The emergence of a register system from the word-initial voicing contrast in Japanese

Mieko Takada[1], Eun Jong Kong[2], Kiyoko Yoneyama[3], and Mary E. Beckman[4]

愛知学院大学
AICHI GAKUIN UNIVERSITY

learning to TALK

Historical background

▸ Modern Japanese has voiced /b, d, g/ initially and medially, but Old Japanese voiced stops attested only medially.

▸ Initial /b, d, g/ develop later from:
  ▸ loss of initial vowels — e.g., [n]daku > [daku] 'embrace'
  ▸ influx of loanwords with voiced stops from Middle Chinese — e.g., [budo:] 'grape' (cf. Shanghai [bu[1]dɔ[5]])

▸ Old Japanese voiced stops reconstructed as prenasalized [[m]b, [n]d, [ŋ]g]. Philological evidence for prenasalization augmented by modern variation in transcribed reflexes of medial /b, d, g/ across dialects (see Fig. 1).
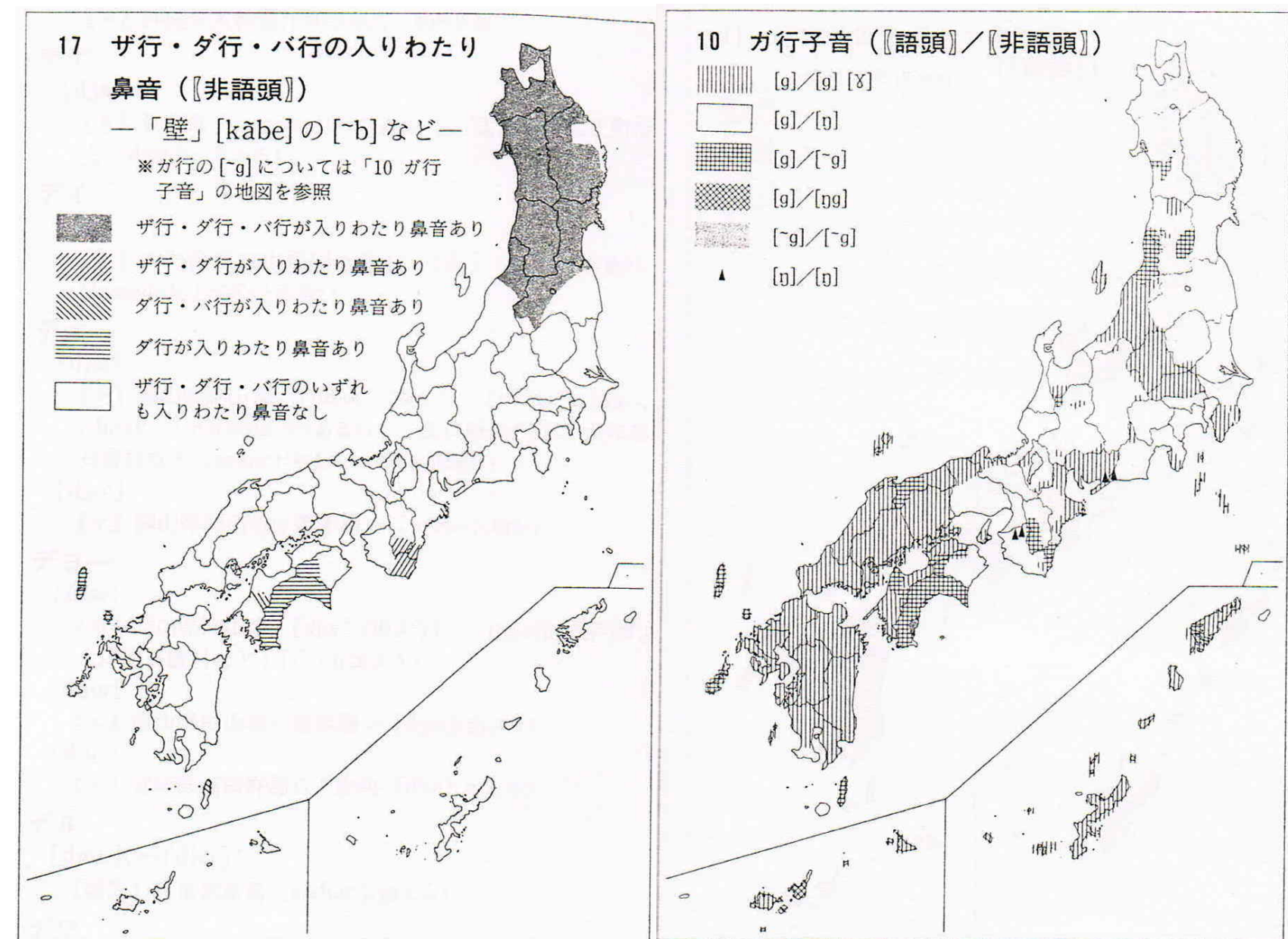

Figure 1 : Dialect maps from Uwano et al. (1989) showing distribution of prenasalized (and other) reflexes for /b, dz, d/ (left) and /g/ (right).

