

Laryngeal classification of Korean fricatives: evidence from sound change and dialect variation

Yoonjung Kang^{1,2}, Jessamyn Schertz², Sungwoo Han³

¹University of Toronto Scarborough, ²University of Toronto, ³Inha University

Korean obstruents

	Fortis	Lenis	Aspirated
Stops	/p' t' k'/	/p t k/	/p ^h t ^h k ^h /
Affricates	/c'/	/c/	/c ^h /
Fricatives	/s'/	/s/?	

	Fortis	Lenis	Aspirated	/s/
VOT	short	long	extra long	
f0	high	low	high	?
V_V voicing	no	yes	no	
Glottal width	[constricted]	([spread])	[spread]	
Glottal tension	[stiff]	([slack])	[stiff]	?

/s/

VOT

- Most studies report a **long** aspiration (in low vowel contexts), ambiguous between lenis and aspirated stops.
- Conflicting evidence: Kagaya (1974) reports an aspirated-like glottal opening while Kim et al. (2011) report a lenis-like glottal opening.

f0

- Most studies report a **high f0** on the vowel following initial /s/, comparable to or slightly higher than /s'/.
- But, a much **lower** f0 (close to that of **lenis** obstruents) is reported for some speakers of Jeju dialect (Cho et al. 2002).

Intervocalic voicing

- Glottal opening gesture inhibits voicing of /s/ but the glottal opening is significantly reduced in intervocalic position compared to initial position.
- Conflicting evidence: reported rates of voicing vary from 20~50%. (Kagaya 1974, Kang 2000, Cho et al. 2002, Hwang 2004, Kang et al. 2009, Holliday 2010, Kim et al. 2011, Jang 2012, Chang 2014)

Sound change and /s/

On-going sound change in Seoul Korean (Jun 1993, Silva 2006, Kang 2014)

- Development of consonant-induced pitch perturbation into tonal contrast in initial position: Lenis → L tone; Fortis/Aspirated → H tone
- Merger of VOT contrast between Lenis and Aspirated stops.
- Females lead the change.

Phyeongan Korean in China (Kang and Han 2012)

- A North Korean dialect as spoken by ethnic Koreans in Dandong, China.
- Retains a VOT pattern of stops similar to that reported for Seoul Korean in the 1960s (cf. Kim 1965, Lisker and Abramson 1967).

How does /s/ pattern in this diachronic and dialectal variation?

Current study

Speakers

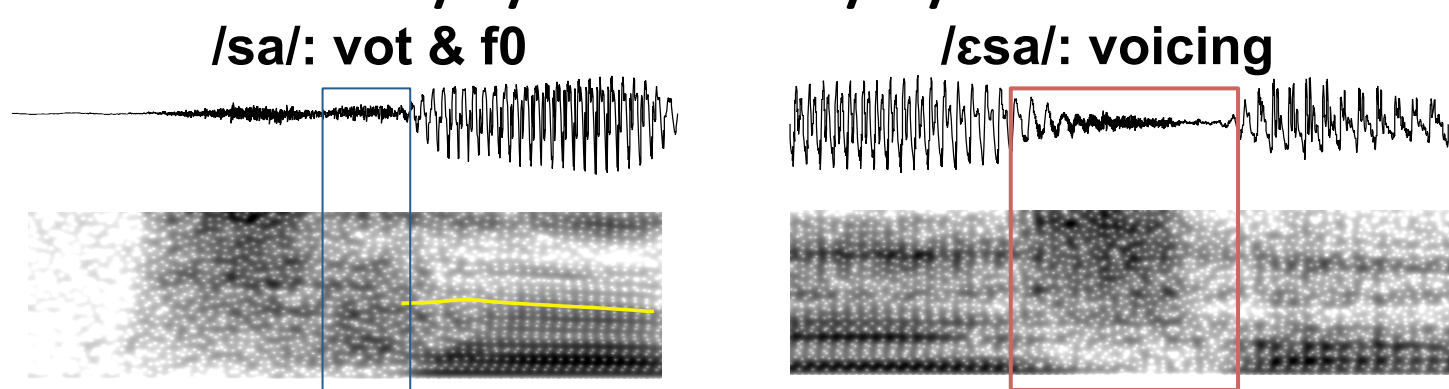
- Phyeongan (P): M13, F10 (Year of birth: 1937~1969)
- Seoul-Older (SO): M17, F14 (Year of birth: 1943~1966)
- Seoul-Younger (SY): M13, F10 (Year of birth: 1981~1992)

Speech material

- Word-initial affricates /c, c', c^h/ and fricatives /s, s'/ before /a/
- Word-medial lenis affricate /c/ and fricative /s/ before /a/
- Repeated 3 times in isolation

Acoustic measurements

- Initial: VOT, f0 at vowel midpoint
- Medial: Percentage of consonantal constriction with voicing.



