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5aSC22. Effects of age, sex, context, and lexicality on hyperarticulation of Korean fricatives

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1. BACKGROUND

- Korean is known for a rare 3-way laryngeal contrast among **FORTIS**, **LENIS**, & **ASPIRATED** voiceless stops and affricates. Differences along many acoustic dimensions, including: [1–23]

Property (in initial position, unless noted)	FORTIS	LENIS	ASPIRATED
Voice onset time (VOT)	short	long	v. long
Fundamental frequency (f_0) onset	high	low	v. high
Voice quality	pressed	v. breathy	breathy
Intensity buildup	v. quick	slow	quick
Constriction duration (medially)	v. long	short	long
Following vowel duration	long	long	short

- Diachronic shift toward \uparrow role of f_0 & \downarrow role of VOT. [9, 21, 22]
- 2-way contrast between fortis /s*/, nonfortis /s/ is controversial: unclear whether /s/ is lenis, aspirated, or hybrid (*lenis+aspirated*) due to ambiguous phonetic and phonological properties. [1–23]

QUESTION: How is the /s/-s*/ contrast hyperarticulated?

- GOALS:** (i) examine effects of talker-related and linguistic factors (age, sex; vowel context, (non)lexicality) on hyperarticulation, (ii) explore implications for phonological analysis of /s/ & /s*/.

2. METHODS

- PARTICIPANTS:** 34 native speakers of Seoul Korean tested in Seoul

OLDER talkers (born before 1977)	YOUNGER talkers (born after 1990)
9 f, 9 m. $M_{\text{age}} = 57.7 \text{ yr}$ (SD 5.7)	8 f, 8 m. $M_{\text{age}} = 22.4 \text{ yr}$ (SD 1.9)
daily exposure to Korean = 94.7%	daily exposure to Korean = 71.7%

- MATERIALS:** real words & nonce items (ex: /sata/ ‘buy’ cf. /sana/)

- TASK:** elicited production of **citation** speech & **clear** speech

- Condition 1 (citation speech): utter target word in frame sentence (/___-to is*ipnita/ ‘There is/are also ___’)
- Condition 2 (clear speech): utter target word, *as if speaking to a foreigner who has just started to learn Korean*, so that the word can be distinguished from a similar word (ex: /sata/ ‘buy’ cf. /s*ata/ ‘wrap’)

- ACOUSTIC ANALYSES:**

a) **frication duration**

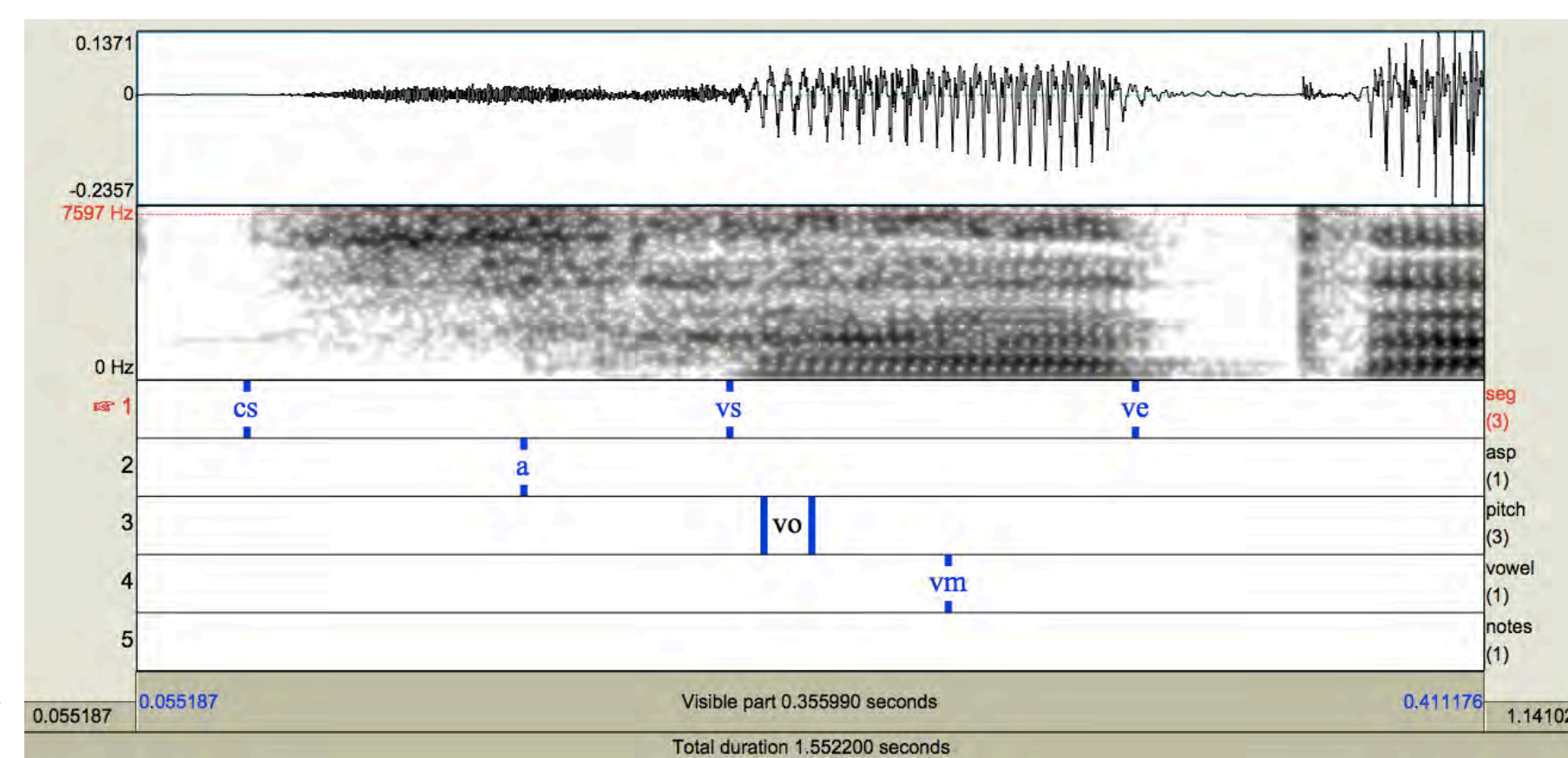
b) **aspiration duration**

(via Praat script by [24])

