Biology, socialization, and identity: Accounting for the voices of female-to-male transsexuals

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Gender and the voice

- Differences between men's and women's voices are frequently attributed to physiological differences between the sexes, but are often in fact learned (Simpson 2009)
  - Literature on childhood language socialization shows that boys and girls take on gendered phonetic traits before physiological differentiation occurs during puberty (e.g. Sachs et al. 1973)
  - Even features linked to biology are also influenced by culture (see, e.g. Yuasa 2009)
- However, we still lack a comprehensive understanding of a number of issues. For instance:
  - Which phonetic features are influenced by biology, and how strong is this influence?
  - Which are learned during language socialization?
  - How malleable are these features beyond childhood?

A NEW SPEAKER GROUP

- To add to our understanding of these issues, I focus on a group that is almost completely absent from the linguistic literature: female-to-male transsexuals, or trans men
  - Individuals assigned to a female gender role and raised as such, but who identify as men and take steps to transition from a female gender role to a male one.
- Previous studies of transsexuals' voices have shown that we can learn quite a bit from looking at these speakers, but usually the focus is on trans women
  - For instance, Gelfer & Schofield (2000) analyzed the differences between trans women whose voices were perceived as male and those perceived as female, and identified 160 Hz as a cross-over point that distinguished the two groups

New insights

- However, trans men promise a unique set of insights. There are a number of reasons for this:
  - One of the most common medical interventions sought by trans men is testosterone therapy, which produces many of the changes men typically go through during puberty, including a drop in vocal pitch
  - Because trans men's voices are usually perceived as male, they can shed light on the perception of different kinds of masculinities (as well as maleness/femaleness)
  - As Kulick (1999) suggests, some may assume that trans women are actively constructing femininity but that trans men aren't doing anything special in talking like men
    - (in other words, "talking like a man" may be seen speaking in a neutral way, while "talking like a woman" is seen as involving some degree of artifice)

Trans men vs. non-trans men

- One of my analyses investigated the perception of 6 trans men's voices compared to 7 non-trans men who were rated as either straight- or gay-sounding based on read speech
- The goal was to discover how trans men would be perceived on a scale of gay-soundingness and whether this might have anything to do with gender socialization
- Many of the phonetic features linked to the perception of sexual orientation are also socially learned differences between men's & women's voices (Smyth & Rogers 2002)
- Listeners did in fact perceive the trans men in this study the same way as they perceived the gay-sounding non-trans men

Acoustic comparisons

- For the most part, trans men's voices are acoustically indistinguishable from non-trans men's voices
  - Mean pitch
  - Pitch range
  - Voice quality
  - Mean F1 & F2
  - Vowel peripherality
  - Sibilants ← except center of gravity

No significant difference

- These similarities show that childhood gender socialization is far from deterministic – these speakers either
  - Failed to acquire normative feminine styles, and/or
  - Changed gendered features of their voices during transition
- In other words, self-defined identity matters too

Trans men's voices

- Having compared trans and non-trans men, I now want to turn to differences among trans men's voices
  - 8 trans men from CA (n = 5), CO (1), MA (1) and OK (1)
  - 1 speaker was Black, 4 White, 3 Multi-racial
  - Age range from 19-51
  - Length of time on testosterone varies from 7 months to 10 years
- First, intra-speaker variation & change over time
- Second, inter-speaker variation based on length of time on testosterone and age of speaker

But first, van Borsel's study

- The only other acoustic study of trans men was done by van Borsel and his colleagues (van Borsel et al. 2000; Adler & van Borsel 2006)
- 2 Belgian trans men during their first 13 months on hormones
  - Language spoken is unclear
  - Trans men were taking oral testosterone, which is not typically used in the US and is thought to produce slower and less dramatic masculinization than other forms (Gorton, Buth & Spade 2005)
- Found that trans men experience a significant drop in F0 during the first year on testosterone, along with a significant narrowing in pitch range
- Based on a reading passage, mean F0 went from 215 to 155 Hz for one speaker and 160 to 132 Hz for the other

Change over time

- Two speakers in my study were available for a follow up session approx. one year after the initial recording session
  - Sam a college student from MA who was 21 with 11 months on hormones at our first recording and 23 months at our second
  - Phil, who is also a student and who is from CA, was 24 and had been on testosterone for 8.5 years at our first recording and 9.5 years at our second
- Both speakers had changes progressing beyond the first year of testosterone
- However, Sam's changes are (predictably) more dramatic and wide-reaching

Sam

Feature	11 months	23 months	Difference	P-value
Mean F0	129 Hz	111 Hz	-13.95%	0.001016 **
F0 range	79	76	-4%	Not significant.
Mean creakiness	-1.724528302	-8.294339623	-380.96%	.0000000002404 ***
Mean F1	493	481	-2%	Not significant.
Mean F2	1737	1720	-9%	Not significant.
/s/ center of gravity	6762	3898	-42.35%	.0000005902 ***
/s/ standard dev.	3183	2740	-13.92%	.0000002445 ***
/s/ skew	0.346608712	-0.084144044	-124%	.0000003192 ***
/s/ kurtosis	1.587947846	-0.282579225	-117.8%	.0000001956 ***

Phil

Feature	8.5 years	9.5 years	Difference	P-value
Mean F0	92 Hz	98 Hz	+6.52%	Not significant
F0 range	33	33	0.0%	Not significant.
Mean creakiness	0.866037736	-0.6415094	-174%	.0000000002404 ***
Mean F1	551	534	-3%	Not significant
Mean F2	1651	1752	+6.12%	Not significant.
/s/ center of gravity	6523	7335	+12.45%	0.004399 **
/s/ standard dev.	2515	2167	-13.84%	0.003067 **
/s/ skew	0.346608712	-0.084144044	-124%	0.00005934 ***
/s/ kurtosis	0.967292218	0.897690476	-7.2%	Not significant

Time on hormones and age

- Time on hormones
  - Speakers who have been on testosterone longer show:
    - Lower mean F2 ($p < 0.035$)
    - Smaller standard deviation for /s/ ($p < 0.019$)
    - Lower kurtosis for /s/ ($p < 0.036$)
  - This provides more evidence for ongoing change
  - After transition, speakers experience ongoing socialization as men
- Speaker age
  - Older speakers show (suggestively):
    - More negative skew for /s/ ($p < 0.076$)
  - Before transition, speakers experience ongoing socialization as women
  - Older speakers may experience less dramatic linguistic changes

Discussion

- Researchers of gender socialization often focused on the ways that this process can be oppressive by forcing children into tightly restricted roles on the basis of biological sex
- However, the research I presented demands a somewhat different view of gender socialization:
  - Those undergoing socialization are not passive recipients of the social order, but rather have some agency in what kinds of gendered styles they take on
  - Gendered styles are not acquired during childhood alone – language socialization continues throughout the lifetime
  - The ongoing nature of socialization promises room for change, but also constrains speakers by making change more difficult over time
  - Socialization and biology interact intimately with identity

Future directions

- Long-term ethnographic research
  - Longitudinal study that shows changes in progress, including pre-testosterone recordings
  - Interactive data
  - How interlocutors actually make sense of the changes these speakers experience

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