Creaky Voice in a diverse gender sample: Challenging ideologies about sex, gender and creak in American English

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NEW WAYS OF ANALYZING VARIATION (NWAV 44)
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Background

- Conflicting perspectives on the link between gender and creaky voice, which has been associated with:
  - **Men** in the UK (Esling 1978; Henton & Bladon 1988; Stuart-Smith 1999)
  - **Young, white women** in the US (Yuasa 2010; Podesva 2013)
  - **Chicano/a gangsters** (Mendoza-Denton 2007, 2011)
  - **Men** who are (perceived as) **gay/queer** (Podesva 2007; Zimman 2013)
- Gendered meaning of creak is still uncertain

Background

- Previous studies all operate within the gender binary
- Limitations of this view:
  - Restricts our theorization of gendered social meaning to two options: **maleness/masculinity** and **femaleness/femininity**
  - Encourages **simplification of gendered meaning** based on broad correlations
  - Does not reflect the **full diversity** of the population. What about **trans speakers**?
  - Hard to tease apart **socialization**, **identity**, **physiology**

Our goals

- To include speakers with a **wider range of identifications** related to sex and gender
- To take a more **nuanced view** of gender identity and different aspects of sex
- To pay special attention to how creak relates to **queer** and **trans** identities
  - Zimman (2012, 2013) suggests that trans men may be especially creaky

Who uses creak?

Can a more diverse sample wrt sex and gender help us get a handle on creak's social meanings?

Coding for sex and gender

- Factors to consider
  - **Identity**: current self-reported gender
  - **Socialization**: sex assignment at birth
  - **Laryngeal physiology**: exposure to testosterone
- Operationalized as 2 factors, each with 3 levels
  - **Gender identity**: female, male, non-binary
  - **Sex assigned at birth** and current **hormonal status**:
    - Male-assigned (AMAB)
    - Female-assigned, not on testosterone (AFAB)
    - Female-assigned, on testosterone (AFAB+T)

Identity categories

	Female	Male	Non-binary
AMAB	Trans women	Cis men	AMAB non-binary
AFAB	Cis women	Trans men, not on testosterone	AFAB non-binary, not on testosterone
AFAB+T	N/A	Trans men, on testosterone	AFAB non-binary, on testosterone

Methods: Data collection

- Native speakers of American English, ages 18-35:
  - Recorded in 2013, at Reed College Lab of Linguistics (LoL) in Portland, Oregon
  - 80% self-reported as white or Caucasian
- 2 speech styles:
  - **Casual interview** discussing speaker's hometown
  - Scripted reading of the **Rainbow Passage**

Methods: Speakers

- Speakers self-reported their gender identity, assigned sex, and hormonal status in a post-recording questionnaire and/or online survey

	Female	Male	Non-binary	Total
AMAB	8	6	5	19
AFAB	6	2	10	18
AFAB+T	N/A	7	7	14
Total	14	15	22	51

Methods: Subsample

We present results from a subsample of 27 speakers:

	Female	Male	Non-binary	Total
AMAB	3	6	3	12
AFAB	6	2	1	9
AFAB+T	N/A	4	2	6
Total	9	12	6	27

Methods: Transcription

- Segmental: Phonemic transcriptions and segmentations automatically generated by FAVE (Rosenfelder et al. 2011)
  - Full recording of Rainbow Passage
  - First 5 minutes of the casual interview recording
  - Boundaries hand-corrected by RA in cases of FAVE error
- Prosodic: Locations of right edges of intonation phrases (IPs), and IP boundary tone type, using ToBI labels (Veilleux et al. 2006, Beckman & Ayers Elam 1997)
  - L-L%: low falling (e.g. declarative)
  - L-H%: low rising (e.g. continuation rise)
  - H-H%: high rising (e.g. yes/no question)
  - H-L%: high plateau (e.g. trailing off)
  - !H-L%: downstepped plateau (e.g. calling contour)