c) **vowel duration**

d) **f_0 onset**

Spectrogram of
OF11 saying /sata/

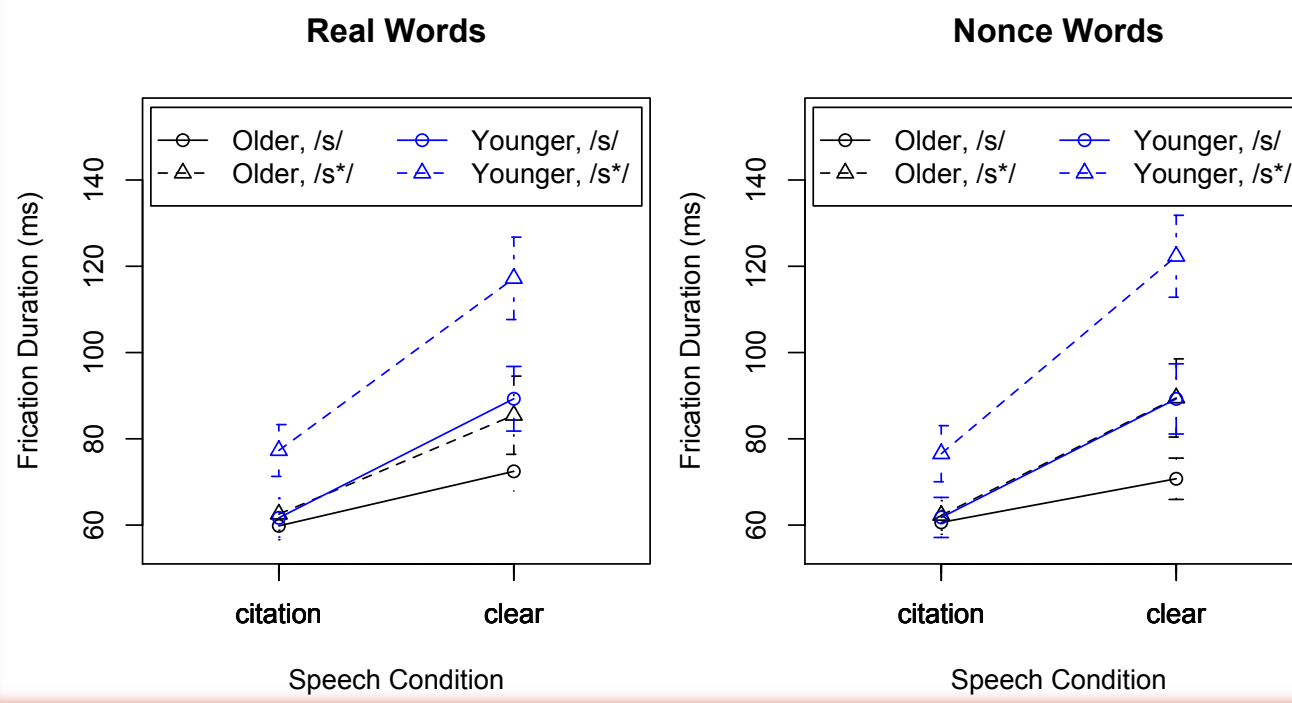
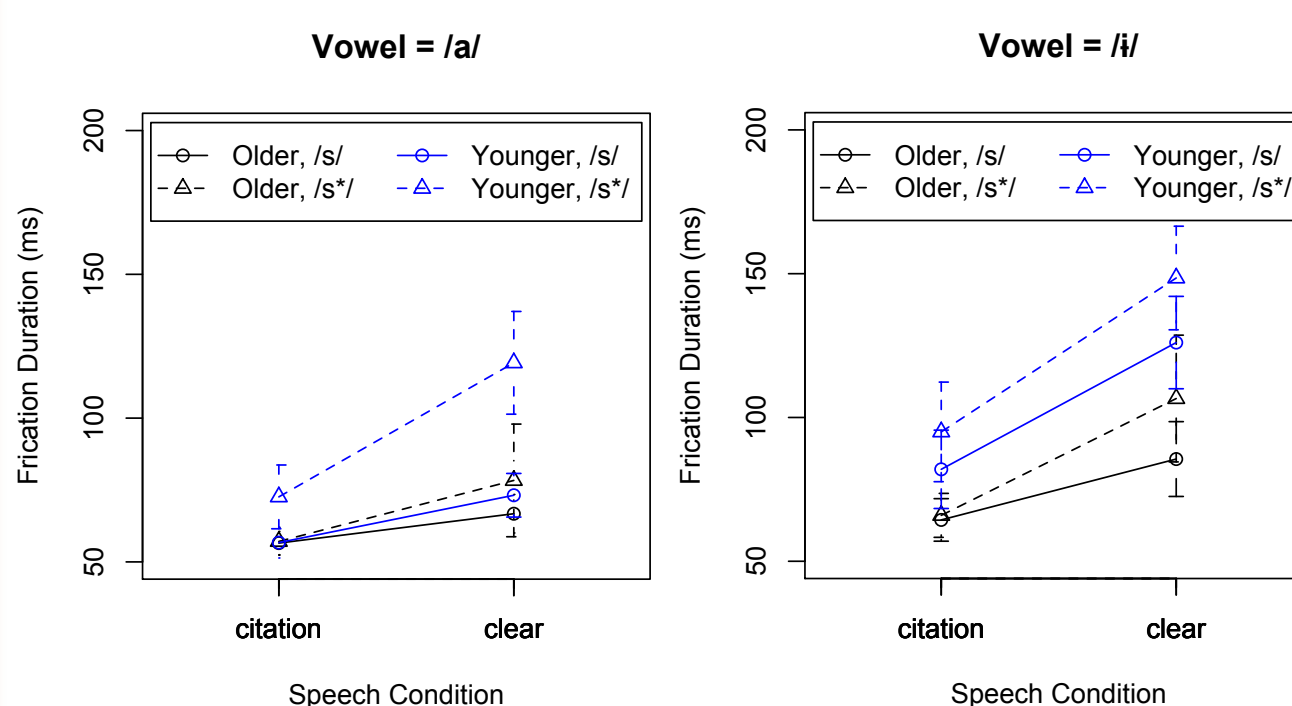
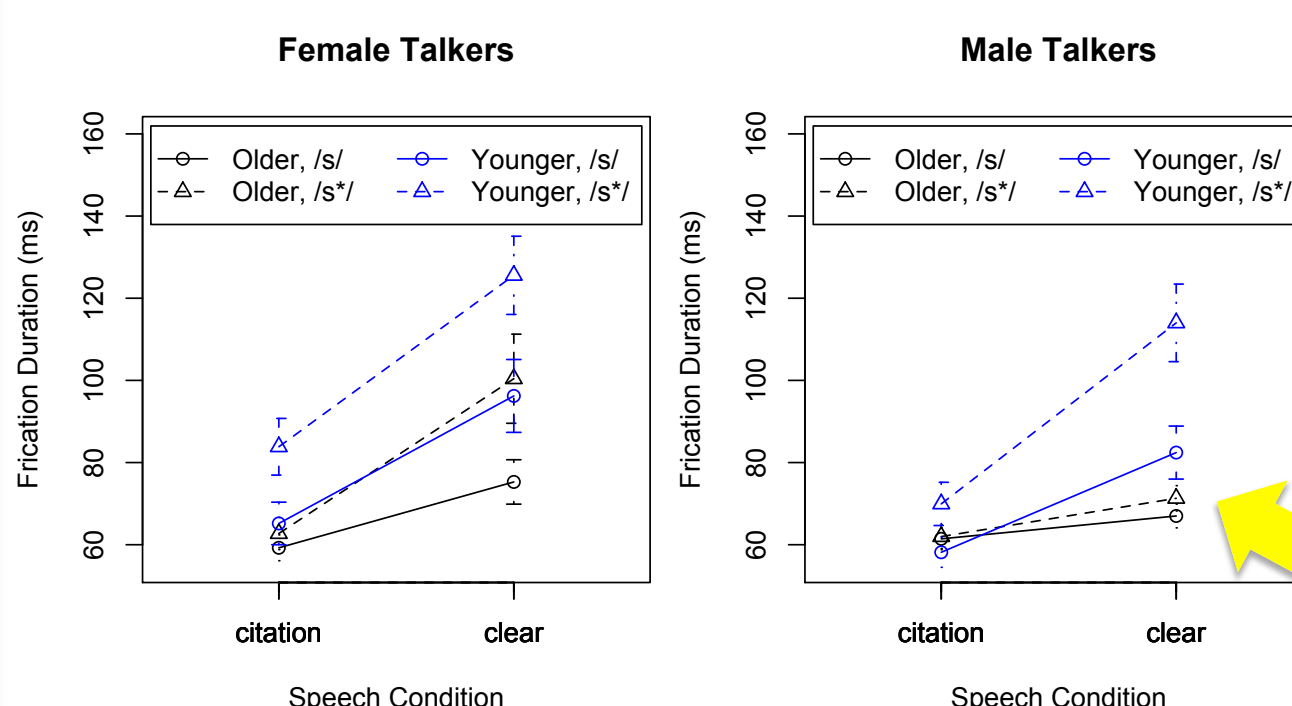
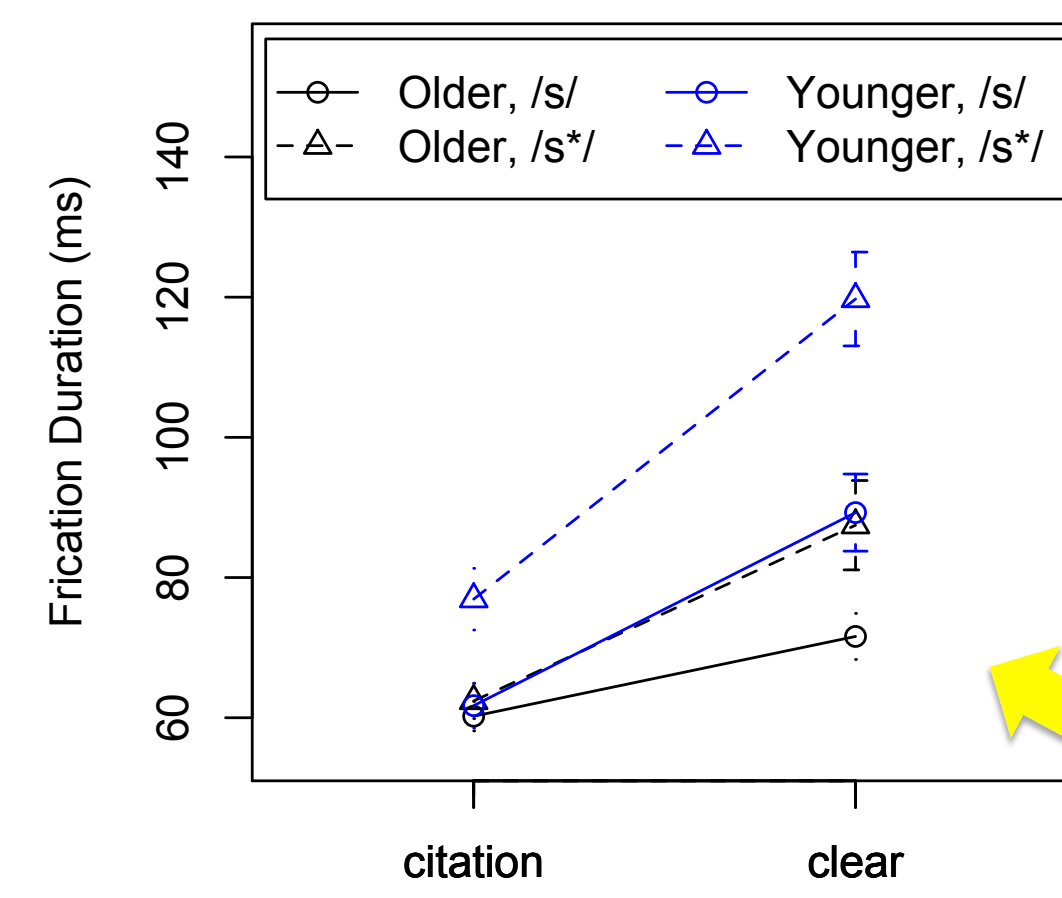