Statistical analysis

- Linear mixed-effects models comparing /s/ with other consonants in VOT, f0 and voicing percentage.

Summary

	Phyeongan /s/				Seoul /s/		
	Fortis	Lenis	Asp.		Fortis	Lenis	Asp.
VOT							
f0		✓	✓		✓	✓	✓
Voicing		✓	✓			✓	✓
Initial : [spread, slack] Medial: [spread, slack]							

Discussion

Phonetic ambiguity of plain voiceless fricatives

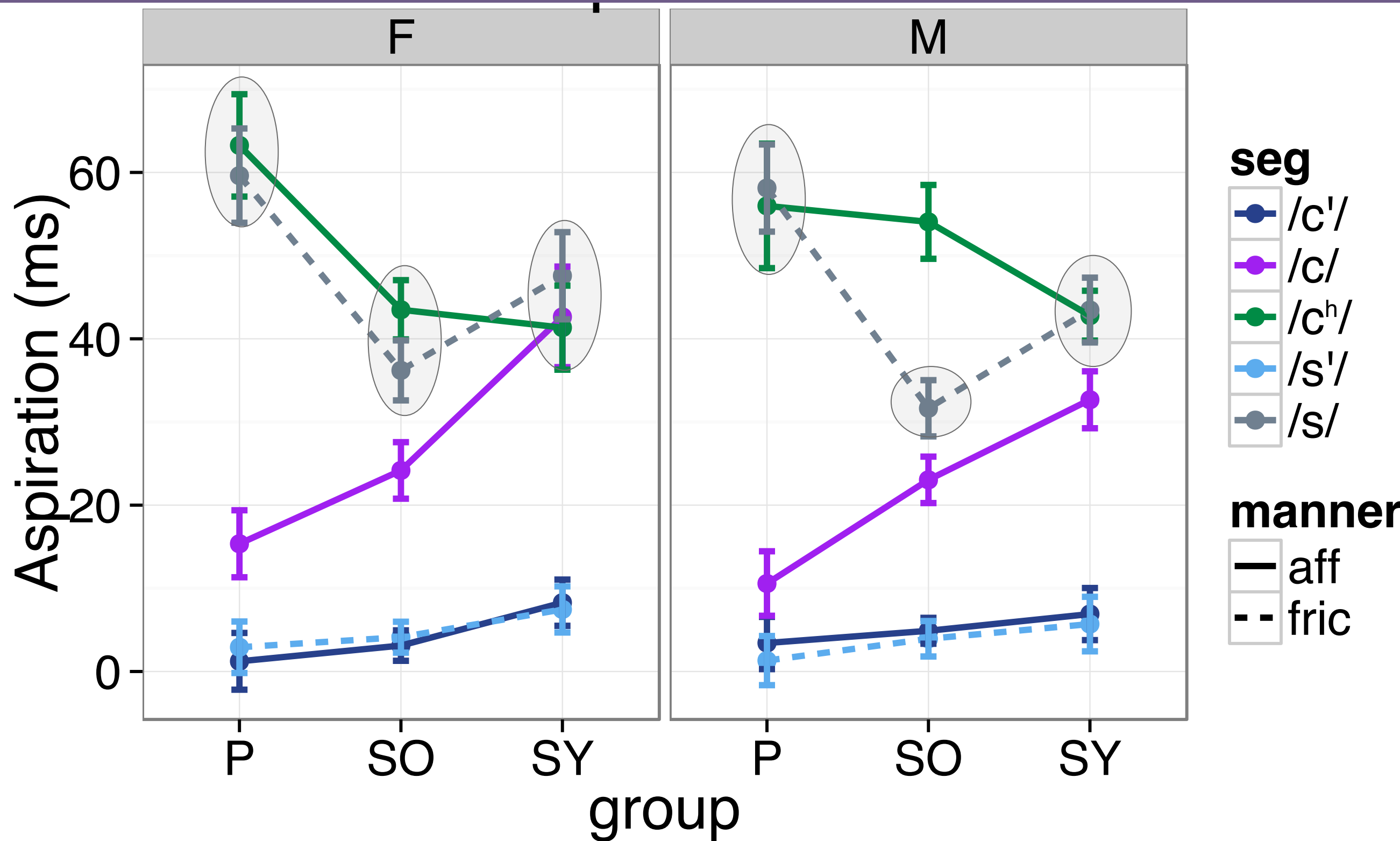
- Due to the aerodynamic requirement of frication, plain voiceless fricatives tend to be produced with a wide-open glottis (Stevens and Keyser 2001, Kingston 2011).
- Voiceless fricatives often pattern with aspirated obstruents phonologically (cf. Vaux's law, Vaux 1998).
- The ambiguous intervocalic voicing (consistent across all dialects) is in accord with Iverson (1983)'s suggestion that /s/ is [spread] (like aspirated plosives) but not [stiff] (unlike aspirated plosives).

