

Pitch and VOT as Factors in the Perception of Sexuality and Masculinity in Male Speech

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Previous Work

- ▶ Research strongly suggests that speakers can utilize acoustic features to project sexual orientation and that listeners can accurately perceive this information
 - ▶ Gaudio (1994), Crist (1997), Linville (1998), Podesva, Roberts, & Campbell-Kibler (2001), Smyth, Jacobs, & Rogers (2003), Pierrehumbert et al. (2004), Munson et al. (2005), Levon (2006) Munson and Zimmerman (2006), Podesva (2006), Levon (2007), Munson (2007), Munson and Mack (2010), Campbell-Kibler (2011), Levon (2011), Podesva (2011a, 2011b)

How do you sound Gay?

- ▶ **Sibilant Quality/Length**- Crist (1997), Linville (1998), Munson et al. (2005), Levon (2007), Mack & Munson (2010), Campbell-Kibler (2011)
- ▶ **Mean Pitch**- Gaudio (1994), Smyth, Jacobs, & Rogers (2003), Munson (2007)
- ▶ **Pitch Variability**- Gaudio (1994), Podesva (2006), Podesva (2011)
- ▶ **Vowel Quality**- Podesva, Roberts, & Campbell-Kibler (2001), Pierrehumbert et al. (2004), Munson et al. (2005), Podesva (2011)
- ▶ **Projected Stature**- Munson (2006)
- ▶ **Velar Nasal Retention**- Campbell-Kibler (2011)
- ▶ **Word final /t,d/ release**- Podesva (2006)
- ▶ **/l/ lengthening**- Crist (1997)

Research Question

To what extent do mean f_0 and VOT in word-initial, voiceless stops affect listener perceptions of Sexuality, Education, and Masculinity?

Speaker Demographics

- ▶ 4 male university students ages 19-23
- ▶ 2 self-identified as straight: 0506S, 1826S
- ▶ 2 self-identified as gay: 1103G, 2420G

Listener Demographics

- ▶ Undergrads in introductory linguistics courses
- ▶ 65 native English monolinguals
- ▶ Representative Sample
 - ▶ Mainly NC Residents
 - ▶ YOB: 1989-1995, mean \approx 1992
 - ▶ Nearly 75% female
 - ▶ Nearly 75% straight
 - ▶ Nearly 65% white

Recording

- ▶ Varied word list
- ▶ *Cap, Coat, Pocket, & Token*
- ▶ 44100hz sampling rate

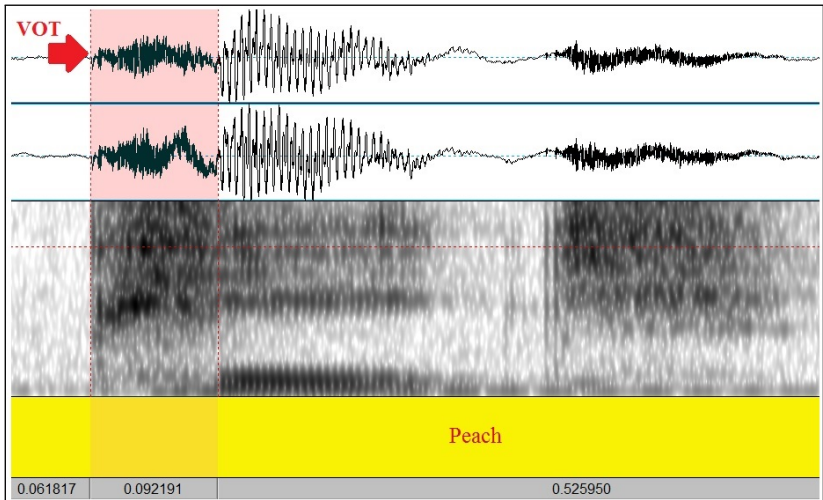
Mean f_0

- ▶ Praat pitch manipulation function
- ▶ Up15- raised 15hz
- ▶ Down15- lowered 15hz
- ▶ Applied to entire stimulus

VOT

Following Lisker and Abramson (1964), VOT measured as the interval between the release of the stop and the onset of glottal vibration.