3.

RESULTS

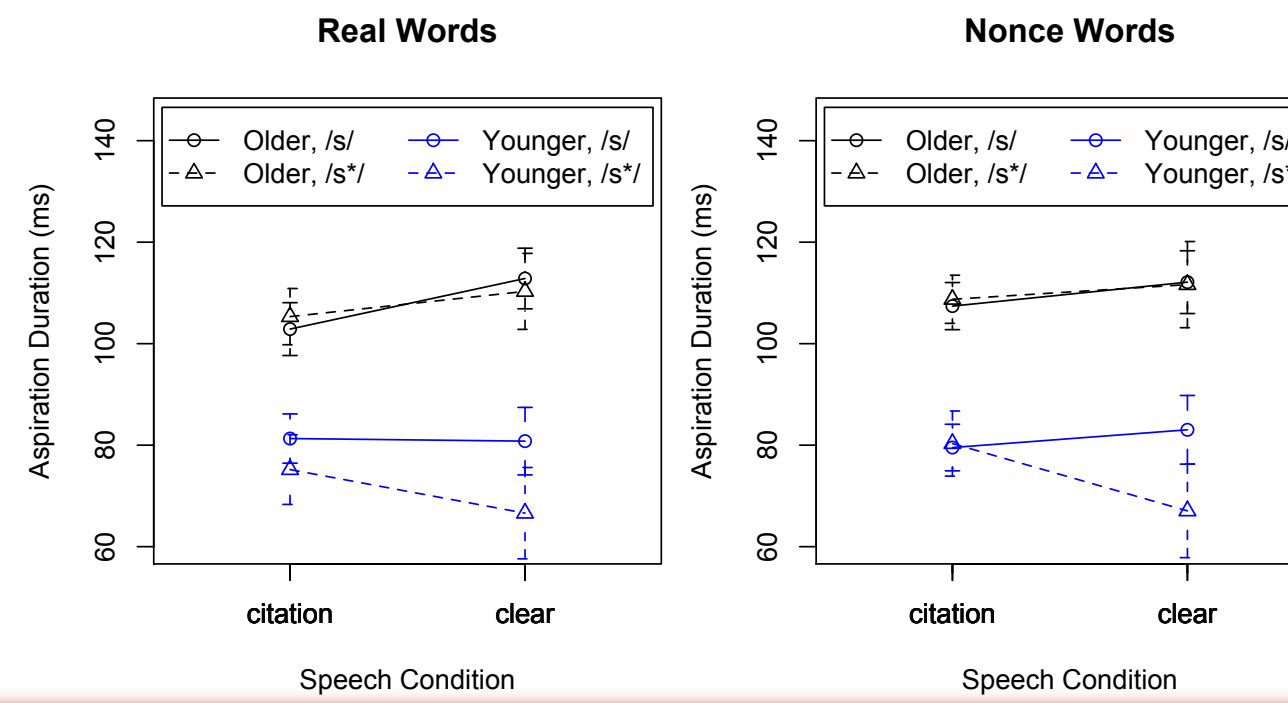
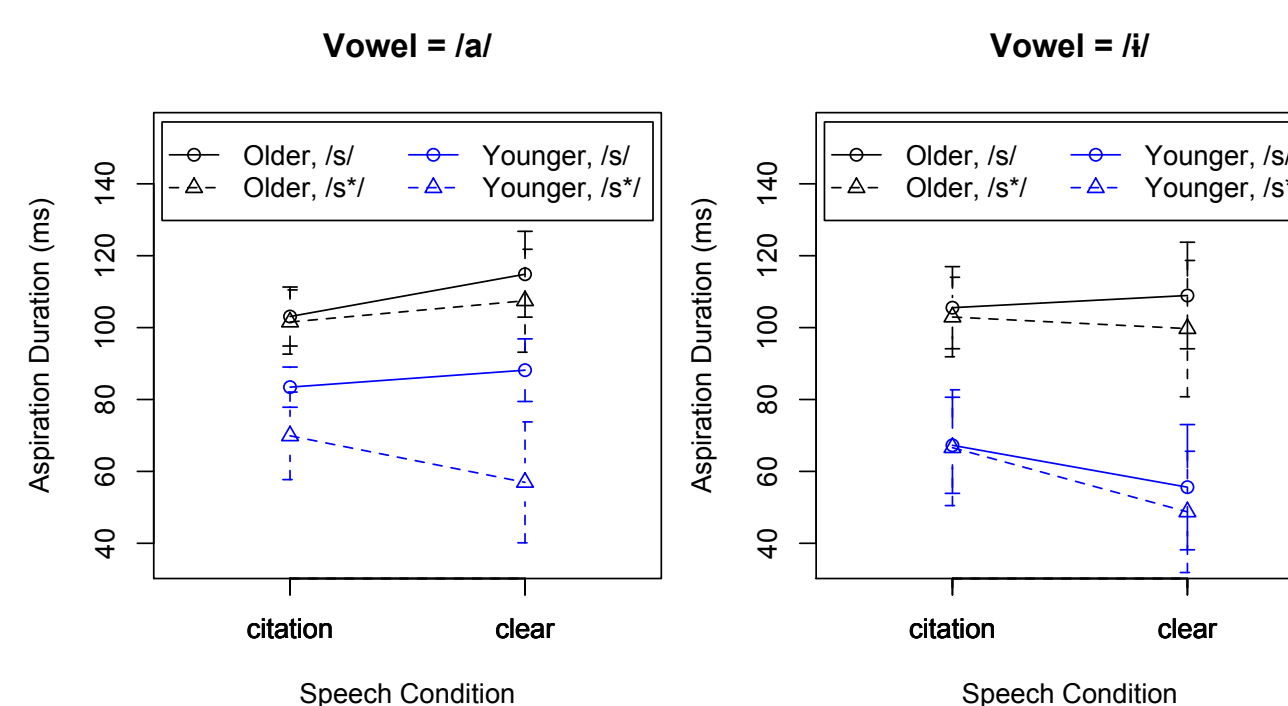
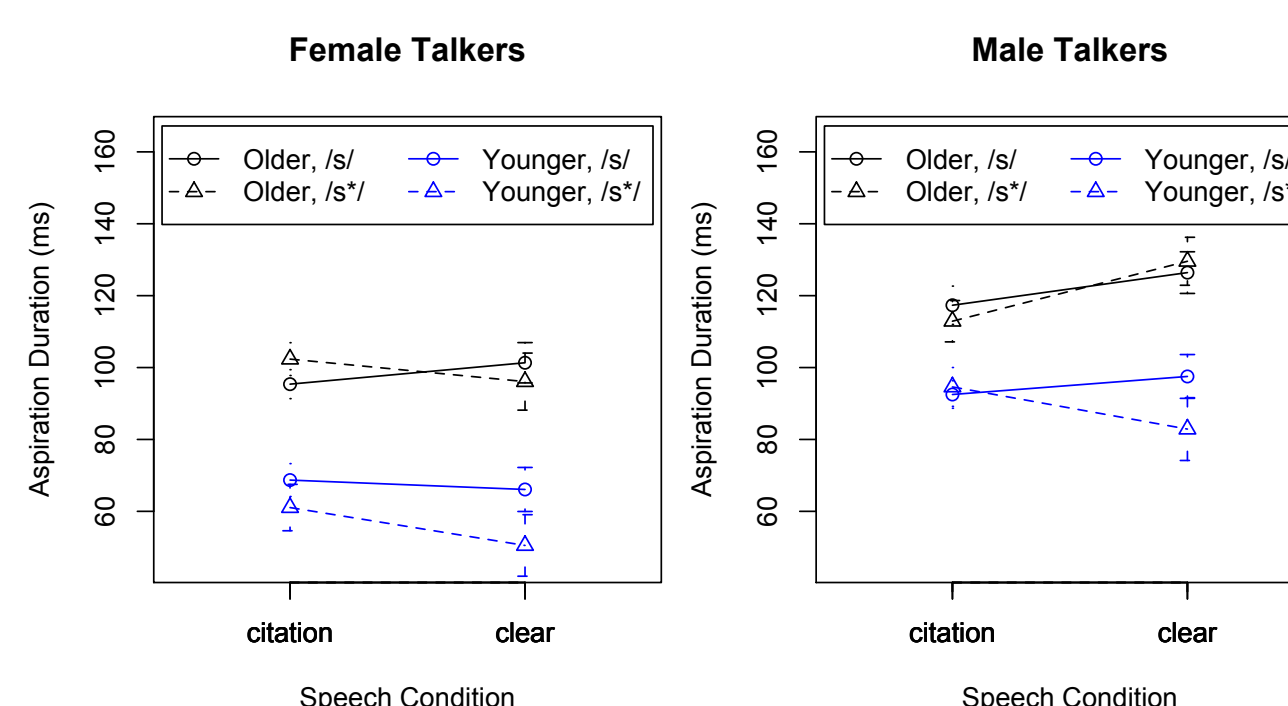
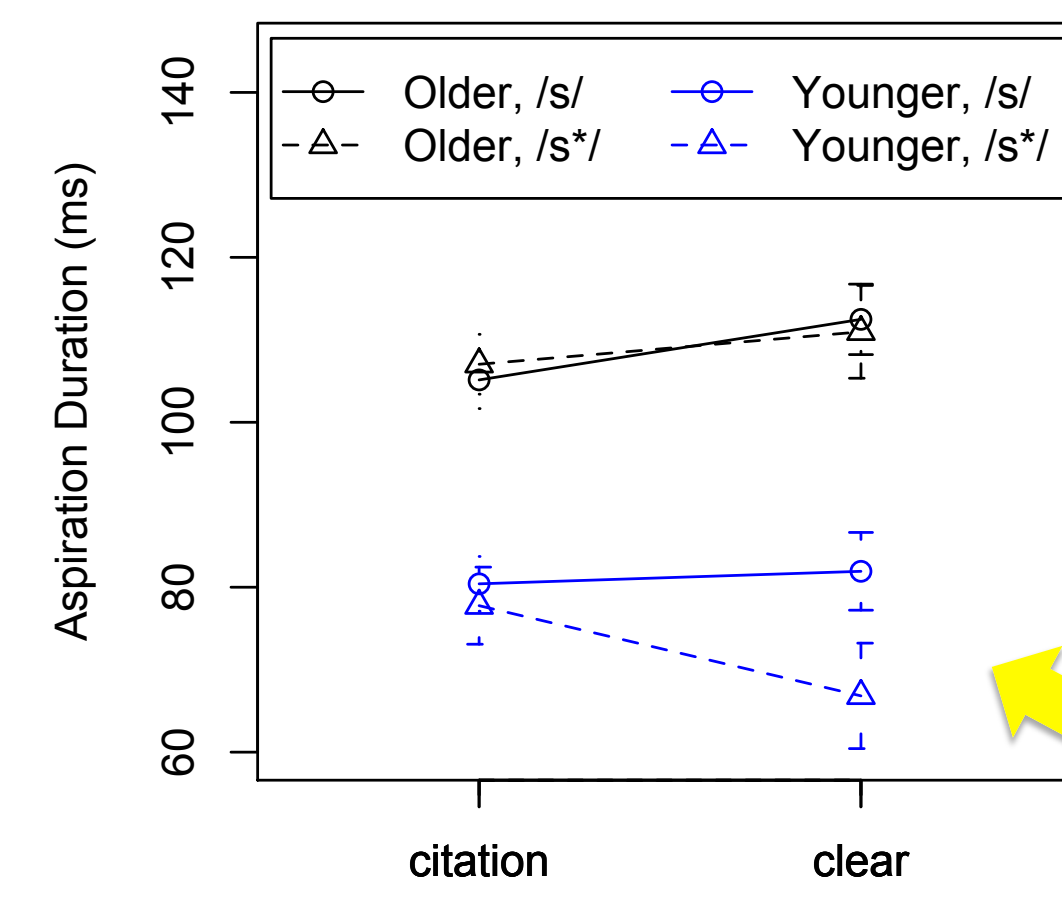
a) FRICATION DURATION