Takada's (2011) VOT study shows

▸ Variation across dialects in realization of initial stops (compare Kinki speakers to older Tohoku speakers in Fig. 2 (b1)).

▸ Variation across generations (compare older Kinki speakers in Fig. 2 (a1) at right with younger Kinki speakers in Fig. 2 (a5) below).
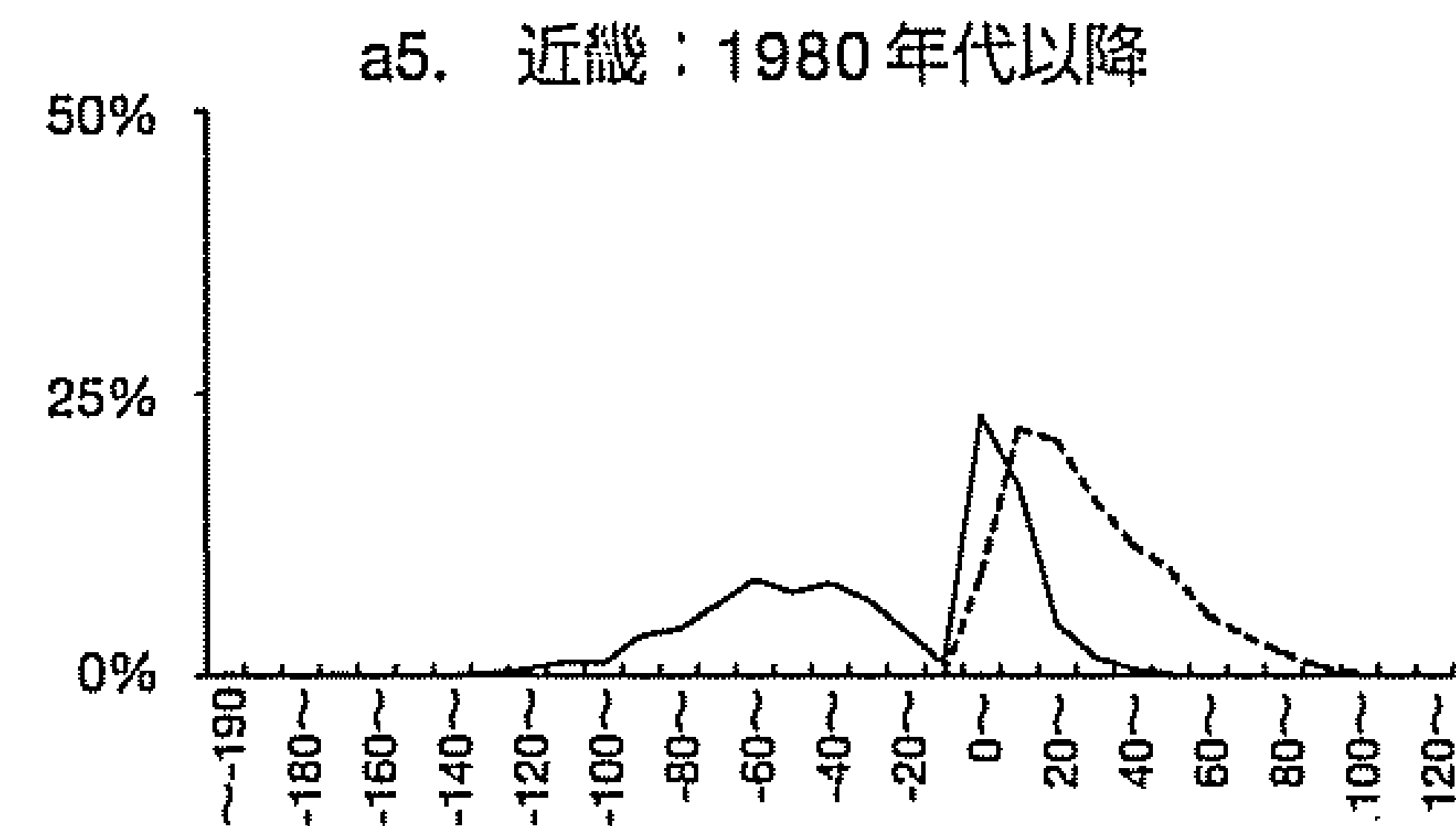

a5. 近畿：1980 年代以降

Figure 2 : Panel (a5) from bottom row of Figure 3-24 in Takada (2011), for Kinki speakers born after 1980.