VOT



VOT

- ▶ Praat duration manipulation function
- ▶ 200% original VOT duration
- ▶ Applied to *Cap*, *Pocket*, & *Token*

Presentation of Stimuli

- ▶ Primed: words written on board
- ▶ Confusion: “This is Speaker 1, 2, ...”
- ▶ Stimulus then 20 second pause

Original

Pitch Up

Pitch Down

200 % VOT

Ratings & Scales

- ▶ For each “speaker”, three 7pt Likert scales
- ▶ Gay vs. Straight
- ▶ Educated vs. Uneducated
- ▶ Masculine vs. Feminine
- ▶ Randomly changing alignments

Ratings & Scales

Extremely Straight	Quite Straight	Somewhat Straight	Neither Gay Nor Straight	Somewhat Gay	Quite Gay	Extremely Gay
Extremely Uneducated	Quite Uneducated	Somewhat Uneducated	Neither Educated Nor Uneducated	Somewhat Educated	Quite Educated	Extremely Educated
Extremely Feminine	Quite Feminine	Somewhat Feminine	Neither Masculine Nor Feminine	Somewhat Masculine	Quite Masculine	Extremely Masculine

Ordinal vs. Continuous

- ▶ Inherent order, no inherent distance
- ▶ Ceiling and Floor Effects - Hedeker (n.d.)
- ▶ Continuous predictions outside range - Hedeker (n.d)

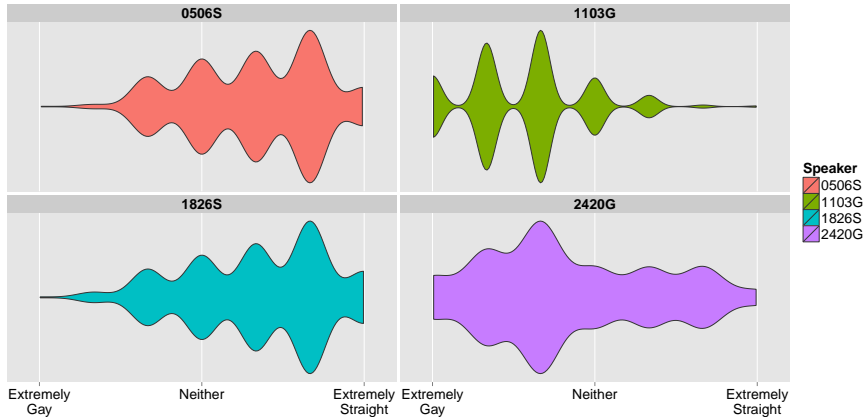
CLMM

- ▶ Cumulative Link Mixed Model
- ▶ *ordinal* package- `clmm2`
- ▶ Random effect: Listener
- ▶ 3-Way Interaction: Speaker ~ Word ~ Treatment
- ▶ Separate models for each Property (Gay, Educated, Feminine)

Overview

- ▶ Significant Main Effects
 - ▶ **Speaker**
 - ▶ Word
 - ▶ Treatment
 - ▶ Listener Sexuality ★
- ▶ Education
 - ▶ Homogenous
 - ▶ Minimal effects of treatment

Ratings of Sexuality by Speaker

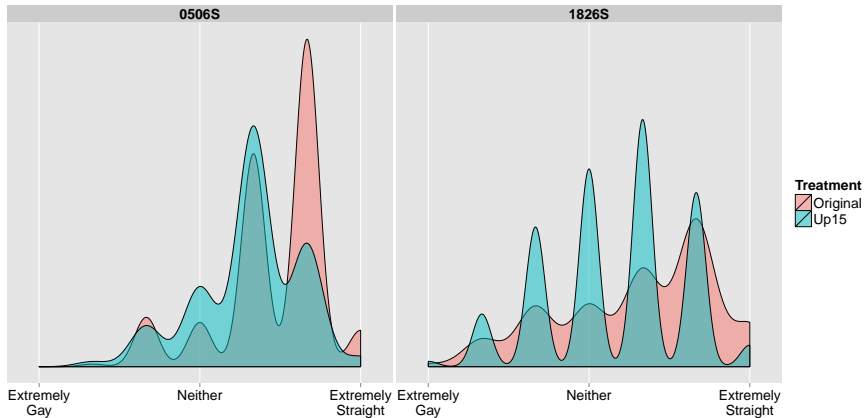


- ▶ Perceived Gayness: Most to Least
 - ▶ 1103G, 2420G, 0506S, 1826S
- ▶ Not sig. across all words/treatments
- ▶ Direction and ordering consistent