- Condition \times Fricative [$p < .001$]
- Condition \times Age [$p < .001$]
- Condition \times Age \times Fricative
- Condition \times Age \times Sex [$p < .001$]
- Condition \times Age \times Vowel
- Condition \times Age \times Lexicality



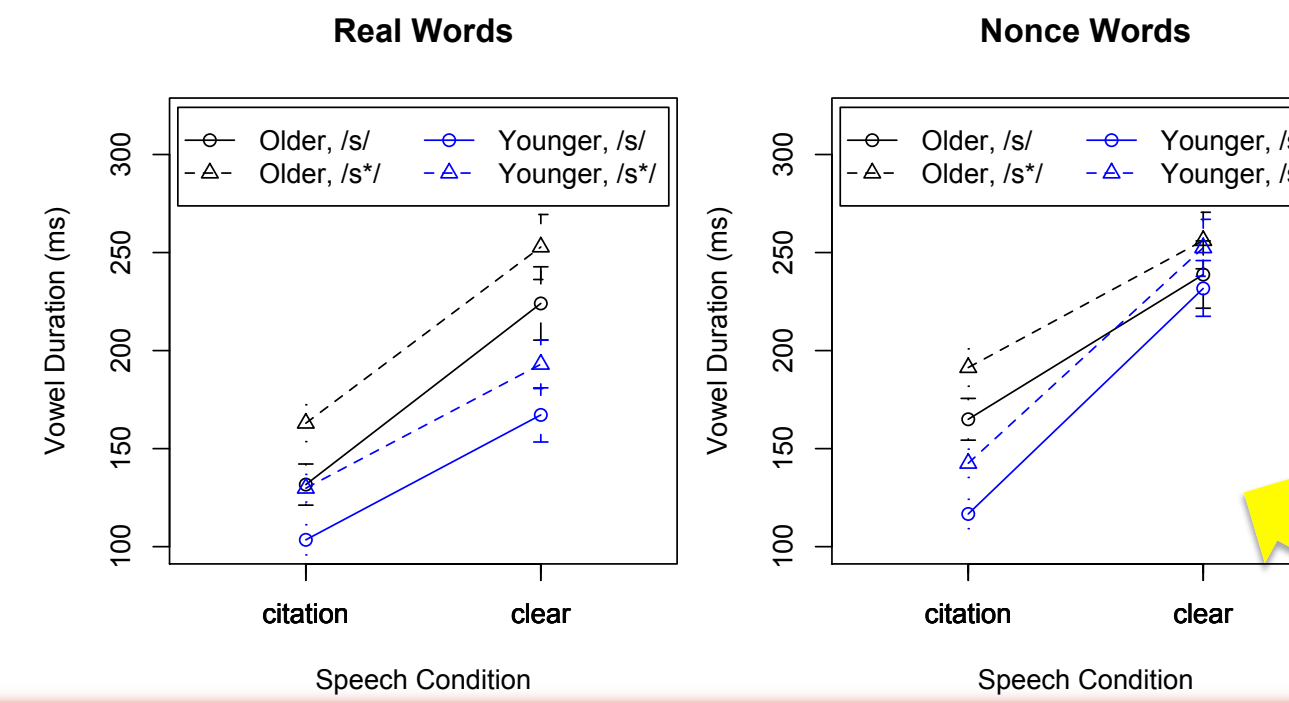
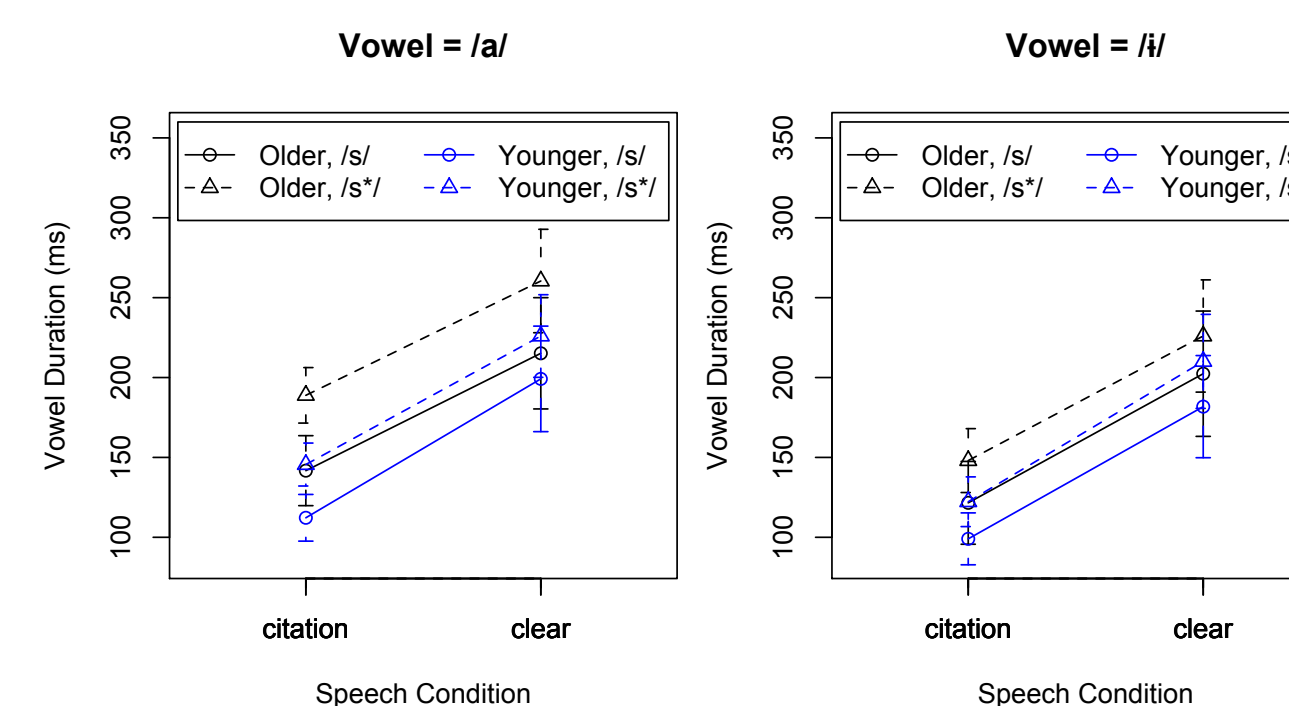
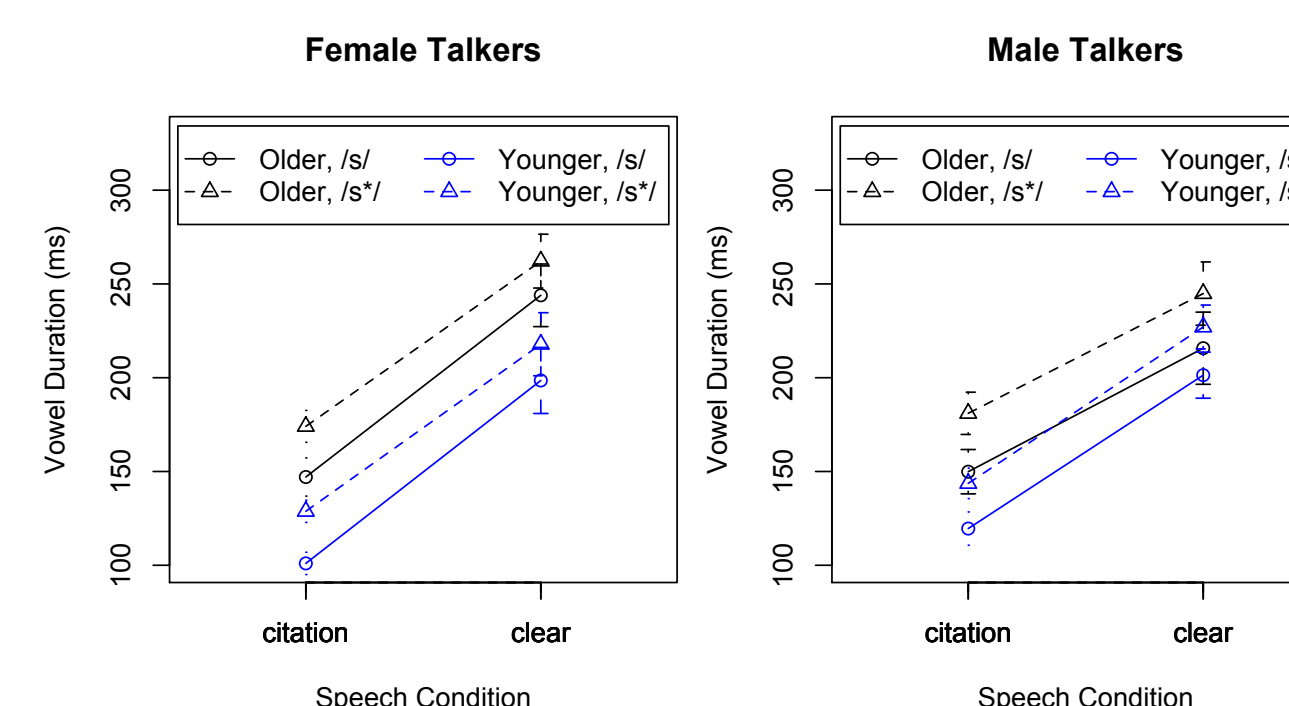
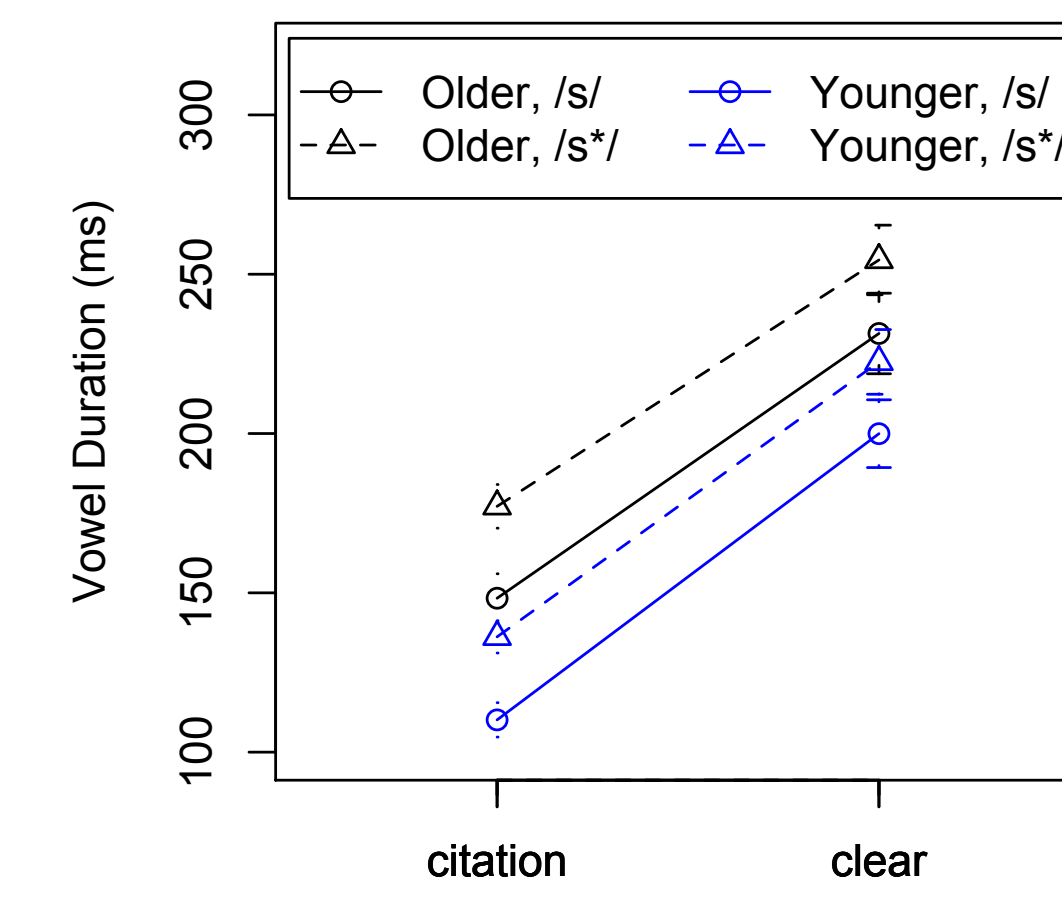
b) ASPIRATION DURATION