Phonologization of tone following /s/

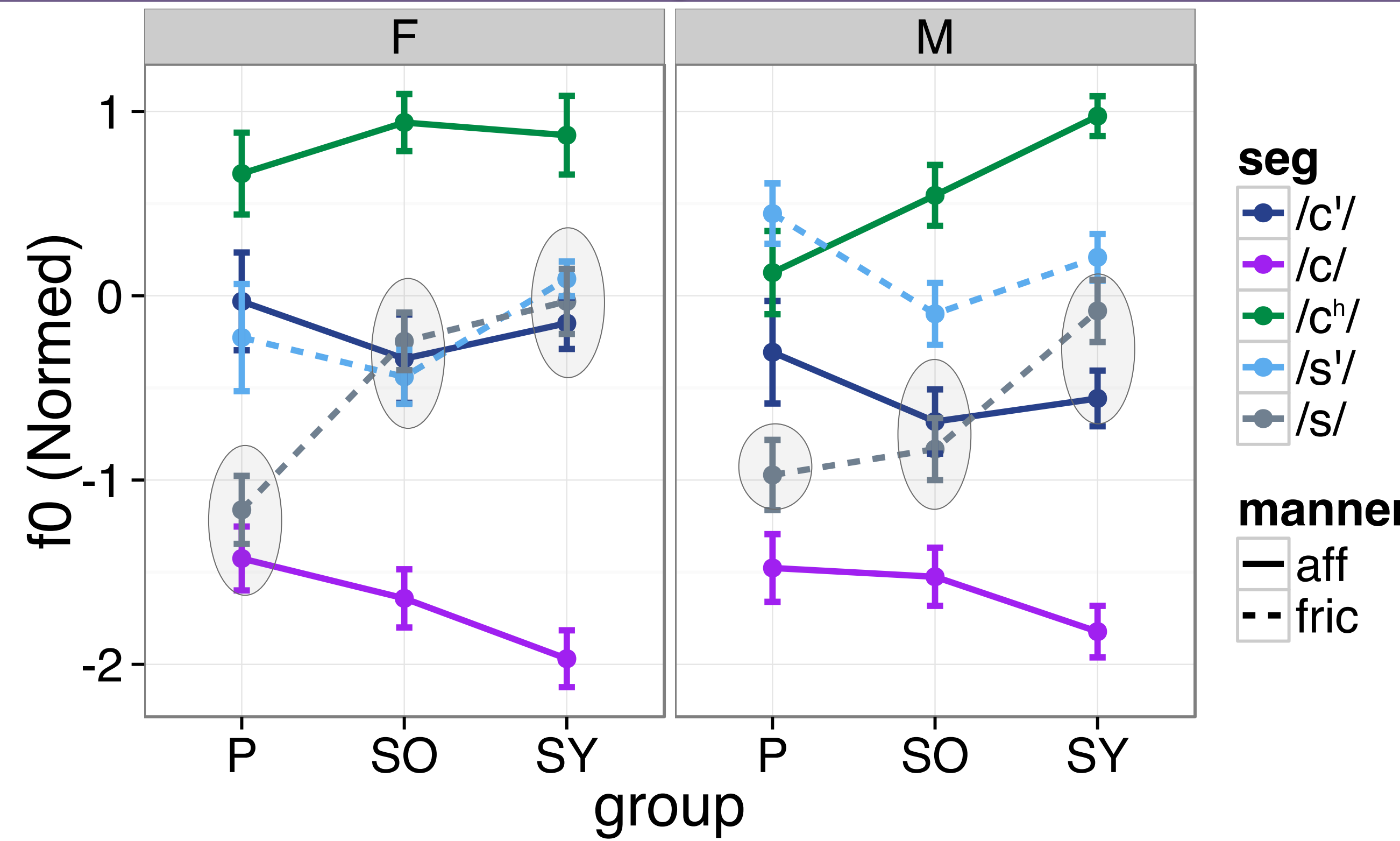
- As word-initial tonal contrasts develop in Korean, dialects make different choices for the ambiguous /s/: Phyeongan-L, Seoul-H
- More categorical tonal distinction in female than in male speech.
- Given the similar patterning of intervocalic /s/ across dialects, this dialectal difference does not seem to follow from inherent difference in articulation of /s/; nor does it follow from the VOT characteristics (cf. Kingston 2011 on Athabaskan).

Supported by SSHRC #410-2011-1008 to Yoonjung Kang. Thanks to Mary Parayno, Gowoon Snover, Wu Shengai and the department of Linguistics at Seoul National University and to the audience at McGill, Carleton, and CLA 2015 for comments and suggestions.

VOT



f0



Intervocalic voicing