Treatments

- ▶ Raising Pitch
 - ▶ Straight Speakers- Less Straight, $p < 0.05$
 - ▶ No opposite effect for Lowered Pitch

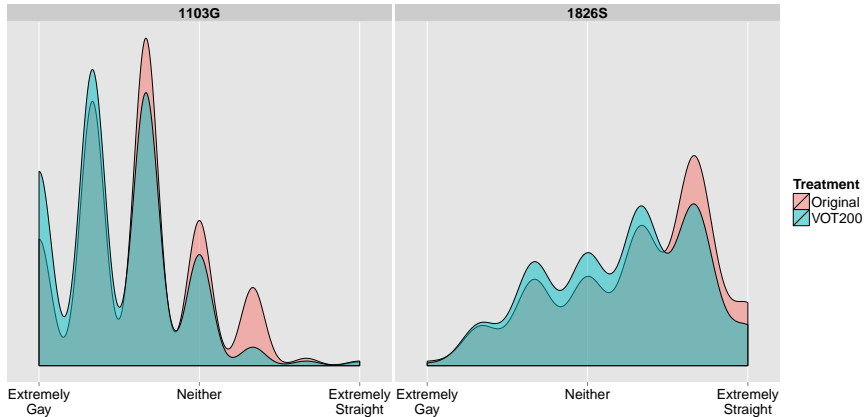
Raised Pitch and Sexuality



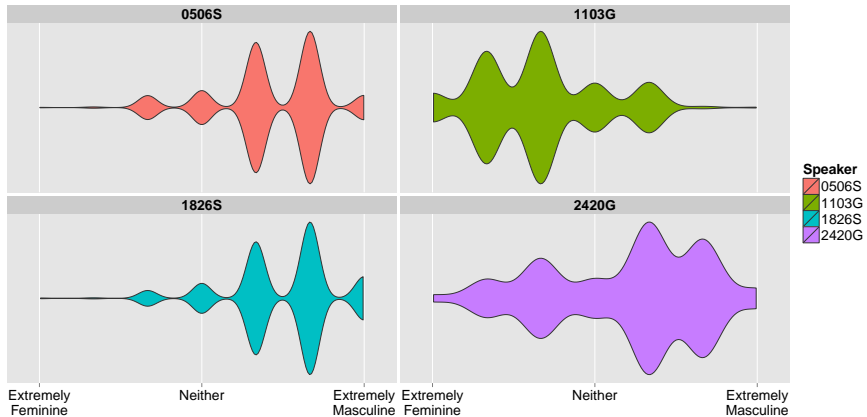
Treatments

- ▶ Raising Pitch
 - ▶ Straight Speakers- Less Straight, $p < 0.05$
 - ▶ No opposite effect for Lowered Pitch
- ▶ Doubled VOT
 - ▶ 1103G and 0506S- More Gay $p < 0.01$

VOT and Sexuality



Ratings of Masculinity by Speaker

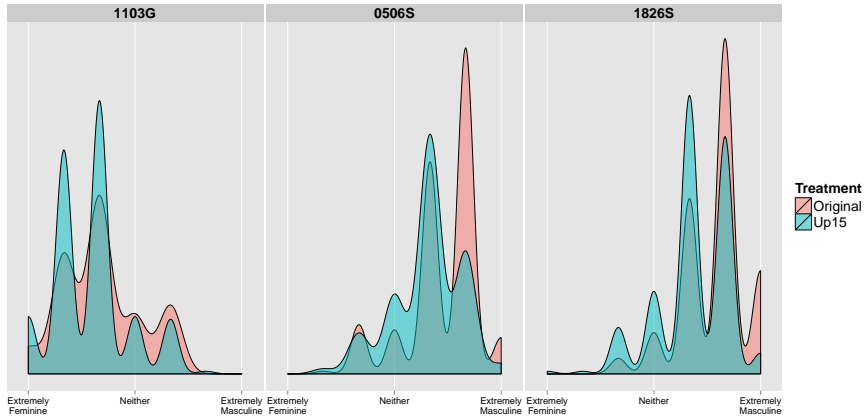


- ▶ Perceived Masculinity: Most Feminine to Least
 - ▶ 1103G, 2420G, 0506S, 1826S
 - ▶ cf. Sexuality
- ▶ Not sig. across all words/treatments
- ▶ Direction and ordering consistent
- ▶ Case of 2420G

