

Effects of a sound change in progress on gender-marking cues in Japanese

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Sound change in progress in VOT values

- ▶ Japanese is described as contrasting voiced /b, d, g/ to voiceless /p, t, k/. This accords with voice onset time (VOT) values reported in Takada (2011) for Kinki speakers born before 1910.
- ▶ Takada (2011) also reports differences in VOT values for /b, d, g/ across later generations which suggest sound changes in progress in several dialect regions, including the Tokyo area.

Women are now leading the Tokyo sound change

- ▶ A reanalysis of Tokyo-area speakers from Takada's (2011) apparent-time study by Takada, Kong, Yoneyama, and Beckman (2014) shows that among older speakers [Fig. 1, top], women produce proportionally more tokens with voicing lead and fewer tokens with short lag VOT compared to men.
- ▶ Among middle-aged speakers [Fig 1., bottom], both women and men produce about equal numbers of tokens with lead and lag.
- ▶ By contrast, among the young adult controls in a study of Tokyo-area children by Kong, Beckman, and Edwards (2012) [Fig. 2], women produce far fewer tokens with voicing lead.

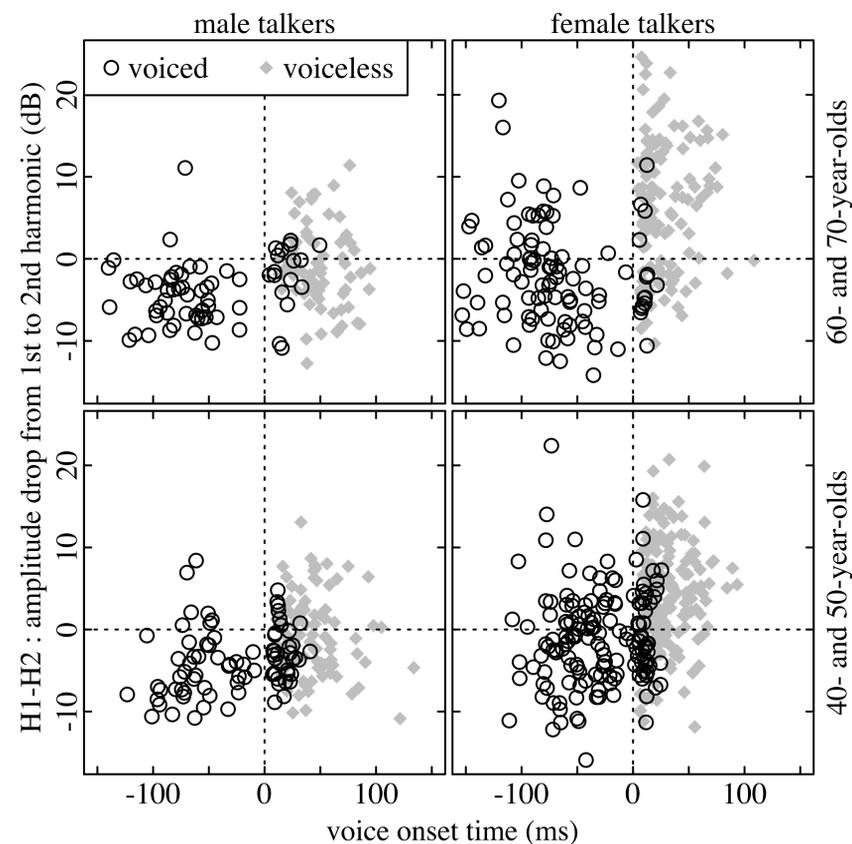


Figure 1 : H1-H2 (amplitude drop from 1st to 2nd harmonic in spectrum estimated over a 25-ms window – a measure of voice quality) against VOT measured in recordings of men and women in two generations of Tokyo speakers recorded for Takada's (2011) apparent-time study.

Gender differences in secondary cues?

- ▶ Across languages, lower fundamental frequency and differences in voice quality on the following vowel often function as secondary cues to a “true” voicing contrast between stops with lead VOT (pre-voicing) and stops with short lag VOT.
- ▶ In Japanese, Ohara (2004) shows that overall lower pitch and a less breathy voice quality are related also to less feminine styles.
- ▶ In the middle-aged and older Tokyo women talkers [Fig. 1, right], many data points for voiceless stops have high positive values, indicating a generally breathy (or ‘lax’) voice quality.
- ▶ By contrast, most data points for men [Figs 1 & 2, left] have negative H1-H2 values, indicating a more pressed (or ‘tense’) voice quality. This is true even for their voiceless stops, suggesting a primarily gender-marking function for H1-H2.

A new function for lead VOT in men?

- ▶ Results of a perception study suggest that, in young adult men, production of lead VOT (as well as of a more tense voice quality) marks a more masculine-sounding talker [Figs. 2 & 3, left].