Cross-generation differences suggest sound changes in progress

▸ Tokyo speakers show an even more extreme cross-generational shift in distribution of VOT values for voiced stops.
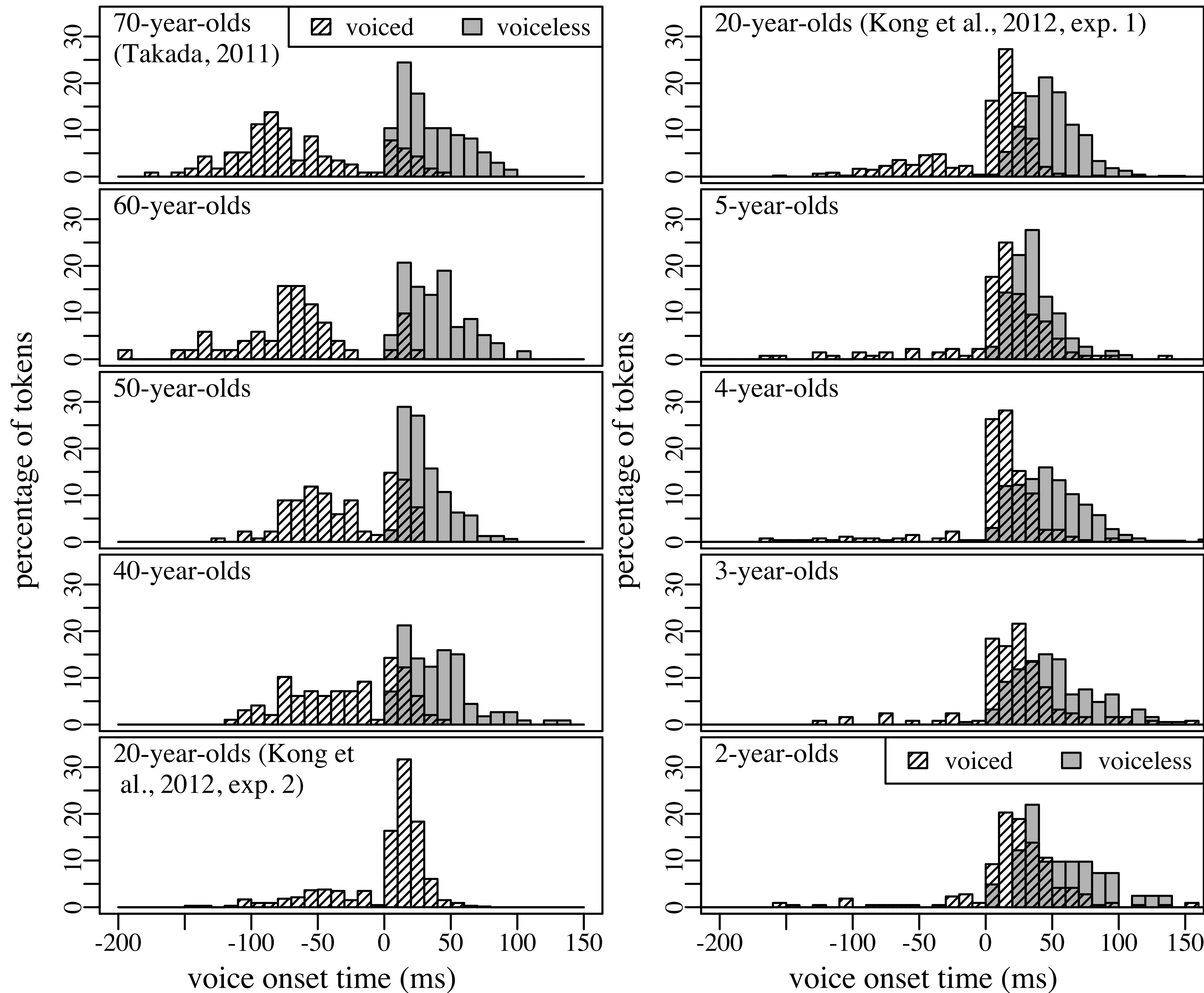