Treatments

- ▶ Raising Pitch
 - ▶ 0506S, 1826S, 1103G- More Feminine; $p < 0.05$

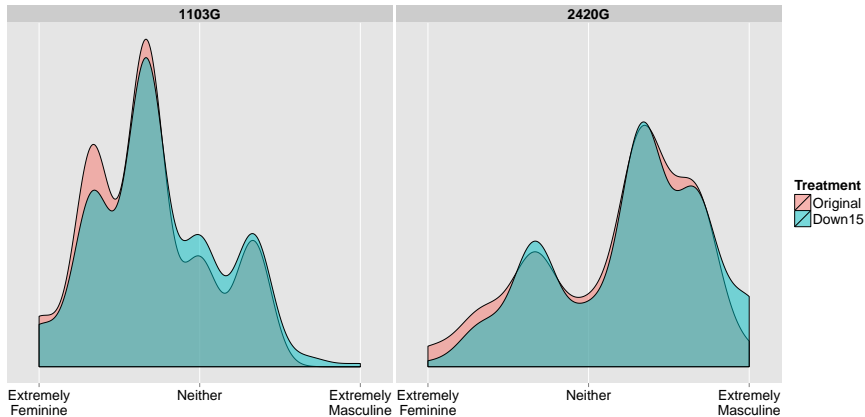
Raised Pitch and Masculinity



Treatments

- ▶ Raising Pitch
 - ▶ 0506S, 1826S, 1103G- More Feminine; $p < 0.05$
- ▶ Lowering Pitch
 - ▶ Gay Speakers - Less Feminine; $p < 0.05$

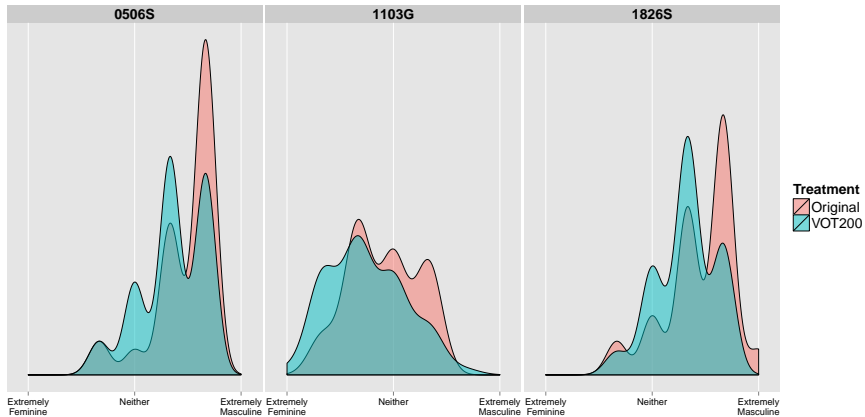
Lowered Pitch and Masculinity



Treatments

- ▶ Raising Pitch
 - ▶ 0506S, 1826S, 1103G- More Feminine; $p < 0.05$
- ▶ Lowering Pitch
 - ▶ Gay Speakers - Less Feminine; $p < 0.05$
- ▶ Doubling VOT
 - ▶ 1826S, 0506S, 1103G More Feminine *Cap*; $p < 0.05$

