Developing graphical methods in sociophonetics
outline of a research agenda
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Developing graphical methods in sociophonetics: outlines of a research agenda

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1. Watt & Fabricius S-centroid normalization

- A vowel extrinsic, formant intrinsic centroid-based normalization algorithm
  (Watt & Fabricius 2002; Fabricius, Watt & Johnson 2009)
- Built into the NORM normalization and plotting suite (Thomas & Kendall 2007)
- Has been applied to a broad range of data from varieties of English and other languages (Kamata 2006; Wien et al. 2008; Mesthrie 2010; Simonet 2010)
- Further road-tests published and in progress (Clopper 2009; Flynn 2012)

- Centroid (S) of triangular vowel space is mean of F1 and F2 values for \([i],[u]\) and (hypothetical) \([-\sqrt{3}\] vowel
- \(F_1, F_2\) of \([-\sqrt{3}] = F_1\) of \([i]\)
- All original Hz values then expressed relative to S

2. S-centroid angle method

- Makes vowel space configurations more easily comparable across speakers
- Angles on F1–F2 plane relative to S
- S (with co-ordinates \([1,1]\)) is common to all speakers in sample when using W&F (or modified W&F) method

Advantage: unlike real vowels, S does not move over time because it is a product of the normalization algorithm

- Angles are positive above horizontal line, and run counterclockwise from \(0^\circ\) to \(180^\circ\); negative and clockwise below it (\(0^\circ\) to \(-180^\circ\))

3. S-centroid anchor method

- Documents interspeaker variation and change over time by measurements in degrees relative to a stable point, rather than eyeball judgments of relative vowel locations (measured in Fabricius 2007)
- Can be used in combination with Euclidean/Cartesian distances (as in Fabricius 2007; Richards, Haddock & Foulkes 2009)
- Quantification enables further statistical testing

Illustrated here with RP generational data from Hawkins & Midgley (2005), Moreiras (2006) (oldest and youngest age groups); template for spiderweb diagrams (see below) available from Anne Fabricius: fabri@ruc.dk

4. Future directions

- Can we use these methods to make a principled distinction between the Centre and Periphery of a vowel space (Labov 1994)?
- What will be the value of adding angle measurements to the set of criteria used to gauge the efficacy of normalization algorithms?
- How can angle measurements be adapted to deal with clouds of tokens rather than average points, as at present?
- What statistical models are optimal for data of this kind?

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References


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