Figure 3 : Voice onset time measured for voiced and voiceless stops in recordings of 4 generations of Tokyo speakers from Takada's (2011) apparent-time study and in recordings from 2 generations of Tokyo speakers in two experiments in Kong, Beckman, & Edwards (2012).
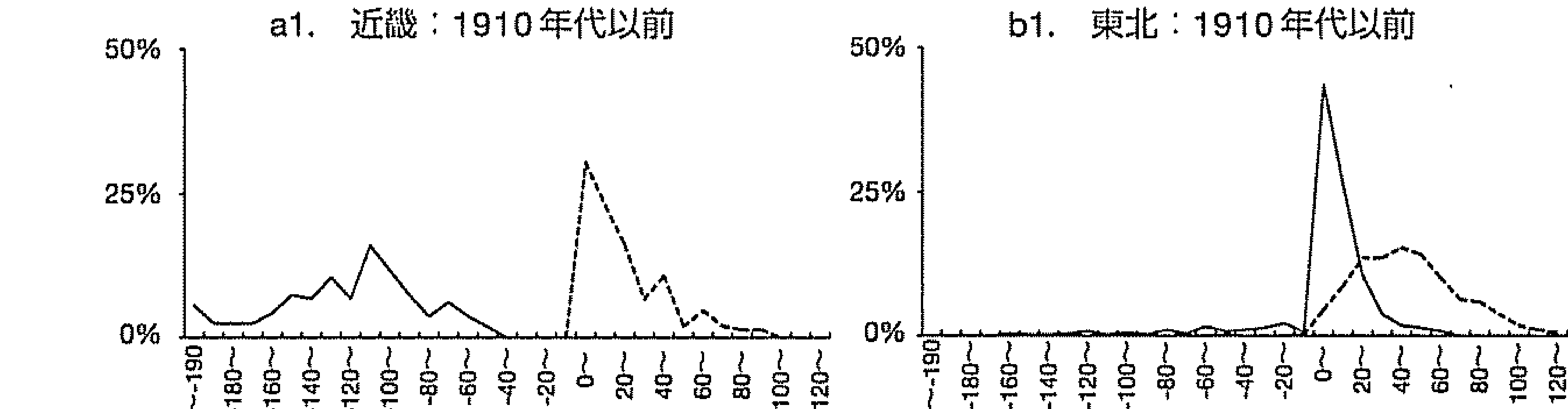
a1. 近畿：1910 年代以前

b1. 東北：1910 年代以前

Figure 2 : Panels (a1) and (b1) from top row of Figure 3-24 in Takada (2011) showing VOT for voiced stops (solid lines) and voiceless stops (dashed lines), for Kinki speakers (panel a1 on left) and Tohoku speakers (panel b1 on right) born before 1910.

Women are now leading the Tokyo sound change

▸ Among the older Tokyo speakers in Takada (2011) [top row in Fig. 4 below], women produce proportionally more tokens with strong pre-voicing.

▸ Among the middle-aged Tokyo speakers in Takada (2011) [middle row], women produce about as many tokens with pre-voicing as do the men.