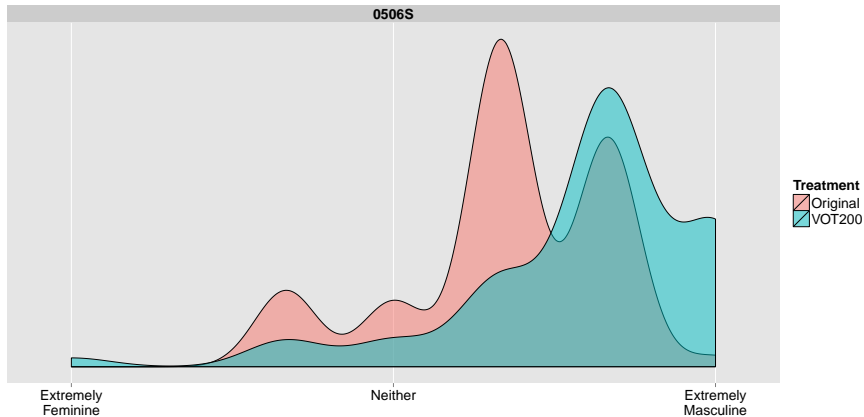
VOT and Masculinity – Cap



Treatments

- ▶ Raising Pitch
 - ▶ 0506S, 1826S, 1103G- More Feminine; $p < 0.05$
- ▶ Lowering Pitch
 - ▶ Gay Speakers - Less Feminine; $p < 0.05$
- ▶ Doubling VOT
 - ▶ 1826S, 0506S, 1103G More fem. *Cap* $p < 0.05$
 - ▶ 0506S Less fem. *Token* $p < 0.05$

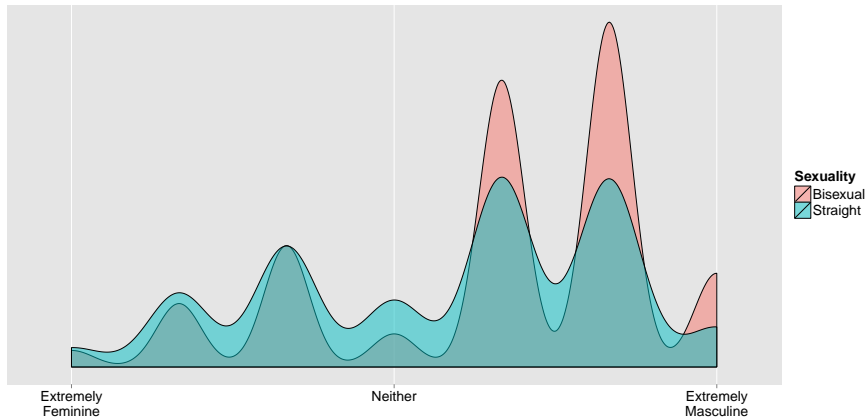
VOT and Masculinity – 0506S – Token



Listener Sexuality

- ▶ Bisexual Listeners consistently rated Speakers less feminine compared to others; $p < 0.05$
- ▶ Across Speakers, Words, and Treatments

Ratings of Masculinity; Bisexuals vs. Straights



- ▶ Sexuality and Femininity Linked
- ▶ Not 1:1
- ▶ 2420G: Gay yet Masculine
 - ▶ cf. Smyth, Jacobs, & Rogers (2003)

Pitch and Sexuality

- ▶ Raised Pitch
 - ▶ Straight speakers less straight
- ▶ No opposite effect for Gay speakers
- ▶ Suggests overriding factors besides Pitch

VOT and Sexuality

- ▶ 1103G and 0506S more gay
- ▶ Indexing Clarity/Education ?
 - ▶ VOT- Podseva, Roberts, Campbell-Kibler (2001)
 - ▶ Dispersed vowel space- Pierrehumbert et al. (2004)
 - ▶ Velar nasal retention- Campbell-Kibler (2011)
 - ▶ Word final /t,d/ release- Podseva, Roberts, Campbell-Kibler (2001), Podesva (2006)
- ▶ Overall lowest VOTs of group - salience?

Pitch and Masculinity

- ▶ Raised Pitch
 - ▶ 0506S, 1826S, and 1103G more feminine
 - ▶ For straight speakers, parallel to Sexuality effects
 - ▶ 1103G- hypersensitive?
- ▶ Lowered Pitch
 - ▶ Gay speakers less feminine
 - ▶ No parallel for Sexuality, suggests overriding factors

VOT and Masculinity

- ▶ *Cap*- More feminine for 1826S, 0506S, 1103G
- ▶ *Token*- Less feminine for 0506S
- ▶ Points to segmental differences

Gaydar?