- Condition \times Fricative [$p < .05$]
- Condition \times Age [$p < .01$]
- Condition \times Age \times Fricative
- Condition \times Age \times Sex
- Condition \times Age \times Vowel
- Condition \times Age \times Lexicality



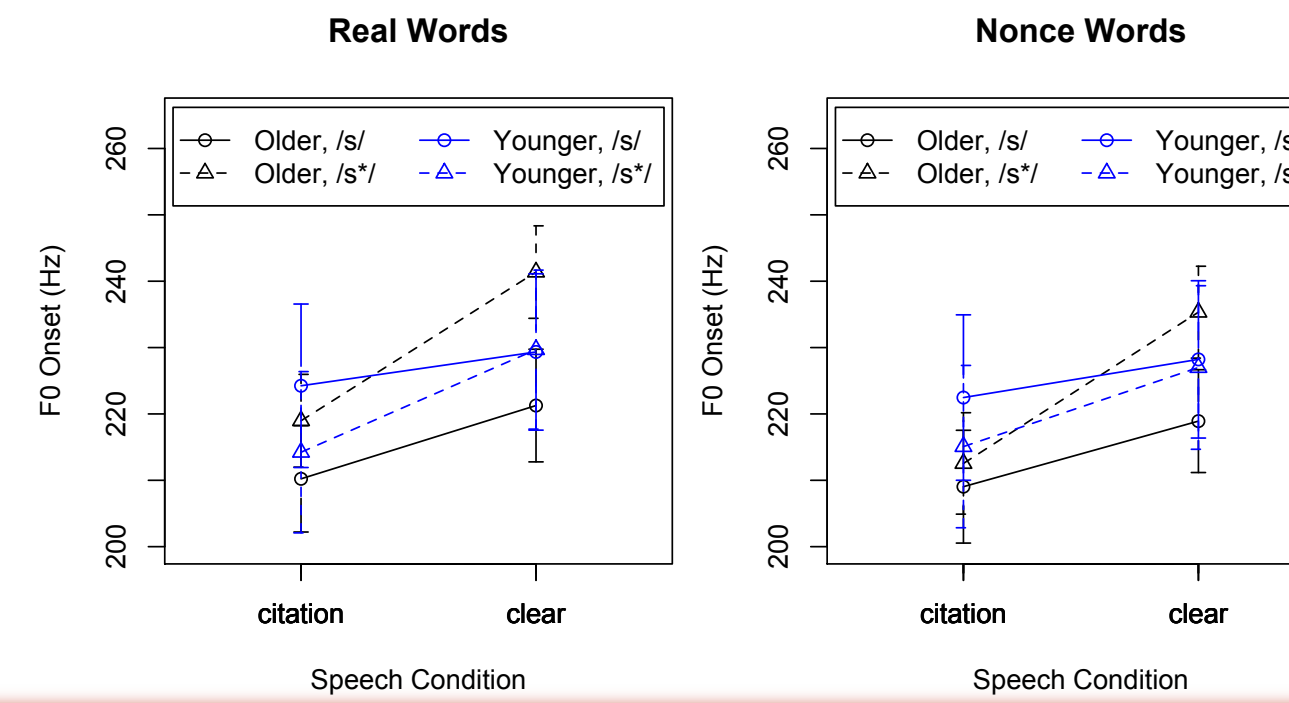
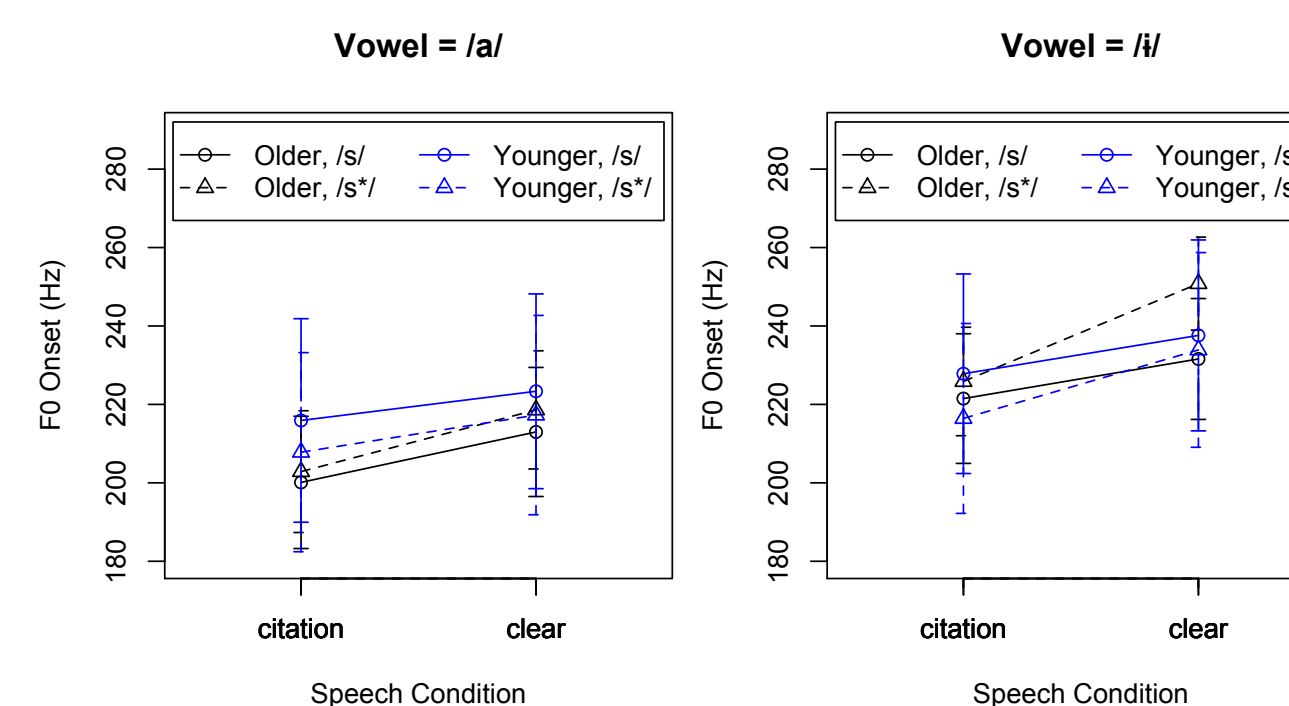
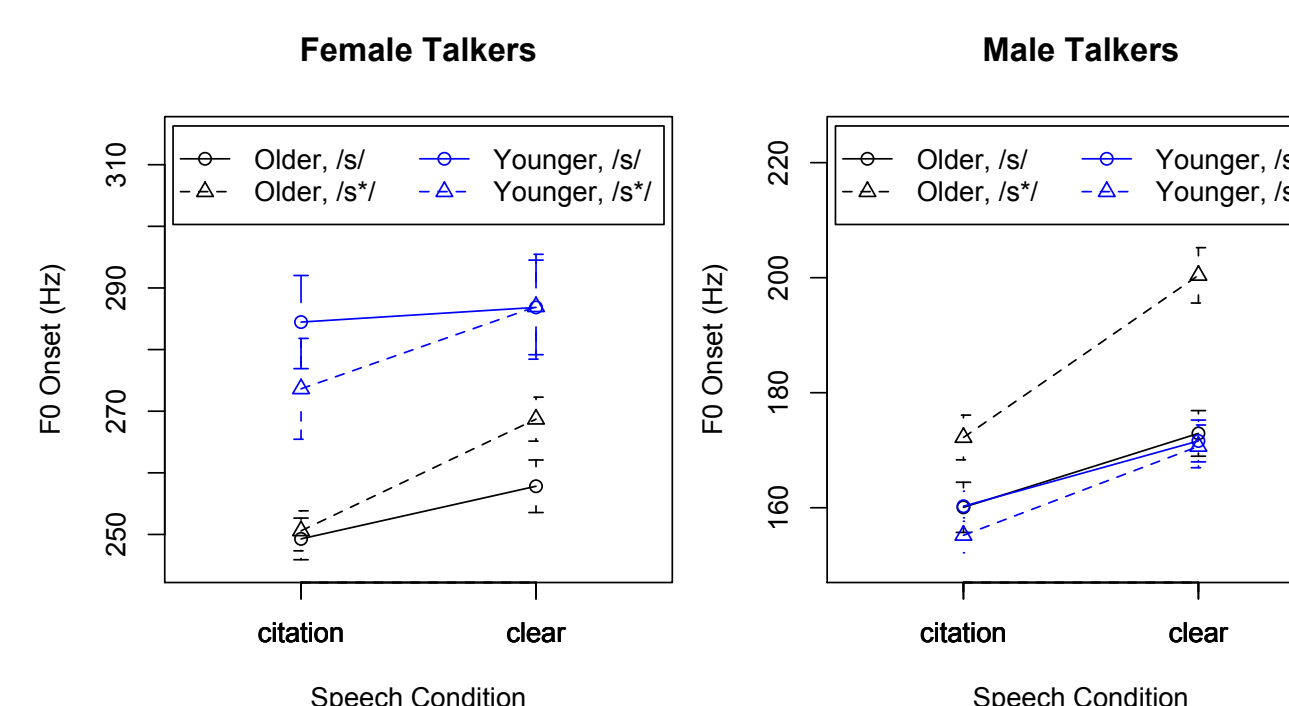
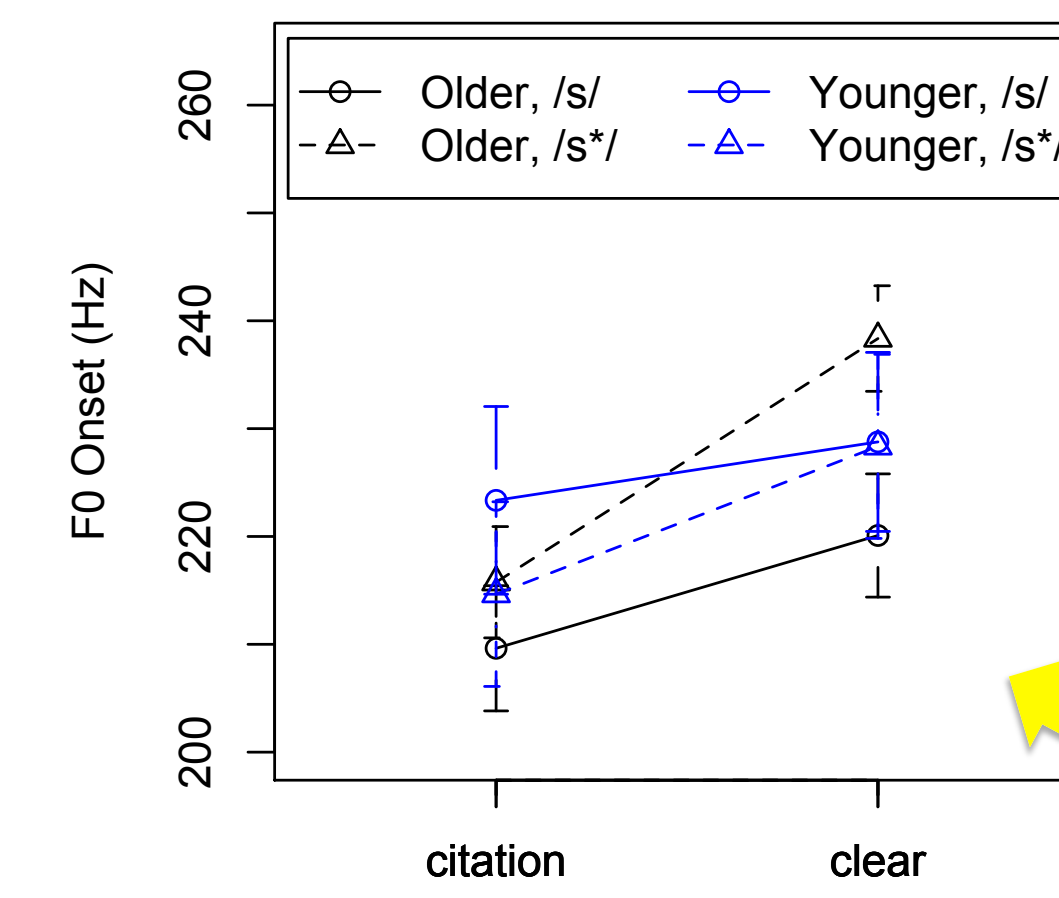
c) VOWEL DURATION

