length
 - ▶ Maybe a case of transphonologization (Hyman 2013)?
 - ▶ Perceptual experiments needed to rule out near-merger

DCT predicted trajectories



- ▶ 269 California speakers from 5 field sites reading “cot” and “caught” from wordlist
- ▶ Distance between **Discrete Cosine Transform coefficients**: models distance between formant trajectories
- ▶ No significant change over time ($p=0.09$)