▸ Among the young adult speakers in Kong, Beckman, & Edwards (2012) experiment 1 [bottom row], women produce very few tokens with pre-voicing (and the same is true for Kong et al. (2012) experiment 2 [not shown]).
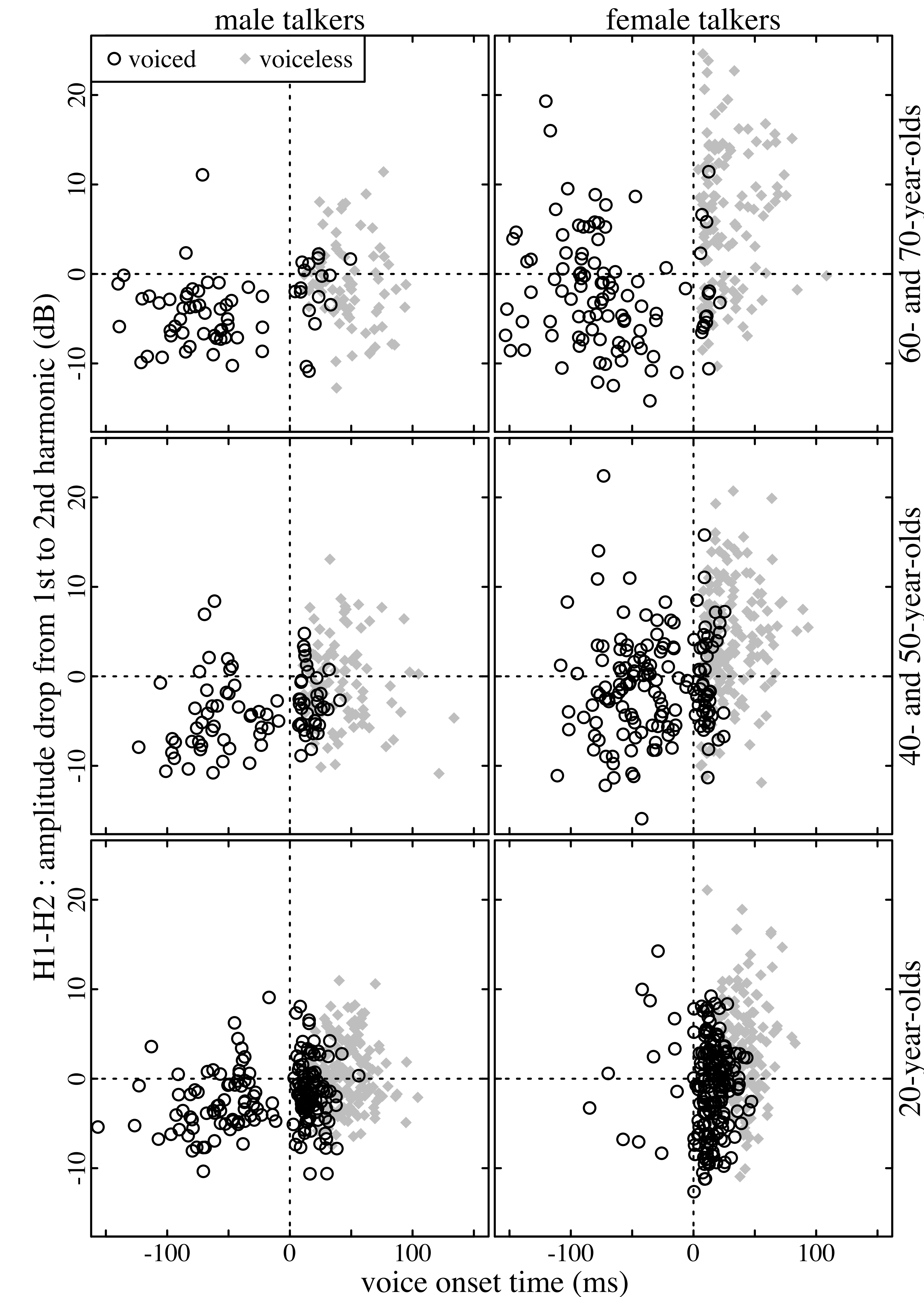

Figure 4 : H1-H2 as a function of VOT for the 40- through 70-year-old Tokyo speakers in Takada (2011) [top and middle rows] and for the 20-year-olds in Kong, Beckman, & Edwards (2012), experiment 1 [bottom row]

An associated change in the function of voice quality?

▸ H1-H2 (amplitude drop between 1st and 2nd harmonic in a spectrum estimated over a 25-ms window beginning at voice onset) is a measure of voice quality.

▸ In the middle-aged and older Tokyo speakers [top and middle rows in Fig. 4], most data points for men have negative H1-H2 values, indicating a more pressed (or 'tense') voice quality. By contrast, many data points for women have high positive values, indicating a generally breathy (or 'lax') voice quality.

▸ Analyses in progress of the gender-rating block of a perception study [Fig. 5 below] suggest that more conservative VOT values, as well as more tense voice quality values, mark more masculine-sounding voices for young adult men.

▸ By contrast, results for young adult women (who produce too few tokens with voicing lead for VOT to mark gender identity) suggest a shift in the primary function of voice quality from marking femininity to cuing the voicing contrast.