- ▶ Effect of Sexuality on ratings of Masculinity, not Sexuality
- ▶ Bisexual: n=6, Gay: n=3, Pansexual: n=2
- ▶ Bisexuals listeners overall rated speakers as less feminine
- ▶ Majority White females from NC
- ▶ Unique background?
 - ▶ Rural sexual progressives
 - ▶ Gayness \neq Femininity?

Take Home Points

- ▶ Sexuality and Masculinity linked, but not 1:1
- ▶ Higher Pitch: More Gay/Feminine
- ▶ Lower Pitch: More Straight/Masculine
- ▶ Doubled VOT: Interactions with segmental features, but overall More Gay/Feminine
- ▶ Sexuality of Gay speakers not influenced by pitch, overriding factors

Future Work

- ▶ More balanced sample of listeners
- ▶ Stimuli: % changes, burst amplitude
- ▶ Greater control of phonetic content
- ▶ Phonemes implicated in change
- ▶ Better scales: sliding, perhaps?

References

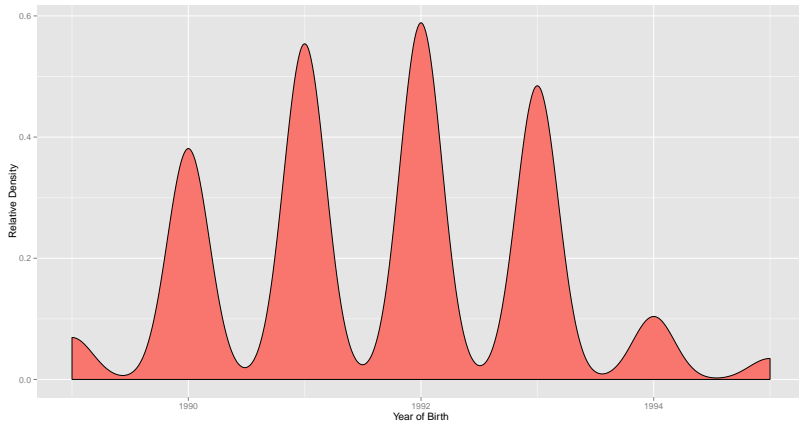
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Thank You!

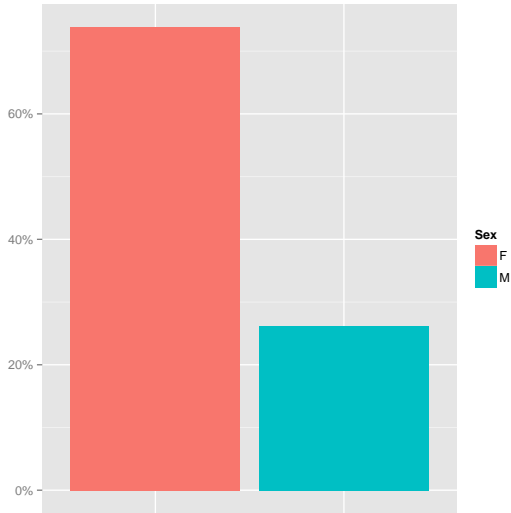
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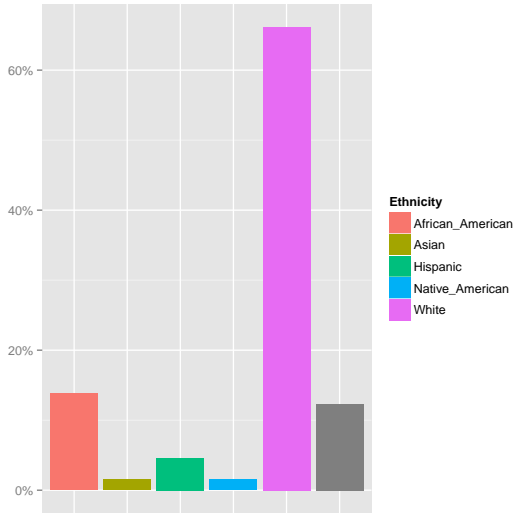
Listener Year of Birth



