Vocalic style versus stylization: How outliers exemplify acoustic axes of style

Janneke Van Hofwegen

N WAV 42
Jocks and Burnouts Revisited
October 18, 2013
The data: Eckert (1989, 2000)

Belten High
Detroit suburbs, 1980s
The data: Eckert (1989, 2000)

Belten High
Detroit suburbs, 1980s
The data: Eckert (1989, 2000)

Belten High
Detroit suburbs, 1980s

burnouts

jocks

Stanford University
The data: Eckert (1989, 2000)

Belten High
Detroit suburbs, 1980s

- burnouts
- in-betweens
- jocks
The data: Eckert (1989, 2000)

- Two one-on-one interviews with two particular students
- Each speaker is an extreme within her group; neither is a prototypical member.

the most burned-out of the burnouts
interview persona is tough, cool
doesn’t care about social standing within the school
The data: Eckert (1989, 2000)

• the most burned-out of the burnouts
• interview persona is tough, cool
• doesn’t care about social standing within the school

‘I don’t know. We just had a lot of fun together. I remember one time we got in trouble. We used to a- me and her. Our whole life we’ve gotten in so much trouble together.’
The data: Eckert (1989, 2000)

- Two one-on-one interviews with two particular students
- Each speaker is an extreme within her group; neither is a prototypical member.

Judy:
- the most burned-out of the burnouts
- interview persona is tough, cool
- doesn’t care about social standing within the school

Melody:
- the most squeaky-clean of the jocks
- interview persona is sweet, innocent
- concerned with her place in the social hierarchy, popularity
The data: Eckert (1989, 2000)

Melody

- the most squeaky-clean of the jocks
- interview persona is sweet, innocent
- concerned with her place in the social hierarchy, popularity

‘Me and K[im], we used to have so much fun, we'd do the announcements, and we'd, um, once we were talking, we had the weather report and we had the news part, so we used to do the, um, the news, I used to do the news and she used to do the weather, fluctuating days.’
The data: Eckert (2000, p. 86)

We’ve *gotten* in so much trouble together
The data: Eckert (2000, p. 86)

burnouts

Judy

jocks

Melody

once we were talking
The data: Eckert (2000, p. 86)

We just had a lot of fun together.

We used to have so much fun.
The usual sociophonetic research question:

**How do we go about representing these speakers’ vowel systems?**
Sociophonetic dialectology’s objective:

To accurately and reliably represent a speaker’s vowel space by carefully identifying appropriate tokens (name your vowel!)

1. Controlling for phonological environment
2. Controlling for articulatory context
3. Controlling for duration
4. Controlling for word frequency/class
5. Controlling for lemma
6. Controlling for Observer’s Paradox

So, this is what I do:

1. Extract ~25 tokens for each vowel class
2. No tokens with < primary stress
3. No function words
4. No tokens < 75 ms
5. No preceding vowels, glides, /r/
6. No following vowels, glides, liquids
7. No more than 2 tokens of the same lemma
Figure 4.1 Northern cities chain shift
Speaker means

Mean vowel formant values
non-normalized

Mean vowel formant values
non-normalized

Melody

Judy
<table>
<thead>
<tr>
<th></th>
<th>Jocks &gt; burnouts</th>
<th>Mixed</th>
<th>Burnouts &gt; jocks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female &gt; male</td>
<td>(e) lowering</td>
<td>(aeh)</td>
<td>(o), (oh)</td>
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<tr>
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<td>(e) backing</td>
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<tr>
<td>Male &gt; female</td>
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<td></td>
<td>(Δ) backing</td>
</tr>
</tbody>
</table>

Eckert (2000) p. 121
Normalized Speaker means

Mean vowel formant values
Watt & Fabricius normalized

Melody
Judy

Variant: ModWF
Speaker means + 2 standard deviations (2α)

Mean vowel formant values
non-normalized

Mean vowel formant values
non-normalized
Another sociophonetic research question:

**How do we go about representing these speakers’ vocalic stylization?**

**Outliers:** tokens falling outside 2 standard deviations from the mean
Outliers as instances of *stylization*

- Linguistic extremes for stylistic stance-taking (Kiesling 2012; Podesva 2011).

- Outlying vowels (Labov, Baranowski, & Dinkin 2010) implicated in sound change.

- *Stylization* (Coupland 2007; p. 154): ‘...projecting personas, identities and genres other than those...current in the speech event...’ (Coupland 2007; p. 154). Here, I argue that vowels falling outside speakers’ idiolectal envelopes (or *styles*) shed light on their stylistic repertoires.
Outliers as instances of **stylization**

Mean vowel formant values
non–normalized

Stylization

Style

Judy
Judy says...
Melody says...
The thing about outliers…

![Bell curve diagram with standard deviations and probabilities labeled]
The thing about outliers…

In a normal distribution, 4.2% of values expected to lie outside 2 standard deviations from the mean.
Acoustic Analysis

• Word and phone alignments obtained using Penn Forced Aligner package (Rosenfelder et. al 2011)
• Measurements taken on all stressed vowel tokens (N = 8,825)
  1. Filtered for Duration (< 75 ms) (N = 5129)
  2. Checked and cleaned up as needed.
  3. All tokens checked for outlier status (> or < 2α from the mean) in each of the F1 and F2 dimensions.