- Condition \times Fricative
- Condition \times Age
- Condition \times Age \times Fricative
- Condition \times Age \times Sex
- Condition \times Age \times Vowel
- Condition \times Age \times Lexicality [$p < .001$]



d) F_0 ONSET

- Condition \times Fricative [$p < .05$]
- Condition \times Age [$p < .05$]
- Condition \times Age \times Fricative
- Condition \times Age \times Sex
- Condition \times Age \times Vowel
- Condition \times Age \times Lexicality



TALKER SEX

VOWEL HEIGHT

LEXICALITY

4.

DISCUSSION

- The /s/-s*/ contrast is hyperarticulated in terms of frication, aspiration, & f_0 onset (but **not** vowel duration).
 - frication for /s*/ \nearrow more than for /s/, *esp. for younger & females*
 - aspiration for /s*/ \searrow , *for younger only*
 - f_0 onset for /s*/ \nearrow more than for /s/, *less so for younger*
- Little effect of vowel height, unexplained effect of lexicality.
- Vis-à-vis older talkers, younger talkers give **more weight** to frication & aspiration differences, but *less weight* to f_0 differences.

5.

CONCLUSIONS

- As with the 3-way stop contrast, the 2-way /s/-s*/ contrast is enhanced differently by younger vs. older Korean speakers.
- Older speakers target frication and f_0 \rightarrow makes /s/ look ‘lenis’.**
- Younger speakers target frication and aspiration \rightarrow makes /s/ look both ‘lenis’ and ‘aspirated’ (i.e., ‘lenis-aspirated’ hybrid).**
- Diachronic change in use of f_0 for /s/-s*/ differs from change documented for stops [9]: **role of f_0 decreases.**