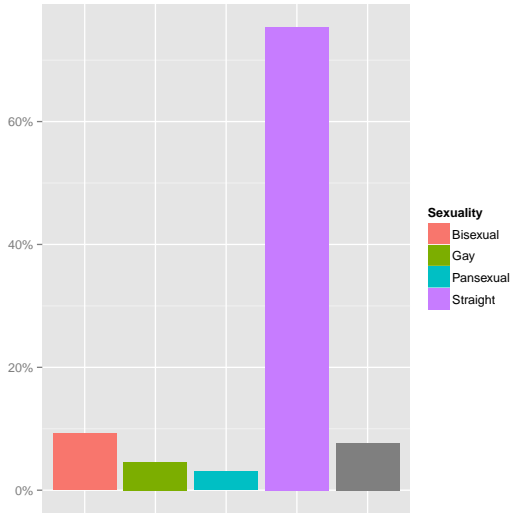
Listener Sex



Listener Ethnicity



Listener Sexuality



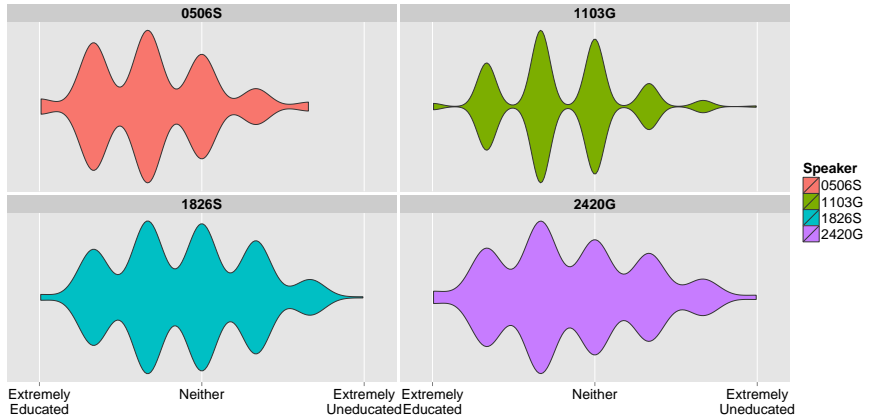
Coding

[1] Extremely Gay	[2] Quite Gay	[3] Somewhat Gay	[4] Neither Gay Nor Straight	[5] Somewhat Straight	[6] Quite Straight	[7] Extremely Straight
[1] Extremely Educated	[2] Quite Educated	[3] Somewhat Educated	[4] Neither Educated Nor Uneducated	[5] Somewhat Uneducated	[6] Quite Uneducated	[7] Extremely Uneducated
[1] Extremely Feminine	[2] Quite Feminine	[3] Somewhat Feminine	[4] Neither Masculine Nor Feminine	[5] Somewhat Masculine	[6] Quite Masculine	[7] Extremely Masculine

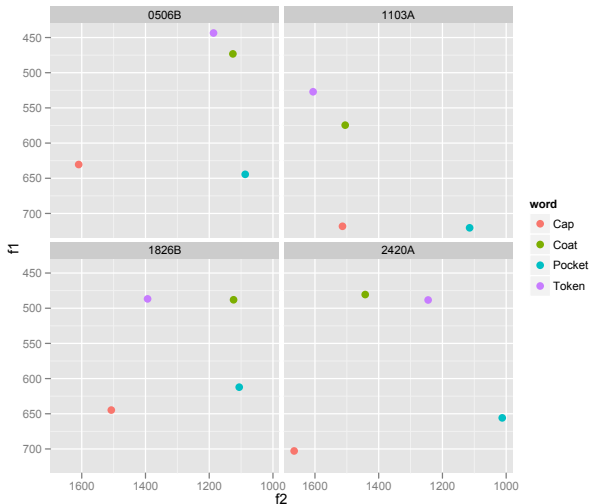
VOT Altered Times in ms

	2420G	1826S	1103G	0506S
Pocket	223	152	160	109
Token	172	124	174	127
Cap	211	182	149	144

Ratings of Education by Speaker



Speaker Formants



What to Expect

Background

Projecting Sexuality

Experiment

Research Question

Speakers

Listeners

Treatments

Analysis

Modeling

Results

Sexuality

Masculinity

Conclusion

Discussion

Summary