Methods: Auditory coding

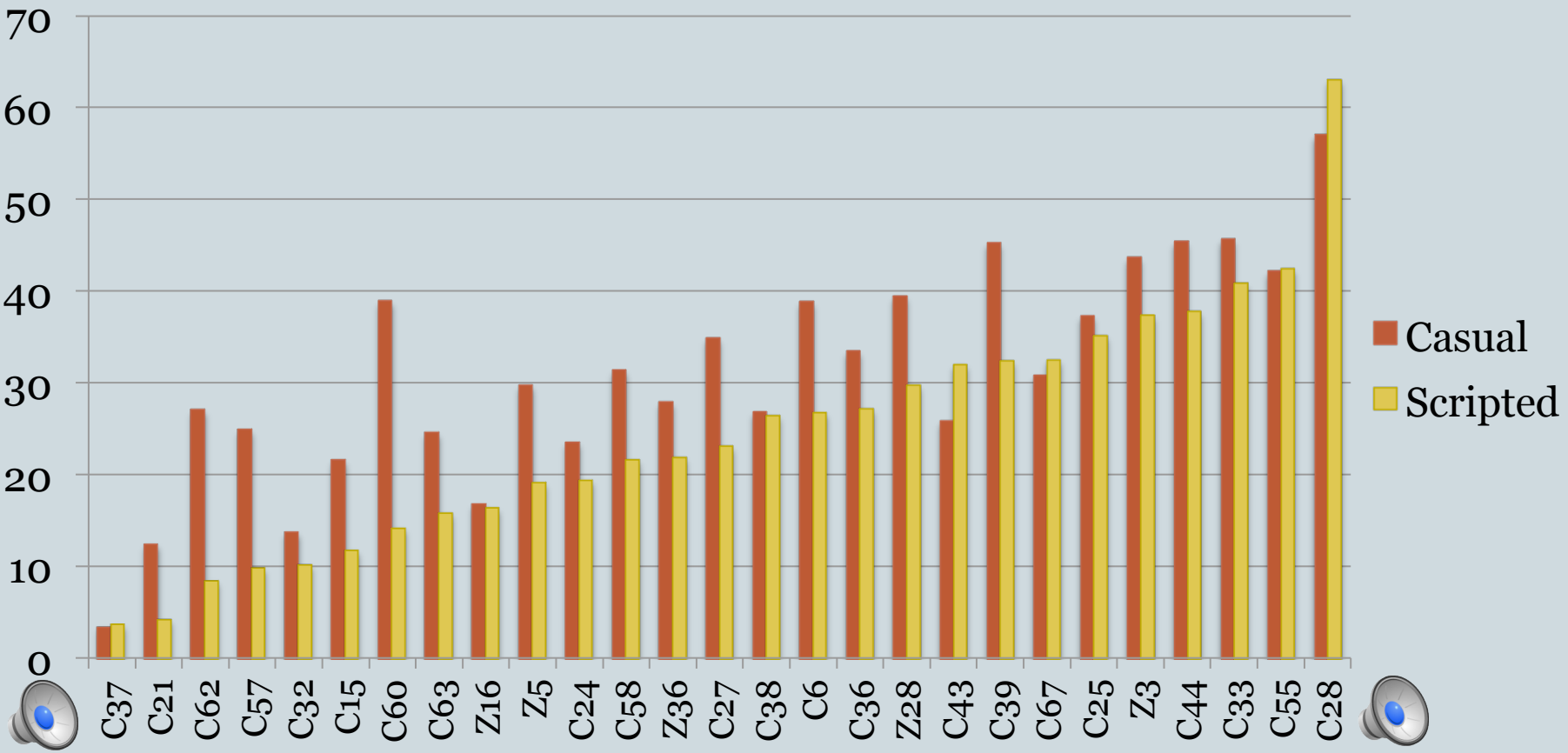
- Each vowel was coded by a primary coder for:
  - **Voice quality**: modal, creaky, other (e.g. breathy), or unsure
  - **Pitch accents: unaccented, accented, nuclear accented**
  - **Vowel quality: generated by FAVE, hand-corrected by RA**
- A secondary coder coded for voice quality
  - Mean inter-coder reliability across recordings: **84.9%**
- Discrepancies between coders resolved by authors
  - In cases where no 2 coders agreed on a given vowel's voice quality code, that vowel was discarded

Methods: Auditory coding

- All coding was done auditorily, as in previous work on creak and gender (Podesva 2013; Zimman 2013)
- Choice also based on results of related work (Khan et al. 2015)
  - 16 trained linguistics students rated relative creakiness of phrase-final word 'bows' extracted from the Rainbow Passage
  - Crosslinguistic acoustic cues for creak (H1-H2, H1-A1, H1-A3) were found ***not*** to be correlated with our students' creakiness ratings
  - Creaky voice in American English, at least, seems to be cued by a more complex array of acoustic features