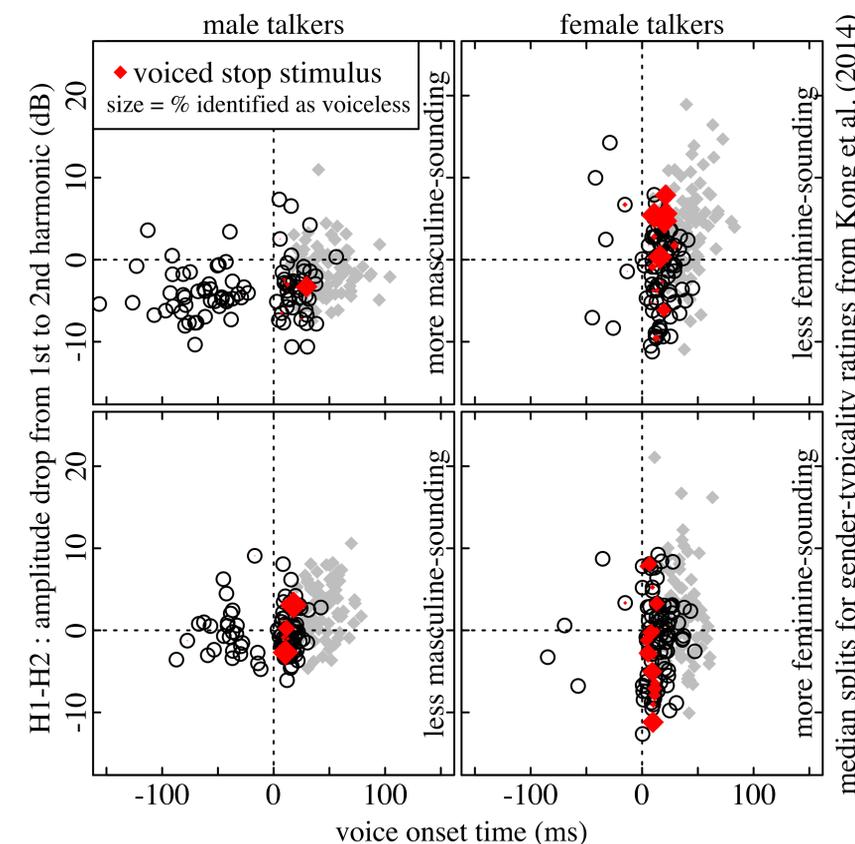


Figure 2 : H1-H2 against VOT measured in recordings of young adults in Kong, Beckman, & Beckman (2012), with talkers divided by gender ratings in the gender-identification block of a perception study into more masculine (less feminine) voices [top] versus more feminine (less masculine) voices [bottom].

Shifting function of voice quality in women?

- ▶ By contrast, results for young adult women (who produce almost no tokens with lead VOT) suggest a reduced function for VOT and a shift in the primary function of voice quality from marking gender to cuing the voicing contrast [Fig. 2, right].
- ▶ While this shift is in progress, women's productions are more ambiguous; in the phoneme-identification block of the perception study, more responses to women's voiced stops were mis-identified the target as voiceless [red diamonds].

Different interactions with fundamental frequency?

- ▶ Men's stimuli [Fig. 3, left panel] mostly had low F0 values and were rated as fairly masculine (although stimuli with lead VOT were rated as even more masculine).
- ▶ By contrast, women's stimuli showed a larger variation in F0 values and a correspondingly large range for femininity ratings [Fig. 3, middle panel].
- ▶ Women's stimuli also showed a large range for H1-H2 values [Fig. 2], as well as a better separation between lower H1-H2 values for (less breathy) /d/ [solid line] relative to /t/ [dashed line] in stimuli with high F0 values [Fig. 3, right panel].
- ▶ Thus, in women, more reliable production of the voice quality cue to voicing is associated both with higher pitch and with a more feminine gender rating.

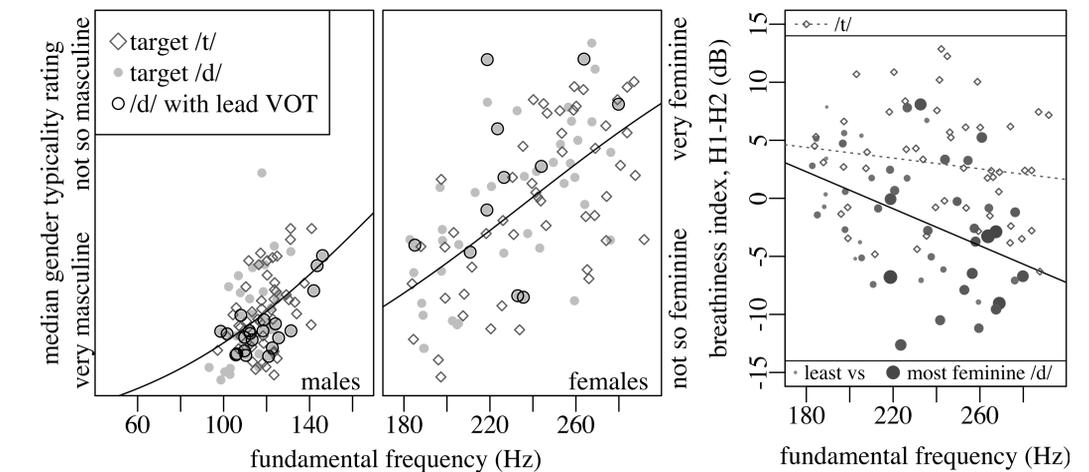


Figure 3 : Gender-typicality ratings as a function of fundamental frequency for men's voices [left] and women's voices [middle]. H1-H2 as a function of F0 for women's voices [right].

Appendix – Method for the perception study

- ▶ 100 /d/- and 100 /t/-initial CV stimuli extracted from the productions in Fig. 2
- ▶ 20 young native speakers of Tokyo Japanese listened in 2 blocks to:
 - ▶ identify initial stop as “t” vs “d” and then rate “t” or “d” category goodness
 - ▶ identify talker as male vs female and then rate masculinity or femininity

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