Problems:
• Aligner off
• More than one talker
• Systematic measurement errors (e.g., Melody /ow/)

Vowels (N = 3104): (iy), (i), (ey), (e), (ae), (o), (oh), (^), (ow), (uw)

Results:
• Judy: 85 outliers; 1218 usable tokens (7.0%)
• Melody: 152 outliers; 1886 usable tokens (8.0%)
Control vowels vs. All vowels (2α)

Mean vowel formant values
non–normalized

Mean vowel formant values
non–normalized

Judy

Melody

Mean vowel formant values
non–normalized
Control vowels vs. All vowels (2α)

Mean vowel formant values
non-normalized

Judy

Melody

Mean vowel formant values
non-normalized

Stanford University
Normalized Speaker means (2α) - All vowels

Mean vowel formant values
Watt & Fabricius normalized

F1/S(F1)
F2/S(F2)
Variant: ModWF
# Outliers and their classes

<table>
<thead>
<tr>
<th>Speaker</th>
<th>Vowel</th>
<th>Outlier N</th>
<th>Normal N</th>
<th>% total of vowel class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Judy</td>
<td>^</td>
<td>13</td>
<td>181</td>
<td>6.70%</td>
</tr>
<tr>
<td></td>
<td>ae</td>
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<td>150</td>
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<tr>
<td></td>
<td>e</td>
<td>10</td>
<td>114</td>
<td>8.06%</td>
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<tr>
<td></td>
<td>ey</td>
<td>7</td>
<td>147</td>
<td>4.55%</td>
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<td>i</td>
<td>5</td>
<td>76</td>
<td>6.17%</td>
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<tr>
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<td>iy</td>
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<td>uw</td>
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</tbody>
</table>
Hypotheses

- Vowels involved in sound change – (ae), (o), (oh), (e), (^) – will have proportionately more outlying tokens than non-changing vowels.
  
  NCS vowels >> other vowels

- Vowels on the periphery vowels – (iy), (ey), (ae), (o), (oh), (ow), (uw) will have proportionately more outlying tokens than interior vowels (i), (e), (^).

  peripheral/ vowels >> interior vowels

- Content words are more likely to contain outlying vowels than function words

  content word vowels >> function word vowels

- The non-conforming speaker (Judy) will have proportionately more (extreme) outlying tokens than the conforming speaker (Melody)

  Judy >> Melody
NCS vowels >> other vowels

<table>
<thead>
<tr>
<th></th>
<th>Outlier N</th>
<th>Normal N</th>
<th>% of total tokens</th>
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<tr>
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<td>stable</td>
<td>97</td>
<td>1269</td>
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Zeppelin

no

does

Denise

Judy back (e) outlier

Judy low (ow) outlier

Melody front (^) outlier

Melody low (iy) outlier
peripheral vowels >> interior vowels

<table>
<thead>
<tr>
<th></th>
<th>Outlier N</th>
<th>Normal N</th>
<th>% total</th>
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<tr>
<td>interior</td>
<td>92</td>
<td>1085</td>
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<tr>
<td>periphery</td>
<td>145</td>
<td>2402</td>
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Chi-square statistic: 6.091
p-value: 0.01358722
content word vowels >> function word vowels

<table>
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<th>Outlier N</th>
<th>Normal N</th>
<th>% total</th>
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<td>content</td>
<td>151</td>
<td>2267</td>
<td>6.24%</td>
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<tr>
<td>function</td>
<td>86</td>
<td>1220</td>
<td>6.58%</td>
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so Judy back (ow) outlier
smoke Judy back (ow) outlier
that Melody high (ae) outlier
cast Melody high (ae) outlier
Judy >> Melody

<table>
<thead>
<tr>
<th></th>
<th>Outlier N</th>
<th>Normal N</th>
<th>% total for speaker</th>
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<tr>
<td>Judy</td>
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<td>1218</td>
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<tr>
<td>Mary</td>
<td>152</td>
<td>2269</td>
<td>6.28%</td>
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Mean vowel formant values
Watt & Fabricius normalized

shoes
too

Judy (uw) distribution
Conclusion

F1/F2 outliers can be indicators of *stylization* in the vowel space.
- Vowel stylization is not limited to vowels in that are already in flux.
- Vowel stylization is not sensitive to a word’s class (content or function words can be outliers).

**THUS, EVERY VOWEL HAS POTENTIAL FOR STYLIZATION.**

F1/F2 stylization should be productively/perceptually extreme.
- Vowel stylization more readily occurs for vowels on the periphery of the vowel space.

**NOT EVERY (STATISTICAL) OUTLIER IS NECESSARILY STYLISTICALLY SALIENT AND VICE VERSA.**

‘[Stylization] requires an acculturated audience able to read and predisposed to judge the semiotic value of a projected persona or genre. It is therefore especially tightly linked to the normative interpretations of speech and non-verbal styles entertained by specific discourse communities’ (Couplane 2007; p. 154).

Future work:
Look at those features that cluster with F1/F2 extremism…
- Duration? Pitch? Intensity?
- Phrasal stress?
- Information structure?
- Affective content?
Thank You!

Many thanks to Penny Eckert and the Stylistic Variation class (Jeremy Calder, James Collins, Annette D’Onofrio, Katherine Hilton, Ed King, Teresa Pratt, and Dasha Popova) for brainstorming, support, and feedback. Thanks also to Rob Podesva for analytic and moral support.
References


Control vowels vs. All vowels

Mean vowel formant values
non- normalized

Judy
Melody
Stanford University