The data: overall patterns

- **Wide range across speakers** in use of creak



The data: overall patterns

	Female	Male	Non-Binary	total
AMAB	26%	26%	27%	26%
AFAB	38%	35%	22%	37%
AFAB+T	n/a	23%	23%	23%
total	35%	26%	29%	

Modeling

- We ran a **mixed-model logistic regression** on individual vowels
  - Response: Voice quality (creak is the application value)
  - Predictors:

Internal factors
- Word (random)
- Vowel quality
- Stress (primary, secondary, none)
- Pitch accented (yes, no)
- Position in IP (final, non-final)
- IP bndry tone (LL, LH, HH, HL)
- IP-initial vowel (yes, no)
- Style (casual, reading)

Social factors
- Speaker (random)
- Year of birth (continuous)
- Gender id (F, M, non-binary)
- Sex (AFAB, AFAB+T, AMAB)
- Sexual orientation (asexual, bi, gay, queer, straight)

Results: Internal factors

- All internal factors selected were in line with previous literature

Factor	*p* value	Level		*n*	Proportion of vowels that are creaky	Factor weight
IP boundary tone	p < .001	…				
Position in IP	p < .001	…				
IP-initial vowel	p < .001	…				
Vowel quality	p < .001	…				
Stress	p = .00161	…				
Style	p < .001	Casual	0.248	13788	.31	.562
		Reading	-0.248	7054	.25	.438

Results: Social factors

- The social factors show a more complicated picture
  - Gender identity, sexual orientation, and age are NOT predictors of creak as a main effect
  - **Sex is the only social predictor of creak**

Factor	***p* value**	**Level**		***n***	**Proportion of vowels that are creaky**	**Factor weight**
Sex	p = .0419	AFAB	0.492	7126	.37	.621
		AMAB	-0.239	9230	.26	.441
		AFAB + T	-0.254	4486	.23	.437

Discussion

- We return to our original goals, specifically in how we tease apart various aspects of sex and gender.
  - **Identity**: self-reported gender identity
  - **Socialization**: sex assignment at birth
  - **Laryngeal physiology**: exposure to testosterone
- We've determined that **gender identity does not predict use of creak**

Discussion

- So should we just replace "gender" with "sex assignment at birth"?
- Not exactly. **Sex assignment at birth alone does not predict creak either.**
- Speakers assigned female at birth fall into two categories with respect to use of creak:
  - AFAB speakers (not on T) favor use of creak
  - AFAB+T speakers disfavor use of creak, like AMAB speakers

Discussion

- Ah! So then is it the physiological aspect of sex?
- **Laryngeal physiology is the common trait here.**
  - AFAB speakers not on T favor creak
  - AMAB and AFAB+T speakers disfavor creak
- Helps us group cis men and trans men on T (less creak) apart from trans men not on T (more creak).

Discussion

- One possible interpretation:
  - Men are presumably motivated to sound more masculine
  - Cis men and trans men on T achieve this through laryngeal changes from testosterone exposure
  - Trans men not on T may utilize creak as an alternative
- However, this account cannot explain why cis women use creak at such a high rate!
  - We do not assume that all people, regardless of gender or sex, are motivated to sound more masculine
  - Thus, **this cannot be the end of the story**

Conclusions

- Our study complicates our view of gender and creak
  - **Wider range** of sex/gender categories
  - Explicitly tease apart separate influences of **identity**, **socialization**, and **physiology**
- **Laryngeal physiology was the best predictor** of creak use, not gender identity or assignment at birth
- We're currently working to further complicate this finding with additional data in our sample
- We invite your input and suggestions

Acknowledgments

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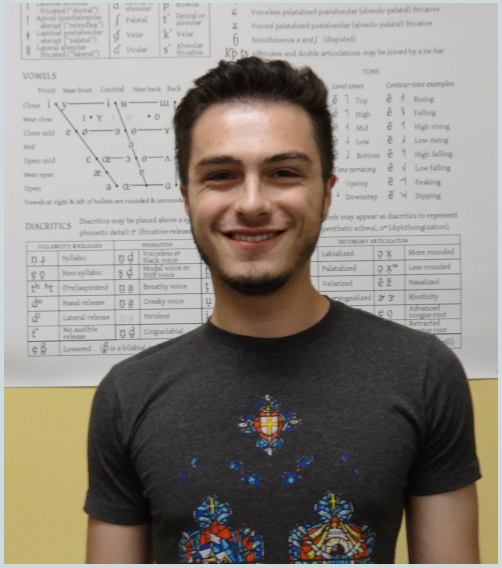

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