▸ While this shift is in progress, women's productions are more ambiguous; in the phoneme-identification block of the same perception study, more responses to the women's voiced stops mis-identified the target as voiceless (red diamonds).
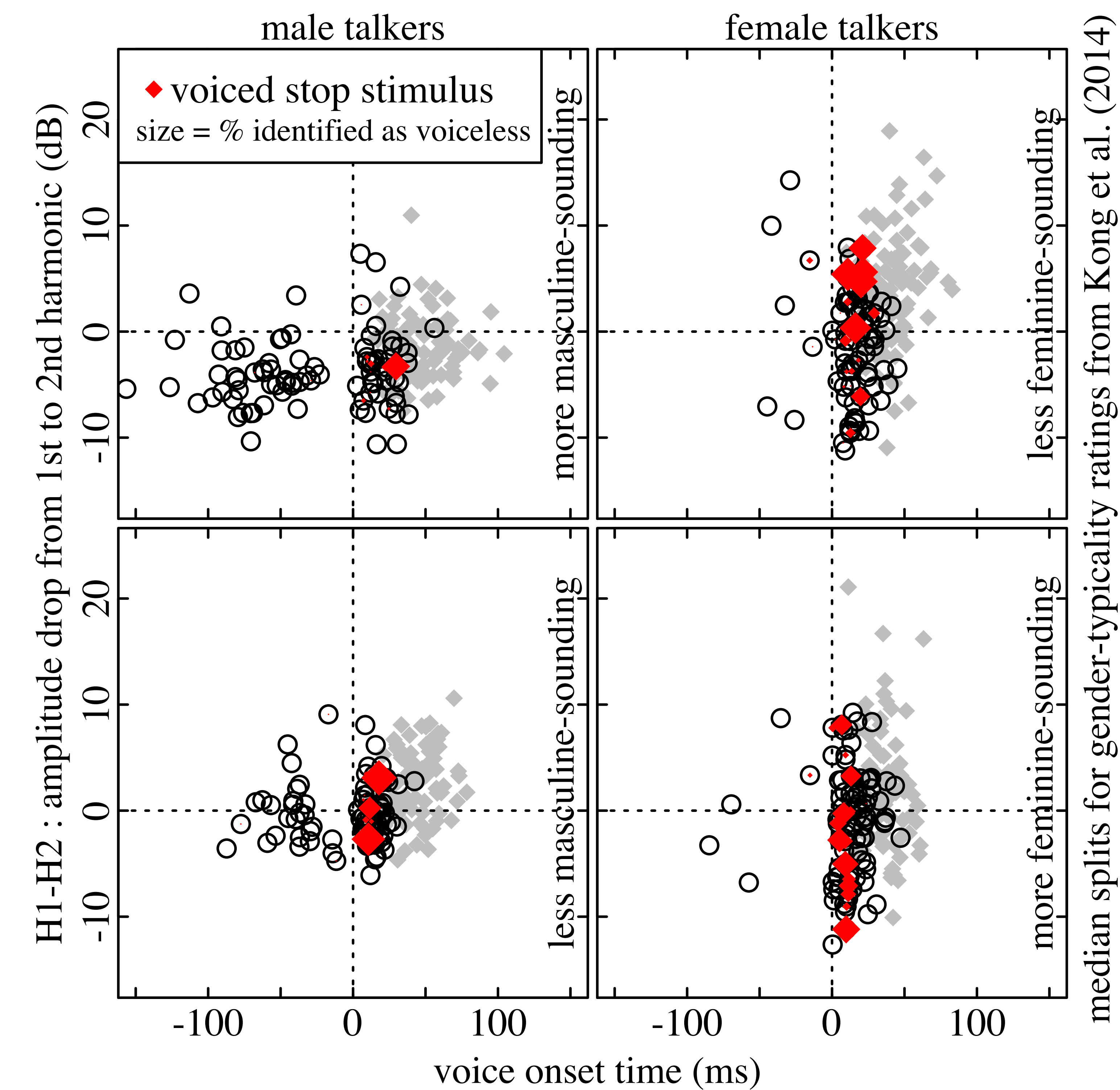

Figure 5 : Same data as in bottom row of Figure 4, grouped by gender-typicality ratings in a study to be reported in detail in Kong, Yoneyama, & Beckman (2014) — i.e., the more versus less masculine male voices (left panels) and the less versus more feminine female voices (right).

Authors' affiliations: 1) Aichi Gakuin University, 2) Korea Aerospace University, 3) Daito Bunka University, 4) Ohio State University

Authors' email addresses: 1) takadam@dpc.agu.ac.jp, 2) ekong@kau.ac.kr, 3) yoneyama@ic.daito.ac.jp, 4) beckman.2@osu.edu